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"Transformation of Research and Community Service in Enhancing Sustainable Development Goals (SDGs)"

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Yogyakarta
@November 2024

Remarks by the Conference Chair

Assalamu'alaikum warrahmatullahi wabarakatuh

First and foremost, let us offer our praise and gratitude to Allah SWT for the grace, guidance, and blessings, allowing the 12th ICERI, organized by Research and Community Services, Universitas Negeri Yogyakarta, to be held successfully. This conference is taking place at the Performance Hall FBSB Universitas Negeri Yogyakarta over two days, from October 16–17, 2024.

The theme for this year is "Transformation of Research and Community Service in Enhancing Sustainable Development Goals (SDGs)." This theme was chosen to highlight the significant role that universities play in achieving the SDGs, which are integrated into the Tri Dharma of Higher Education: education, research, and community service. As centers of knowledge, universities support the central and regional governments in preparing, implementing, monitoring, evaluating, and reporting on the SDGs Action Plan in Indonesia. A concrete demonstration of this role is the transformation of research and community service to enhance the achievement of the SDGs. Therefore, strengthening the quality of research and community service is crucial in this endeavor.

The sub-themes of ICERI 2024 include:

1. Digital Learning
2. Research and Education
3. Sport and Health
4. Character Development
5. Social Emotional Learning
6. New Pedagogy: Design, Application, and Evaluation
7. Artificial Intelligence in Education
8. Community Education
9. Applied Science and Technology
10. Arts and Humanities Issues
11. Economics, Business, and Management
12. Languages and Literature.

The objective of ICERI 2024 is to provide insights and innovative learning alternatives that align with the advancements of the times through ideas, experiences, and research findings contributed by lecturers, teachers, and researchers. We are honored to present keynote speaker Prof. Dr. Ahmad Najib Burhani, MA (Head of the Social Sciences and Humanities Research Organization - National Research and Innovation Agency, RI). In addition, there will be two plenary sessions featuring four invited speakers: Session 1 will be led by Prof. Soni Nopembri, S.Pd., M.Pd., Ph.D. (Universitas Negeri Yogyakarta, Indonesia) and Pirom Chenprakhon, Ph.D. (Mahidol University, Thailand), while Session 2 will feature Prof. Dr. Baholy Robijaona (University of Antananarivo, Madagascar) and Dr. Jose Hanham (Western Sydney University, Australia). We will also have four parallel sessions.

We have worked diligently to prepare for ICERI 2024, and I would like to express my deepest appreciation and gratitude to all the committee members. We acknowledge that there may be areas for improvement, and on behalf of the committee, I extend our sincerest apologies for any shortcomings. I hope this event will be beneficial for everyone, and I wish you all a fruitful and enjoyable experience at ICERI 2024.

Thank you.
Wassalamu'alaikum warrahmatullahi wabarakatuh.

Yogyakarta, October 16, 2024
Conference Chair

Prof. Dr. Eli Rohaeti, M.Si.

Welcome Message from The Organizing Committee

Assalamu'alaikum warrahmatullahi wabarakatuh.
May peace be upon you, and may God bless us all.

On behalf of the Directorate of Research and Community Services at Universitas Negeri Yogyakarta, I warmly welcome you to the 12th International Conference on Educational Research and Innovation (ICERI) 2024. This international conference brings together the results of research and community service from UNY lecturers, students, and external contributors.

The theme of ICERI 2024, "Transformation of Research and Community Service in Enhancing Sustainable Development Goals (SDGs)," reflects the critical importance of research and community service in the context of today's rapidly evolving science and technology landscape. ICERI 2024 provides participants with the opportunity to share their creative and critical perspectives based on research and community service. We believe that these contributions will help shape ideas that can enhance community well-being and foster collaborations that strengthen SDGs.

We extend our gratitude to our keynote speaker, Prof. Dr. Ahmad Najib Burhani, MA (Head of the Social Sciences and Humanities Research Organization - National Research and Innovation Agency, RI), as well as our invited speakers: Prof. Soni Nopembri, S.Pd., M.Pd., Ph.D. (Universitas Negeri Yogyakarta, Indonesia), Pirom Chenprakhon, Ph.D. (Mahidol University, Thailand), Prof. Dr. Baholy Robijaona (University of Antananarivo, Madagascar), and Dr. Jose Hanham (Western Sydney University, Australia). We are deeply thankful for their willingness to share their knowledge and expertise.

Lastly, we sincerely appreciate all presenters and participants for their contributions to ICERI 2024. A heartfelt thank you to the entire organizing committee for their dedication and commitment in making this conference a success. We wish you all the best at ICERI 2024.
Wassalamu'alaikum warrahmatullahi wabarakatuh.

May peace be upon you, and may God bless us all.

Best Regards,
Director of the Directorate of Research and Community Services
Universitas Negeri Yogyakarta

Prof. Dr. Yudik Prasetyo, S.Or., M.Kes.

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Effectiveness of Training for Optimizing Early Childhood Education Activity Programs

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Abstract

This research aims to determine the effectiveness of training in developing Early Childhood Education activity programs. This research is quasi-experimental research without a control group with 30 research respondents. Data collection techniques use tests and observations with a Likert scale. The results of the validity test state that the correlation value is > 0.3 so it is valid. The results of the reliability test for the three instruments show a Cronbach's Alpha value > 0.06 so they are declared reliable. The data was then analyzed quantitatively. The research results show that training optimizes activity programs in Early Childhood Education. This can be seen from the increase between the pre-test and post-test. The knowledge, attitudes and skills of teachers still need to be improved through routine and ongoing training activities.

Keywords: Effectiveness, training, optimizing, early childhood education

1. Introduction

Early Childhood Education is the most basic education for laying the foundation of a child's life (Dimyati, 2013). Early childhood is the golden age, where all aspects of child development take place very rapidly. The golden age is effective for stimulating children with elements of goodness (Islamiah F et al., 2019), because there is very rapid development and it has an impact on future life (Mursid, 2015). At this golden age, children have very good sensitivity and readiness to receive external stimuli. The stimulation provided can have a positive impact on child development, so that child growth and development can be optimally pursued and support child development in the next stage. The aspects of development that need to be developed in children include aspects of cognitive, emotional, personality, and moral development (Theodotou E, 2019). All aspects must be developed proportionally and in balance, and design by curriculum.

The implementation of the curriculum is also still experiencing obstacles. Curriculum update is an important thing for the government to do in an effort to improve the quality of Indonesian education and create a generation of the nation that has good quality Human Resources (HR) and can compete with other countries in accordance with the changes and developments of the times. Curriculum reform is carried out to improve the quality of education in Indonesia to make (Handoko, 2022). Based on the results of interviews with twenty teachers, data was obtained that in implementing the independent curriculum in kindergarten, many teachers are still confused and feel unable to move on from the previous curriculum. Fear of making mistakes or misperceptions causes teachers to apply learning as usual.

Teachers have difficulty when compiling learning plans, namely when analyzing. Learning Outcomes to be achieved by students are made per phase, then formulated in the form of Learning Objectives and arranged in the form of Learning Objective Flow. Not only that, teachers who cannot use technology properly will experience difficulties in making Lesson Plan or Modul Teaching. In addition, teachers also have difficulty in determining the right learning methods and strategies for children so that the learning process becomes fun and students also actively participate in the learning process (Pujiastuti, 2021).

Social and emotional competence is one of the important components to be stimulated early on. These competencies are needed so that children gain confidence and are able to build relationships in their environment, solve problems, and overcome challenges (Halle and Darling-Churchill, 2016). Children's social-emotional competencies can be developed through Social Emotional Learning (SEL), popularized by CASEL (Collaborative for Academic, Social, and Emotional Learning (Borowski, 2019). In fact, some kindergarten teachers tend to emphasize academic teaching in the classroom

(Bassok, Latham, & Rorem, 2016), practicing more academic skills such as reading, numeracy, and spatial skills (Bahlmann Bollinger & Myers, 2020).

Early childhood education institutions such as Kindergartens have made efforts to help children develop their potential. However, based on observations, some Kindergartens still emphasize learning activities on completing Children's Activity Sheets. Children's Activity Sheets completed by children generally tend to be individual, so that interpersonal intelligence such as cooperation has not developed optimally. The aspect of independence is also underdeveloped because educators still help children a lot in completing assignments.

Some children have not been accustomed to appearing confident through learning activities that accustom children to dare to speak and show their abilities in front of the class in turns. In addition, social emotional stimulation and early detection of growth and development are not optimal. This is based on the results of observations that some children's activities are dominated by cognitive and language development activities. Thus, teachers need to be trained to be able to develop social emotional learning for children in the classroom.

Teachers have a role to stimulate children's development, including early detection of growth and development. According to research by Rahayu & Purnamasari (2019), SDIDTK (Early Intervention Detection Stimulation for Growth and Development) training can improve knowledge and skills with a p value <0.005. Mentoring will also improve teacher performance to improve pedagogical competence and professionalism. With the training needed to improve the professional abilities of educators, it is hoped that educators will have new experiences, skills and knowledge about various things after participating in training. In reality, 50% of teachers are still not skilled and have no knowledge of growth and development detection, so training is needed.

On the other hand, the development of teachers' musical abilities also still needs to be done. Some teachers still need to develop musical arts activities, both creating songs and clapping, and composing songs that are appropriate to the topic and interesting.

2. Method

This research is an experimental research that aims to determine the effectiveness of training to optimize Early Childhood Education activity programs. The stages of the research method are: 1) Providing a pre-test of the knowledge and skill of kindergarten teachers, 2) Providing treatment, and 3) Providing a post-test of the knowledge of kindergarten teachers in developing the program. The scores obtained for each number are added up and then the total number is adjusted to the specified category. The category provisions can be seen in Table 1 below.

Table 1. Category frequency distribution

Value interval	Data category
(Xi + (1,5 Sdi) s.d ST)	Very good
Xi s.d (Xi + (1,5 Sdi))	Good
(Xi – (1,5 Sdi)) s.d Xi	Enough
SR s.d (Xi – (1,5 Sdi)	Not enough

(Djatmiko, 2018)

Information:
Xi = ideal average
ST = highest score
SR = lowest score
Sdi = ideal standard deviation

The instrument for measuring knowledge is in the form of 20 questions in multiple choice form. Participants are asked to choose the most appropriate answer. The score for each number is 1 if the answer is correct, and 0 if the answer is wrong. The instrument grid for measuring caregivers' knowledge can be seen in Table 2 below.

Table 2. Frequency distribution of categories of teacher knowledge

Score	Category
61-80	Very good
41-60	Good
21-40	Enough
1-20	Not enough

To determine the skills of teachers, observations were made using a Likert Scale. Observers fill in the observation results by choosing one answer, namely Always (Score 4), Often (Score 3), Rarely (Score 2), and Never (Score 1).

Researchers conducted observations on four things, namely: implementation of the Kurikulum Merdeka, social emotional learning, early detection of growth and development, and development of music arts activities for children. The scores obtained for each number are added up and then the total number is adjusted to the specified category. The category provisions can be seen in Table 3 below.

Table 3. Category frequency distribution

Value interval	Data category
(Xi + (1,5 Sdi) s.d ST)	Very good
Xi s.d (Xi + (1,5 Sdi))	Good
(Xi – (1,5 Sdi)) s.d Xi	Enough
SR s.d (Xi – (1,5 Sdi)	Not enough

(Djatmiko, 2018)

Information:
Xi = ideal average
ST = highest score
SR = lowest score
Sdi = ideal standard deviation

Based on this formula, categories are then created, namely as follows.

Table 4. Frequency distribution of categories of teacher skills

Score	Category
61-80	Very good
41-60	Good
21-40	Enough
1-20	Not enough

The instrument is declared valid if each statement item in the questionnaire can be used to reveal something that will be measured by the questionnaire. The indicators in the questionnaire can be said to be valid if the calculated r value is greater than the r table. If the validity value of each answer obtained when giving a list of questions is greater than 0.3 then the question item can be said to be valid (Sugiyono, 2016). Testing the validity of the instrument in this research was carried out using Pearson Product Moment analysis, and the results showed a correlation value of > 0.3 so it was declared valid.

3. Results and Discussion

The effectiveness of the Early Childhood Education Program Activity Optimization Training can be seen in Table 5 below.

Table 5. Result of pre-test and post-test scores knowledge

No	Category	*Pre-test*	Percentage	*Post-test*	Percentage
1	Very Good	0	0 %	18	60 %
2	Good	14	46.6 %	12	40 %
3	Enough	16	53.3 %	0	0 %
4	Not enough	0	0%	0	0 %

Based on the measurement results, it can be concluded that effective training improves the knowledge of kindergarten teachers in developing activity programs in Early Childhood Education, especially in the implementation of the Independent Curriculum, social emotional learning, early detection of growth and development, and development of music arts activities for children. Ginsberg (1997) stated that training will provide good results if it is adjusted to needs. The results of this study are also in line with the findings of Nelson (2012) and Pakpahan (2016) that training has a positive and significant effect on performance. KW Maulidta et al. (2013), stated that through an educational approach, it can trigger the development of a person's skills and potential. Through this activity, a person will learn from not knowing to knowing.

Table 6. Results of pre-test and post-test scores teachers skills make modul teaching

No	Category	Score *Pre-test*	Percentage	Score *Post-test*	Percentage
1	Very good	0	0 %	11	36.6 %
2	Good	10	43.3 %	19	63.3 %
3	Enough	20	56.6 %	0	0 %
4	Not enough	0	0%	0	0 %

Table 7. Results of pre-test and post-test scores teachers skills make activity based on Social Emotional Learning (SEL)

No	Category	Score *Pre-test*	Percentage	Score *Post-test*	Percentage
1	Very good	0	0 %	15	50 %
2	Good	20	66.6 %	15	50 %
3	Enough	10	33.3 %	0	0 %
4	Not enough	0	0 %	0	0%

Table 8. Results of pre-test and post-test scores teachers skills practice early detection of growth and development

No	Category	Score *Pre-test*	Percentage	Score *Post-test*	Percentage
1	Very good	0	0 %	11	36.6 %
2	Good	13	43.3 %	19	63.3 %
3	Enough	17	56.6 %	0	0 %
4	Not enough	0	0%	0	0 %

Table 9. Results of pre-test and post-test scores teachers skills practice be creative in making songs

No	Category	Score *Pre-test*	Percentage	Score *Post-test*	Percentage
1	Very good	0	0 %	0	36.6 %
2	Good	6	20 %	16	53.3 %
3	Enough	24	80 %	14	46,6 %
4	Not enough	0	0%	0	0 %

Based on the research results, it can be seen that training can improve the quality of Early Childhood Education activity programs. This can be seen from the increase in pre-test and post-test scores. This is in line with Sedarmayanti's statement (2013) that training has been proven to be able to activate work that was initially less active, reduce negative impacts, overcome limited experience, or overcome the lack of self-confidence of training participants.

Teachers must have the competence to be able to carry out educational development activities for their students. Development activities in education must always be improved, so that teachers are able to improve the quality of PAUD learning according to their age stages (Alkornia, 2016). Professional teachers always improve their academic and practical knowledge through tiered education or training (Febrialismanto, 2017). Teacher professionalism is related to the elements of teacher work management in making plans, then applying them, and the evaluation of the quality of learning. The importance of becoming a professional teacher is the teacher's willingness to continue learning. Other professions may rest, but the teaching profession must not stop learning (Chatib, 2011).

Kindergarten teachers can act as facilitators, models, motivators, evaluators, and other roles (Fauzi, 2019). Teachers as facilitators need to provide various learning resources and encourage children to learn. The world of education now requires qualified and competent educators in their fields. The role of teachers in the world of education greatly influences the success or failure of the education. Teachers must have high motivation to continue learning and have the principle of lifelong learning (Widiastuti, 2016). Teachers are not merely teachers who transfer knowledge, but also transfer values and skills.

4. Conclusion

The results of the study showed that work skills training effectively improved the knowledge of kindergarten teachers in optimizing programs in PAUD. This can be seen from the increase between the pre-test and post-test. Teachers need to have knowledge to achieve success in a job. Teacher skills still need to be improved through routine and ongoing training activities.

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The Application of the VAK Learning Model in Language Learning: A Literature Review

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Abstract

The VAK learning model, which categorizes learners into Visual, Auditory, and Kinesthetic modalities, has been increasingly integrated into language education. This literature review investigates the application of the VAK model in language learning. By analyzing studies conducted from 2020 onwards, this review highlights the model's effectiveness in enhancing student engagement, retention, and language proficiency. The findings indicate that utilizing VAK strategies leads to improved educational outcomes and fosters a more inclusive learning environment for diverse learners.

Keywords: VAK Learning Model, Language Learning, Students' Engagement, Learning Outcomes.

1. Introduction

The landscape of education has undergone significant transformations in recent years, driven by advancements in pedagogical theories and an increasing recognition of the diverse needs of learners. In particular, language education has emerged as a critical area where innovative teaching strategies are essential to address the multifaceted challenges faced by both educators and students. One such innovative approach is the VAK learning model, which categorizes learners based on their preferred sensory modalities: Visual, Auditory, and Kinesthetic. This model not only aligns with contemporary educational theories advocating for personalized learning but also addresses the varying preferences of learners, which can significantly impact their engagement and success in language acquisition.

The VAK Learning Model, originally developed by Neil Fleming in the late 20th century, posits that individuals have distinct preferences when it comes to absorbing and processing information (1). The model encourages educators to tailor their instructional methods to align with these preferences, thereby fostering a more effective learning environment. 1. Visual Learners: These learners prefer to see and visualize information. They benefit from diagrams, charts, videos, and other visual aids that help them understand complex concepts. In language learning, visual learners may excel when presented with graphic organizers, flashcards, or illustrated storybooks. 2. Auditory Learners: Auditory learners thrive in environments where they can hear information. They benefit from discussions, lectures, and audio recordings. In the context of language learning, auditory learners often excel in activities that involve listening to native speakers, engaging in conversations, or participating in audio-based exercises. 3. Kinesthetic Learners: Kinesthetic learners learn best through hands-on experiences. They prefer to engage in activities that involve movement or manipulation. For language learners, kinesthetic activities could include role-playing, interactive games, or any activity that allows them to practice language skills in a dynamic way. The effectiveness of the VAK model lies in its ability to create a more inclusive learning environment that recognizes the diversity of learners (2). By accommodating different learning styles, educators can enhance student engagement, retention, and overall academic performance (3).

Importance in Language Education Language learning is inherently complex, as it requires the simultaneous development of multiple skills, including reading, writing, speaking, and listening. Traditional teaching methods often fail to address the individual needs of learners, leading to disengagement and frustration. In contrast, the VAK model allows for a more tailored approach that can significantly improve the learning experience. Recent studies have underscored the importance of applying the VAK model in language education. For example, research by Khusniyah and Rahmawati (2022) indicated that incorporating VAK strategies into English language instruction resulted in enhanced vocabulary retention among students (4). Similarly, VAK-based activities for reading demonstrated higher engagement levels compared to those in traditional classrooms (5). The role of motivation in language learning cannot be overstated. Motivated learners are more likely to invest time

and effort into their studies, leading to better outcomes. The VAK model fosters motivation by providing varied learning experiences that resonate with students' preferences. When learners engage with material in ways that they find enjoyable and effective, their intrinsic motivation increases, resulting in a more positive attitude toward language acquisition (6).

The VAK model aligns with this perspective by promoting active learning through a variety of modalities. Additionally, the principles of differentiated instruction, which advocate for tailoring teaching methods to meet the diverse needs of learners, are intrinsic to the VAK model. By integrating differentiated strategies into language education, teachers can ensure that all students, regardless of their learning style, have access to meaningful and engaging learning experiences.

The integration of the VAK model into language education has profound implications for educators. It encourages teachers to move away from one-size-fits-all approaches and to consider the unique needs of their students. Educators are prompted to employ a range of teaching methods, including visual aids, auditory resources, and kinesthetic activities, to create a dynamic and engaging learning environment. Moreover, training teachers to recognize and respond to different learning styles can lead to more effective instructional practices. Professional development programs that focus on the VAK model can equip educators with the necessary tools and strategies to implement this approach effectively. By fostering an awareness of individual learning preferences, educators can enhance their teaching efficacy and improve student outcomes

2. Method

This literature review employed a systematic approach to gather, analyze, and synthesize relevant academic literature focused on the VAK learning model's application in language learning. The following sections detail the specific materials and methods used in this review process;

1) Database Selection: Academic databases were chosen based on their relevance and reputation in the field of education research. Key databases included Google Scholar searching using Publish or Perish from 2020-2024. These databases provide access to a wide range of peer-reviewed articles, conference papers, and educational resources.
2) Keyword Identification: A set of targeted keywords and phrases was developed to facilitate the search for relevant literature. Keywords included "VAK", "visual auditory kinesthetic", "language learning". Boolean operators (AND) were employed to refine the search results and focus on studies specifically discussing the VAK model in language learning.
3) Inclusion and Exclusion Criteria: Specific criteria were established to determine which studies would be included in the review. The inclusion criteria were as follows: - Studies published between 2020 and the present to ensure the relevance of the findings. - Peer-reviewed articles that focused on the application of the VAK model in teaching languages. - Research that presented empirical data or theoretical discussions on the effectiveness of the VAK model in enhancing language learning outcomes. Conversely, exclusion criteria eliminated studies that: - Were not in English. - Focused on topics outside of language learning. - Did not specifically address the VAK model or its application. Data Collection After applying the search strategy, a total of 20 studies were identified and collected. The selected articles were carefully reviewed for their relevance to the research questions guiding this literature review.

3. Result and Discussion

Application of VAK Learning Model in Language Learning

The Visual, Auditory, Kinesthetic (VAK) learning model has been recognized as an effective multisensory approach to enhance language learning. This model engages learners by utilizing their sensory preferences—visual, auditory, and kinesthetic—thus enabling them to absorb, retain, and apply new information more effectively. Several studies from 2020 to 2024 have demonstrated the positive impact of VAK on various aspects of language acquisition, including vocabulary mastery, writing, and motivation.

Vocabulary Mastery

The VAK learning model has shown significant results in enhancing vocabulary retention, especially for abstract terms, which are typically harder for students to memorize. In a classroom action

research study conducted by Hidayatullah et al. (2022), students demonstrated a marked improvement in vocabulary mastery, with 21 out of 25 students achieving the minimum mastery criteria after applying the VAK model. The multisensory nature of VAK, which involved visual aids, auditory repetition, and kinesthetic activities, resulted in better memory retention and active classroom participation (7)(8)(9)(10)(11)(12)(13).

Writing Skills Improvement

In the domain of writing, the VAK learning model has proven particularly effective in improving both the organizational and linguistic components of students' writing skills. A study by Ramadian et al. (2020) found that VAK helped students in organizing descriptive texts more efficiently, leading to a significant increase in their average writing scores. The use of bodily movements, such as "Use Your Body to Describe" activities, helped reinforce sentence structure and grammar, providing students with cues for correct sentence formation (7).

Moreover, students who learned through the VAK model were better able to convey clear topic sentences and use descriptive language, as demonstrated in studies focusing on descriptive and narrative writing. This model encourages active engagement and reduces grammatical errors, improving overall writing performance (7)(14).

Speaking Skills through the VAK Learning Model

The development of speaking skills in language learning has always been a complex process, requiring mastery not only of grammar and vocabulary but also fluency and confidence in communication. The Visual, Auditory, Kinesthetic (VAK) learning model has emerged as an effective approach to address these challenges by engaging students through a multisensory method. This model integrates various stimuli that cater to students' dominant learning styles, providing a holistic way to develop and strengthen speaking skills in particular.

Research has demonstrated that the VAK model is particularly effective in improving students' fluency and pronunciation, essential components of speaking proficiency. Nida et al. (2023) conducted an experimental study on the effect of blended learning combined with the VAK model on students' speaking skills, and the results were compelling. The students who were taught using VAK activities alongside traditional methods showed significant improvements in their speaking fluency and pronunciation. The use of auditory cues, such as listening to native speakers and repeating phrases, allowed students to internalize correct pronunciation patterns, while kinesthetic activities—such as role-playing and physical gestures—reinforced their learning (15).

The kinesthetic component is particularly impactful in improving fluency. By incorporating movement and physical engagement into speaking exercises, students not only practice verbal communication but also experience the language in a more embodied way. This reduces the cognitive load associated with processing speech, allowing them to speak more naturally and confidently.

One of the major obstacles to developing speaking skills in language learners is anxiety and fear of making mistakes. The VAK model helps mitigate this challenge by creating a more engaging and supportive learning environment. The model encourages active participation through auditory and kinesthetic activities that make speaking practice less formal and more interactive. For example, interactive games, role-playing, and pair-work activities allow students to practice speaking in a non-threatening context (6).

A study by Hidayatullah et al. (2022) demonstrated that students who engaged in kinesthetic activities, such as storytelling with gestures or acting out dialogue, were less anxious and more willing to speak in front of the class. This reduced anxiety led to an improvement in overall speaking performance as students felt more comfortable experimenting with the language and making mistakes (16). The tactile involvement of kinesthetic learning also helped reinforce language acquisition, providing students with a physical connection to the language they were using.

The VAK model enhances the traditional approach to speaking by incorporating multisensory learning techniques. Students exposed to visual aids, such as flashcards, videos, or images, in combination with auditory input (listening to dialogues or conversations), and physical engagement (role-play or movement-based tasks), show more robust speaking performance.

A study conducted by Litta and Budiarty (2020) in early childhood language education revealed that creating a comfortable classroom environment through VAK strategies helped young learners develop basic speaking skills more effectively. By providing visual cues and engaging them in physical activities, students were able to better remember and apply new vocabulary in their speech (17).

Similarly, Ramadian et al. (2020) found that combining visual and auditory activities, such as having students watch videos and then describe what they saw, or listen to dialogues and recreate the conversation, significantly boosted their speaking skills. These techniques allowed students to internalize speech patterns, making it easier for them to reproduce and improvise in real-time communication (7).

The auditory component of the VAK model has been particularly effective in teaching pronunciation and intonation. Listening exercises, in which students hear native speakers and practice repeating sentences or phrases, help learners develop accurate pronunciation. The kinesthetic aspect also plays a role in teaching pronunciation by using movements that mimic the rhythm and flow of speech.

For instance, Perdaniama (2021) highlighted how students were able to master intonation and stress patterns by engaging in rhythmic activities, such as clapping or moving to the beat while practicing dialogues. These physical movements helped reinforce auditory patterns, which are crucial for natural speech delivery (6).

One of the notable effects of the VAK model is its ability to foster collaborative speaking practices. The kinesthetic component, in particular, encourages students to work together in pairs or groups, engaging in meaningful conversations that simulate real-world interactions. This not only helps students practice speaking but also improves their listening and response skills, which are essential for effective communication.

A study by Muslimin et al. (2022) found that students who engaged in group activities, such as problem-solving tasks that required discussion and negotiation, showed improved speaking skills over time. The VAK model, with its emphasis on active participation, helped students build the confidence to speak more naturally in group settings (8).

Learning Motivation and Engagement

One of the most notable effects of the VAK model is its ability to boost student motivation and engagement. Multiple studies have indicated that students feel more enthusiastic and connected to their learning when they are allowed to engage in activities that align with their preferred learning styles. For example, a 2023 study by Malvigie et al. found that the application of the VAK model in a social studies class increased student motivation from 43.34% in the pre-cycle stage to 100% by the second cycle. The variety of materials and activities involved in VAK learning helps to prevent monotony and keeps students engaged in the learning process ((17).

The study also demonstrated that VAK is effective in maintaining long-term student motivation, as it offers a holistic learning experience by combining visual, auditory, and kinesthetic modalities. This engagement leads to deeper cognitive connections, helping learners achieve higher proficiency in language skills (18).

Challenges and Recommendations

While the VAK model has been widely praised for its effectiveness, some challenges have been reported. Teachers often face difficulties in simultaneously catering to all three learning styles, especially in large classrooms. Additionally, the need for diverse teaching materials that address each modality can be resource-intensive. However, with the growing integration of technology, such as augmented reality, these challenges can be mitigated. Future research should explore the use of digital tools to further enhance the application of VAK in language learning((19)(20).

The VAK learning model has demonstrated a significant positive impact on the development of speaking skills in language learning. By addressing students' individual learning preferences and engaging them in multisensory activities, the model enhances fluency, pronunciation, and confidence in speaking. The incorporation of visual, auditory, and kinesthetic elements into language lessons creates a dynamic and supportive environment, helping students overcome anxiety and build essential communication skills. With continued research and application of the VAK model, educators can further refine its use to optimize language learning outcomes, particularly in speaking proficiency.

4. Conclusion

The exploration of the VAK learning model in language education reveals a multifaceted approach that significantly enhances the teaching and learning process. This literature review underscores the importance of accommodating diverse learning styles—Visual, Auditory, and Kinesthetic—within language instruction, particularly in the context of Indonesian, German, and English language

education. The evidence gathered from various studies highlights several key findings that emphasize the effectiveness and applicability of the VAK model in fostering positive educational outcomes.

a. Enhanced Engagement and Motivation: One of the most notable outcomes of implementing the VAK model is the increase in student engagement and motivation. By utilizing a range of teaching strategies that align with students' preferred learning modalities, educators create a more dynamic and participatory classroom environment. This heightened engagement leads to greater enthusiasm for language learning, making students more likely to invest time and effort in their studies.
b. Improved Retention and Comprehension: The research indicates that students who learn through a multimodal approach retain information more effectively. Engaging multiple senses reinforces memory and understanding, enabling learners to make connections between concepts. The studies reviewed illustrate that vocabulary retention, reading comprehension, and overall linguistic abilities are significantly enhanced when VAK strategies are employed.
c. Skill Development: The VAK model promotes the development of essential language skills—speaking, listening, reading, and writing—by providing varied and interactive learning experiences. Kinesthetic activities, visual aids, and auditory resources not only make learning more enjoyable but also facilitate real-world language use, leading to improved proficiency across all language dimensions.
d. Inclusive Learning Environment: By recognizing and addressing different learning preferences, the VAK model fosters an inclusive classroom that values diversity. This approach not only benefits students with varying abilities and backgrounds but also promotes a collaborative learning culture where all students feel supported and engaged.

The findings of this literature review carry significant implications for educators and curriculum developers. The VAK model serves as a valuable framework for designing language instruction that is both effective and responsive to student needs. Educators are encouraged to integrate VAK strategies into their teaching practices, ensuring that lessons are dynamic, varied, and inclusive. Furthermore, ongoing professional development focused on the VAK model can empower teachers to refine their instructional methods, fostering an adaptable teaching style that embraces the complexities of language acquisition. Learning programs should emphasize the importance of multimodal instruction and provide practical tools for incorporating VAK principles into lesson planning.

Recommendations for Future Research While this review provides a comprehensive overview of the VAK model's application in language education, there are several areas that warrant further exploration:

a. Longitudinal Studies: Future research should consider longitudinal studies to assess the long-term impacts of VAK-based instruction on language proficiency. Understanding how these strategies influence language skills over time will provide deeper insights into their effectiveness.
b. Contextual Variations: Investigating the implementation of the VAK model across diverse educational contexts—such as urban versus rural settings, different age groups, and varying cultural backgrounds—could yield valuable information on its adaptability and effectiveness in various environments.
c. Integration with Technology: With the increasing integration of technology in education, future studies could examine how digital tools and resources can enhance the application of the VAK model. Exploring the effectiveness of online platforms, educational apps, and multimedia resources in supporting multimodal learning would be particularly relevant in today’s digital age.

The application of the Visual, Auditory, Kinesthetic (VAK) learning model in language learning has demonstrated a broad range of positive effects, particularly in enhancing key language skills such as vocabulary acquisition, writing, and speaking. By addressing individual learning preferences through multisensory engagement, the VAK model fosters a more dynamic, interactive, and supportive learning environment.

In the realm of speaking skills, the VAK model has been especially effective. It has shown to improve fluency, pronunciation, and confidence in verbal communication by integrating auditory cues with kinesthetic and visual activities. The reduction of speaking anxiety through kinesthetic engagement and the use of interactive techniques such as role-playing and collaborative tasks are notable contributions of this model to language learning.

Overall, the VAK model not only improves academic performance but also makes the learning experience more engaging and enjoyable. Its flexibility in addressing diverse learning styles makes it a valuable tool in language education. Moving forward, integrating technological advancements such as augmented reality could further enhance its application, making it even more effective in a variety of educational contexts.

This model is poised to continue playing a crucial role in improving language learning outcomes, particularly in developing speaking proficiency, as more educators adopt its methods and tailor them to their students' unique needs.

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Ideal Management Standard of Labschool Junior High School Yogyakarta State University

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Abstract

As a form of educational innovation, it is necessary to have appropriate management standards so as to meet the needs of students and community satisfaction in the field of education, both knowledge and utilization of renewable technology in education. As a new school, the management standards of the Junior High School of Labschool Yogyakarta State University (YSU) are still in the stage of development towards standardized and distinctive excellence. Towards the standardized management standards of YSU Labschool Junior High School and has superior characteristics that can later become a reference or pilot for other schools, it needs special attention. The development plan for management standards, apart from being based on the Regulation of the Minister of Education, Culture, Research and Technology (Permendikbudristek) Number 47 of 2023, must also have a distinctive feature so that it can attract potential users. Thus, the Board of Trustees as an advisory board of YSU conducted research on the Management Standards of SMP Labschool YSU based on an Analytical Study at the Junior High School Labschool of Surabaya State University and Malang State University. The purpose of the research is to describe the ideal and superior management standards of the Junior High School Labschool YSU. This research uses descriptive qualitative research, using Milles & Huberman analysis. The subjects in this study were the management of Junior High School Labschool YSU. Data collection techniques through documentation studies, interviews, and observations. The data collection instruments to be used are educational documents, interviews with principals and Labschool teachers, and observations. Validation in this research uses source validation. The output of this research is in the form of policies for laboratory school service units, especially regarding the management of junior high schools, among others; input on standardized and superior YSU Labschool Junior High School management policies that have distinctiveness that can be taken into consideration for the development of YSU Labschool Junior High School.

Keywords: Management Standards, Labschool, Junior High School

1. Introduction

Yogyakarta State University (YSU) is one of the universities that produce professional teacher candidates. Prospective teachers are equipped with a foundation of knowledge through learning activities on campus and learn to implement this knowledge in schools to support professional, pedagogical, social and personal competencies. The school in question is currently a laboratory school at YSU and several partner schools. Still using partner schools as one of the learning resources because the laboratory school at YSU does not accommodate all levels.

History states that YSU when it was still the Yogyakarta Institute of Teacher Training and Education actually had a laboratory school but along with the policies of the government the school was taken over so that only in 2013 began to have Pedagogia Kindergarten as a Labschool YSU pilot. Pedagogia Kindergarten is growing rapidly, the public trust is very high and expects there to be a further level of elementary school so that in 2017 through the Faculty of Education, Pedagogia Elementary School was opened.

Pedagogia Elementary School also developed very rapidly from the beginning with only one rombel (study group), two years later it opened two rombel with an average of 24 students per rombel. The amount of public trust in SD Pedagogia is because the elementary school is under YSU, the majority of educators are YSU alumni and the curriculum offered does not only use the government curriculum but has its own specialties. This uniqueness makes users feel that they need a secondary school managed by YSU. This is supported by the results of an assessment conducted by the laboratory school unit in 2023 with the subject of Pedagogia Elementary School student guardians totaling 50 people, one of

which obtained data that student guardians have “fallen in love” with YSU so that they want the Laboratory Elementary School to be more advanced and there will soon be a junior high school or a further laboratory high school. This is a challenge for YSU to be able to provide the best response and service in the world of education for the community.

This challenge triggered the birth of the Junior High School of Labschool YSU in 2024 by starting the registration of new students in February 2024. Labschool YSU Junior High School has a vision to make students have noble character, global competence and love for culture. And has a mission, among others, organizing an educational process based on noble character values, independence and inclusion, organizing learning based on the nation's cultural values and the uniqueness of Yogyakarta, organizing global competency-based learning, organizing excellent programs for sustainable development of student potential, improving the quality of humanist educators and lifelong learners, creating accountable management of institutions and resources. The vision and mission of YSU Labschool Junior High School are in line with the 2021-2025 YSU strategic plan.

One of the contents of YSU's research strategic plan for 2021-2025 makes the laboratory school model an effort to improve the quality of research-based learning and STEAM (connecting knowledge and technology). This effort is a form of educational innovation system to make laboratory schools as pilot schools for other schools, both at pre-school, elementary and secondary levels. As a form of educational innovation, it is necessary to have appropriate management standards so that it can meet the needs of students and community satisfaction in the field of education, both knowledge and utilization of renewable technology in education. As a new school, the management standards of YSU Labschool Junior High School are still under development towards standardized and distinctive excellence.

The Ministry of Education, Culture, Research and Technology has issued Regulation of the Minister of Education, Culture, Research and Technology (Permendikbudristek) Number 47 of 2023 concerning Management Standards in Early Childhood Education, Primary Education, and Secondary Education on August 4, 2023. This regulation was issued to implement the provisions of Article 31 of Government Regulation No. 57 of 2021 on National Education Standards. The management standards in question are minimum criteria regarding the planning, implementation, implementation, and supervision of educational activities carried out by educational units so that the implementation of education is efficient and effective in order to optimally develop the potential, initiative, ability, and independence of students.

Towards the standardized management standards of YSU Labschool Junior High School and has superior characteristics that can later become a reference or pilot for other schools, it needs special attention. The plan for developing management standards, apart from being based on the Regulation of the Minister of Education, Culture, Research and Technology (Permendikbudristek) Number 47 of 2023, must also have a distinctive feature so that it can attract potential users. As a material for developing management standards, YSU needs to conduct an analytical study of Labschool Junior High School. Thus, the Board of Trustees as an advisory board of YSU conducted research on the Management Standards of YSU Labschool Junior High School.

2. Method

This research uses descriptive qualitative research, which is research that seeks to describe and interpret something, for example, situations and conditions with existing relationships, developing opinions, consequences or effects that occur and so on [1]. This type of descriptive qualitative research presents the data as it is without manipulation or other treatments. The purpose of this research is to present a complete picture of an event or intended to expose and clarify a phenomenon that occurs. In addition, the research aims to explain or describe a situation as it is and interpret the object according to what it is, events, or everything related to variables that can be explained either with numbers or words [2]. This research interprets and describes data related to the current situation, attitudes and views that occur in a society. Descriptive research is mostly not intended to test certain hypotheses, but rather to describe what a variable, symptom, or situation is.

Data collection techniques through documentation studies, interviews, and observations. The data collection instruments to be used are educational documents, interviews with Labschool principals and teachers, and observation. Validation in this study uses source validation. Data analysis techniques used using Milles & Huberman in 1992. The data analysis technique in this study is based on the opinion of Milles & Huberman (1992) as follows.

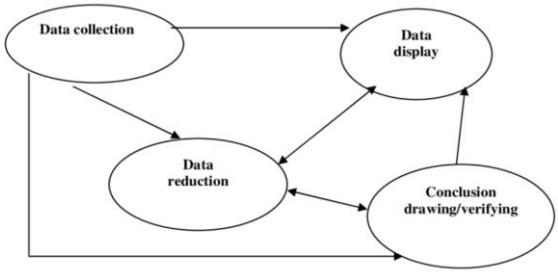


Figure 1: Milles and Huberman's Qualitative Data Analysis Technique

3. Results and Discussion

The purpose of the educational management analysis study at YSU Labschool Junior High School is to find information related to educational management at YSU Labschool Junior High School, the information is used as a reflection and input for YSU and the Laboratory School Unit to determine follow-up for the progress of YSU Labschool Junior High School. Respondents involved in the analysis activities are the Principal / Teacher / Educator at the Junior High School of Labschool YSU in 2024. The instrument was developed based on the Regulation of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia Number 47 of 2023 concerning Management Standards in Early Childhood Education, Primary Education, and Secondary Education. The following are details of the research results in the analysis study process at YSU Labschool Junior High School

Vision is very important for an educational institution and must be formulated well [3]–[5]. The vision formulated by Labschool Junior High School has focused on the fundamental aspects of morals, global competence, and love of culture. The important role of vision for an institution is as a unifying direction and determining factor in every decision making. The vision needs to be an inspiration and motivation for everyone in the institution to realize the idea, and the vision needs to be an inspiration for the achievement movement of the school community expressed through the services offered and the needs that can be addressed, the values obtained and the hopes and ideals of the future [4]. Labschool YSU Junior High School has expressed its vision well and meaningfully while keeping a global outlook.

Unprofessional school management can hinder the education process and can hinder the school as a formal education institution [6]. In order for school management to function properly, it is necessary to manage the organization (school) effectively and efficiently, and to have a strategic plan to achieve the goals and objectives [4]. Educational institutions such as schools, vision and mission are two vital elements that must exist and be implemented in earnest, not just concepts that cannot work operationally [3]. The mission of YSU Labschool Junior High School is in line with its vision. Basically, the mission is only a method to achieve school goals that will help society and the state in educating the nation's life [6]–[8]. These goals have appeared in the mission formulated by Labschool Junior High School.

Goal setting is generally based on key success factors, which is done after the vision and mission are set [3]. Objectives need to be formulated carefully and systematically to suit the needs and ideals of educational institutions, including YSU labschool junior high school. Every institution needs to consider the development and challenges of education in the future in setting its goals [9]. The objectives carried out at YSU Laboratory Junior High School not only develop cognitive abilities, but also focus on the affective and psychomotor domains through the national curriculum and cambridge curriculum. In addition, the existence of teacher supervision at least once a year makes monitoring of teacher performance and professionalism maintained.

Regarding the short and medium term plans of the education unit, YSU labschool junior high school has been well organized and systematic. In addition, the plan reflects activities to support students' learning process in cognitive, affective and psychomotor aspects. The plan is operational and realistic. This is certainly a separate opporrtunities for 'selling value' to the community. The plan featured by the Junior High School Labschool YSU includes the realization of the realization of superior character through mutual respect, polite speech, discipline, independence, mutual cooperation, responsibility, and tolerance among the academic community. The character dimension plays an important role to be one of the things that schools pay attention to in making educational planning [10], [11]. These values are certainly important to prepare students in an era that is increasingly experiencing moral decadence like today.

The curriculum used by YSU Labschool Junior High School is in accordance with the recommendations recommended by the Ministry of Education and Culture, namely the independent curriculum. This is reflected in school activities that have implemented various effective learning methods, such as project-based learning, cooperative learning, and problem-based learning [12], [13]. These methods were chosen because they are considered capable of activating students in active learning, developing critical and creative thinking skills, and encouraging collaboration. The learning program at the Junior High School of Labschool YSU is designed flexibly to accommodate the various learning styles of students. Educational institutions need to continue to improve and develop, including in terms of curriculum improvement and teaching methods that are in accordance with the latest developments and the needs of students [14].

The Junior High School of Labschool YSU implements a student-centered and quality improvement-oriented assessment system. Assessment is carried out diversely using various instruments, such as portfolios, projects, and written tests. The applied assessment program also refers to the principles of the Merdeka Curriculum, namely authentic, differentiated, and continuous assessment implemented into summative and formative assessments. This is an important phase because the process and results of student learning function to make decisions based on certain things and considerations and criteria [15]. Assessments provide feedback on students' learning progress for parents, teachers and students themselves. Assessments also help teachers to make decisions about students' needs, and guide lesson planning and implementation [16].

Analysis related to the number of educators at the Junior High School of Labschool YSU shows that it is not in accordance with the number of subjects, but it is in accordance with the ratio of students. As Government Regulation No. 74 of 2008 concerning Teachers states that the ideal ratio between teachers and students is 1:20 for elementary, junior high, and high school levels with details of the number of educators 8 teachers and the number of students 19 students. Currently there is 1 Special Mentor Teacher who assists 4 Special Needs Children with detailed needs: 3 hearing impaired students and 1 ADHD student. This balanced composition is important for the continuity of learning at school [17], [18]. Schools also need to pay attention to the process of recruitment, development, promotion and transfer, dismissal of staff, as well as rewards or appreciation of educators/educational personnel.

Related to facilities and infrastructure, the junior high school Labschool YSU has been adequate enough to support the learning activities that take place. Existing facilities and infrastructure have been utilized to support learning activities. The function of managing facilities and infrastructure is very basic in improving the quality of learning, creating a socio-emotional climate and managing group processes, so that the success of teachers in creating conditions that allow indicators of the teaching and learning process to take place effectively [19]. Sedangkan, kaitannya dengan pemanfaatan The use of surrounding resources as alternative learning facilities and infrastructure of the Junior High School Labschool YSU has not been maximized. Although some teachers have tried to integrate the surrounding environment into the learning process, but overall it still needs to be improved. However, this has become a matter of concern and several activity programs have been arranged to support this with Guest teacher and Guest Lecture activities.

Every effort to achieve educational goals, both quantitative and qualitative goals, education costs have a very decisive role [20] In the budgeting strategy carried out by labschool junior high school is to identify the priority activities to be financed by being financed according to the allocation and needs. The school budget managed includes development funds, tuition fees, annual activities, uniforms, and catering, while development funds and tuition fees will be deposited to the Faculty of Education and Psychological Sciences YSU. Annual activity funds are managed to meet the needs of learning activities for one year. The general principles of education financial management are: frugal, directed, open, comprehensive, periodic, accountable, effective and efficient [21]. These principles are expected to be maintained by policy makers and stakeholders of the Junior High School of Labschool YSU.

Regarding the implementation of learning activities at the Junior High School of Labschool YSU, the results are very satisfactory. It is important for educational institutions to ensure that an adequate and conducive learning environment is provided to support an effective learning process [14], [22], [23]. Students' active participation increased significantly, especially in problem-based project activities. The use of technology and innovative learning media also succeeded in increasing students' interest in learning. Good cooperation between teachers, students and parents creates a positive and conducive learning environment. Overall, these activities have succeeded in achieving the set objectives and have had a positive impact on all components of the school.

School-based management (SBM) at the junior high school of Labschool YSU has succeeded in creating a safe, fun, and inclusive learning environment. Educational institutions must have the ability to compete and meet the expectations of the community as users of educational services [14], [24], [25]. The junior high school has implemented programs such as peer tutoring, inclusion classes, and various interesting extracurricular activities. Teachers at the school also actively implement differentiated learning, use various learning resources, and create an active learning atmosphere. Parental involvement is limited to monitoring, but in the future the school has prepared a program to involve parents, with the hope that learning achievement will improve and students will develop into holistic individuals.

Law Number 20 of 2003 concerning the National Education System and Regulation of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia Number 47 of 2023 concerning Management Standards in Early Childhood Education, Basic Education Level, and Secondary Education Level simply provides management direction to every educational institution, including Labschool YSU Junior High School, all components of education are interconnected in an integrated manner, with the aim of achieving national education which focuses on developing the potential of students to become individuals who have faith and devotion to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. Therefore, YSU Labschool Junior High School must always uphold the existing educational standards and continue to innovate in accordance with the times, student needs, and local wisdom.

4. Conclusion

The vision, mission, and goals formulated by Labschool Junior High School have focused on the fundamental aspects of morals, global competence, and love of culture. Labschool YSU Junior High School has formulated short and medium term plans that are well organized, systematic, and measurable. The curriculum used by Labschool YSU Junior High School is in accordance with the recommendations recommended by the Ministry of Education and Culture, namely the independent curriculum, and is equipped with an assessment system that is student-centered and oriented towards quality improvement. Facilities and infrastructure of SMP Labschool YSU have been sufficient so that they can support ongoing learning activities. School-based management (MBS) at the junior high school of Labschool YSU has succeeded in creating a safe, fun, and inclusive learning environment. The thing that needs to be considered is related to the number of educators at the Junior High School of Labschool YSU shows that it is not in accordance with the number of subjects, but it is in accordance with the ratio of students.

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The Importance of Student Learning Analysis in Language Teaching Research Methods Courses Using *Project-Based Interactive* Multimedia Learning Padlet for Higher Education

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Abstract

Based on interviews and field observations from several students who took the Language Teaching Research Methods course, information was obtained that there were several related obstacles in writing research proposals. *First*, the material on Language Teaching Research Methods is classified as difficult because students do not understand the research concept well. *Second,* textbooks that are guides for students are not used by students as they should because there is still a lack of student interest in reading structured books. *Third*, the implementation of lectures has not been able to make students active and independent because learning is still monotonous and has not varied. *Fourth,* the questions in the textbook are not varied so that students are less able to study and find solutions to these problems. The research method used is part of development research or R&D. This research uses two techniques, namely qualitative descriptive analysis techniques and quantitative descriptive analysis. Qualitative data in the form of descriptions from questionnaires of lecturer and student responses, profiles, learning tools, writing research proposals in higher education. Quantitative data in the form of assessment scores from instruments filled in by students regarding the profile of learning tools for writing research proposals in higher education. The instruments used in this study are the results of observation and questionnaires. The results of the questionnaire response student response profile of learning tools writing research proposals in Higher Education 82.42 also with the qualifications strongly agreed.

Keywords: Language Teaching Research Methods, *Project Based Learning,* Padlet

1. Introduction

In learning, one of the courses that students must study is the Language Teaching Research Methods course, one of the demands in the Language Teaching Research Methods course is students' expertise in writing research proposals. Through proposals, students participate in the development of science and technology for the progress of the Indonesian nation. In accordance with the opinion of experts (Wardani et al. 2020) that the capacity of learners to get used to writing critical thinking is very important. It is related to brainstorming research topic problems, reflection, and exploration of research topic problems. Students must also be able to write research background, research problems, related literature reviews, and research methods based on research proposal guidelines. Writing skills related to organizational competence, elaborating content, paying attention to mechanics, language use, and vocabulary are the main capital and support for success in carrying out research proposals. In research proposals, students must have many ideas and be creative in finding the main problems in the world of education, for that students are invited to be sensitive to the issues around them and find creative and innovative solutions. Education has a strategic role in realizing this, by producing creative and innovative human resources that are carried out in stages and sustainably, so that they are able to compete and are expected to have a competitive advantage in the national context in the era of global competition (Widiansyah, 2018: Rusmini, 2017: Turmidhi: 2019).

The emergence of problems in education in learning is a symptom that shows a gap between educational outcomes and life demands. This problem arises in a variety of ways, ranging from problems in the teaching and learning process in the classroom that are related to the field of study, related to the curriculum, related to one level of education, to problems related to educational policies and concepts (Nurhuda, 2022: Megawanti, 2015: Romdloni, Saiban, & Hazin, 2021). Writing a research proposal is found in the Language Teaching Research Methods course. This course aims to equip students with knowledge, understanding and application of various research methods in the context of preparing a final project. In the lecture, various types of research are discussed, scientific research steps ranging from determining topics, identifying problems, reviewing literature, determining the focus of the problem, determining variables, design and methods, data collection techniques, analysis and drawing conclusions. Learning activities include lectures with various approaches and methods that

involve many students, such as discussions, observation activities in the field to learn to identify problems and practices for making pre-proposals. This course is given with a balanced composition between theory and practice. Evaluation is carried out through written tests, structured assignments and student participation in the class.

One of the skills that students master in studying the language teaching research methods course is in the cognitive aspect. The cognitive aspect is a person's ability to think, act and feel. In this case, the cognitive aspects that are required are a. Students have the ability to recognize, remember (knowledge) and understand (comprehension) terminology, definitions, facts, ideas, patterns, sequences, methodologies, basic principles of educational research methodology. b. Students are able to apply (application) the terminology, definitions, facts, ideas, patterns, sequences, and basic principles of educational research methodology in dissecting/describing problems of education and foreign language learning. c. Students have the ability to analyze (analysis) information on the discipline of educational research methodology and divide or structure the information into small parts, put it into patterns or relationships and are able to recognize and distinguish the causes and effects of an educational phenomenon. d. Students are able to synthesize by providing an explanation of a structure or pattern of educational phenomena that were previously unseen, are able to make a generalization (conclusion) and are able to recognize data or information obtained in educational phenomena to produce the necessary solutions. e. Students have the ability to evaluate and create solutions, ideas based on scientific methodology in the field of education and foreign language teaching. Left- and -right justify your columns. Use tables andPadlet can be used as a support for the learning process and made as a new innovation in media making. The use of padlets as a medium can make it easier for students to find and understand material in one frame at once, so that in this case teachers can use it as interactive multimedia which can later help teachers and students interact in the learning process effectively, either that can support the distance learning process (online/online) or will even be able to help in the learning process in the classroom. Multimedia itself is defined as a combination of various media (file formats) from text, sound, images, and videos (Lestari, 2020:4). While interactive can be interpreted as 2-way communication or more communication elements. In interactive multimedia, interaction is one of the prominent features in multimedia that allows active learning, which not only allows users to see and hear but also do something. In the context of multimedia, do here can be in the form of responding to the proposed statement or being active in the simulation that has been provided.

The use of padlets as interactive multimedia can not only be used in the teaching and learning process in the classroom, but can also be used in the teaching and learning process outside the classroom. (Kus Eddy Sartono, Ambarsari, and Herwin 2022) said the results showed that the interactive multimedia developed was suitable for use in learning activities and as an alternative learning medium for PKn, especially for grade IV on Indonesian cultural diversity material. with the PjBL (Project Based Learning) step contained in the learning tool. Through this PjBL (Project Based Learning) based learning activity, students are expected to be active in investigating (learning by presenting real-world problems), and students can work in a cooperative or independent team, detailing the process of completing research proposal projects well.

2. Method

In this study, it is research and development (R&D). This research has an important role in developing a new product or improving an existing product for education (Borg & Gall, 1983: 772). According to Sugiyono (2011: 407) said that the research and development method is a research method used to produce a certain product, and test the effectiveness of the product. So that research and development methods are research methods used to produce or develop a product, and are tested for their effectiveness and feasibility. Based on ADDIE's research and development, the development research model applied in this study is the ADDIE development model with five stages, namely *(Analysis, Design, Development, Implementation, Evaluation).* The needs analysis method helps in making informed decisions regarding the steps that need to be taken to address the gap between the current state and the desired goals. This could include changes in training, product development, or improvements in the system.

3. Results and Discussion

a. Needs Analysis Stage

The analysis stage is a stage where researchers analyze what problems are related to learning to write research proposals in Indonesian Higher Education in general and students in several Higher Education in Indonesia. The activity carried out at this stage is to conduct a needs analysis by collecting various articles containing research related to learning to write research proposals, in general, as well as their supporting theories. The collection of needs analysis data was carried out in public and private higher education throughout Indonesia. For the questionnaire to analyze the needs of students and lecturers, several Higher Education Institutions in Indonesia were distributed, namely Muhammadiyah University of Education, Sorong University of Education, Abulyatama University of Aceh, PGRI University of West Sumatra, Azkia University, and Ekasakti University. For field observation, two Higher Education Institutions were carried out at PGRI University of West Sumatra and Azkia University.

1) Results of Situation Analysis

Data collection was carried out by distributing questionnaires to students and lecturers, teaching those who teach language teaching research methods courses. Observations were made in the classrooms of the University of PGRI West Sumatra and Azkia University to observe the methods used by lecturers in teaching. In this Higher Education, lecturers have the freedom to manage the material that they will teach in class, especially in learning to write research proposals, but still refer to the RPS related to the material and time that has been set. During the observation, several things were found, including (1) lecturers using lecture and question and answer methods; (2) the media used, namely whiteboards, textbooks, and LCDs, and (3) lecturers use group discussions for students whose percentages are according to the material to be made by their papers. The reason lecturers use the lecture method is that this lecture method is considered the best method to deliver material to students with low academic ability. Lecturers do not use other methods because they are worried that the method is not able to help students understand the material provided. The use of the question and answer method aims to make students more active, to measure students' understanding of the material that has been studied, and to build interaction and communication between lecturers and students. And in concluding the material, the lecturer felt easier. The use of LCD aims to increase the interest and motivation of the community to learn. With LCD, lecturers can display material examples of titles in writing proposals for language teaching research methods and the material to be presented. When the lecturer comes, the arrival of the lecturer has been awaited by the students and they have prepared themselves to take part in the learning process because the lecturer will provide examples of research titles related to research proposals. This happened during the implementation of observation. The lecturer showed the material, the atmosphere that was initially conducive became noisy and there were several students who were busy themselves. From this incident, a lesson can be learned that students' interest and motivation in learning will be reduced or even lost if the media chosen is not in accordance with the character and abilities of students. Therefore, lecturers are required to know and understand the character and abilities of students before choosing the material to be given.

Based on the results of observation, it was also found that lecturers used group discussions for students whose percentages were according to the material that would be made by their papers. In the language teaching research methods course, lecturers use group discussion strategies as an integral part of the learning process. This strategy is implemented to support students in presenting the material they have learned, as well as to encourage more effective interaction and collaboration among students, but there are also some students who ignore and listen to their peers for a percentage in class. The use of group discussions in the language teaching research method course by lecturers is actually one of the effective learning methods and approaches also to improve material understanding, critical thinking skills, communication skills, and cooperation between students. By actively involving students in the learning process, lecturers can create a dynamic and collaborative learning environment, which will ultimately improve the quality of learning and students' understanding of the material being taught. In this case, the lecturer also needs to emphasize that there must be a representative response from each group so that the group discussion runs effectively.

a) Results of the Student Needs Analysis Questionnaire

The responses of lecturers and students to the implementation process of learning to write research proposals in the language teaching research methods course in the classroom are very necessary to find out whether the device to be developed meets the needs of lecturers and students in the classroom and to find out what methods are commonly used by lecturers, especially in learning to write research

proposals in the teaching research methods course in the classroom. To obtain information related to the learning activities of writing research proposals in the teaching research methods course in the classroom, data collection was carried out using a questionnaire. The questionnaire given to lecturers and students had previously been validated by one validator which can be seen in the attachment. The data was validated by an expert lecturer from Yogyakarta State University, namely Mr. Dr. Agus Widyantoro, M.Pd. After being validated by the validator, the needs analysis questionnaire with a questionnaire assessment category was very feasible and ready to be used in research. Based on the results of the assessment, the questionnaire can be used with revisions. The comments given by the validator on the questionnaire were that in general the questionnaire was good and could be used in collecting research data. The suggestion from the validator was that there were several errors in the spelling of words that needed to be corrected. Based on the comments from the validator, revisions were made to the writing errors in the questionnaire. The revised questionnaire was used to collect data from lecturers and students. The questionnaire given to lecturers was related to 4 assessment components which were reduced to 48 statement items with five answer choices, namely 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree. (2) Student Questionnaire Results

The questionnaire given to lecturers contains 5 statements with 4 assessment components, namely Target Situation Analysis (TSA), Current Situation Analysis (PSA), Learning Situation Analysis (LSA), and Mean Analysis (MA). For more details, the indicators of each point can be explained as follows: Target Situation Analysis (TSA) with a total of 1-17 statements with 17 statements, Current Situation Analysis (PSA) 18-28 with 11 statements, Learning Situation Analysis (LSA) 29-35-43 with 7 statements, and Mean Analysis (MA) 36-39 with 4 questions. Overall, the results of the student response questionnaire response to the learning tool profile writing a research proposal in Higher Education 82.42 with qualifications strongly agree to develop a learning tool.

(a) Target Situation Analysis (TSA)

Statements related to the evaluation process used to deeply understand the situation, needs, and dynamics of the target in learning consist of 17 statement items. For the overall data summary, you can see in the following table. The following are the results of the assessment conducted by the lecturers.

Table 1. Results of the Questionnaire Assessment Related to the Target Situation Analysis (TSA)

No	Indicator 1	Average Score	%	Category
1	Target Situation Analysis (TSA)	12275	86,45	SS
Average Score		9641	85,32	SS

Based on the table above, the student's Target Situation Analysis (TSA) component with his statement I want materials and steps of language teaching research methods in innovative textbooks, it can be concluded that students strongly agree in learning the need for innovative learning tools. Students also want and need interesting textbooks as my guide to understand the learning material.

(b) Current Situation Analysis (PSA)

Questionnaire statements relating to Current Situation Analysis (PSA) are used to find out the evaluation process that aims to understand the current state and conditions of an organization, project, or situation in the learning of language teaching research methods. The following are the results of a questionnaire related to the Analysis of the Current Situation (PSA) used in teaching writing research proposals.

Table 2. Results of the Questionnaire Assessment related to the Analysis of the Current Situation (PSA)

No	Indicator 2	Score	%	Category
1	Current Situation Analysis (PSA)	7354	79,12	S
	Average	7354	79,12	S

Based on the table above, the second assessment component relates to Current Situation Analysis (PSA) in teaching writing research proposals which includes one of the statements in my opinion the most difficult skill in learning the language teaching research method is writing a research proposal. It can be concluded that students still have difficulty in understanding the research proposal material in

the language teaching research method course. The lecturer gave a score of 7354 or 79.12% with the category agreeing to this.

(c) Learning Situation Analysis (LSA)

Questionnaire statements related to Learning Situation Analysis (LSA) are used to find out the evaluation process used to understand the conditions and dynamics in the learning environment. LSA aims to identify needs, challenges, and factors that affect the teaching and learning process, with the aim of improving the effectiveness and quality of education. The following are the results of a questionnaire related to Learning Situation Analysis (LSA) used in teaching writing research proposals.

Table 3. The results of the Questionnaire Assessment are related to the Learning Situation Analysis (LSA)

No	Indicator 2	Score	%	Category
1	Learning Situation Analysis (LSA)	4793	81,03	SS
Average		4973	81,03	SS

Based on the table above, the second assessment component is related to Learning Situation Analysis (LSA) in teaching writing research proposals which includes one of the statements I like the textbook on research methods of language teaching both in print and online platforms. Students gave a score of 4973 or 81.03% with the category strongly agreeing with this. From the results of the questionnaire, information was obtained that in teaching language teaching research research courses, students liked digital-based textbooks.

(d) Mean Analysis

Questionnaire statements related to Mean Analysis are used to find out the process of understanding whether the observed changes are statistically significant and practical in learning. In addition, to see an overview of the success in the learning of each student in participating in learning. For the following are the results of the questionnaire related to Mean Analysis) used in teaching writing research proposals

Table 4. Questionnaire Assessment Results related to Mean Analysis

No	Indicator 2	Score	%	Category
1	Mean Analysis	2738	81,01	SS
Average		2378	81,01	SS

Based on the table above, the second assessment component is related to Mean Analysis in teaching writing research proposals which includes one of the statements required a public lecture from practitioners in the field of language teaching research methods. Students gave a score of 2378 or 81.01% with the category strongly agreeing with this. From the results of the questionnaire, information was obtained that in teaching language teaching research methods courses, it is necessary for practitioners in this field so that students are more skilled in finding facts and problems in designing research proposals and are able to design them.

4. Conclusion

The questionnaire was validated by a lecturer at Yogyakarta State University, namely Mr. Dr. Agus Widyantoro, M.Pd. Based on the validation results from the validator that the questionnaire was suitable for use, the results of the student response of the learning device profile students writing a research proposal in Higher Education 82.42 also with the qualifications strongly agreed.

Acknowledgement

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Training on the Development of Project Based Learning (PjBL) LKPD for Teachers of the Indonesian School in Kinabalu, Malaysia

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Abstract

The implementation of education is accompanied by various learning tools that encourage active student participation, one of which is the Student Worksheet (LKPD) that incorporates Project Based Learning. (PjBL). Learning using PjBL worksheets serves as a guide for learning and as a means to master various competencies. The learning conducted by teachers, equipped with PjBL worksheets, is capable of guiding students in mastering the learning material while also striving to engage students actively in learning activities through the assigned project creation. Through the use of LKPD PjBL in the learning process, the quality of education can be improved. The implementation of this Community Service (PKM) seeks to provide a solution on how the quality of learning can be improved through the use of LKPD PjBL in the learning process, through training on the development of LKPD PjBL for teachers at Indonesian schools in Kinabalu, Malaysia.

Keywords: Training, student worksheets, project-based learning.

1. Introduction

Elementary School is an educational level that serves as the foundation of knowledge, skills, and moral values. Education at the elementary school level plays a role in strengthening the educational process that encourages students to independently and creatively develop knowledge and core character values [1]. Teachers as facilitators of the learning process are important to continuously improve the quality of pedagogical competence with the hope of having creativity and innovation to develop an innovative learning process, especially in developing teaching materials and LKPD (Student Worksheets).

One of the teachers' tasks in the learning process is as planners, processors, and evaluators [2]. As a planner, teachers should be able to develop teaching materials, student worksheets, and media, and prepare what will facilitate the learning process. Teaching materials developed by teachers have many functions in assisting the learning process. These functions include: as teaching materials, as a substitute for the teacher's presence, as evaluation tools, and as study reference, according to materials [3]. Student Worksheet (LKPD) is a collection of sheets containing activities for students that allow them to engage in real activities with the objects and issues being studied. [4]. A well-developed and properly executed LKPD will facilitate students in carrying out the learning process according to the learning scenario/syntax [5].

The issue of developing LKPD for teachers is not only related to pedagogical skills but also to the mindset of teachers who tend to take the easy way out by using teacher's books or teaching modules. This issue of behavior in teaching remains a major problem and has not yet developed within teachers/educators in Indonesia. Furthermore, Zuriah et al.[6] stated that most teachers still lack the development of creative works to create sufficient and contextually appropriate teaching materials, and have not yet developed LKPD in accordance with innovative and engaging learning for their students. In fact, the textbooks published by the Education Department are still considered capable of meeting the real learning material needs of students [7].

Teachers as facilitators of various subjects, primarily at the elementary school level as classroom teachers. Teachers are expected to have creativity and innovation to help students understand the lesson material and instill character values. The implementation of the curriculum must also be supported by various learning tools that engage students actively, one of which is the Student Worksheet (LKPD) that contains project-based learning. (PjBL) [8].

The use of Project-Based Learning Student Worksheets (LKPD PjBL) in education is expected to help students become more active in mastering the learning material and enhancing their creativity. According to what Prastowo [9] stated, in terms of objectives, the PjBL LKPD serves as a learning guide and as a reinforcement of character values. The learning conducted by teachers equipped with the PjBL LKPD is capable of guiding students in mastering the learning material while also reinforcing the character values contained within it.

The PjBL LKPD that is prepared to provide the expected benefits must be of high quality and effective, as well as contain character values [10]. Therefore, the preparation of the PjBL LKPD is expected to instill character values in students when they study the PjBL LKPD they use in their learning.

Community service activities that involve providing training materials for creating Student Worksheet (LKPD) containing Project-Based Learning (PjBL) are part of the community service duties assigned to Professors at the university as one of the obligations to implement the tridharma of higher education in 2024.

The process leading to the training begins by asking about the needs in the field where community service is conducted, namely in the schools where the teachers teach. Based on the identification of those needs, the community service program was carried out. The training materials have been prepared to meet the needs at the elementary school level, specifically the Student Worksheet (LKPD) that contains project-based learning. (PjBL).

2. Method

From the background of the problem, it can be understood that the main issue in this Community Service is the lack of teacher competence in preparing Project-Based Learning Student Worksheets (LKPD PjBL), the absence of tools to support teachers in effective teaching and evaluation, teachers observe that students feel bored when asked to read and solve problems without guidance, and some students feel there is a misunderstanding in instilling character values with the material.

From the main issue mentioned above, it can be broken down into several problems, including; the ability to compile PjBL LKPD by Indonesian teachers at Kinabalu School in Malaysia, which still needs to be improved in the training activities for creating PjBL LKPD. In addition, efforts to improve and develop the professionalism of Indonesian teachers in Kinabalu, Malaysia, especially in the creation of good PjBL LKPD, in the following Figure 1:

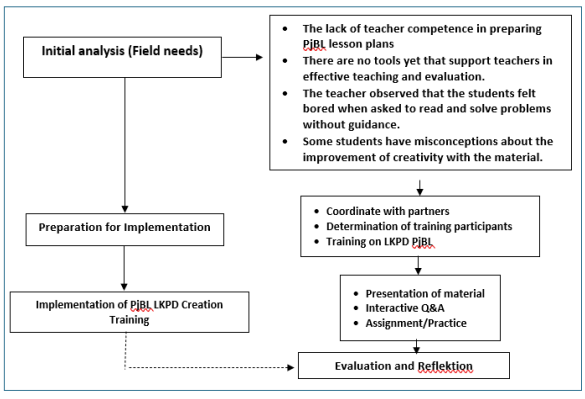


Figure 1. Scheme for the implementation of community service activities

The method used in this PKM is hybrid, namely 1) training conducted both online and offline, and 2) online mentoring. (online). The training was conducted at the Indonesian school in Kinabalu, Malaysia. The first method of community service activities is to provide training materials, including presentations on the proper systematics of LKPD, teaching materials and learning resources in elementary schools, and Project-Based Learning. (PjBL). It is hoped that the teachers who attend and participate in the training can become trainers for other teachers at their school.

The second method is mentoring. Mentoring is carried out by providing time to accompany training participant teachers when applying the skills they have acquired to their peers. Team members can become facilitators if needed to deliver the same material at a school for all the teachers in that school.

3. Results and Discussion

The community service program will be conducted from June 14, 2024, to August 2, 2024, with the theme "Training on the Preparation of Student Work Sheets (LKPD) for Project-Based Learning (PJBL) for Indonesian Elementary School Teachers in Kinabalu, Malaysia." This activity is conducted through hybrid learning at the Indonesian School in Kinabalu, Malaysia. Here is the map of the community service location at Sekolah Indonesia Kinabalu, Malaysia, in the following Figure 2:

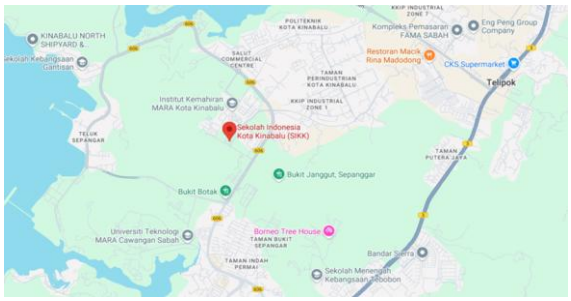


Figure 2. Map of the Community Service Location in Kinabalu, Malaysia

The organizer of this community service program (PkM) is the assignment of a Professor with a group of elementary education lecturers and the coordinator of the Community Learning Center (CLC) in Kinabalu, Malaysia. The organizers prepared the venue facilities, then distributed training materials and provided guidance during the training to the participants. Participants then undergo training through the activity. The rundown of the community service program activities can be seen in Table 3, as follows:

Table 3. Schedule of the PjBL LKPD Preparation Training Activities

Via online

No	Time	Agenda
Day 1: Friday, July 12, 2024		
1.	13.00 – 13.30	Opening and welcome speech by the principal of CLC SD in Keningau and the coordinator of the service team
2.	13.30 – 15.00	Presentation of Initial Material
3.		Material 1: Student Worksheet based on Project-Problem Based Learning (PjBL). Speaker: Dr. Fathurrohman, M.Pd.
4.	15.00 – 15.30	Question and Answer
5.	15.30 – 15.30	Presentation of product tasks and offline training plan

Via face to face

No	Time	Agenda
Day: Tuesday, July 23, 2024 Community Service Activities at CLC SD in Keningau		
1.	08.00 – 08.30	Opening and welcome speech by the principal of CLC SD in Keningau and the coordinator of the service team
2.	08.30 – 12.00	Strengthening the Material
		Material 4: Student Worksheets based on Project-Problem Based Learning (PjBL). Speaker: All Team Members
3.	12.00 – 13.00	Rest, Prayer, and Lunch

4.	13.00 – 15.30	Journey to Kinabalu

Online Via Zoom

No	Time	Agenda
Thursday, August 2, 2024		
1.	13.00 – 14.30	Review product
2.	14.30 – 15.00	Closing

The initial activity of the organizers involves preparation with attendance through the shared webpage. Then, after successfully logging in, the participants completed the provided pre-test. After that, the community service program activities began with a workshop contract. The workshop contract requires participants to adhere to the rules during the workshop. These rules contain guidelines for the implementation of the workshop. In the speaker's presentation, there are five topics that will be covered. The material consists of Project Based Learning, LKPD in Elementary Schools, templates and procedures for preparing LKPD, and applications for preparing LKPD PjBL.

The workshop began with a pre-test, followed by the presentation of materials, then participants engaged in a Q&A session with the resource person, and concluded with a post-test. The duration of the training is 4 months, starting with an introductory session where the material is presented, followed by guidance until a product in the form of a PjBL LKPD is produced. Below are some documentation of the implementation of the PjBL LKPD Development Training. In Figure 3, as follows:

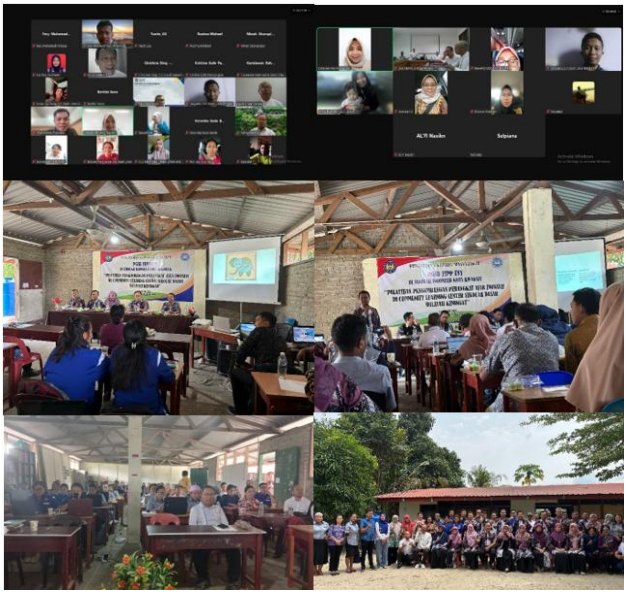


Figure 3. Implementation of the PjBL LKPD Development Training in Kinabalu, Malaysia

The implementation of Community Service through training in the preparation of LKPD PjBL for teachers at the Indonesian School in Kinabalu, Malaysia, was carried out over several months both offline and online using the Zoom application. It is hoped that through Community Service and training for Indonesian teachers in Kinabalu, Malaysia, the competencies of teachers at the Indonesian School in Kinabalu, Malaysia, will continue to improve and develop.

4. Discussion

The rapid advancement of technology in this period feels very fast. Mainly in the world of Education, especially regarding the needs in learning. In every learning process, the role of information technology is crucial to support the achievement of effective learning. There are many benefits from the use of technology in education, such as improving the quality of learning, expanding access, facilitating the delivery and understanding of material, and adding information [6].

In the implementation of the current independent curriculum, the presence of information technology is felt to be very necessary. All activities are conducted online, especially in school learning.

Therefore, training for the development and utilization of teaching materials in online learning is highly needed, especially by teachers.

There are many providers of information technology applications for learning nowadays. Various uses of teaching materials that can be utilized in online learning. One of them is the use of Pancasila student profile teaching materials that can be used for learning in schools.

In the implementation of the current independent curriculum, teachers are required to be able to use and utilize technology, because learning is currently conducted through an online system. (dalam jaringan). In the training on the Development of Project-Based Learning Worksheets for Elementary School Teachers in Indonesia, Kinabalu, Malaysia, the first topic presented was related to Project-Based Learning. (PjBL). The second is related to the Student Worksheet (LKPD). The third is about the Template for Preparing LKPD for Project-Based Learning (PjBL) and the fourth is about the application in Preparing LKPD for PjBL.

In this training, teachers will be provided with training materials on the stages of creating PjBL LKPD preparation, which serves as teaching materials for students to facilitate their learning activities. The PjBL LKPD preparation teaching materials play a significant role in education as they can enhance students' learning activities.

Development of teaching materials for the preparation of PjBL LKPD, which includes subjects, learning activities, content, IT information, student work activities based on PjBL that can be filled out by students, glossary, and practice questions.

It is expected that after this training, teachers will be able to utilize the knowledge and skills acquired during the training. Then, after the training briefing by the resource person is completed. Then, support was provided by assigning the task of creating teaching materials for the Preparation of Project-Based Learning (PjBL) Student Worksheets. From this training, teachers were able to produce a product in the form of teaching materials for the Preparation of PjBL Student Worksheets.

5. Conclusion

The learning process is a very important process for students. As teachers, they are required to always facilitate the learning process well. One effort to provide the best education to their students is by improving teachers' abilities through training.

During the implementation of the current independent curriculum, where learning activities must align with the prevailing curriculum, learning materials need to be adjusted accordingly. Therefore, as teachers, they must facilitate their students to ensure the learning process continues. Consequently, teachers need to develop Pancasila student profile teaching materials in accordance with the implementation of the independent curriculum.

The development of Project-Based Learning (PjBL) Student Worksheets conducted by teachers, which includes supporting information, Learning Activities, Content, Student Worksheets, PjBL-based work activities that can be filled out by students, Glossary, and Practice Questions. This training is a training on the Preparation of PjBL LKPD at SD Indonesia Kinabalu, Malaysia. The material inside is about Project-Based Learning (PjBL), LKPD, templates, and applications for preparing LKPD PjBL. Where teachers are expected to utilize the knowledge gained during the training after it concludes. Then, after the briefing in the training by the resource person was completed. Then, assistance was provided by assigning the task of creating a PjBL LKPD in the form of an LKPD. From this training, teachers were able to produce a PjBL LKPD in the form of an LKPD.

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The Effectiveness of Interactive Learning Media Based on Indonesia's Cultural Diversity on the Love for the Homeland Character for Elementary School Students

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Abstract

This research aims to prove the effectiveness of interactive learning media based on Indonesia's cultural diversity in enhancing the love for the homeland character of elementary school students. Strengthening the sense of love for the homeland has become one of the concerns for the next generation, especially at the elementary school level. This is very important because it is a fundamental character of the nation for the integrity of the nation in the future. Field facts show that there are still often students who do not understand that character. This research is a quasi-experimental study, with a non-equivalent pretest-posttest control group design. The subjects of the research are elementary school students. The selection of respondents was done through simple random sampling. Data collection was conducted through a questionnaire. This research involves one control class group and one experimental class group. The research was conducted in the 4th grade of VQ Elementary School and the 4th grade of State Elementary School in the city of Yogyakarta. Data collection instrument for the variable of patriotism character using a self-assessment scale questionnaire, to measure students' patriotism character. Data analysis using Independent T Test statistics. The research results show that the processing and analysis of data yielded a posttest score of 37.42 for the experimental class and a posttest score of 33.13 for the control class, indicating that the posttest score of the experimental class was higher than that of the control class. It can be concluded that there is a difference between the posttest of the experimental class and the posttest of the control class in terms of achieving the character of love for the homeland. The use of interactive learning media based on Indonesia's cultural diversity is effective in fostering a love for the homeland among fourth-grade elementary school students.

Keywords: Love for the homeland, interactive media, cultural diversity of Indonesia.

1. Introduction

Character education is very important in educational programs. Through character education, we can develop the basic potential of students to become better, think well, and behave well, strengthen and build a multicultural national behavior (strength good behavior), and enhance the civilization of a nation that is competitive in global interactions (filter out cultures that do not align with the noble values of Pancasila) [1]. Character education in Indonesia is implemented in an integrated manner with other subjects. Thus, character education is not only the responsibility of school teachers but also a shared responsibility among all components of education. Character education in Indonesia, with its diverse cultural and religious backgrounds, is very important and urgent. In this case, education not only serves to instill values based on a certain culture but also universal human values [2].

The rich and diverse culture is seen as a means to learn to appreciate differences in values, perspectives, and behaviors in social interactions. Through this, students' character will be formed to be sensitive to differences, caring, empathetic, and participative in common interests. These values form the basis of mutual understanding in living together amidst diversity. Thus, students are equipped with values of living together in peace not only as a form of co-existence but more as a pro-existence. Education must be able to stop the increase of values of silence, ignorance, inequality, prejudice, injustice, and ignorance and shift them to inclusive values of care and sharing, equality, justice, and sympathy [3].

Child character development includes: first, love for God, independence, responsibility, honesty, generosity, helpfulness, self-confidence, creativity, hard work, leadership, justice, humility, tolerance, peace, and unity [4]. The values of character education in Indonesia have been identified as 18 values derived from religion, Pancasila, culture, and national education goals, namely: religious, honest, tolerant, disciplined, hardworking, creative, independent, democratic, curious, patriotic, love for the

homeland, appreciating achievements, friendly/ communicative, peace-loving, fond of reading, environmentally conscious, socially aware, and responsible [5].

The low sense of patriotism is demonstrated by the reality on the ground that students arrive late to ceremonies, lack appreciation during flag ceremonies, dislike national and regional songs, while preferring adult songs that are not yet appropriate for their age to understand and comprehend. If this condition is left unaddressed, it is feared that students will not recognize the Indonesian nation and its cultural wealth, which could result in a lack of patriotism among the students. The values of love for the homeland need to be instilled from an early age so that as the successors of the nation, they can embody attitudes and behaviors that are beneficial to the interests of society. The school, especially the teachers, are expected to find ways to enhance the love for the homeland so that students possess noble character, health, intelligence, skills, achievements, and competitiveness, and have a commitment to advancing the nation [6][7][8][9].

The description of the problems faced at school serves as the basis for the solution to the issues encountered by students, which is the use of interactive learning media. The use of interactive media is expected to improve the quality of learning, stimulate students' understanding of character values conveyed in learning activities, and enhance students' motivation to practice those character values. Interactive learning media will provide a different atmosphere and enhance students' understanding of the material [10]. Interactive media has a positive impact on educators, as the presence of multimedia allows them to develop learning media, making the learning process more effective. Interactive media for students is expected to make it easier for them to absorb lesson material quickly and can increase students' learning motivation because the learning process becomes more engaging.

2. Method

This research is a quantitative study using a quasi-experimental design. The quasi-experimental design is intended in this study because the subjects receiving the treatment, in this case, the students, cannot be fully tightly controlled by the researcher. This research will test the effectiveness of interactive media on the diversity of Indonesian culture in enhancing the love for the homeland character of elementary school students. If presented in table form, the research design will look as follows:

Table 1. Research Design

Groups	Pretest	Treatment	Posttest
Eksperimen	O1	X1	O2
Kontrol	O3	X2	O4

Keterangan:
O1 : pretest eksperiment groups
O2 : posttest eksperiment groups
O3 : pretest control groups
O4 : postets control groups
X1 : treatment for the experimental group using interactive media on the diversity of Indonesian culture.
X2 : treatment for the control group using the usual learning video media.

This research begins with administering a pretest to both the experimental and control groups. Next, each group is given a treatment. After the treatment for the experimental group is completed, both groups are given a posttest to see the results. The next step is to compare the pretest and posttest results of both groups.

The population of this study consists of all fourth-grade classes at SD Negeri VQ in Yogyakarta city and SD Negeri B in Yogyakarta city. The research sample consists of students in the fourth grade at SD VQ and the fourth grade at SD Negeri B, Yogyakarta, determined through purposive sampling. The fourth grade at SD VQ serves as the experimental group, which receives special treatment in this study, while the fourth grade at SD Negeri B, Yogyakarta, is the control group that does not receive treatment using interactive media on the diversity of Indonesian culture.

Data analysis techniques in the research use quantitative analysis through t-tests using SPSS 23.0 for Windows. The use of the t-test is preceded by conducting prerequisite tests, namely normality and homogeneity tests of the self-assessment scale results to measure the improvement in the character of love for the homeland.

3. Results and Discussion

a. Results normality test

The normality test of the data in this study uses the Kolmogorov-Smirnov test. Data is said to be normal when the significance value of the calculation results is $\alpha \geq 0.05$, then it is said to be normally distributed. Conversely, if the value of $\alpha \leq 0.05$, then the distribution is not normal. Here are the normality test results for all research variables.

Table 2. Result of normality test

No.	Data	Sig (p)	Keterangan
1.	*Pretest* Increase in love for the homeland Class IV (Control Class)	0,230	Significance > 0,05 then it is considered normal
2.	*Posttest* Increase in love for the homeland Class IV (Control Class)	0,060	Significance > 0,05 then it is considered normal
3.	*Pretest* Increase in love for the homeland Class IV (Eksperiment class)	0,410	Significance > 0,05 then it is considered normal
4.	*Posttest* Increase in love for the homeland Class IV (Eksperiment class)	0,090	Significance > 0,05 then it is considered normal

Based on the results of the normality test of the data above, it is known that the data distribution is normal. Next, a hypothesis test will be conducted using parametric statistics, as the data meets the requirements to be tested with parametric statistical analysis.

b. Result of Homogenity test

After conducting the normality analysis test, the next step is to test for homogeneity. Just like the normality test, the homogeneity test is also conducted with the help of SPSS 23. The condition for data variance to be considered homogeneous is when the significance is greater than 0.05. The results of the data homogeneity test can be seen as follows:

Table 3. Result of Homogenity test

No.	Data	Sig.	Keterangan
1.	Pretest IV class B	0,159	Significance $\alpha > 0,05$ then it is considered homogent.
2.	Post test IV class B	0,270	Significance $\alpha > 0,05$ then it is considered homogent.
3.	Pretest IV class VQ	0,270	Significance $\alpha > 0,05$ then it is considered homogent.
4.	Pretest IV class VQ	0,281	Significance $\alpha > 0,05$ then it is considered homogent.

Based on the data distribution above, the variance of the data between the control class and the experimental class is said to be homogeneous. Thus, the data meets the requirements for analysis.

c. Result Hipotesis Test

The Influence of Using Interactive Media on the Diversity of Indonesian Culture in Enhancing Elementary School Students' Love for Their Country

The hypothesis in this research is "The Effectiveness of Interactive Media on the Cultural Diversity of Indonesia in Increasing the Love for the Homeland of Fourth Grade Elementary School Students." The analysis used is the T test. Interactive media on Indonesia's cultural diversity is used as a treatment for the experimental class. In the data from the Post Test analysis of the experimental class, a score of 37.42 was obtained. The post-test for the control class was not given any treatment in this study. The control class only used learning media as usual, namely with cultural diversity learning

videos that are typically used, specifically the cultural diversity videos available on YouTube. The analysis test data for the control class obtained a score of 33.13, so it can be concluded that there is a difference between the posttest results of the Experiment class and the posttest results of the control class.

Based on the data, it shows a difference between the experimental class, which was given learning treatment with interactive media on the diversity of Indonesian culture, compared to the control class, which was not given any special treatment in learning regarding the love for the homeland character of fourth-grade elementary school students. Thus, it is concluded that the use of interactive media on the diversity of Indonesian culture is effectively influential in improving the love for the homeland character of fourth-grade elementary school students.

d. Discussion

The Influence of Using Interactive Media on the Diversity of Indonesian Culture Towards Enhancing the Love for the Homeland Character of Fourth Grade Elementary School Students

Character education is important to teach at all levels of education, especially at the primary education level. Considering the importance of good character values from the time students undergo education in school, including elementary school. Character education carries the task of developing students' moral knowledge, moral feelings, and moral behavior. Kamaruddin [11] explains that character strengthening is an important part of the performance of the educational process. The formation of students' character is expected to become ingrained in them and serve as a guide in their behavior. therefore, schools must not overlook the character education process in school program activities.

Whether or not the goals of character education are achieved is partly influenced by the extent to which the learning messages about character values reach the students. The knowledge of character values possessed by the students will affect their behavior in accordance with those character values. The delivery of learning messages to students can be maximally achieved if supported by the use of diverse learning media. Through the use of interactive media showcasing Indonesia's cultural diversity, students' enthusiasm for learning increases, making the learning process more effective [12].

Knowledge about the character of love for the homeland found in the interactive media of Indonesia's cultural diversity is expected to serve as the foundation for students' behavior, reflecting the indicators of the values of love for the homeland. Hudi [13] in his research explains that there is a correlation between the knowledge possessed by students and the moral behavior exhibited. Based on the findings of previous research, when expecting students to exhibit patriotic character, they must first possess knowledge of patriotic values within themselves.

Berkowitz, M.V., and Bier [14] explain that one of the things that can be done in character education is choosing pedagogical strategies in the implementation of character education. In this study, the chosen pedagogical strategy involves the use of interactive media on Indonesia's cultural diversity in the implementation of learning. When this interactive media on Indonesia's cultural diversity is used as an activity in the classroom, it is expected that the results in strengthening the character of love for the homeland among students will be more optimal compared to those who do not use interactive media on Indonesia's cultural diversity.

The use of interactive media on the diversity of Indonesian culture in character education is also discussed in the findings of the research by Sasminto and Mustadi [15], which states that integrative learning media based on character education has an impact on the improvement of students' character education. In this case, the interactive media on Indonesia's cultural diversity can serve as teaching material in student learning activities. Based on the information received through the materials in the interactive media on Indonesia's cultural diversity, which students study, it will provide a foundation of moral knowledge to guide students' behavior.

The presence of interactive media on the diversity of Indonesian culture is intended as an alternative educational medium for students in their learning. Elementary school students will enjoy learning media such as interactive media on Indonesia's cultural diversity, which contains interesting pictures and stories that embody character values. Therefore, teaching materials such as interactive media on the diversity of Indonesian culture are created with consideration of the characteristics of elementary school students. Pradipta and Wangid [16] explain that the use of interactive media on the

diversity of Indonesian culture influences students' character in learning. Furthermore, Suryani [17] stated that students' interest in learning has a significant impact on the improvement of students' character after participating in lessons using appropriate teaching materials.

Related to the interactive media on the diversity of Indonesian culture used in character education for love of the homeland, the content of the materials in the interactive media on the diversity of Indonesian culture is also related to the values of love for the homeland. To be able to have a sense of love for the homeland, students are first strengthened in their understanding of the importance of behaving with love for the homeland, through learning about the importance of behaving with love for the homeland. Widyaningsih [18] explains that the value of love for one's country is a character value instilled in a person through examples and role models. Through character education, it will influence individuals' way of thinking, attitudes, or behaviors of loving their homeland in daily life.

Learning that starts from the student's immediate environment aligns with the characteristics of elementary school children, as elementary school students find it easier to understand material more broadly when it begins from their immediate surroundings. In order to spark students' curiosity about the content of the Indonesian cultural diversity interactive media, the material is presented in an engaging manner to stimulate students' interest in the importance of patriotism. Mustadi, A [19] explains in his research findings that a good understanding of concepts in students begins with a good sense of curiosity.

Based on the discussion from various sources above, the interactive media of Indonesia's cultural diversity influences the learning of enhancing the character of love for the homeland. Strengthening character through interactive media of Indonesia's cultural diversity begins with students' understanding of the importance of behaving with love for the homeland, thereby developing a character of love for the homeland within themselves. After that, it is hoped that it will impact his behavior, so that it will eventually become a culture ingrained in him as a foundation for the child to navigate life.

4. Conclusion

Based on the data analysis conducted using normality tests, homogeneity tests, and T-tests with SPSS 23.0, the results of the normality test showed a significance level greater than 0.05, indicating that the obtained data is normal. Similarly, the homogeneity test also showed a significance level greater than 0.05, indicating that the obtained data is homogeneous. In the T-test for data processing and analysis, the results showed a posttest score of 37.42 for the experimental class and a posttest score of 33.13 for the control class, indicating that the posttest score of the experimental class was higher than that of the control class. Thus, it can be concluded that the use of interactive media on the diversity of Indonesian culture has an effective impact on enhancing the love for the homeland character of fourth-grade elementary school students.

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STRENGTHENING PROFESSIONAL COMPETENCE IN POWER GENERATION ENGINEERING USING A MOTOR GENERATOR CONTROL TRAINER

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Abstract

Professional competence is a requirement that must be met for vocational school graduates. One of the competencies in the field of electrical engineering is related to power generation. The research was conducted using the andragogy training method which combines lecture, demonstration, practice, evaluation, and mentoring methods. The training material consists of one trainer of teaching media related to motor control using a variable speed drive (VSD) as a motor and generator speed regulator. In addition to the teaching media in the form of a trainer, it is also equipped with a guidebook and evaluation method. Learning using teaching media and the andragogy method can improve the competence of participants in the competence of power generation. The indicator of the success of the research can be seen from the results of the average ability or competence of participants with an increase in test scores from 65,7 to 80.06.

Keywords: Professional Competence, Andragogi, Generator Control Trainer

1. Introduction

Vocational education is an institution that produces graduates who are ready to work in the business world or industry. This can be achieved if supported by adequate facilities and infrastructure. Facilities and infrastructure must be linear with world developments [1]. One of the means to support learning is teaching media. Teaching media in vocational education can be in the form of trainer kits, jobsheets, videos, and teaching aids.

The use of teaching media is very supportive in improving the competence of vocational graduates. Vocational schools are implemented with the aim of developing participants in preparing them for the world of work [3]. Munadi also expressed the same thing that vocational schools are implemented by emphasizing the readiness of graduates to enter the world of work. Vocational schools can be considered effective if graduates can work according to the demands of the needs of the world of work [2].

Competence is an individual's ability to carry out and solve a problem successfully [4]. The competence of vocational graduates includes cognitive, affective, and psychomotor abilities. Cognitive is an ability related to personal knowledge. Affective is related to the ability in daily activities such as attitudes and behavior. While psychomotor is related to the skills of participants in certain fields of expertise. Psychomotor abilities in the world of work are referred to as professionalism. Professional ability is referred to as a person's ability to carry out work according to procedures, correctly, and successfully according to the goals to be achieved. Professional competence is a person's ability to improve one's mastery of knowledge [6].

Along with the development of technology, the competence of vocational graduates must also be proven by competency certification. Competency certification is defined as the process of recognizing a person's ability through a competency test scheme with reference to the National Work Competency Standards. Competency certification that a person has is a form of written recognition given by a certification institution [5].

Motor generator control is one of the competencies that must be mastered by vocational graduates, especially in the field of Electrical Engineering. Motor generator control is used as synchronization between generators, measurement, and monitoring of generator conditions. The use of motor control is expected to increase the efficiency of generator performance. There are several journals that have discussed the synchronization of power plant generators. Each study has its own method to determine

the efficiency of generator loading on the power plant network. For example, research conducted by Rifdian L.S and Hartono [8] regarding the efficiency of three-phase generator synchronization, this study involves verifying the potential speed and direction of wind, planning the use of loads, selecting generators, and testing the generator stage on wind turbines. The test results show that this wind turbine can operate efficiently, with the generator efficiency reaching a maximum value of 20.68% and the lowest value of 3.10%. In the discussion, an analysis of generator efficiency on wind turbines, testing of generator insulation conditions, and testing of wind turbine performance were carried out to analyze generator efficiency on Wind Turbines and Wind Turbine operational systems. The results of these tests have an important role in determining the efficiency and performance of generators and wind turbines. This research has significance because wind power plants can be a solution to overcome the problem of electricity access in areas that are not yet covered by PLN and are not affected by the weather.

Research conducted by Sudaryanto Armansah [9] discusses the effect of synchronous generator field strengthening on terminal voltage. A synchronous generator is a synchronous machine that converts mechanical energy into electrical energy. Its relationship to a synchronous generator is that the strengthening in the generator is very important because of the voltage generated by the strengthening system itself. The amount of voltage generated by the generator depends on the amount of strengthening current and the speed of rotation of the magnetic field that cuts the generator anchor winding after being connected to the load. Research by Gunawan and Hartanto [10], namely where the Sudirman Park apartment is equipped with three Generator-Set (Genset) units with a capacity of 2000 KVA each. The total capacity reaches 6000 KVA. This shows the seriousness in providing backup electricity to overcome disruptions or power outages from PLN. The power used by the apartment is 3465 KVA. Although equipped with three GeneratorSets, only two are used to supply 1 apartment building. This indicates that the system is designed to be able to handle the load by using two generator sets simultaneously. The study conducted by Ermawati, et al. [11] aims to examine the performance of synchronous generators against changes in active power loads using energy conversion devices, such as diesel engines, as primovers. Synchronous generators are used in large power plants to generate electrical energy from mechanical energy obtained from primovers. To maintain optimal generator performance, its stability must be maintained properly. Synchronous generators have construction, characteristics, and have a way to control their terminal voltage. Where this can refer to the excitation system, increasing the capacity of synchronous generators, and the working principle of the Automatic Voltage Regulator (AVR) in maintaining constant generator voltage. In addition, this journal also discusses the types of rotors in synchronous generators and methods for regulating synchronous generator voltage, including the synchronous impedance method [12]. This study by Perawati [13] discusses the characteristics of synchronous generators that are heavily loaded and not constant, and their effect on reducing working voltage during welding. The field coil on the rotor is connected to an excitation source that sends direct current to the field coil, creating a constant magnetic flux. Then, by activating the prime mover, the rotor rotates, producing the rotation of the magnetic field of the field coil. The rotation of the rotor not only drives the magnetic field, but also induces changes in the magnetic flux in the anchor coil in the stator. This change creates an electromotive force (emf) induction in the anchor coil, thereby producing an electric potential. Thus, this principle is the basis for generating electrical energy in a generator [14]. Meanwhile, other research on generator synchronization has been conducted by Mulia Agustianti, et al [15] where generator synchronization is the process of connecting two or more power supply sources with the condition of equalizing the voltage, frequency, phase, and phase sequence to meet the existing load needs. This process is important to ensure that the generator can operate simultaneously with the power system.

2. Method

The methods used in conducting the research are broadly divided into 3 stages, namely pretest, treatment, and posttest. More details can be seen in Figure 1.

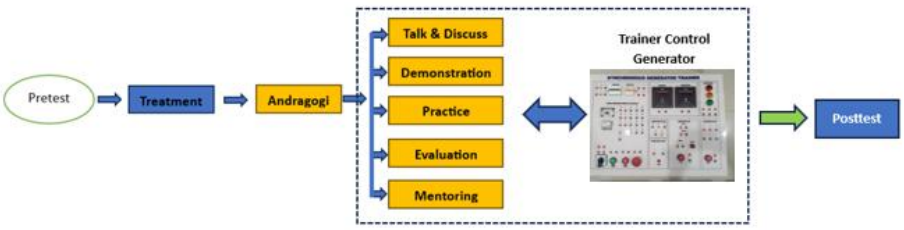


Figure 1. Research Methode

The pretest stage was carried out by letting participants learn and practice using teaching media directly. Participants were left like that without any instructions and guidebooks. After the pretest assessment results were obtained, participants were invited to discuss and carry out learning with the andragogy model. The implementation of the andragogy model was carried out with a system of 1 lecturer 4 participants and 1 lecturer 10 participants. The total number of participants was 37 participants. After the andragogy learning model was applied, participants were asked to carry out repeated practice individually and work on posttest questions. postest.

Pretest, andragogy learning, and posttest activities were carried out using a motor generator control trainer. The motor generator control is the main component in regulating the generator rotation speed to produce electrical energy. So the use of this teaching media will make it easier for participants to understand the working concept of generator speed control.

3. Results and Discussion

The developed motor generator control is a complete device assembled from several components into one unit. The components used consist of Metering, buttons, emergency switches, Magnetic contactors, overloads, and circuit breakers. The results of the developed motor generator control can be seen in Figure 2.



Picture 2. Trainer Kit Control Motor Generator

The development and research activities were carried out for 2 months, namely July to August 2024. In Week 1-3 in July, the development of motor generator control was carried out and the end of July to August 2024. Documentation of andragogy learning activities implemented using motor generator control can be seen in Figures 2 and 3.



Figure 3. Practice Using Generator Motor Control

Actions in the andragogy method implemented to improve competence include lectures and discussions, demonstrations, practices, evaluations, and mentoring. Lecture and discussion activities are carried out in order to deliver material face to face in the classroom and case study discussions in groups. After this activity is completed, it is continued with a demonstration of teaching media delivered by the lecturer or instructor.

After the demonstration is complete, the activity is continued by carrying out independent practice using the control generator teaching media. Practice is carried out alternately until participants understand the function, how it works, and how to operate the tool. The results of the work during the student's practice will be evaluated periodically starting from preparation, process, testing, and operation for the motor control generator.



Figure 4. Lecturer and Discussion

The results of the activities after the evaluation are in the form of a participant's practical work assessment form in the form of a final score. The standard score applied is a minimum of 75. For participants who get a score below 75 will take part in mentoring activities in the laboratory. Mentoring is carried out systematically with 1 lecturer 2 participants. During the mentoring activity, participants will be guided by the lecturer for 1 experiment, after which they will be asked to carry out the practice and then assessed again by the lecturer. Mentoring activities are carried out for 2 meetings. Continuous and repeated learning activities have a major influence on improving participants' professional abilities [7].

The final result in the form of an assessment of the participants' professional practices in the field of power generation, especially motor generator control, is presented in the form of numbers and graphs in Figure 5.

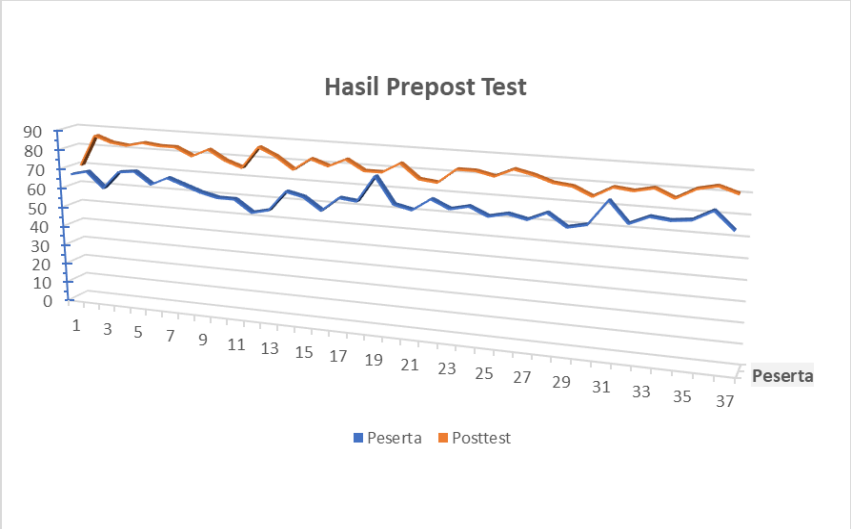


Figure 5. Graphic PrePost Test

Based on the pretest results, the average value was 65.7 while the final result or posttest assessment obtained an average value of 80.6. So from these results, it can be concluded that most participants were declared competent from the set standard, which is 75. The following is a brief breakdown of the data from the posttest assessment results.

Tabel 1. Competent and Incompetent

No	Participants	Competent	Incompetent
1	36	v	
2	1		v

4. Conclusion

Based on the andragogy method applied in the classroom, the results of the increase in participant competence were obtained. The andragogy method by applying teaching aids in the form of motor generator control implementation in the field of power generation is very effective in improving participants' knowledge, skills, and analytical thinking. The use of teaching aids in the learning process that is used repeatedly is very helpful for participants in improving their expertise in the field of motor generator control. Expertise competencies related to generator control are professional competencies in special fields that must be mastered by vocational graduates. The final result obtained in the implementation of motor generator control with the andragogy method is with an average value of 80.06 from a pretest value of 65.7.

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ENGLISH TRAINING FOR TOUR GUIDES: EMPOWERING THE YOUTH OF PENGASIH, KULONPROGO

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Abstract

To enhance the English language skills of the Karang Taruna (Youth) members in Pengasih Village, Kulonprogo, it is essential to conduct an English language training program in the area, aligned with the growing tourism industry in Kulonprogo Regency. This activity aims to improve the participants' English proficiency, particularly in their role as tour guides, addressing the challenges faced by Karang Taruna members. Furthermore, English proficiency is crucial in meeting the demands of the job market, where it often serves as an additional requirement during job applications. The program involves 30 Karang Taruna members in Pengasih Village, spanning across various age groups. The methods employed include training, mentoring, and practical communication exercises in English. This community service project is implemented over a period of four months, from August to November 2024, covering the stages from proposal drafting to activity reporting. The training and mentoring sessions are conducted both offline and online, totaling 32 hours. The success of this program is evaluated based on participant engagement, attendance rates, and improvements in English proficiency, which are assessed through observations and English language tests. The primary outcome of this initiative is the establishment of a Cooperation Agreement (IA) between the service team and the local Kapanewon office. Additionally, the secondary outcome includes the publication of the results in the proceedings of an international seminar.

Keywords: Training, English Language, Karang Taruna, Tour Guide, Pengasih, Kulonprogo

1. Introduction

The Pengasih Village in Kulon Progo, Yogyakarta, possesses significant potential for tourism development. Various attractive natural and cultural tourist attractions in this region offer substantial opportunities to enhance the local economy through the tourism sector. One of the key factors in maximizing this potential is the active involvement of local youth, particularly members of Karang Taruna, in developing their English language skills as tour guides. However, the primary issue faced is the limited mastery of essential vocabulary and expressions in English required for tour guiding.

Karang Taruna in Pengasih Village is a youth organization that actively participates in various social and economic activities within the village. Although there is a strong desire among its members to contribute to tourism development, many lack sufficient English language skills. This inadequacy hinders their efforts to provide optimal service to foreign tourists and promote Pengasih Village, Kulon Progo, as an attractive tourist destination.

Most members of Karang Taruna have a high school educational background; however, few possess adequate English proficiency to communicate with foreign tourists. Currently, many members of Karang Taruna have begun to engage in local tourism activities, yet they still encounter challenges in English, particularly in vocabulary mastery and the use of English expressions as tour guides.

The condition of the tourism sector in Serut Village indicates that despite the considerable potential of tourist attractions, promotion and service to visitors remain suboptimal. In the upstream sector, limited access to English language training and supporting materials poses a significant challenge. In the downstream sector, the ability to guide and interact with foreign tourists is crucial to enhancing the overall tourism experience and attracting more visitors.

The objective of this community service initiative is to provide English language training to members of Karang Taruna in Pengasih Village, enabling them to enhance their mastery of vocabulary and expressions necessary to become competent tour guides. This training is expected to empower local youth to communicate with foreign tourists confidently and effectively, as well as to promote tourist attractions in Kulon Progo more broadly.

This initiative aligns with the Merdeka Belajar Kampus Merdeka (MBKM) policy, which emphasizes community empowerment through collaboration between higher education institutions and society. The program also supports the Key Performance Indicators (IKU) for universities, specifically focusing on faculty engagement outside the campus. The emphasis of this community service is on empowering the village by enhancing the English language skills of local youth, with the ultimate goal of improving the welfare and independence of Pengasih Village.

The tourism sector plays a significant role in increasing regional income and creating numerous job opportunities for local communities. The diversity of tourist destinations, ranging from natural attractions to cultural experiences, makes Yogyakarta a favorite destination for both domestic and international tourists. One area in Yogyakarta experiencing rapid growth in tourism is Kulon Progo. This regency boasts relatively new but already well-known tourist destinations among visitors [1]. Kulon Progo is increasingly recognized for its natural beauty, including beaches, mountains, and waterfalls, which attract many tourists. Investment in infrastructure and tourism promotion is also crucial in increasing the number of visits to this region.

To support the tourism sector, it is essential to have competent human resources (HR), particularly in terms of English language proficiency. English serves as the primary means of communication utilized by international tourists when visiting tourist destinations. Therefore, strong English language skills will greatly assist tourism practitioners in providing optimal service to foreign visitors. With effective communication, tourists will feel more comfortable and satisfied, which can subsequently enhance the positive image of the tourist destination.

Furthermore, mastering English opens opportunities for tourism practitioners to understand and implement best practices within the global tourism industry. They can participate in international training, read the latest literature, and engage in global conferences, all of which are conducted in English. Thus, tourism practitioners can continuously update their knowledge and skills in line with the latest developments in the tourism sector. Investing in English education and training for tourism HR not only improves service quality but also supports the sustainability and competitiveness of the tourism sector on an international scale.

To enhance the English language skills of Karang Taruna members in Pengasih Village, structured and continuous training is necessary. This training can be designed to teach speaking, listening, reading, and writing skills in English, focusing on situations and contexts relevant to the activities of Karang Taruna in the village. With solid English proficiency, Karang Taruna members can communicate more confidently with visitors or tourism actors coming to their village, enhance their capabilities in managing cultural events, and expand their professional networks with relevant stakeholders at both local and international levels.

Moreover, English language training can also open new opportunities for Karang Taruna members to engage in projects or programs that require cross-cultural communication. They can learn about their local cultural values and traditions in English, enabling them to effectively promote and protect their village's cultural heritage to a global audience. Therefore, investing in English training not only provides direct benefits in improving individual capabilities but also holds the potential to stimulate local economic growth through increased tourism and the promotion of Serut Pengasih Village's rich traditions.

Tourism-focused English language training that emphasizes vocabulary and expressions is crucial for enhancing communication skills in the tourism context. In this training, participants are taught to recognize and utilize vocabulary specific to providing services to tourists, including terms related to the hospitality industry, transportation, and tourist attractions. Additionally, they are trained to master expressions commonly used in daily interactions with tourists, such as welcoming guests, providing information about tourist attractions, and responding to inquiries or complaints.

Mastery of vocabulary and expressions not only enriches the English language skills of participants but also enhances the quality of service they provide to tourists. The importance of vocabulary in language can significantly influence tourist satisfaction during their travels [2]. By achieving a better command of the language, they can communicate information more effectively, understand the needs of tourists, and build positive relationships with visitors. Ultimately, this can lead to increased tourist satisfaction, better promotion of tourist destinations, and support for the overall growth of the tourism sector. Thus, vocabulary will also be an essential component in English language

training for the community, as the first aspect that training participants need to understand is the words they will use in constructing sentences, both in written and spoken forms [3].

2. Method

The methods employed in this program include training, mentoring, and practicing communication in English. The first step in implementing this activity was a thorough identification of the issues faced by the Karang Taruna of Pengasih Village. To delve deeper into these issues, the service team conducted surveys and interviews with Karang Taruna members. The team also identified the level of English proficiency and specific training needs. Based on the survey and interview results, English training materials were designed, focusing on vocabulary and expressions needed for Karang Taruna members in Pengasih Village to become tour guides.

In the implementation phase, the community service team delivered the material through lectures, roleplays, discussions, and question-and-answer sessions. The team also provided the training participants with opportunities for direct practice. At the end of each session, the team conducted reflections to gather feedback from the participants for improvement in subsequent sessions. Additionally, at the end of the training, the team conducted a comprehensive evaluation of the program's implementation and discussed the sustainability of the program in the future. The stages of the community service activity are illustrated in Figure 1 below.

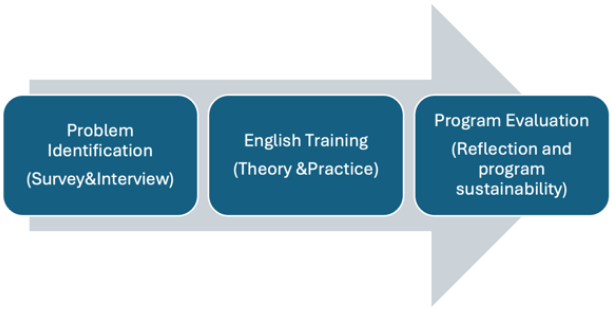


Figure 1. The stages of the community service program

3. Results and Discussion

This community service activity was carried out over a period of four months, from August to November 2024, starting from the preparation of the proposal to the reporting of the activities. The training and mentoring sessions lasted for 32 hours, both offline and online. The offline meetings were held at the Village Hall of Pengasih, Kulonprogo, from 9:00 AM to 3:00 PM WIB. Each meeting consisted of three sessions, with each session covering different material. The distribution of materials for each meeting and session is presented in Table 1 below.

Table 1. The distribution of materials for each meeting and session.

Meeting	Material	PiC
Week 1	- Greetings and Welcoming Guests - Self-Introduction	Rozan (Ilyas)
	Describing Person, Object, Place	Eko
	Explaining Something	Tyas
Week 2	Delivering A Procedure	Eko (Farrij)
	Making/Designing Itinerary	Rozan & Tyas (Ilyas; Riefda)
Week 3	Showing the Way	Tyas (Riefda)
	Parting/Leave-Taking	Eko & Rozan (Farrij; Ilyas)

The training material was developed by the service team, accommodating the needs of the youth organization (Karang Taruna) in the Pengasih village. The designed material focuses on "English for Tour Guide," with the hope of equipping the youth organization with knowledge regarding vocabulary, expressions, phrases, and sentences used in guiding tourists who visit their region.

The training material was prepared with full attention to the specific needs of the members of Karang Taruna in Pengasih. The process of developing this material employed a participatory approach, wherein the service team conducted surveys and discussions with the local village head to identify the needs of Karang Taruna and to understand their challenges and expectations in fulfilling the role of a tour guide.

The primary focus of the designed material is "English for Tour Guide," which aims to equip the youth organization with the knowledge and skills necessary for developing tourism in Pengasih. This material encompasses various important aspects, such as relevant vocabulary, expressions, phrases, and sentences frequently used in interactions with tourists. By understanding specialized vocabulary, participants will be better able to explain tourist attractions, provide information about local culture, and respond to questions that visitors may pose.

Moreover, this material is also designed to help participants build confidence when speaking in English, enabling them to communicate effectively and create positive experiences for tourists. It is hoped that, through this training, the members of Karang Taruna will not only enhance their English language skills but also improve the quality of tourism services in their area, thereby attracting more visitors and positively impacting the local community.



Figure 2. Materials delivery by the community service team

During the training, members of Karang Taruna actively participated in the entire training, mentoring, and practice process. After receiving theoretical training, participants engaged in direct practice through role play as tour guides using English, as illustrated in the following figure.



Figure 3. The training participants are engaging in role play as tour guides.

Roleplay in English language training for tour guides offers various important benefits. This method not only contributes to the improvement of participants' English language skills but also provides highly valuable practical experience in the context of tourism. Roleplay can create situations that closely resemble reality, allowing participants to practice speaking English in contexts relevant to

their profession as tour guides. Communicative English training in the field of tourism can help participants understand and use the vocabulary and phrases necessary for interactions with tourists [4]. Through roleplay practice, participants can hone their speaking skills and feel more confident when communicating with visitors.

In addition to roleplay, the resource persons also employ question-and-answer sessions and discussions with participants. The question-and-answer sessions can encourage active interaction between the resource persons and participants. By providing participants with the opportunity to ask questions, they can clarify information that they may not have fully understood, which in turn will enhance their understanding of the use of English in the context of tourism.



Figure 4. Question and answer session between the instructor and participants.

Furthermore, the question-and-answer session also serves as a tool for evaluating participants' understanding of the material that has been taught. In English training for tour guides, it is essential for participants to comprehend vocabulary and phrases relevant to the tourism industry. The question-and-answer session allows the instructors to assess the extent to which participants have absorbed the information and to identify areas that need improvement. This interaction can help participants better understand grammar as well as the appropriate usage of English in relevant contexts [5]. Thus, this session is not only beneficial for the participants but also provides valuable feedback for instructors regarding the effectiveness of the teaching methods employed.

Additionally, the question-and-answer session can enhance participants' confidence in speaking English. Many trainees feel anxious or fearful about speaking in English, especially in formal situations such as being a tour guide. With the presence of a question-and-answer session, participants have the opportunity to practice speaking in a more relaxed and informal setting. Providing motivation and the chance to ask questions can help participants feel more comfortable using English [6]. This increased confidence is crucial for a tour guide, who must be able to communicate effectively with tourists.

At the end of each meeting, the service team conducts reflection and evaluation of the materials, methods, and training media. Participants are given the opportunity to express ideas and provide feedback during the implementation of the program. Overall, participants indicated that the training has provided positive benefits, such as improving their English language skills in tour guiding, enhancing their confidence in speaking English, and increasing their vocabulary related to tour guiding.



Figure 5. Discussion on Program Sustainability.

To ensure the sustainability of the program, the service team discussed with representatives from the Pengasih village by inviting international students from UNY to visit the village and provide training participants with opportunities to act as guides. Furthermore, the service team also created a WhatsApp Group as a communication medium between the service team and participants for program follow-up.

4. Conclusion

The community service activities in Pengasih Village, Kulon Progo Regency, have successfully enhanced the English language skills of the members of Karang Taruna, particularly in the context of tourism as tour guides.This program provided structured and participatory training that accommodated the specific needs of the members, focusing on relevant vocabulary and expressions. Through interactive training methods, including roleplay and question-and-answer sessions, participants were able to improve their communication skills, build confidence, and understand best practices for interacting with tourists.

The success of this program was also supported by the active participation of the participants, who demonstrated enthusiasm for learning and practicing. Moreover, measures to ensure the sustainability of the program through collaboration with international students from UNY and the use of digital communication platforms will strengthen the relationship between participants and the service team. Thus, it is expected that this activity will not only enhance the English language skills of the members of Karang Taruna but also have a positive impact on the development of tourism and the welfare of the community in Pengasih Village.

Acknowledgement

The Community Service Team expresses gratitude to Yogyakarta State University for facilitating this service activity, allowing the program to proceed smoothly.

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PSYCHOLOGICAL WELL-BEING ENHANCEMENT PROGRAM FOR LP MA'ARIF PWNU DIY SCHOOL LEADERS

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Abstract

This Community Service Program (PkM) was conducted to address issues faced by school leaders regarding counterproductive behavior, including frequent conflicts arising from interactions between colleagues. These issues are suspected to stem from low levels of psychological well-being and a tendency towards dark triad personality traits, which in some cases lead to deviant behavior within educational environments. Therefore, researcher team implemented an intervention aimed at enhancing the psychological well-being of school leaders within the LP Ma'arif NU PWNU DIY. The intervention chosen is Stress Management Intervention (SMI) through psychoeducational sessions. The psychoeducational material was divided into four sessions: stress management assessment, understanding stress, stress management strategies, and empathy and effective communication. Effectiveness of this intervention was evaluated through pre- and post-test. The results indicate that the SMI significantly reduced tendencies toward dark triad traits (narcissism and psychopathy), depression, and stress. Additionally, it improved participants' understanding of stress and their psychological well-being. Overall, the participants' evaluation responses were positive, with some constructive feedback.

Keywords: psychological well-being, dark triad personality, stress management, psychoeducation

1. Introduction

Studies emphasize the significance of teachers' relationships with students [1, 2], colleagues, and principals [3, 4], pointing out that while student-teacher interactions are often emphasized, relationships with colleagues and leaders also impact performance. Lawler, Thye & Yoon [5] found that positive interactions in structured environments yield rewards [6, 7]. However, internal school dynamics can lead to issues such as violence against students, with KPAI reporting teacher violence as a major concern [8], along with power struggles [9] and corruption[10, 11]. Wicaksono et al. [12] and Kusmaryani et al. [13] further explored how personal and professional aspects of colleague relationships influence interaction quality, with teachers seeking support to boost performance and productivity.

Teacher issues often stem from poor well-being. A scoping review by Agyapong et al. [14] found that teachers are highly vulnerable to psychological problems, with burnout (25.12%-74%), stress (8.3%-87.1%), anxiety (38%-41.2%), and depression (4%-77%) affecting them. These issues impact both teachers' physical and mental health, as well as their teaching quality and productivity. Additionally, the review explored the dark triad personality, which is linked to interpersonal problems and destructive behavior, including counterproductive workplace behavior [15].

The PkM team from the UNY Psychology Department aims to improve and strengthen teachers' psychological well-being through a Stress Management Intervention (SMI). SMI involves organizational activities designed to enhance well-being and reduce employee stress by addressing its causes or mitigating its effects [16]. Improved well-being and reduced stress can lead to benefits like better performance, stronger relationships, and lower absenteeism [17]. Holman et al. found that SMI not only reduces stress but also improves overall psychological well-being, including burnout, anxiety, and depression [16].

Lembaga Pendidikan Ma'arif Nahdlatul Ulama (LP Ma'arif NU) is one of the departments within the Nahdlatul Ulama (NU) organization that aims to realize the ideals of NU education. LP Ma'arif NU is a departemental apparatus of Nahdlatul Ulama (NU) which functions as an implementer of Nahdlatul Ulama educational policies, which exist at the level of the Executive Board, Regional Board, Branch Board, and Deputy Branch Board.

An initial interview with the head of LP Ma'arif DIY region revealed issues about school leaders' behavior, including oppositional, emotional, aggressive, and manipulative tendencies, along with unresponsiveness and lack of open-mindedness. These issues suggest underlying personality and psychological well-being problems, likely affecting performance. To investigate further, the study measured psychological factors such as the dark triad personality, depression, anxiety, stress, and psychological well-being.

The dark triad personality refers to a concept encompassing three negative personality traits: Machiavellianism, narcissism, and psychopathy, characterized by a desire for power, status, and dominance in social environments [14, 15, 16]. Individuals exhibiting these traits tend to be insensitive, selfish, and manipulative behavior aimed at achieving personal goals; narcissism refers to excessive self-centeredness; while psychopathy is marked by impulsivity, recklessness, and a lack of empathy [15].

Depression is an emotional disorder characterized by feelings of sadness, loss of interest, hopelessness, and accompanied by physical symptoms such as fatigue, sleep disturbances, and decreased energy [19]. The aspects measured in depression include dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia, all of which are associated with a diminished ability to engage in daily activities.

According to the American Psychological Association (APA), anxiety is defined as a condition characterized by physical tension, worry, and physical changes such as increased heart rate and blood pressure. Anxiety arises from irrational thought patterns and dysfunction in the neural circuits that regulate emotion and cognitive control [20]. This response encompasses aspects such as autonomic arousal, skeletal musculature effects, situational anxiety, and the subjective experience of anxiety [19, 21].

Lovibond defines stress as a negative emotional response that arises when demands exceed an individual's coping ability, often causing anxiety, tension, and overwhelm [19]. Stress affects health directly via autonomic and neuroendocrine responses, and indirectly through behaviors that can lead to physical illnesses like cardiovascular diseases [22]. It encompasses aspects such as difficulty relaxing, nervous arousal, irritability, over-reactivity, and impatience.

Psychological well-being (PWB) refers to a positive perception of oneself and life, satisfying relationships, and the ability to face life's challenges [23]. According to Ryff and Keyes [24], there are six aspects to consider in psychological well-being: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth.

After identifying the psychological factors affecting school leaders, intervention solutions are needed. Enhancing psychological well-being and reducing stress through SMI hopefully would address issues such as oppositional behavior, emotional reactivity, aggression, manipulation, unresponsiveness, and closed-mindedness. Supported by LP Ma'arif NU PWNU DIY, the program aims to improve school leaders' well-being and equip them with stress management skills for more effective contributions to their institutions.

2. Method

This community service program (PkM) was designed based on the Stress Management Intervention (SMI) model, focusing on psychoeducation about stress. The material presented was designed according to necessity. The material was divided into four sessions: stress management assessment (session 1), understanding stress (session 2), stress management strategies (session 3), and empathy and effective communication (session 4). The methods of activity used in the intervention included assessments, lectures, discussions, and games.

The analysis of effectiveness of this intervention was conducted using both quantitative and qualitative approaches. Quantitatively, the study was designed using one group pre-post test design to observe and analyze the differences condition before and after the intervention. Data collection was done through questionnaires, including psychological scales and open-ended questions for activity evaluation. The scales used were the Short Dark Triad (SD-3) personality test, the Depression Anxiety Stress Scales (DASS), the Psychological Wellbeing (PWB) Scale, true-false questions to assess understanding of the material, and evaluation questions.

3. Results and Discussion

This social service activity program (PkM) was designed to address the issues faced by school leaders of LP Ma'arif NU PWNU DIY. Issues arising among teachers may be caused by several factors, such as poor mental well-being [14], bad relationships among colleagues [6, 7], and tendencies toward dark triad personality traits [15]. These factors can negatively affect the teachers' physical and mental health, as well as impact the quality of their teaching and work productivity. To address this challenges, Stress Management Intervention (SMI) was implemented to improve and strengthen the psychological well-being of participants. This intervention was selected based on a literature review by [16], which found that SMI impact not only reduce stress but also boarder to enhance overall psychological well-being.

The participants in this study were 69 school leaders from LP Ma'arif NU PWNU DIY (M_{age} = 40.64; N_{female} = 39; N_{male} = 30). The analysis began by testing normality assumption using Kolmogorov-Smirnov test. The results indicate that only psychological well-being was normally distributed, while the other variables were not. Then, normally distributed variables were tested using paired sample independent test, while others used Wilcoxon test. The results of the analysis can be seen in the following table 1 and 2.

Table 1. Wilcoxon test result (pre-post test)

	Z	Asymp. Sig. (2-tailed)
Machiavelianism	-1,949	0,051
Narcissism	-4,128	<0,001*
Psychopathy	-5,921	<0,001*
Depression	-2,102	0,036*
Anxiety	-1,881	0,06
Stress	-2,419	0,016*
Content understanding	-6,365	<0,001*

* = significant

Table 2. Paired sample T-test result

	t	df	Sig. (2-tailed)
Psychological Wellbeing	-13,291	68	<0,001*

* = significant

Analysis of the intervention result showed significant differences in variables such as narcissism, psychopathy, depression, stress, psychological well-being, and participant's understanding comparing beginning and end of the intervention. However, variables such as Machiavellianism and anxiety did not show significant differences, although their values were close to the threshold of significance. The qualitative shows positive evaluation responses from participants too, with some constructive feedback. These results indicate that generally the SMI successfully improved the psychological well-being of the school leaders of LP Ma'arif NU PWNU DIY.

The effectiveness of SMI could be attributed to the well-tailored content, which was carefully designed to meet the specific needs of the participants. The intervention used a psychoeducation method to teach about the stress itself and strategies for managing it both personally and professionally. Dolan et al. [25], in a meta-analysis, revealed that psychoeducation has a significant effect on reducing global stress, anxiety, and depression. Similarly, Van Daele et al. [26], in their meta-analysis, found that psychoeducational models on stress effectively reduce stress. These programs are also considered more efficient as they can be conducted in a group setting, saving time and effort.

This program only required a single-day meeting consisting of four sessions with a total duration of seven hours. The four sessions of this intervention had different aims, yet interconnected content. The first stress management assessment session aimed to raise participant's awareness of workplace stressors they experienced by self-assessing themselves. The second session about understanding stress provided psychoeducation about stress, including myths, theories, and the impact of stress psychologically or physically. The third, stress management strategies session, focused on stress management. It's teaching participants how to manage themselves to avoid being reactive and practice mindfulness. Hidajat et al. [27] in his systematic review, found that mindfulness-based interventions

show promising results in reducing stress and burnout. The final session covered empathy and effective communication, focusing on stress management in interactions with colleagues.

4. Conclusion

Overall, this community service program (PkM) successfully and significantly improved the psychological well-being of school leaders of LP Ma'arif NU PWNU DIY. The program effectively reduced levels of dark triad traits such as narcissism, psychopathy, depression, and stress, while also enhancing participants' psychological well-being and understanding toward stress. The intervention used was Stress Management Intervention (SMI), incorporating psychoeducation in it. The content covered various topics that designed according necessity, including stress management assessment, understanding stress and its effects, strategies for managing stress, and fostering empathy and effective communication.

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STRENGTHENING EARLY CHILDHOOD MANAGEMENT THROUGH THE INTEGRATION OF ENTREPRENEURSHIP SOCIAL VALUES: A CASE STUDY AT ABA SUKOREJO WEDI KLATEN KINDERGARTEN

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Abstract

This community service program aims to strengthen the management of Early Childhood Education (PAUD) management through the integration of entrepreneurship social values at ABA Sukorejo Kindergarten, Wedi, Klaten. This program includes training and mentoring for PAUD managers in resource management, sustainable program development, and social entrepreneurship skill improvement. The results of this program showed a significant increase in managers' understanding of innovation in the management of educational institutions, with 85% of participants stating a better understanding. In addition, this program successfully involves parents in the children's learning process through the "Learning with the Community" program, which has a positive impact on children's learning motivation and social-emotional skills. The manager has also succeeded in implementing a more transparent and accountable financial management system, as well as designing new programs based on social needs. The challenge in the limited time of participants to take part in the training is overcome by a combination of face-to-face and online training. Community involvement in supporting PAUD operations has also increased, as seen from the contribution of parents in the form of donations of teaching materials and volunteers. Thus, this program has succeeded in increasing the capacity of PAUD managers in carrying out sustainable entrepreneurship social-based management.

Keywords: social entrepreneurship; PAUD; education management; parental involvement; community service; ABA Kindergarten

1. Introduction

Early Childhood Education (PAUD) is an important foundation in child development, because this period is a golden period in children's physical, cognitive, social, and emotional development. Early childhood education institutions such as kindergartens (TKK) have a strategic role in supporting children's growth and development. However, challenges in early childhood education management often arise, especially in terms of resource management and sustainability. To overcome this, the integration of entrepreneurship social values can be an innovative solution in strengthening early childhood education. This article discusses how to strengthen the management of PAUD management in ABA Kindergarten through the application of social entrepreneurship values in community service programs.

ABA Sukorejo Wedi Klaten Kindergarten is one of the PAUD Institutions that has been established for a long time, but faces various challenges in its management, especially in terms of resource management efficiency, sustainable program development, and community involvement. Social entrepreneurship values, which emphasize social innovation, sustainability, and community empowerment, are believed to be able to provide solutions to these problems. Social entrepreneurship focuses not only on achieving economic benefits, but also on broader social impacts, which is especially relevant for early childhood education and development institutions.

Social entrepreneurship involves the creation of innovations that have a social impact by utilizing existing resources creatively and efficiently (Bacq & Janssen, 2011). In the context of PAUD, managers can adopt the principles of entrepreneurship by doing, namely; first, educational program innovation (Palacios-Marqués et al., 2019; Yusuf et al., 2022). Early childhood education managers can develop educational programs that not only educate children, but also empower parents and the surrounding community. For example, skills training programs for parents or community members that can support

children's learning processes at home and at school. This can create active involvement of the community in children's education.

Second, resource optimization. Many PAUD face limited resources, both in terms of funding and facilities. Social values of entrepreneurship can help managers to be more creative in optimizing the use of existing resources. For example, through cooperation with social institutions or companies that have corporate social responsibility (CSR) to support early childhood education programs. Third, improving the quality of management and leadership. Early childhood education managers can integrate modern management practices that are oriented towards social outcomes. This includes more strategic planning, participatory decision-making, and transparent and accountable financial management. Strong and innovative leadership is needed to create the sustainability of the PAUD program.

Community service programs focused on the integration of entrepreneurship social values in an effort to strengthen the management of ABA Sukorejo Wedi Klaten Kindergarten management can be carried out with several main activities; First, social entrepreneurship-based management training. The community service team provided training to the manager of ABA Sukorejo Wedi Klaten Kindergarten on the basic concept of social entrepreneurship and its application in the context of education. The training covers innovative and sustainable program development strategies, financial management, and strengthening community engagement. Second, assistance in program implementation. After the training, the community service team continues to assist kindergarten managers in implementing the programs that have been planned. This assistance includes periodic monitoring and evaluation to ensure the successful integration of entrepreneurship social values in PAUD management.

2. Method

This community service activity was carried out at ABA Sukorejo Wedi Klaten Kindergarten from June to September 2024. This kindergarten was chosen because it has a special need in strengthening urgent management and openness to new approaches. The main target in this activity is the manager of ABA Sukorejo Kindergarten, which consists of the principal, treasurer, and teachers with a total of 5 people. In addition, parents of students and the Foundation were also involved in community empowerment sessions. A participatory approach is used in this activity, where each kindergarten manager is actively involved in planning and decision-making. The methods used include entrepreneurship-based social management training, and intensive assistance in program implementation. This activity is carried out in several stages, namely; First, needs analysis. The stage is to conduct interviews with kindergarten managers to identify management problems. Second, training. The stage provides training on the basic concepts of social entrepreneurship and how to integrate them in the management of early childhood education. Third, the implementation, ABA kindergarten managers apply the concepts that have been learned with the guidance of the service team. Fourth, monitoring and evaluation, conducting regular visits to monitor progress and provide feedback related to implementation.

The tools and materials used in the training include social entrepreneurship training modules, stationery, and simple software for PAUD financial management. The evaluation was carried out through questionnaires filled out by kindergarten managers before and after the training, as well as interviews to evaluate the effectiveness of implementation in the field. Monitoring is carried out every two weeks for three months. The main challenge faced is the limited time of kindergarten managers to participate in intensive training. To overcome this, the training is carried out in stages and partly through online media so that time flexibility is more maintained.

3. Results and Discussion

After the training, there was a significant increase in the understanding of ABA kindergarten managers towards the concept of social entrepreneurship, especially in terms of resource management and sustainable program development.



Figure 1. Training for Kindergarten Teachers and Managers Session 1



Figure 2. Training for Kindergarten Teachers and Managers Session 2

Based on the evaluation questionnaire, 85% of participants stated an increase in their understanding of the importance of innovation in the management of educational institutions. This is in line with research that shows that training in social entrepreneurship can increase the capacity of individuals to manage resources and design innovative programs oriented to the needs of the community (Weerawardena & Sullivan Mort, 2006).

ABA Kindergarten has successfully implemented a new educational program that involves the active participation of parents in the children's learning process, in accordance with the social values of entrepreneurship. Parental participation not only increases their involvement in children's education, but also has a positive impact on the development of children's social skills. In the context of early childhood education, family involvement plays an important role in supporting the holistic development of children. Other studies have also shown that parental involvement in the learning process increases children's motivation to learn as well as children's social-emotional skills (Henderson & Berla, 1994).

In addition, the manager managed to develop a more transparent and accountable financial management system, which has been implemented since the second month of the program. Transparency in financial management is one of the main principles in social entrepreneurship that can increase the confidence of various stakeholders, including the community, donors, and the government. This improvement in financial management allows ABA kindergartens to manage funds more efficiently and ensure the sustainability of the programs that have been developed (Yoo, 2016).

The quality of learning at ABA Kindergarten has improved significantly after parents are involved in the "learning with the community" program. Teachers reported an increase in children's motivation to learn, which was shown through active participation in classroom activities and an increase in children's social-emotional abilities. Community-based programs like this have a great impact on creating a holistic learning environment and supporting children's cognitive, social, and emotional development (Hoover-Dempsey & Sandler, 1997).

Community involvement in supporting ABA Kindergarten operations is increasing. Through the "community cares for education" program, local residents began to contribute in the form of donations of teaching materials, volunteers, and moral support for managers and teachers. Strengthening collaboration between educational institutions and local communities is one of the effective ways to improve the sustainability of educational institutions, especially in areas with limited resources. (Yusuf et al., 2022)

After the service activities were completed, the ABA Kindergarten manager has shown the ability to run a program that was developed independently. A sustainability plan that includes fundraising strategies and ongoing cooperation with the community has been drawn up by the management team. This program is projected to continue with minimal assistance from the service

team. Program sustainability is one of the indicators of the success of community service, especially if participants can apply the knowledge and skills acquired independently (Suharni, 2019).

ABA kindergarten managers demonstrated improved skills in managing limited funds and resources through innovative fundraising strategies involving local communities and donors. The manager also succeeded in designing new programs that are creative and oriented to social needs, such as skills training for parents. According to the literature, innovations in fundraising strategies can provide sustainable solutions for educational institutions that have limited budgets (Bloom & Chatterji, 2009).

The main challenge faced is the limited time of teachers and managers to attend all training sessions in full. The solution is to combine all face-to-face sessions with online training so that it is more flexible for the participants (Garrison & Kanuka, 2004). Flexibility in training is essential to ensure that participants with limited time can remain actively involved in the program. In addition, difficulties in attracting parental involvement are overcome by providing incentives in the form of skills training sessions that are beneficial for parents. This approach not only increases participation, but also strengthens the relationship between schools and families.

4. Conclusion

Strengthening management at ABA Sukorejo Wedi Klaten Kindergarten through the application of entrepreneurship social values in community service programs has succeeded in increasing the effectiveness and sustainability of the institution. By integrating the principles of social entrepreneurship, such as program innovation, resource optimization, and improving the quality of management and leadership, kindergarten managers are able to develop educational programs that are not only beneficial for children, but also actively involve parents and the community. The training and mentoring provided allowed managers to apply the concept of social entrepreneurship independently, with results that included increased financial transparency, higher community involvement, and increased motivation and social-emotional skills of children.

The success of this program is also demonstrated through the ability of managers to develop sustainable programs that involve support from local communities and donors, as well as the implementation of innovative fundraising strategies. Challenges faced during the training process, such as limited time for participants and lack of parental involvement, were successfully overcome with an online training approach and relevant incentives for parents. Overall, the integration of entrepreneurship social values has proven to be effective in strengthening the management and sustainability of the PAUD institution, as well as having a positive impact on the development of children and the surrounding community.

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RELEVANCE OF TASK ANALYSIS OF TPACK COMPETENCY WITH WORK ENVIRONMENT OF VOCATIONAL HIGH SCHOOL TEACHERS ON BUILDING DESIGN, MODELING, AND INFORMATION ELEMENT CONSTRUCTION COST PLANNING AND SCHEDULING IN SPECIAL REGION OF YOGYAKARTA

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Abstract

This research aims to determine (1) the level of TPACK competency mastery of vocational high school teachers in Design, Modeling, and Building Information on the elements of Cost Planning and Construction Scheduling, (2) the level of TPACK competency mastery in the work environment in the field of cost planning and construction scheduling, and (3) the relevance of TPACK competency between Vocational High Schools teachers in Design, Modeling, and Building Information and the work environment in the elements of Cost Planning and Construction Scheduling. This research uses a descriptive method with a quantitative approach. The sampling technique in this study employed simple random sampling, resulting in a sample of 10 Vocational High Schools teachers from the Design, Modeling, and Building Information program and 10 employees/laborers from the industry partners of each school. Data collection in this study was done through questionnaires and interviews. The results show that the TPACK competency of Vocational High Schools teachers in the elements of Cost Planning and Construction Scheduling is excellent, with a percentage score of 88.66%. The same is true for the TPACK competency of the workforce in the elements of Cost Planning and Construction Scheduling, which also falls into the excellent category, with a percentage score of 88.66%. Furthermore, the Wilcoxon test results show that there is a relevance between the TPACK competencies of teachers and the work environment.

Keywords: Relevance, TPACK, Teachers, Work Environment.

1. Introduction

Science and technology (S&T) have undergone significant development and will continue to progress as time goes on. This development has given rise to new ideas and forms of knowledge and technology that bring advancements to various sectors of life, including education. There are several positive impacts of technology use in the education world, such as serving as a source of knowledge and a center of learning, the emergence of new teaching methods that facilitate the learning process for both students and teachers, the existence of data management systems for assessment results that ease teachers' work, and the ability to quickly meet the demand for educational facilities (Akbar & Noviani, 2019).

The tangible manifestation of the development of science and technology (S&T) is the industrial revolution. According to Annisa (2021), the industrial revolution refers to a leap or surge that brings human life toward a more advanced or modern direction, with the goal of making life easier for people. From this explanation, it can be understood that humans will always evolve by making progress through utilizing the advancements in science and technology so that they can live their lives more easily.

In Prasetyo and Trisyanti (2018), The Fourth Industrial Foundation states that the world has undergone four stages of revolution, namely: 1) Industrial Revolution 1.0, which occurred in the 18th century through the invention of the steam engine that allowed mass production of goods, 2) Industrial Revolution 2.0, which took place in the 19th-20th century with the use of electricity, making production costs cheaper, 3) Industrial Revolution 3.0, which occurred around the 1970s with the use of computerization, and 4) Industrial Revolution 4.0, which emerged around the 2010s with artificial intelligence and the Internet of Things, becoming the backbone of human and machine movement and

connectivity. From the explanation above, it is clear that humans are now living in the era of the Fourth Industrial Revolution.

In the era of the Fourth Industrial Revolution, the industrial world will require human resources capable of keeping up with and utilizing the ongoing advancements, including in the construction sector. Construction is a field focused on development, which can include buildings, roads, bridges, airports, dams, and many others. In the construction sector, various types of jobs have adapted to technological advancements. For example, in building planning, what was initially done by hand with paper and pen has now shifted to the use of software, which is much more efficient. Similarly, the calculation of work volumes and cost requirements, which used to be done manually, is now simplified with the use of software. Even more recently, there is a technology called Building Information Modelling (BIM), which can be used to handle multiple aspects of construction work simultaneously. Therefore, to keep pace with these developments, it is reasonable to expect the industry to require a workforce with the appropriate competencies.

The needs of the industrial world present a challenge for vocational education in the construction field, such as Vocational High Schools with a concentration in Design, Modeling, and Building Information. Vocational High Schools with a Design, Modeling, and Building Information concentration are required to prepare their graduates to become skilled workers with competencies that align with the demands of the construction industry. This is in line with the opinion of Prasetyo & Trisyanti (2018:26), who mention two approaches to addressing the Fourth Industrial Revolution: preparing relevant education that aligns human resources with the needs of the times, and equipping human resources with educational values taught through the social humanities. To achieve this, a curriculum needs to be developed in accordance with the needs of the industry. Additionally, professional and competent teachers are required. One of the competencies that teachers must have in this context is Technology, Pedagogy, and Content Knowledge (TPACK).

TPACK is the knowledge of combining its elements—technology, pedagogy, and content—simultaneously. This competency is very important for a teacher because it can be used to enhance the quality of teaching in line with existing demands and changes (Hidayati, Setyosari, & Soepriyanto, 2019:292). With TPACK competency in Vocational High Schools teachers in the Design, Modeling, and Building Information concentration, it is expected that they can maximize students' knowledge and skills by keeping up with developments in the field, so that future workers can meet the industry's needs.

From the observations that have been conducted, there are 12 vocational high schools in the Special Region of Yogyakarta with a concentration in Design, Modeling, and Building Information. The observation also revealed the number of teachers responsible for the Cost Planning and Construction Scheduling element at each school. Each of these Vocational High Schools has industrial partners scattered across the Special Region of Yogyakarta. These partners are companies working in the construction field as designers or field implementers.

To determine whether the education being implemented aligns with the needs of the industry, it is necessary to assess the TPACK mastery of Vocational High Schools teachers and analyze its relevance to the industry's requirements. Among the many schools and industrial partners, there is no data indicating the level of TPACK mastery among teachers or the relevance between teachers' TPACK competencies and the industry's needs. Therefore, research is needed on the mastery of TPACK competencies among teachers in relation to industry needs to determine whether there is relevance between the two.

2. Method

The research method used in this study is a descriptive method with a quantitative approach. The study was conducted from August 2024 to September 2024 in the Special Region of Yogyakarta Province. Sampling in this study employed the simple random sampling technique, resulting in a sample of 10 Vocational High Schools teachers from the Design, Modeling, and Building Information program, and 10 employees/workers from the industry partners of each school. The details of the schools and their industry partners are shown in Table 1 below.

Table 1. List of Schools and Industry Partners

No	Schools	Industry Partners
1	SMK N 3 Yogyakarta	PT. Pola Data Consultant

No	Schools	Industry Partners
2	SMK N 1 Seyegan	PT. Elcentro Engineering Consultant
3	SMK N 1 Sedayu	CV. Sarana Reka Mandiri
4	SMK N 2 Pengasih	CV. Arsita Kencana
5	SMK N 2 Wonosari	CV. Trigonal
6	SMK N 2 Depok	PT. IKA
7	SMK N Yogyakarta	CV. Anugrah Hatatah Indah
8	SMK N 1 Ngawen	CV. Cipta Persada Mandiri
9	SMK Muhammadiyah 3 Yogyakarta	Sellora Design Studio
10	SMK Muhammadiyah Pakem	PT. Saraswati Indoland Developement

The variables in this study are the TPACK competency mastery of Vocational High Schools teachers in Design, Modeling, and Building Information, and the employees/workers of industry partners in the elements of Cost Planning and Construction Scheduling.

Data collection in this study used questionnaires and interviews. The use of questionnaires aimed to obtain information on TPACK competency mastery from the respondents. The questionnaires were designed using a Likert scale to measure the level of TPACK competency mastery of respondents on each item. Interviews were conducted to explore the respondents' TPACK competency mastery in more detail to obtain more valid and reliable results.

This study uses descriptive statistical data analysis techniques to measure the level of TPACK competency mastery among Vocational High Schools teachers. To calculate the TPACK competency mastery score, the Hypothetical Mean and Hypothetical Standard Deviation can be determined. The formulas for calculating the Hypothetical Mean and Hypothetical Standard Deviation are as follows:

$$Xi = \frac{1}{2}(Xmax + Xmin)$$

Keterangan:
Xi : Hipotetic Mean
Xmax : Highest Score
Xmin : Lowest Score

$$Sdi = \frac{1}{2}(Xmax - Xmin)$$

Keterangan:
Sbi : Hipotetic Standar Deviation
Xmax : Highest Score
Xmin : Lowest Score

The obtained scores are then categorized based on the score range. The table of score categories is as follows:

Table 2. Score Range Value Categories

Categories	Score Range
Very Good	X ≥ Xi +1,5 Sbi
Good	Xi + 1,5 Sdi > X ≥ Xi
Poor	Xi > X ≥ Xi – 1,5 Sdi
Very Poor	X < Xi -1,5 Sdi

In addition to the descriptive statistical analysis technique, this study uses the Wilcoxon signed-rank test to determine whether there is relevance between the TPACK competency mastery of Vocational High Schools teachers and their industry partners. Based on Sudjana (1995), the test begins by pairing and ranking the scores between the Vocational High Schools teachers and their industry partners. From these paired scores, the difference between the two values is then calculated. Each difference from the paired scores is ranked, without considering the positive or negative sign. The rankings are then separated based on the positive (+) and negative (−) signs of the difference values.

The smallest ranking between the two signs is then summed absolutely to obtain the Jhitung value. This result is then compared with the J value in the table, based on the significance level (α) used. If the Jhitung result is less than or equal to the Jtable, then H0 is rejected and H1 is accepted. Below is the table of critical values (J) for the Wilcoxon test according to Sudjana (1995):

Table 3. Critical Values of the Wilcoxon Test

Sample Size	Significance Level	
	0,01	0,05
6	-	0
7	-	2
8	0	4
9	2	6
10	3	8
11	5	11
12	7	14
13	10	17
14	13	21
15	16	25
16	20	30
17	23	35
18	28	40
19	32	46
20	38	52
21	43	59
22	49	66
23	55	73
24	61	81
25	68	89

3. Result and Discussion

The research was conducted at 10 representative Vocational High Schools with a Design, Modeling, and Building Information concentration, along with their industry partners in the field of construction and building technology in the Special Region of Yogyakarta, which were considered to adequately represent all Design, Modeling, and Building Information Vocational High Schools and their industry partners in the region. The 10 Vocational High Schools and their industry partners include: SMKN 3 Yogyakarta, SMKN 1 Seyegan, SMKN 1 Sedayu, SMKN 2 Pengasih, SMKN 2 Wonosari, SMKN 2 Depok, SMKN 2 Yogyakarta, SMKN 1 Ngawen, SMK Muh. 3 Yogyakarta, and SMK Muh. Pakem. Meanwhile, the industry partners that have collaborative relationships with these Design, Modeling, and Building Information of Vocational High Schools include CV. Sarana Reka Mandiri, PT. Elcentro Engineering Consultant, PT. Pola Data Consultant, CV. Arsita Kencana and CV. Trigonal, CV. Anugrah Hatatah Indah, CV. Sellora Design, CV. Cipta Persada Mandiri, PT. Saraswati Indoland Development, and PT. IKA. After conducting the research, the following results were obtained:

a. Research Results

1) Level of TPACK Competency Mastery among Vocational High Schools Teachers

The results of the percentage score calculations and qualitative criteria for TPACK competency mastery among Vocational High Schools teachers are presented in Table 4 below.

Table 4. Scores and Criteria for TPACK Competency Mastery Levels of Vocational High Schools Teachers

No	TPACK component item	Score (%)	Qualitative Criteria
1	CK	89,17	Very Good
2	TK	88,75	Very Good
3	PK	90,36	Very Good
4	PCK	88,00	Very Good
5	TCK	83,10	Very Good
6	TPK	83,75	Very Good
7	TPACK	97,50	Very Good
	Average	88,66	Very Good

2) Level of TPACK Competency Mastery among Industry Partners

"The results of the percentage score calculations and qualitative criteria for TPACK competency mastery among industry partners (DUDI) are presented in Table 5 below."

Table 5. Scores and Criteria for TPACK Competency Mastery Levels of Industry Partners

No	TPACK component item	Score (%)	Qualitative Criteria
1	CK	88,75	Very Good
2	TK	81,25	Very Good
3	PK	86,67	Very Good
4	PCK	83,75	Very Good
5	TCK	80,63	Good
6	TPK	75,83	Good
7	TPACK	82,50	Very Good
	Average	82,77	Very Good

3) Relevance of TPACK Competency between Vocational High Schools Teachers and Industry Partners

The results of the Wilcoxon test for TPACK competency between Vocational High Schools teachers and industry partners are presented in Table 6 below.

Table 6. Wilcoxon Test Table

School/Industry	School Scores	Industry Parner Scores	Difference	Difference Rank	+	-	Ji
1	103	98	-5	4		4	
2	99	90	-9	6		6	
3	105	87	-18	10		10	
4	100	86	-14	9		9	
5	97	104	7	5	5		5
6	103	91	-12	8		8	
7	86	88	2	2	2		2
8	88	85	-3	3		3	
9	103	92	-11	7		7	
10	98	97	-1	1		1	
						J_{cal}	7

The null hypothesis (H0) of this study is that there is no relevance between the TPACK competency of Vocational High Schools teachers and industry partners (DUDI). Meanwhile, the alternative hypothesis (H1) is that there is relevance between the TPACK competency mastery of

Vocational High Schools teachers and industry partners. The condition for accepting H1 is that the J_{cal} value must be less than J_{table}.

From the calculation in Table 6, the Jhitung value is 7. The significance level (α) used in this study is 0.05. Based on Table 3, with α = 0.05 and a sample size of 10, the Jtabel value is 8. Based on these values, it can be seen that J_{cal} (7) < J_{table} (8). Therefore, H1 of this study is accepted.

b. Discussion

The analysis results of content knowledge competence in schools and industries showed an average score of 89.17% and 88.75%, respectively, both falling within the "very good" category. These results indicate that the respondents have very good mastery and understanding of the subject matter. For technology knowledge competence, the average scores in schools and industries were 88.75% and 81.25%, respectively, both within the "very good" category. These results demonstrate that the knowledge of technology usage is very good. For pedagogical knowledge competence, the average scores in schools and industries were 90.36% and 86.67%, respectively, both within the "very good" category. These results indicate that the knowledge of mastering pedagogical teaching practices is very good. For pedagogical content knowledge competence, the average scores in schools and industries were 88.00% and 83.75%, respectively, both within the "very good" category. These results show that the respondents are highly capable of delivering diverse teaching materials in both Vocational High Schools and industries, as well as using appropriate models, media, and teaching methods in alignment with the content, which is very good.

The technology content knowledge competence in schools and industries showed average scores of 83.10% and 80.63%, respectively, both in the "very good" category. These results indicate that knowledge and usage of various technologies used in teaching and the workforce are very good. However, the use of the latest technology, such as BIM (Building Information Modeling), in both Vocational High Schools and industry remains low, and therefore, the use of BIM in the Cost Planning and Construction Scheduling element needs to be improved. For technology pedagogical knowledge competence, the average scores in schools and industries were 83.75% and 75.83%, respectively, both in the "very good" category. These results indicate that knowledge of technology to create new perspectives on certain materials in Vocational High Schools is very good, while in the industry, it is categorized as "good." In Vocational High Schools, BIM technology does not yet align with the applied learning model, while in the industry, the use of BIM for delivering information is still insufficient. For technology pedagogical and content knowledge competence, the average scores in schools and industries were 97.50% and 82.50%, respectively, both within the "very good" category. These data show that respondents have excellent mastery of material integration, presentation, and the use of technology.

Based on the qualitative criteria in Table 4, it is shown that the TPACK competence of the teachers in the Cost Planning and Construction Scheduling element at Vocational High Schools with a Design, Modeling, and Building Information concentration in the Special Region of Yogyakarta is very good for all TPACK components, with an overall score of 88.66%. The highest percentage is seen in the TPACK aspect with a score of 97.50%, while the lowest percentage is found in TCK (Technology Content Knowledge) at 83.10%. The factor contributing to the lower percentage in the TCK aspect is that many teachers are still not using BIM technology in the preparation of cost planning and construction scheduling. Meanwhile, the competency of industrial employees in partner industries also shows that all TPACK components are very good, with an overall score of 82.77%. The highest percentage is found in the CK (Content Knowledge) aspect with a score of 88.75%, while the lowest is in the TPK (Technological Pedagogical Knowledge) aspect with a score of 75.83%. The factor influencing the lower score in the TPK aspect is that the use of BIM for delivering information by employees is not yet optimal. Based on the Wilcoxon test results above, it can be seen that the calculated value of Jhitung is smaller than the table value (Jtabel). This result indicates that the null hypothesis (H0) is rejected, and the alternative hypothesis (H1) is accepted. This means that there is a relevance between the TPACK competence of the teachers and the needs of the industrial partners (DUDI). This finding shows that vocational education is aligned with the needs of the industry in the era of Industry 4.0. This alignment between vocational education and industry needs can optimize the competencies of Vocational High Schools graduates as human resources who are competitive in the workforce, while also minimizing the unemployment rate of graduates from the Design Modeling and Building Information Concentration programs.

4. Conclusion

Based on the research results and discussion above, it can be concluded that the TPACK competence of Cost Planning and Construction Scheduling teachers in Vocational High Schools with a Design, Modeling, and Building Information concentration in the Special Region of Yogyakarta is very good for all TPACK components, with an overall score of 88.66%. The highest percentage is found in the TPACK aspect with a score of 97.50%, while the lowest percentage is in TCK (Technology Content Knowledge) at 83.10%. The same results were observed for the TPACK competence of DUDI, which also falls into the "very good" category with an overall score of 82.77%. The highest percentage is in the CK (Content Knowledge) aspect with a score of 88.75%, while the lowest percentage is in the TPK (Technological Pedagogical Knowledge) aspect with a score of 75.83%. Furthermore, the results of the Wilcoxon test indicate that there is a relevance between the TPACK competence of Vocational High Schools teachers and DUDI.

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FACTORS INFLUENCING STUDENT SATISFACTION IN INTERNATIONAL ACCREDITATION STUDY PROGRAM

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Abstract

This study aims to develop and validate an instrument to measure the quality of higher education services in FIBAA-accredited programs, focusing on modifying the HEDPERF framework to better fit the characteristics of internationally accredited programs, an area with limited prior research. Using a survey method, data were collected from 140 students enrolled in FIBAA-accredited programs at Universitas Negeri Yogyakarta, with Exploratory Factor Analysis (EFA) and Cronbach's alpha applied to test the instrument's validity and reliability. The analysis identified 36 valid items across five components: institutional facilities, academic services administrative staff, non-academic services administrative staff, academic services for teaching staff, and international activities support, explaining 63.95% of the total variance. The instrument demonstrated high reliability with a Cronbach's alpha score of 0.97, indicating its robustness for evaluating service quality in higher education. The findings offer a reliable tool for identifying areas of improvement in service delivery, thereby enhancing student satisfaction and supporting international accreditation. Future research could explore the use of this model in different cultural contexts and integrate AI-based feedback systems for more dynamic service quality assessment.

Keywords: Higher Education Service Quality, HEDPERF, FIBAA Accreditation

1. Introduction

The quality of higher education is an urgent demand, both as a mandate of laws and regulations and a form of accountability to stakeholders. Students, as the main customers, must receive adequate facilities to achieve satisfaction during their education. This satisfaction is an emotional reaction that arises after students compare their expectations with the performance received [1]. If expectations are met, students will feel satisfied, but if they are not met, disappointment can occur. Therefore, the quality of educational services greatly influences students' perceptions of higher education institutions.

Student satisfaction also plays an important role in accreditation, both nationally and internationally, as regulated by the Foundation for International Business Administration Accreditation (FIBAA) accreditation agency. Higher education institutions that succeed in providing quality services will receive the highest score on the relevant accreditation. FIBAA accreditation, achieved by several study programs at Yogyakarta State University in 2022, is proof that the management of education at the university has met the set quality standards. To maintain this accreditation, institutions must continue to improve services by identifying factors that influence student satisfaction, so that they can take strategic steps in maintaining the quality of education provided.

Service quality in higher education has been a focus in the service marketing literature, particularly in relation to consumer perception [2], [3], [4]. Perceived quality is defined as the consumer's assessment of the service experience [5], which is influenced by the comparison between consumer expectations and actual experiences [6]. In the context of higher education, instruments used to measure service quality include SERVQUAL and HEDPERF. HEDPERF (Higher Education Performance-only) was developed specifically to measure higher education service quality with more focus on actual performance aspects than expectations [7], [8]. Both SERVQUAL and HEDPERF have been validated in the higher education sector, with SERVQUAL being more widely used to measure the gap between expectations and perceptions, while HEDPERF focuses more on direct service performance assessments.

Student satisfaction as consumers is measured through an evaluation of the services received by comparing the expected results with those obtained [9]. Dimensions of student satisfaction can be seen from several aspects, including confirmation of expectations, repurchase intentions, and willingness to recommend [10]. Indicators of student satisfaction include overall satisfaction with the service, conformity to expectations, and the tendency of students to recommend the service to others [11].

Quality is also a key element in higher education. Garvin divides quality into five categories and eight attributes, including performance, reliability, and aesthetics [12]. Crosby defines quality as conformity to specifications, while Juran sees it as conformity to use [12]. In this context, quality includes aspects of design, conformity of services to designed standards, and performance of services in practice. Good quality ensures that services meet or even exceed student expectations.

This study aims to measure the quality of higher education services in FIBAA-accredited study programs using a modified HEDPERF questionnaire. The quality of educational services is an important factor that directly influences student satisfaction and shows how well educational institutions meet quality standards. Although HEDPERF is widely used to measure service quality in higher education, this instrument has not been fully adapted to the characteristics of study programs that have international accreditation such as FIBAA. Therefore, this study makes adjustment to several items in the HEDPERF questionnaire to make them more relevant in measuring service quality in the study program. By using the Exploratory Factor Analysis (EFA) method, this study will identify and validate the most influential factors in the context of FIBAA accreditation. The results of this study are expected to help improve the measurement of higher education service quality, especially for study programs that apply international standards.

2. Method

This study was conducted at Yogyakarta State University using a survey method with a questionnaire distributed through Google Forms. The sample consisted of 140 students from internationally accredited study programs under FIBAA. This sample size is considered adequate based on MacCallum et al. [13], who suggest that a minimum of 60 respondents is sufficient for exploratory factor analysis (EFA). The instrument used was adapted from the HEDPERF framework, which evaluates the quality of higher education services across six dimensions: academic, non-academic, reputation, access, programs, and understanding. The adaptation process also incorporated elements of SERVQUAL and SERVPERF.

The data collected will undergo analysis to assess item validity and reliability, using EFA and Cronbach's alpha. The final EFA construct consists of four components and 44 items, as outlined in Table 2. A five-point Likert scale was employed, ranging from 1 (strongly disagree) to 5 (strongly agree). The choice of a five-point scale aims to enhance the response rate and quality while minimizing respondent fatigue [14], [15].

Following the EFA, items that load onto the identified factors will be categorized into their respective constructs. The next step involves assessing the reliability of each construct using Cronbach's alpha. A high reliability score will indicate the instrument's applicability in real-world research, enhancing the precision of data collection aligned with the study's objectives [16].

3. Results and Discussion

A total of 44 items related to higher education service quality were analyzed using Exploratory Factor Analysis (EFA) with a varimax rotation solution. However, several items did not meet the required factor loading threshold, as identified by the EFA. In addition, some items had factor loading values below 0.50, consistent with the recommendations by Hair et al. [17]. Consequently, items that did not meet the recommended value were excluded from further analysis. The detailed outcomes of the EFA, including the construct validity of the tested instruments, are presented in Tables 1 through 3, which include the variance for each factor, eigenvalues, Kaiser-Meyer-Olkin (KMO) values, and results from Bartlett's Test of Sphericity.

The KMO and Bartlett's Test were employed to evaluate the appropriateness of the items for factor analysis [18]. Specifically, the KMO test assesses whether the sample size is adequate for factor analysis, which seeks to uncover the underlying factors influencing relationships among variables. Additionally, the KMO test detects multicollinearity within the items, indicating whether multiple items are measuring the same construct. Conversely, Bartlett's Test of Sphericity examines the correlations among items, providing statistical evidence that at least some of the variables are significantly correlated, thereby justifying the use of factor analysis.

According to Table 1, the results indicate that the use of factor analysis to assess the teacher competency construct is appropriate, as the KMO value of 0.93 exceeds the recommended minimum threshold of 0.60 [19]. KMO values above 0.80 are considered highly acceptable [19], [20].

Additionally, Bartlett's Test of Sphericity yielded significant results ($p < 0.05$), further supporting the factorization of the correlation matrix and demonstrating that the variables are independent and suitable for factor analysis [17].

Table 1. Appropriateness test using factor analysis and uniformity of KMO items and bartlett's test of higher education service quality construct

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.933
Bartlett's Test of Sphericity	Approx. Chi-Square	5502.283
	df	946
	Sig.	.000

The explained variance value, which represents the proportion of variance accounted for by the measured items, is a critical metric for researchers assessing research variables. The analysis concerning the teacher competency construct reveals the weighted variance contribution of each factor, as detailed in Table 2. Notably, the total explained variance for the construct measuring higher education service quality is 63.95%. This figure is deemed adequate, as it surpasses the minimum threshold of 50% established [20]. In this analysis, five distinct factors account for 63.95% of the overall variance associated with the construct. One of these factors has a variance value of 20.23%, which is below the 50% threshold, suggesting that the data does not exhibit common method bias [21]. Overall, the findings indicate that five principal factors have been successfully extracted in relation to the construct of higher education service quality, aligning with the results presented in Table 2.

Table 2. Number of explained variances (n=140) for higher education service quality instruments

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	21.771	49.480	49.480	8.901	20.228	20.228
2	3.053	6.938	56.417	5.680	12.909	33.137
3	2.055	4.671	61.088	5.329	12.111	45.248
4	1.748	3.973	65.061	4.975	11.306	56.555
5	1.297	2.947	68.008	3.253	7.392	63.947

The component matrix with varimax rotation, referred to as the rotated component matrix, was performed to illustrate the relationships between items and their corresponding factors following the varimax rotation process. An analysis was conducted on all items across the four constructs related to higher education service quality. The results of the rotated factor analysis for the construct of higher education service quality are presented in Table 3, which displays the weighting values. Initially, 44 items were developed for the higher education service quality construct; however, after conducting the factor analysis, only 36 items were deemed suitable for inclusion in the construct. Conversely, 8 items were excluded from the analysis due to their failure to achieve the necessary threshold of factor weighting values, which was set at a minimum of 0.50.

Table 3. Items of the higher education service quality instruments after EFA: FL based on principal axis factoring varimax (FL<.50 removed)

No.	No. Item	Factor				
		1	2	3	4	5
Institutional Facilities						
1	I44	.788				
2	I43	.750				
3	I38	.748				
4	I37	.722				
5	I34	.681				
6	I39	.680				
7	I41	.667				
8	I40	.648				
9	I35	.622				
10	I42	.614				
11	I29	.592				
12	I36	.578				
13	I33	.560				
14	I32	.552				
15	I31	.548				
16	I30	.524				
Academic Services Administrative Staff						
1	I17		.719			
2	I18		.707			
3	I22		.557			
4	I19		.526			
5	I23		.518			
Non-Academic Services Administrative Staff						
1	I14			.711		
2	I11			.700		
3	I12			.699		
4	I13			.624		
5	I15			.608		
6	I16			.572		
Academic Services for Teaching Staff						
1	I10				.658	
2	I6				.642	
3	I8				.629	
4	I7				.621	
5	I9				.595	
6	I5				.589	
International Activities Support						
1	I26					.644
2	I27					.589
3	I28					.534

The analysis of the rotated factor weighting for the higher education service quality construct encompasses five principal dimensions: institutional facilities, academic services provided by administrative staff, non-academic services from administrative staff, academic services for teaching personnel, and support for international activities. The findings from the factor analysis indicate that all sixteen items associated with the institutional facilities sub-construct were accepted, with factor loading values ranging from .524 to .788. This suggests a strong correlation between these items and the

underlying factor of institutional facilities, indicating their relevance in assessing this dimension of service quality.

Similarly, the academic services provided by administrative staff sub-construct yielded five accepted items, with factor loading values between .518 and .719. This finding implies that these items significantly contribute to the perceived quality of academic services offered by administrative personnel. In the non-academic services sub-construct, six items were accepted, displaying factor loading values ranging from .572 to .711, further emphasizing the importance of this dimension in the overall construct of service quality.

The academic services for teaching staff sub-construct also included six accepted items, with factor loading values from .589 to .658. This indicates that these items are crucial for understanding the quality of academic support provided to teaching staff. Lastly, the international activities support sub-construct revealed three accepted items, with factor loading values between .534 and .644. This suggests that these items are relevant in evaluating the support provided for international initiatives, which are increasingly important in a globalized education environment.

Data analysis was performed using IBM SPSS Statistics version 25, utilizing the internal consistency method to assess the reliability of the instrument. Cronbach's alpha, a widely used measure for determining the reliability of questionnaire instruments, was employed to calculate the reliability coefficient index. Reliability is defined as the extent to which an instrument yields consistent and stable results. Specifically, consistency refers to the ability of an item to produce similar scores when administered multiple times to the same subject, while stability reflects the instrument's freedom from measurement errors.

To establish the reliability of the research instrument, a Cronbach's alpha test was conducted. Acceptable alpha values typically range from .00 to 1.00, with values between 0.7 and 0.8 considered satisfactory. A lower alpha value indicates decreased reliability, whereas values around 0.90 are viewed as "excellent," values around 0.80 as "good," and values between 0.50 and 0.79 as "adequate." Conversely, values below 0.50 are deemed "unacceptable" and suggest that the instrument may require further refinement. The classification of Cronbach's alpha values is outlined in Table 4.

This analysis underscores the robustness of the factor structure for the higher education service quality construct while also emphasizing the importance of reliability in ensuring the validity of the findings. By establishing acceptable levels of reliability through Cronbach's alpha, researchers can be more confident in the consistency and accuracy of their measurement instrument, thereby enhancing the overall quality of their research outcomes.

Table 4. Cronbach's alpha reliability index for higher education service quality construct

	No. Items	Cronbach's Alpha Value
Institutional Facilities	16	.959
Academic Services Administrative Staff	5	.903
Non-Academic Services Administrative Staff	6	.890
Academic Services for Teaching Staff	6	.894
International Activities Support	3	.859
Total	36	.970

Table 4 presents the values of the Cronbach's alpha coefficient index for the higher education service quality construct. The results indicate the following Cronbach's alpha scores for the respective components: institutional facilities at .959, academic services from administrative staff at .903, non-academic services from administrative staff at .890, academic services for teaching staff at .894, and international activities support at .859. Collectively, the overall Cronbach's alpha (α) value for all items associated with teacher competency is a remarkable 0.970. These findings illustrate that the items constituting the higher education service quality construct demonstrate a high level of reliability and consistency.

Numerous empirical investigations have highlighted a favorable relationship between superior service quality in higher education institutions and student satisfaction. Nonetheless, there remains a gap in research focused on the quality of higher education services within the framework of international standards, such as FIBAA. Given the significant role that service quality plays in enriching

the student learning experience, there is a pressing need to devise an effective instrument to gauge the quality of higher education services, particularly concerning FIBAA international standards.

To address this need, a teacher competency instrument was formulated based on the HEDPERF model. This instrument was tailored to assess the general quality of higher education services, and before its application, a factor analysis was performed to confirm its validity and reliability. High scores for reliability and validity indicate that the research instrument is of exceptional quality [16]. Consistency within the instrument suggests that repeated testing results in nearly identical scores [22]. Factor analysis was utilized to achieve this level of excellence, serving as a statistical method that condenses a large number of survey items into distinct dimensions or constructs relevant to the study variables. This approach effectively eliminates redundant items that convey similar meanings [19].

Exploratory Factor Analysis (EFA) was carried out using a varimax rotation on 44 items related to higher education service quality. The analysis revealed that eight items fell below the minimum factor loading threshold of 0.5, necessitating their exclusion; consequently, only 36 items were retained for further analysis. Importantly, all eigenvalues were above 1.0, indicating the number of components essential for the research instrument [16]. This outcome confirms that all items within the dimensions hold substantial relevance, and all components of the research should be preserved [17].

Furthermore, the results of Bartlett's Test for Sphericity yielded a Kaiser-Meyer-Olkin (KMO) value of 0.93, demonstrating that the sample size is adequate for conducting factor analysis. Factor analysis is suitable when the KMO value surpasses 0.70 [17], [22]. The cumulative variance resulting from the EFA was found to be 63.95%, indicating that these four components account for 63.95% of the variance. This cumulative variance is adequate for determining the composition of the research instrument, as it exceeds the minimum required threshold of 50% [17].

This study produced 5 factors that were acceptable in the test results. This study found that the first and most important factor that needs to be considered based on the samples that have been taken is the "Institutional Facilities" factor because it has a very large Eigenvalue of 21.771 and is able to represent dominantly with a value of 20.23% which is the majority of the variance. This finding shows that the quality of service of FIBAA-accredited universities is influenced by the overall institutional facilities. Other factors are the "Academic Service Administration Staff", "Non-Academic Service Administration Staff", "Academic Services of Teaching Staff", and "International Activity Support" factors which when totaled are able to represent 43.71% of the variance or have an average of 10.78% of the variance of each factor. One of the factors that is directly related to the FIBAA standard is the International Activity Support factor which contains the quality of higher education services in supporting its students to participate in activities at the international level.

The subsequent analysis focused on reliability assessment. Achieving high instrument reliability, in addition to meeting established objective criteria, is vital for obtaining accurate data [16]. The results indicate that the reliability values for the components formed within the research instrument are notably high, with an overall Cronbach's alpha (α) value of 0.97. Each of the five components also exhibits significant reliability, with values ranging from 0.85 to 0.95. An acceptable Cronbach's alpha value lies between 0.7 and 0.8, with lower values indicating decreased reliability [17]. A Cronbach's alpha coefficient around 0.90 is categorized as "very good," while values around 0.80 are also considered "good." Values between 0.50 and 0.79 are deemed acceptable, while those below 0.50 are regarded as "unacceptable" [23]. Consequently, the high reliability and credibility of this instrument render it suitable for future research aimed at measuring the service quality of higher education institutions in alignment with international standards.

Table 5. Higher Education Service Quality Instrument Items

Factor	Item Code	Item
Institutional Facilities	I44	The health care services provided by the institution are adequate and necessary
	I43	The institution provides excellent counseling services
	I38	This institution values input from students to improve service delivery
	I37	This institution fosters and promotes the formation of student organizations

Factor	Item Code	Item
	I34	Students are free to express their opinions
	I39	This institution has standard and simple procedures for providing services
	I41	The institution provides programs with flexible study structures and plans
	I40	The institution provides a wide range of programs with several specializations
	I35	Administrative staff respect the confidentiality of information I disclose to them
	I42	The institution provides international class programs in various study programs
	I29	This institution implements programs with excellent quality
	I36	It is easy to contact administrative staff by phone/social media
	I33	Students are treated equally and with respect by this institution
	I32	Students who graduate from this institution are easily employed nationally and internationally
	I31	This institution provides various international programs that are needed
	I30	Recreational facilities are adequate and necessary
Academic Services Administrative Staff	I17	The working hours of the administrative service are according to working hours
	I18	The administrative staff has a positive attitude towards their work and students
	I22	I feel safe in my relationship with this institution
	I19	The administrative staff can communicate well in both Indonesian and English with students
	I23	This institution provides services within the expected deadlines
Non-Academic Services Administrative Staff	I14	The administrative staff is never too busy to accept my request for help
	I11	When I have a problem, the administrative staff is sincerely interested in solving it
	I12	The administrative staff provides individual attention
	I13	Questions and complaints are handled quickly and effectively
	I15	The administrative staff keeps accurate records that can be referred to
	I16	When the administrative staff promises to do something within a certain time, they do it
Academic Services for Teaching Staff	I10	The teaching staff uses foreign literature in teaching in class, both books and scientific journals
	I6	The teaching staff can communicate well in both Indonesian and English in class
	I8	The time available to consult with the teaching staff is sufficient and convenient
	I7	The teaching staff provides feedback on my progress
	I9	The teaching staff is qualified and experienced in their respective fields of knowledge
	I5	The teaching staff has a positive attitude towards students
International Activities Support	I26	The institution provides support in participating in international seminars or conferences

Factor	Item Code	Item
	I27	The institution provides support in participating in international competitions
	I28	The institution provides support in participating in student exchanges domestically and abroad

4. Conclusion

This study successfully developed and validated an instrument to measure higher education service quality in FIBAA-accredited programs using an adapted HEDPERF framework. Through Exploratory Factor Analysis (EFA), 36 key items were identified across five components: institutional facilities, academic services administrative staff, non-academic services administrative staff, academic services for teaching staff, and international activities support. The instrument demonstrated strong validity and reliability, with an overall Cronbach's alpha score of 0.97, confirming its effectiveness in evaluating service quality in internationally accredited institutions.

The findings emphasize the importance of providing high-quality services in higher education, particularly in meeting international standards like FIBAA. The cumulative explained variance of 63.95% shows the instrument's robustness, making it applicable for further assessments of service quality in other accredited programs. This instrument can serve as a valuable tool for institutions aiming to improve their service delivery and student satisfaction.

Future research could explore longitudinal studies to track improvements over time or comparative studies between accredited and non-accredited programs. Expanding the research to different cultural contexts and higher education systems would help generalize the instrument, potentially leading to a global framework for assessing service quality. Additionally, qualitative research and technology-driven solutions like AI-based feedback systems could further enhance understanding and responsiveness to student needs.

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Development of an Internet of Things (IoT) Trainer Based on ESP32 as a Learning Tool for Introducing Sensors and Transducers to Children

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Abstract

This study aims to: (1) Develop ESP32-based Internet of Things learning media for introducing Sensors and Transducers to children, (2) Test the performance of ESP32-based Internet of Things learning media, and (3) Test the feasibility level of ESP32 Sensor and Transducer-based Internet of Things learning media.

The research method uses the ADDIE development model, involving material experts, media experts, and children of the Electrical Engineering Education study program as users. The ADDIE stages include Analyze, Design, Development, Implement, and Evaluate. The research steps include needs analysis and design of learning media. After the design is complete, the media is developed and undergoes a testing stage by material experts, media experts, and users. Testing of users is children from elementary school to high school involving 100 respondents. The data collection instrument uses a questionnaire and data analysis uses descriptive analysis techniques.

This research and development produces IoT Sensor and Transducer Trainer learning media consisting of: Trainer unit, operational guide module, and jobsheet. The performance of the trainer unit functions well and is stable in each part and as a whole. The percentage of the feasibility of learning media by material experts got 92.5%, by media experts got 93.75%, and from users (students) got 90.5%. Based on the three percentages, the ESP32-based IoT Trainer learning media is included in the category of very feasible to be used as a learning media for introducing Sensors and Transducers to children.

Keywords: IoT Trainer, ESP32, Learning Media, Sensor, Transducer, Children

1. Introduction

Technological advancements, particularly in the Internet of Things (IoT), have significantly impacted various sectors, including education. IoT enables autonomous communication between devices and systems, optimizing remote control and automation processes (Patel et al., 2016). This technology is now commonly implemented to enhance students' understanding of technological concepts (Alaa et al., 2017). However, in Indonesia, introducing intelligent control technology to children is limited and often only covered at the tertiary level (Ningrum, 2009). Elementary to high school students face a technology gap due to limited early exposure to sensors and transducers.

This study aims to bridge this gap by developing ESP32-based learning media focusing on fundamental sensor and transducer concepts, both crucial components of IoT technology (Sumarna, 2011). Using sensors such as gas, soil moisture, and photovoltaic sensors, the ESP32 trainer facilitates hands-on learning, encouraging students to apply their knowledge in real-life contexts (Sumarna, 2011). This early exposure is anticipated to stimulate children's interest in technology and provide foundational knowledge for future studies in STEM fields.

ESP32 was selected for its comprehensive connectivity features and support for various sensors, facilitating practical learning in these areas (Stallings, 2015). With this tool, students are expected to understand essential sensor technologies applicable in daily life, especially in smart home, smart farming, and other IoT applications.

2. Method

This study used the ADDIE development model, consisting of five stages: Analyze, Design, Development, Implementation, and Evaluation. The detailed steps are as follows:

a. Analyze
   This stage involved observation and needs assessment to understand children's obstacles and

requirements in learning about sensors and transducers. Analysis included interviews with teachers and students and a review of previously used learning media.

b. Design
The design phase included creating an IoT Trainer based on ESP32, practical worksheets, and learning modules. The IoT Trainer was developed with ease of use and safety for children, incorporating sensors like gas sensors, soil moisture sensors, and photovoltaic sensors (Blynk, n.d.).

c. Development
This stage included assembling the IoT Trainer equipped with various sensors and transducers. The product underwent a series of functionality tests to ensure each component worked well. Validation was conducted by material and media experts through questionnaires and discussions to ensure the media was suitable for use.

d. Implementation
Implementation was conducted by trialing the Trainer on elementary to high school students in Purworejo. Respondents completed a questionnaire after using the learning media to provide feedback on its performance and usability.

e. Evaluation
Evaluation ensured that the media helped students understand fundamental sensor and transducer concepts. Evaluation data were analyzed descriptively, with results indicating that the ESP32-based IoT Trainer received positive responses in terms of material, media, and student engagement.

3. Results and Discussion

This research successfully developed an ESP32-based IoT Trainer as an effective tool for introducing sensor and transducer technology. Based on trials, the Trainer performed well and was easy for students to operate. It effectively supported students in understanding sensor concepts such as gas, soil moisture, and sound sensors, as well as fundamental IoT concepts essential in the modern technology era.

Media evaluation showed high feasibility, with average feasibility scores of 92.5% from material experts, 93.75% from media experts, and 90.5% from student responses. These results indicate that the ESP32-based IoT Trainer is highly feasible as a learning medium for sensors and transducers. Furthermore, students reported increased interest in learning about technology, as this interactive and applicable learning medium facilitated their understanding of IoT technology applications.

These findings align with previous studies highlighting the importance of interactive learning media in enhancing student motivation and engagement (Miftah, 2013; Nurrita, 2018). Besides functioning as a teaching aid, this Trainer provides hands-on experience in applying technology, helping students overcome the technology gap (Kurniawati & Baroroh, 2016).

4. Conclusion

The development of this ESP32-based IoT Trainer effectively addresses the need for introducing sensor and transducer technology to children. This Trainer can serve as an interactive learning medium that both interests students and effectively conveys fundamental IoT technology concepts. This study recommends the use of the IoT Trainer as a technology learning tool for students from elementary to high school levels. With this successful implementation, students are expected to be better prepared for the rapidly evolving technology era.

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How is Collaborative-Seamless Learning Implementing Digital Literacy Training for Lecturers?

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Abstract

Digital literacy training is a way or intervention to improve lecturer performance. The research objectives are 1) to explore collaborative-seamless learning patterns in digital literacy training in higher education, which is held nationally, and 2) to evaluate the level of reaction and learning outcomes from digital literacy training using the Kirkpatrick evaluation model.

We used both qualitative and quantitative approaches to investigate the research problem. Methods that can be used include being directly involved in training, participating in group discussions and validation forums, and conducting in-depth interviews with lecturers. We will also conduct surveys and develop tests based on random sampling to determine the level of learning given to lecturers in Indonesia.

The research results show that the learning approach applied has not yet realized collaborative learning but is only at the lower level, namely independent learning. The learning platform supports 10% if viewed based on the 10:20:70 pattern in developing employee performance. The learning platform has not yet encouraged and guided mentoring activities through the community (20%) and experience-based learning (70%) through project creation. The representation of seamless learning at the platform lies in the flexibility of time and space to access training materials. Other components, such as training material artifacts, are not yet interconnected with the outside world. Evaluation of participant training to measure implementation components (reaction level) and learning outcomes (learning level). Of the 4087 participants, participants rated the implementation component with an average of 91.36%. The learning outcome level was 72.69% passed, and 27.31% did not pass.

Keywords: collaborative learning, seamless learning, digital literacy

1. Introduction

The digital competence of higher education educators has a strategic position in integrating digital technology into learning [1]. The digital competence lecturers possess can influence their motivation in their expected work involvement [2] because digital competence can ward off cognitive load and academic fatigue [3]. This competency supports learning for students because it empowers student autonomy for work in the digital era [4].

Even though lecturers are people with higher education, they are not free from digital threats and crimes that can potentially affect the development of science. Anyone, including lecturers, can be exposed to and believe the truth of misleading information [5], pirate other people's work [6], be caught in plagiarism [7–9], and be involved in social conflicts such as hate speech [10].

The threats of the digital world can be countered by efforts such as moral education [11], mental resilience [8], and technological intervention [12,13]. Technological intervention has a positive side that can prevent and reduce digital threats and crimes if lecturers have adequate digital literacy, such as text mining for hate speech detection [14], reference manager applications and plagiarism checking systems, and various digital tools that support lecturers' work. Digital literacy, specifically for lecturers, is called digital competency, which directly influences performance in education, research, and community service [4,15].

Based on research by researchers using a bibliographic metadata search engine (Publish or Perish) from 2013 to 2023, digital competency mapping for lecturers in Indonesia can be declared minimal amidst the accumulation of assessments of teacher digital competency or pupil and student literacy.

Indeed, lecturers' ability to ward off hoaxes has been studied [5], but no article generally describes lecturers' digital competence. Even though the digital competence of teachers and prospective teachers is at the primary level [16,17], the digital competence of lecturers cannot be equal until it is scientifically explored.

Tracking lecturers' digital competence is necessary if researchers want to know how digital competence predicts lecturers' performance. There are various digital competency tracking tools offered by experts based on specific frameworks, such as the DigCompEdu framework [18], Professional Digital Competence Framework [19], UNESCO Digital Competency [20], ISTE lecturers [21,22], Digital Teaching Professional Framework [23], and HediCom [24]. Dalam penelitian kami, penentuan *framework* yang menjadi acuan harus melibatkan pemangku kebijakan dan menyesuaikan pada konteks Indonesia.

In our research, determining the framework as a reference must involve policy stakeholders and adapt it to the Indonesian context. The Ministry of Education has grasped the importance of all State Civil Apparatus (government employee) under its auspices, including lecturers, to increase digital literacy so that online training will be held massively in March 2023. This distance training begins with a Webinar that utilizes the Zoom Meeting room, YouTube channel, and asynchronous further training via the WKMB (Wiyata Kinarya Merdeka Belajar) platform. It is a momentum for us to explore learning patterns realized to develop lecturers' digital competencies.

We can assume that large-scale training held by the government has gone through official and credible implementation procedures. Moreover, this training facilitates lecturers to learn collaboratively, creating flexible learning through various sources and learning experiences [25]. Competency training should be carried out flexibly, in formal or informal conditions [26], online or offline [27], and adapting to the preferences of the training participants [28–31]. This training can be associated with training that allows for seamless changes in learning modes or seamless learning [32–34].

The term seamless learning is practically different from blended learning or e-learning because of the cross-temporal and cross-spatial nature of this seamless learning [32]. Seamless learning is not tied to a rigid curriculum. It tends to be a meta-learning approach that includes, summarizes, or extends currently known learning designs [26,32] so that digital competency topics can be designed into various learning scenarios. The process of inquiry and collaboration can be embedded in training so that it is not left behind and considered a formality by participants [35].

The prevalence of problems that arise for online training participants is that training does not have an impact on changes in performance behavior due to various factors, such as the focus of training objectives [36], the use of media [37], and online learning activities [27]. The initial factor that drives lecturers to be serious about increasing capacity is motivation, from the motivational, extrinsic, and intrinsic levels. So that this problem no longer dominates, the characteristics of lecturers as training participants must be understood and used as a basis for training design [38].

The research problem includes: 1) What patterns of collaborative-seamless learning emerge in digital literacy training attended by lecturers? 2) To what extent does the collaborative-seamless learning pattern predict digital competence development in lecturers? 3) How is digital literacy training evaluated at Kirkpatrick's reaction level? 4) How is the digital literacy training evaluated at Kirkpatrick's learning level?

2. Method

In order to investigate the research problem, we used qualitative and quantitative approaches. Involving experts in group discussion and validation forums, being directly involved in training, and in-depth interviews with lecturers are approaches that can be taken. We will also conduct surveys and develop tests based on random sampling to measure the level of learning given to lecturers in Indonesia. Collaborative-seamless learning, digital literacy training for lecturers, and lecturers' digital competence are essential variables in problem-solving.

Digital competency is a topic that is on the rise and has been predicted by Howard [4] as a blended future capability where in Indonesia, there are no research results that dare to claim the level of digital competence of lecturers. Furthermore, seamless learning has predicted concept knowledge [39,40] and specific competencies [26]. Researchers have not yet discovered the topic of digital competence and

the emphasis on collaborative search, so our research has a strategic position from the novelty aspect, especially in higher education in Indonesia.

This longitudinal study pays attention to the development of lecturers' digital competence up to the final level in the Kirkpatrick evaluation model, namely, the results level, which allows measuring the impact of training on improving lecturers' performance. This research must maintain long-term relationships between researchers, training participants, and researchers and training program policymakers. This research can be helpful as a mapping of lecturer competencies so that it can become primary data for development research. Apart from that, this research provides evaluation results so that it can be recommended to relevant stakeholders.

The research method used is descriptive survey research design [41] and evaluation research (Kirkpatrick levels of reaction and learning). The research participants consisted of state university lecturers spread across Indonesia, who were determined based on regional sampling and then sent by email. Inclusion criteria included lecturers who had taken digital literacy training with four years or less of teaching experience in education. Exclusion criteria were those who failed to answer the survey questions. The target respondents were 300-500 lecturers, but there were more than 2000 respondents.

This research instrument comes from existing questionnaires and questions developed to achieve research objectives. Variables important for this research include digital literacy learning experience, digital competency development experience, collaborative learning patterns, seamless learning, digital competency level, and demographic variables. Instrument validity involves 2-6 relevant experts. The questionnaire will be tested on a limited basis to check validity and Cronbach's Alpha for reliability before being distributed widely. This instrument requires software assistance in the form of a survey management system and statistical analysis.

The email database of state universities was identified by the Ministry of Education as having taken digital literacy training. A mass email was distributed to all target campuses, asking them to distribute it to faculty members and departments to get involved in this research. Potential subjects cannot see the information of other potential subjects who received the same email. The recruitment email contains the research objectives, inclusion criteria, and the time respondents must complete the survey. Respondents who meet the inclusion criteria are directed to open a link to a survey on collaborative-creative-seamless learning patterns and lecturer digital competency. Participant data is guaranteed confidentiality and is reported as aggregate data. Surveys are active 60 days after the start date. The collected data is stored in a password-protected storage device and only the researcher and research assistants have access.

In the first stage of analysis, descriptive statistics were calculated to analyze demographics and key variables in the study. An independent t-test was conducted to determine differences in reported digital competence between respondents who took part in training with a collaborative-seamless learning pattern and those who did not.

3. Results and Discussion

The aspect of how the collaborative seamless learning model is implemented in training is studied from aspects based on Pornpongtechavanich's research [42]. The two big elements in Seamless learning are the parties involved in organizing the learning and the learning format. The first significant element is the instructor, classroom, students, school, and residence. The second major component contains subsection elements of formal learning and informal learning. Learning strategies that can facilitate seamless learning include several strategies such as flipped classroom, challenge-based learning, mobile learning, Massive Open Online Course (MOOC) learning, multi-terminal interactive learning, community learning, situational awareness learning, and 3D experiential learning [42].

One of the Minister of Education and Culture's policies in employee competency development is to create a learning ecosystem called Wiyata Kinarya Merdeka Belajar (WKMB). WKMB is a form of learning and developing the State Civil Apparatus (government employee) performance. "Wiyata Kinarya" means learning while working, while "Freedom to Learn" means learning employees who can carry out learning with flexibility in time and space and without disturbing main tasks [43]. The WKMB platform can be accessed via the link https://wkmb. kemdikbud. Go. The Head of the WKMB Team for the Employee Education and Training Center stated, "WKMB is a competency development strategy by integrating all resources in developing knowledge, skills and creating superior human resources" (Kwarta Adimphrana).

Collaboration between the Employee Education and Training Center and various parties through WKMB has provided digital literacy training in 2023. Researchers are also participants in digital literacy training activities from government employee universities—head of the Ministry of Education and Culture's Employee Education and Training Center, Dr.Ir. Mustangimah, M.Sc. stated that out of a total of 120,860 government employee under the auspices of the Ministry of Education and Culture, digital literacy e-learning participants recorded from the HR Bureau's DikbudHR application amounted to 30,000 Human Resources from the Ministry of Education and Culture. The number of participants exceeded the original target of 24,000 people. They come from 58 central units, 133 technical implementing units, 77 universities, 49 polytechnics, and 16 higher education service institutions. Of these participants, around 15,000 have continued with literacy training, and the remainder are targeted to participate in digital literacy training at the next stage (October 2023). WKMB accelerates the fulfillment of the right to self-development for government employee Kemendikbudristek [44], including lecturers who join 77 universities, 46 polytechnics, and 16 LLDIKTI.

The digital literacy training process held by the Ministry of Education and Culture began with a Digital Literacy Webinar activity, which was held for four days, starting from 27 - 30 March 2023. This Webinar has reached 25,000 Kemendikbudristek employees consisting of civil servants and government employees with work agreements (PPPK). The Webinar contains material presentations covering digital security, digital skills, digital ethics, and digital culture [45]. After the Webinar, training continues personally via WKMB for government employee registered according to the specified time. So, training is carried out online. The learning plan has been socialized through the guidebook found at the beginning of the WKMB page before starting the training.

Participants are given time to study sequentially for ten days to complete several training subjects. The number of training subjects depends on the training group (sequential learning). Overall, there are eight training groups, where participants from lecturers take the MI DIKTI (Higher Education Service Information Management) training group. The MI DIKTI family provides eight modules consisting of (1) government employee Core Values with AKHLAK; (2) Digital Transformation in the Ministry of Education and Culture; (3) Kemendikbudristek Electronic Government System (SPBE); (4) Electronic Official Document System (SINDE); (5) Digital Space in Legal Perspective; (6) Portal for the Prevention and Handling of Sexual Violence (PPKS) in Higher Education; (7) Digital-based Scholarship Governance; (8) Higher Education Database (PD-DIKTI).

The learning activities in WKMB are independent learning activities that strengthen cognitive abilities. The learning activity begins with participants being asked to complete a pre-test of 8 multiple-choice questions. These questions represent eight training subjects that can be studied. Training materials can be accessed after participants have taken the pre-test. The core activities that participants can carry out consist of 3 activities, namely (1) Studying the material by reading the module, (2) Watching short explanatory and illustrative videos, and (3) Taking multiple-choice quizzes. After completing all activities for each training subject, participants will complete the post-test and level 1 evaluation (training implementation evaluation). The learning completeness score is 70.01, so participants are declared to have passed and entitled to a training certificate of 20 JP.

Participants did not receive a direct response from the teacher during learning activities. Participants get feedback from a machine that calculates scores on quizzes and formative tests that participants take. The chat feature did not function optimally because none of the participants or lecturers used this feature.

Participants can download and save the learning media presented at WKMB on their respective devices. Each participant can repeat according to their learning needs. Modules are designed for independent learning. The average module page consists of 29 - 98 pages. The module has an evaluation, such as answering five multiple-choice questions. However, there are also modules for which there is no evaluation, such as the Digital Transformation module at the Ministry of Education and Culture and the PPKS Portal at Higher Education. There are also modules with evaluation descriptions, such as the digital space module from a legal perspective. Some modules, such as the Higher Education Database, combine multiple-choice questions and essays. Overall, the module was informative but did not accommodate collaborative learning.

The WKMB platform was developed from the collaboration of various parties and standard operational procedures because the target of participants is national, to reach 120,000 government employee Kemendikbudristek. Even though WKMB is quite reliable, each new WKMB session can accommodate 3,000-5,000 accounts [43]. Digital literacy training is carried out in 8 sessions and one

additional session. Each session consists of 10 days of access. The access data from higher education is 4087 people (staff and lecturers). Especially in the MI DIKTI group, there were 2092 participants from lecturers. The scheduling strategy for these training sessions is to keep the platform stable and convenient for participants to access.

This digital literacy training is still in its early stages. This training does not accommodate the digital competence of lecturers responsible for organizing learning using digital technology and enabling students to develop digital competence, as referred to in the DigCompEdu framework [18].

MI DIKTI training provides increased competency for government employee to manage information within the Ministry of Education, Culture, Research and Technology and Higher Education scope. This training provides information for massive socialization about digital transformation in managing higher education. This training is macro in scope and targets educators (lecturers) and educational administration staff (tendik). The implication of this training is to make academics in higher education have awareness and understanding of ICT hardware and software as well as digital operating systems in the Ministry of Education and Culture environment in their professional lives. This training provides an understanding of the importance of using information systems and the importance of government employee understanding ethics and security in the digital space.

Based on Bloom and Anderson's Cognitive Taxonomy, the expected competency standards are at levels C1, C3, and C3 out of six [46]. Competency standards up to C3 in this training try to facilitate participants describing and applying the training material. Judging from the module's contents, it is a tutorial on using the electronic service script system and describes the flow of PD-DIKTI data.

Efforts to facilitate training participants have not been synchronized with learning activities that direct participants to practice applying the concepts written in the module. The learning activities in Figure 6 tend to be uniform from module 1 to module 7, namely reading the module text, listening to explanatory videos, and taking multiple-choice quizzes. The specific instructions in the video do not direct participants to implement it so that they can check or see their progress. The type of evaluation reinforces it in the form of answering quizzes and not reporting practical results.

Efforts to facilitate MI DIKTI training participants held by the Ministry of Education and Culture's Staff Education and Training Center have not yet facilitated participants with a collaborative learning approach. Based on the learning activities available through the WKMB LMS, the learning approach used is dominant at the traditional lecture level and tends to be self-regulated learning compared to the knowledge formation process [47], as in Figure 1.

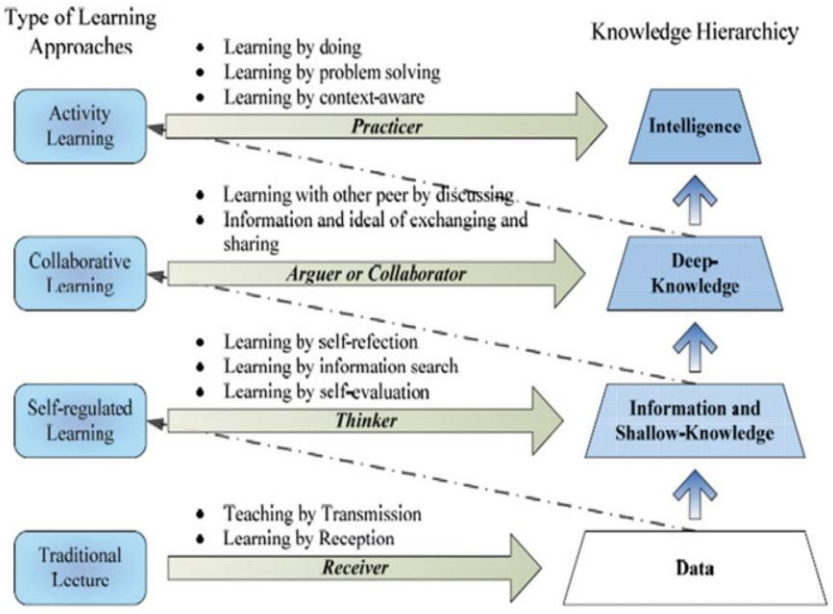


Figure 1. Knowledge Formation Process Based on Learning Approach [32]

The training provided uses a lecture approach that positions training participants as recipients of learning messages. Learning resources transmit teaching materials to training participants so that modules and learning videos are data presented for study. It is natural that interaction between training participants does not occur, even though the chat feature has been provided because the learning approach accommodates the lecture approach. Even though the dominant lecture approach is used, training participants can regulate their learning rhythm independently. In terms of access to teaching materials, they can adjust the time they have. The evaluation provided also allows participants to reflect and self-evaluate because an answer key is provided.

To reach the level of a collaborative learning approach, training must pass the level of self-regulated learning. Independent or self-regulated learning can be interpreted as independent learning, including cognitive, metacognitive, behavioral, motivational, and emotional/affective learning [48]. Independent learning also has strategic models that have different effects on learning outcomes, depending on a person's stage of development or level of education [48,49].

The level of collaborative learning approach has not been implemented by the system in MI DIKTI training because there has been no (1) sharing of responsibilities, (2) making substantive decisions together, and (3) interdependence between training participants. Interaction between training participants does not occur because learning tasks can be done independently. The case is different if the learning task in WKMB training is to create a joint project that requires different skills. In interview sessions with training participants, a collaboration that participants understand can take the form of taking quizzes together. Participants are in the same room as each training access device. When there is a quiz question, they discuss it with each other to determine the most correct answer.

Collaborative learning is strategic in terms of easing students' tasks. The influence of collaborative learning strategies in online learning, when distance learning has an impact on improving student learning outcomes, falls into the medium category [50]. Collaborative learning in online learning can increase learning motivation compared to independent learning [51]. Collaborative learning can also use software such as Canva for Education in distance learning to support the achievement of digital-era learning outputs [52]. However, it was found that not all planned collaborative learning activities were implemented [51].

The experts invited to the Focus Group Discussion of this research formulated that collaborative learning in the context of flexible learning or collaborative seamless learning can be simplified as a collaborative learning practice without space and time limits where students can learn comfortably according to their learning scenarios in a supported learning environment. Collaborate with multiple devices and systems that are more personal, portable, wirelessly networked technologies.

Even though MI DIKTI training does not accommodate collaborative seamless learning, there are many participants from lecturers. The training offered by the Education and Training Center of the Ministry of Education and Culture at the MI DIKTI group is 17 JP (Learning Hours) and issues training certificates for participants who complete and pass the training. This policy motivates training participants to participate in webinars and continue with WKMB LMS e-learning. Based on Figure 2, the lecturers who participated in this training reached 2092 people or 51.18 percent of the total 4087 MI DIKTI participants (lecturers and staff). Lecturers' enthusiasm for independent learning through WKMB is more than half compared to staff and functional positions other than lecturers.

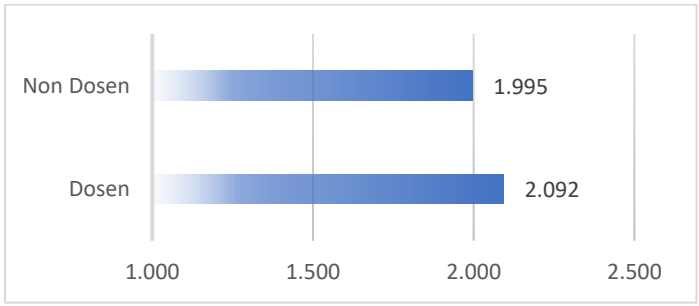


Figure 2. MI DIKTI Training Participants

The results of stage 1 evaluation in the Kirkpatrick framework in post-training reactions are currently in the negotiation stage between researchers and the HR Ministry of Education and Culture, especially the Wiyata Kinarya Merdeka Belajar team. Reaction level measures the level of satisfaction with training services in terms of (1) The advantages of training that make participants satisfied with

the service, (2) Lack of training that makes participants dissatisfied with services, (3) Aspects that make participants consider quality training; and (4) Aspects that make participants consider the training to be of low quality.

Based on stage 1 evaluation in the form of reactions to the training I attended. The results found a very satisfactory average rating of 91.36 on a scale of 100. The highest score was obtained regarding the trainee's knowledge of the training objectives.

The results of stage 2 evaluation in the Kirkpatrick framework are the results of the learning aspects through pre-test and post-test. The material tested on the Wiyata Kinarya Merdeka Belajar platform with government employee lecturers' digital literacy training house consists of (1) an Electronic official script system, (2) Kemendikbudristek's electronic government system (SPBE), (3) Digital transformation at the Ministry of Education and Culture; (4) government employee core values have morals; (5) Digital space from a legal perspective, and (6) Higher Education Database (PD-DIKTI).

The results of the stage 2 evaluation determine whether the training participants will graduate, where graduation is determined with a minimum score of 70 on a scale of 100 for each module. The quiz questions have 70 multiple-choice items—a chance to retake until it reaches the minimum value (70.00). The badge is valid proof that the participant has completed e-learning displayed in the integrated online learning platform and does not replace the participation certificate issued after the participant has completed all stages of the training. Participation certificates are given after participants complete all stages of training. Figure 3 shows the number of participants who passed: 73.33 percent (1,534 people) and 26.67 percent (558 people) who did not pass.

Training through WKMB does not yet have an ideal collaborative seamless learning pattern, and there are still many limitations and weaknesses in the knowledge formation process. At the first launch of the WKMB LMS in facilitating government employee, especially lecturers throughout Indonesia, several people who might not have been able to be reached with face-to-face training received a warm welcome. However, the online training mechanism should follow the learning and development model so that there is continuity of training, which impacts a person's performance in the work unit.

If taken further, the next stage of WKMB will be developed using the 10:20:70 learning development model. 10 percent of structured learning is carried out "outside" the workplace through classical training or distance (virtual) training; 20 percent of learning is carried out "around" the workplace, such as through coaching and mentoring, learning via social media or other sources outside the teacher; and 70 percent of learning is carried out "inside" the workplace through action learning projects, on-the-job training, or work assignments [43]. A 10 percent share can be accommodated through WKMB, so it is natural that learning is concise and targets the achievement of cognitive knowledge. The modules, videos, and quizzes in digital literacy training through WKMB do not contain directions or instructions for realizing 20 percent mentoring and 70 percent experiential learning. Mr. Kwarta projects WKMB with the 10:20:70 design initiated by [53], where 70% of learning can be done through experience by being given assignments or challenges in the world of work.

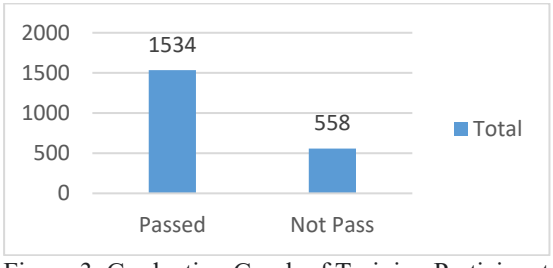


Figure 3. Graduation Graph of Training Participants

4. Conclusion

The research results show that the learning approach applied has not yet realized collaborative learning but is only at the lower level, namely independent learning. Wiyata Kinarya Merdeka Belajar supports 10% if viewed based on the 10:20:70 pattern in developing employee performance. It is just that WKMB has not yet encouraged and guided mentoring activities through the community (20%) and experience-based learning (70%) through project creation. The representation of seamless learning at

WKMB lies in the flexibility of time and space to access training materials. Other components, such as training material artifacts, are not yet interconnected with the outside world. Evaluation of participant training to measure implementation components (reaction level) and learning outcomes (learning level). Of the 2092 participants, participants rated the implementation component with an average of 91.36%. The learning outcome level was 73.33% passed, and 26.67% did not.

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SCHOOL FINANCIAL MANAGEMENT GUIDANCE AT MA'ARIF NU DIY EDUCATIONAL INSTITUTION

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Abstract

The purpose of this community service is 1) to prepare standard operating procedures (SOP) for school financial management, 2) to prepare internal audit rules, and 3) to mentor effective and efficient school financial management. The implementation of the activity began with a field assessment conducted to obtain a valid analysis of the situation and problems. Continued by FGD on internal audit instruments and SOPs. Workshop on Preparing Internal Audit Rules for LP Maarif and Preparing Standard Operating Procedures for School Financial Systems. Participants in the activity were 50 principals and treasurers of LP Ma'arif NU DIY schools, Preparing Internal Audit Rules for LP Maarif and Preparing Standard Operating Procedures for School Financial Systems, and continued with mentoring at the school. Based on the questionnaire, the activity was suitable with the needs of the community, which was very appropriate, had a suitability with the needs of the community, provided benefits to the community, provided motivation for the community, and was able to improve cooperation with the community. The activities produced SOPs for school financial management, internal audit rule guides, journals/proceedings, IPR, videos, IA/PKS, and IPR.

Keywords: mentoring, management, finance, school

1. Introduction

School financial management is the process of planning, organizing, allocating, and controlling school finances to achieve predetermined educational goals. Accounting theory provides a framework for recording, classifying, and reporting school financial transactions. This theory helps schools prepare accurate and balanced budgets, Tracking expenses and income, Accounting for the use of funds, and Evaluate the school's financial performance) [1]

The Ma'arif NU Educational Institution (LPMNU) DIY is managed by one LPMNU PWNU and five LPMNU PCNU branches. LPMNU PWNU DIY oversees 36 educational institutions, including 22 vocational high schools (SMK), seven general high schools (SMA), 5 Islamic high schools (MA), and two special needs schools (SLB). LPMNU PCNU manages middle schools (SMP), Islamic middle schools (MTs), elementary schools (SD), and Islamic elementary schools (MI). There are 172 Ma'arif NU schools in DIY, with 36 participating in this activity.

Various school funding sources include BOS, parents, local government, and community donations. However, inadequate record-keeping has hindered LP Maarif DIY's ability to evaluate based on accurate data. As a result, teacher performance has declined, school performance has worsened, and community interest in enrolling children in schools has decreased.

Based on observations in several schools, the cash receipt and expenditure book only contains financial records made by the school treasurer. The financial records made by the school treasurer only consider cash receipts and expenditures without considering the depreciation of fixed assets owned, so there is no charge for any depreciation of fixed assets. These financial records are made manually. These financial records are not followed up into a monthly school financial report and are also not reported to the foundation regarding the use of these funds. The school has made a report on operational assistance for implementing education. However, this report only presents receipts and expenditures for BOP funds.

The school feels that its financial records have provided information on the cash receipts and expenditures made during the school year. Still, they have not yet described the school's overall performance activities and the fulfillment of responsibilities to the public, especially the foundation. The school should make a financial report for all financial transactions that occur.

This financial report can show the overall performance activities of the school, especially in helping to calculate the depreciation of fixed assets owned, and it can also fulfill responsibilities to the public, especially the foundation.

Initial observations reveal that many schools under LP Ma'arif NU PWNU DIY have poor financial record-keeping. Documents are often disorganized, with some not recorded at all. The preparation of RKAS is done carelessly, serving only as a formality for BOS fund applications rather than a proper financial plan.

Financial management supervision is not carried out periodically due to limited resources. In addition, there is no separation of functions between the recording and authorization sections and between the storage and recording sections. Internal cash control is inadequate.

Based on several problems above, LP Ma'arif NU PWNU DIY needs assistance to improve the administration of financial management of schools under its supervision. LP Ma'arif NU PWNU DIY needs to hold a workshop on preparing SOPs for school financial management following the rules that help schools carry out their activities effectively and efficiently.

School financial management cannot be separated from economic theory, which helps schools understand economic principles related to financial decision-making. This theory allows schools to determine optimal resource allocation, Choose the most efficient funding sources, Manage financial risks, and Increase the efficiency and effectiveness of school operations [2]

Management theory provides principles and techniques for managing school finances effectively. This theory helps schools set up an appropriate organizational structure to manage finances, assign responsibilities and authority, build effective teams, Managing risk and uncertainty [3]

Educational theory helps schools understand how finances can be used to achieve academic goals. This theory allows schools To determine funding priorities, invest funds in the most effective programs and activities, improving the quality of education [4]

Accountability theory emphasizes the importance of transparency and accountability in school financial management. This theory helps schools provide accurate and timely financial information to stakeholders in accounting for the use of funds and increases public trust in schools.

School financial management theory can be applied across several essential areas. First, schools must engage in comprehensive financial planning by developing precise and balanced budgets that align with their educational goals. Effective financial management is critical, utilizing sound accounting and economic principles to ensure resources are managed efficiently. Additionally, regular financial control through audits and reviews is critical to guarantee the responsible use of funds. Finally, schools should conduct periodic evaluations of their financial performance to assess the effectiveness and efficiency of their financial strategies, ensuring continuous improvement in resource allocation and utilization.

The school financial administration management system is still done manually, resulting in much bookkeeping, repeated data writing, and delays in preparing reports. [5]

Effective and efficient school financial management is essential to achieve the educational goals that have been set. Applying school financial management theories can help schools manage their finances responsibly and achieve optimal educational goals. [6] [7] [8].

School auditing systematically collects and analyzes data to assess whether a school is achieving its goals. The goals of a school audit can vary but generally include Evaluating the effectiveness of school programs and services, Ensuring compliance with regulations and standards, Identifying areas for improvement, and Increasing accountability and transparency.

Several theories underlying school auditing include accountability theory, which emphasizes that schools must be accountable to the public for using resources and the results achieved. School auditing is one way to ensure school accountability. Transparency, accountability, and responsibility in school financial management simultaneously influence teacher performance [8].

Quality management theory focuses on improving the quality of education. School auditing can help schools identify areas for improvement and implement an effective quality management system.

The theory of good governance emphasizes the importance of good governance in organizations. School auditing can help schools improve governance by ensuring that schools comply with regulations and standards and use resources effectively and efficiently.

Types of School Auditing

There are several types of school auditing, including:

a. Internal Audit: The school's own staff conducts internal audits. The purpose of internal audits is to help the school improve the effectiveness of its programs and services. [9]
b. External Audit: Independent external parties conduct external audits. The purpose of external audits is to provide an objective assessment of school performance. [10]
c. Financial Audit: Financial audits focus on examining school finances. A financial audit aims to ensure that the school is using financial resources effectively and efficiently. [11]
d. Academic Audit: Academic audits focus on examining a school's educational programs and services. An academic audit aims to ensure that the school is providing quality education to its students. [12]

Benefits of School Auditing

School auditing can offer many benefits to schools, including:

a. Improving the effectiveness of school programs and services
b. Ensuring compliance with regulations and standards
c. Identifying areas for improvement
d. Increasing accountability and transparency
e. Increasing public trust in schools [13]

School auditing is critical to ensure that schools achieve their goals. There are several theories underlying school auditing, and several types of school audits can be conducted. School auditing can provide many benefits to schools. [14] [15] [16]

Standard Operating Procedure (SOP) for School Financial Management

This SOP aims to define clear processes and procedures for managing school finances effectively, transparently, and accountable. This SOP applies to all parties involved in managing school finances, including the Principal, School Treasurer, School Committee, Teachers, Parents/Guardians of Students

Procedure:

a. Planning: Preparation of School Budget Plan (RKAS):

1) Carried out by a team consisting of the principal, treasurer, and school committee.
2) Involving participation from teachers and parents/guardians of students.
3) Taking into account all sources of school income and expenses.
4) Compiled in a transparent and accountable manner.

School Budget Determination:

1) They are conducted by the principal after the school committee has approved the RAS.
2) To be a guideline in managing school finances for one budget year.

b. Management:

Receipt of Funds: Carried out by the school treasurer through various sources, such as SPP, BOS, Committee Funds, Donations, and Grants, which are recorded neatly and in detail in the cash book. **Expenditure of Funds:** Carried out based on valid evidence of expenditure, Submitted by the school treasurer to the principal for approval, Carried out following the established budget. **Financial**

Recording: Carried out by the school treasurer neatly and in detail. Covers all financial transactions that occur at the school. It is stored safely and can be accessed by interested parties.

c. Supervision:

Internal Audit: Conducted by the school's internal audit team periodically, Aims to ensure that school financial management has been carried out in accordance with the established SOP. **Evaluation:** Conducted by the principal and school committee periodically. Aims to assess the effectiveness and efficiency of school financial management. [17] [18] [19]

Accountability

Preparation of Financial Reports: Carried out by the school treasurer periodically. Cover all financial transactions that occur at the school during a specific period and submit them to the principal, school committee, and other interested parties.

Accountability for Use of Funds: Carried out by the principal to the school committee and parents/guardians of students. Carried out in a transparent and accountable manner.

Documentation: All documents related to school financial management must be stored safely and accessible to interested parties.

Review and Evaluation: This SOP will be reviewed and evaluated periodically to ensure its effectiveness and suitability to the school's needs.

Development: This SOP can be further developed according to the needs and conditions of the school.

In implementing this SOP, it is essential to involve all related parties, including the principal, treasurer, school committee, teachers, and parents/guardians of students. Training needs to be provided to parties involved in school financial management so that the SOP can be appropriately implemented. It is important to conduct regular monitoring and evaluation to ensure the effectiveness and efficiency of school financial management.

Implementing good school financial management SOPs will help schools increase accountability and transparency of financial management, Preventing misuse of funds. Improving the quality of education in schools. [20]

The purpose of this activity is:

a. Prepare SOP for school financial management
b. Developing internal audit rules
c. Assistance in effective and efficient school financial management
d. Providing experience to lecturers and students in off-campus activities to integrate theory and Practice (IKU 2, 3, and 5)

2. Method

The methods used are problem identification, FGD, lectures, FGD practice, and workshops.

3. Results and Discussion

The implementation of community service is a form of real contribution from the Lecturer and Student Team to benefit the community. Students are involved in off-campus learning that supports Independent Learning on an Independent Campus. The stages of the activity are as follows:

a. Field Assessment

A field assessment was conducted to provide a valid analysis of the situation and challenges. This involved a Focus Group Discussion (FGD) with LP Ma'arif NU DIY, including school principals and members of the Lecturer Team. During the assessment, the community service representatives met with the LP Ma'arif DIY Foundation Chairperson and school principals. The key findings from the assessment are as follows:

1) There are still limitations in human resources in organizational and business administration, so the organization's role is not yet optimal.
2) Financial bookkeeping is still poorly organized, so obtaining appropriate financial report information is impossible.
3) School marketing/promotion is still lacking.
4) Technology in creative marketing on social media is not yet optimal because there are no creative marketing skills.
5) The administrators' busy schedules have led to difficulties in fulfilling duty assignments, recording activities, and updating financial reports.
6) Financial management still requires assistance to be more optimal in carrying out its role.

Based on document observations, it was found that Financial recording has been done, but it is not following the financial report template, the records often pile up, and there is no activity to summarize the records every month; there is no SOP, and there is no internal audit instrument.

Based on these two things, the service team then provided several solutions, including Compiling an easy and simple internal audit instrument book to make it easier to use by the principal and treasurer at LP Maarif NU DIY. Creating an SOP book.

An FGD was then conducted with the lecturer team to formulate appropriate solutions based on the field assessment results. This is intended so that the training carried out follows the partners' needs. In addition, when the PkM activity is complete, the program or stimulus carried out together can be sustainable *and* carried out independently by partners.

b. Workshop on preparing Internal Audit Rules for LP Maarif and preparing Standard Operating Procedures for School Financial Systems

The purpose of this community service activity focuses on two (2) things, namely, the preparation of SOPs and audit rules. Both pieces of training are carried out with 2-panel discussion sessions to deepen the material. The workshop will be held on: Day, Date: Thursday, July 25, 2024, Venue: PMD Building, FEB UNY. The number of participants is 50 school principals and school treasurers. The following is the workshop schedule on the Preparation of Internal Audit Rules for LP Maarif and the Preparation of Standard Operating Procedures for School Financial Systems. Opening. Singing the Song Indonesia Raya , Speech by Representatives of the FEB UNY Lecturer Team, Speech by Representatives of LP Maarif NU DIY Dr. Birrul Walidain. The service team provides material: financial management and internal audit, The importance of internal audit, Practice of filling out audit instruments, and internal control instruments for compiling school activity and budget plans (RKAS). At this implementation stage, the material regarding financial management and internal audits is discussed in detail. Mentoring activities should be more intensive regarding the problems and solutions so that the principal and treasurer can absorb them more effectively.

Participants were enthusiastic about participating in the training activities. Several participants asked questions. At this implementation stage, they were assisted by two postgraduate students and two undergraduate students of Economic Education.

Financial Management and Internal Audit Assistance was held to provide a more realistic picture of this instrument.

Financial Management and Internal Audit Assistance was conducted twice, and students were assisted as practical assistants. At the mentoring stage, it is carried out in real terms by creating internal audit instruments.

For more detailed assistance, here is the assistance schedule and activities:

The first assistance is done by examining several existing notes, namely minutes, and reviewing several recaps of notes and existing files. Assistance was carried out by sorting transactions that need to be audited. Summarizing notes in a daily journal, Tidying up several existing notes.

c. Mentoring

The first mentoring session on August 30, 2024, at SMK Ma'arif 1 Temon focused on reviewing existing records, including minutes, transaction summaries, and files. The session involved sorting transactions for audit, summarizing entries in daily journals, and organizing the available records.

The second mentoring session took place on August 1, 2024, where the principal and treasurer of SMA Ma'arif Sleman, were guided through completing the internal control instrument. Additionally, the session focused on preparing the School Activity and Budget Plan (RKAS).

The principal and treasurer were enthusiastic and grateful for the mentoring, finding it highly beneficial in applying the insights gained during their training. The financial mentoring and internal audits significantly enhanced the school's financial performance, strengthening their organizational capabilities and boosting its overall productivity.

4. Discussion

a. Achievements of PkM Activities

This community service activity is carried out with school empowerment activities to be able to conduct internal audits. Financial management and internal audit activities can be carried out in an integrated manner so that after the community service activity, the principal and treasurer still possess the skills to increase the productivity of the organization and its business. In detail, the following is the output of this community service activity.

1) LP Maarif can create school financial SOPs.
   This community service activity helps LP Ma'arif design and implement operational systems and procedures related to school finances.
2) LP Ma'arif can carry out good business financial management.
   This service activity includes training and mentoring in financial management and school audit rules. The output is Internal Control Instruments Preparation of School Activity and Budget Plan (RKAS).

b. External achievement

The targeted outputs for this activity consist of mandatory outputs, namely:

1) Mandatory output
   a) The article from community service activities is entitled School Financial Assistance in Realizing a People's Economy.
   b) Both parties have signed the Cooperation/IA document, and it has been uploaded to sikers.uny.ac.id
   c) IPR
2) Additional output
   a) Video of the activity at the following URL: https://youtu.be/S_MUUFAybV8

Activity Evaluation

Activities impact the advancement of knowledge regarding internal audit and financial management. Based on the evaluation, it is known that this activity provides benefits to the community. The following are the evaluation results from the participants.

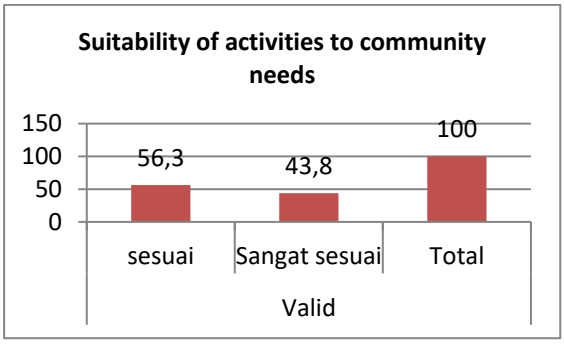


Image. Suitability of activities to community needs.

Through empowerment in the context of financial management and internal school audits, mentoring activities can be a catalyst for increasing schools' role in education.

1. Follow-up Plan
   The follow-up plan for business administration and creative marketing assistance activities in school empowerment can include long-term strategies to ensure the continued benefits provided to the group. The following is a designed activity plan:
   a. Formation of Volunteer Assistance Team
      This activity is carried out by forming a support team consisting of students and activists who are experts in business administration and creative marketing and committed to providing long-term support.
   b. Periodic Monitoring.
      Create a visit schedule plan with regular monitoring sessions to evaluate the progress achieved by the school at LP Ma'arif NU DIY
   c. Continuous Training Module Development.
      It is developing ongoing training modules that can be accessed independently by LP Ma'arif NU DIY.

   Supporting factors
   Several factors can support financial management assistance of LP Ma'arif NU DIY. Here are some supporting factors that can increase the success of the activity:
   a. The high level of awareness and involvement of LP Ma'arif NU DIY members will facilitate learning and implementing financial management and internal audit.
   b. Supporting activity facilities because LP Ma'arif NU DIY has its own office. So it is easier to carry out organizational and business administration activities.
   c. Signal access supports the implementation of social media-based assistance.
2. Inhibiting factors
   Despite efforts to empower LP Ma'arif NU DIY, several inhibiting factors may emerge. Some of these factors include:
   a. The mentoring time is relatively short, so the activities carried out cannot be maximized.
   b. Only two schools have received intensive assistance, so the number needs to be more significant.

5. Conclusion

Management assistance activities in the context of empowering LP Ma'arif NU DIY, it can be concluded that this activity has a significant positive impact. Here are some important points that can be taken as conclusions:

a. We are improving the Skills and Knowledge for treasurers and principals of LP Ma'arif NU DIY.
b. Increased Independence.

Through mentoring, LP Ma'arif NU DIY is now more independent in managing their school. They have the ability to overcome financial management challenges and make better decisions for the sustainability of the school.

c. Network Development and Partnerships.

Mentoring activities have facilitated the formation of networks and partnerships that benefit the group. The relationships built with LP Ma'arif NU DIY and supporting institutions can be additional resources for school development.

d. Group Motivation and Spirit.

This activity has increased the motivation and spirit of LP Ma'arif NU DIY members. They feel more confident and motivated to continue developing their school with enthusiasm.

Thus, this conclusion shows that financial management and internal audit assistance activities provide a real contribution to the empowerment of LP Ma'arif NU DIY, creating sustainable positive changes in school life.

6. Suggestion

Here are some suggestions for mentoring activities for LP Ma'arif NU DIY:

1. Continuation of more specific advanced training to improve financial management and internal audit capabilities.
2. Development of online training modules that can be accessed independently by LP Ma'arif NU DIY members. These modules can contain tutorials, videos, and other resources to facilitate continuous learning.
3. Field Visits and Benchmarking to similar schools that have succeeded in implementing financial management and internal audit strategies. This can provide inspiration and new ideas for LP Ma'arif NU DIY.
4. Formation of online discussion groups or forums where members can share experiences, challenges, and ideas. These discussions can broaden their horizons and create space for collaboration.
5. Empowerment of the younger generation in LP Ma'arif NU DIY, such as new skills training or mentoring programs for schools to be inspired to develop financial management and internal audits in the future. This activity also functions as cadre formation.

With the implementation of these suggestions, mentoring activities can become more holistic and provide ongoing support for school empowerment at LP Ma'arif NU DIY.

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FORMULATION OF NATURAL BODY LOTION USING KEPOK BANANA LEAF EXTRACT

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Abstract

This study focuses on the formulation of body lotion utilizing daun pisang kepok (Musa paradisiaca Linn) extract as an active ingredient. The research aims to evaluate the effectiveness and sensory properties of the lotion through various tests, including organoleptic, pH, viscosity, and adhesion tests. Three formulations were developed with varying concentrations of daun pisang kepok extract (0.5 g, 1 g, and 1.5 g). Results indicated that Formula II (1 g extract) exhibited superior organoleptic qualities, presenting a smooth texture, pleasant fragrance, and quick absorption without a greasy residue. The viscosity measurements revealed that all formulations fell within the acceptable range, with Formula I averaging 50.640 cP, Formula II at 32.240 cP, and Formula III at 57.840 cP. The pH levels of the formulations were found to be between 4 and 6, indicating suitable acidity for skin application. Overall, the findings suggest that daun pisang kepok extract can effectively enhance the quality and characteristics of body lotion, making it a viable option for cosmetic applications.

Keywords: Formulation, Body Lotion, Kepok Banana Leaf Extract.

1. Introduction

Body lotion, or body moisturizer, functions to hydrate the skin, preventing dryness and leaving the skin smooth. Body lotion differs from body cream in that body lotion is a lightweight moisturizer that is quickly absorbed by the skin, primarily serving to maintain skin hydration. In contrast, body cream contains a higher oil content and has a thicker texture. Body cream is intended for extremely dry and cracked skin, as such conditions require a higher level of moisture.

Body lotion is intended for normal skin, helping to maintain daily moisture when there are no significant skin issues. In contrast, body cream is recommended for very dry skin, typically found on areas like the elbows, knees, between the fingers, and feet. The benefits of body lotion include preventing skin problems, softening and moisturizing the skin, brightening the skin, making it smooth, and providing a relaxing effect [1]. Body lotion is applied by spreading it over the skin's surface. The use of natural ingredients in the production of body lotion cosmetics is currently favored by many people. Natural ingredients known for their skin moisturizing properties include yam bean, aloe vera, and others. The public's strong interest in "back to nature" trends has inspired researchers to develop innovative ideas from natural ingredients that have not yet been utilized. One such natural ingredient that can be used as an active component in body lotion is Kepok banana leaf extract. Banana leaves are commonly used for wrapping food, as dining mats, and for making traditional items such as Samir. The active compounds found in banana leaf extract are highly beneficial for the skin, as they help protect the skin from dryness and prevent the loss of moisture.

The supporting ingredients used in the production of body lotion include glycerin, distilled water (aquadest), TEA (triethanolamine), nipagin (paraben), colorants, and fragrances. [2]. Body lotions with natural active ingredients are proven to be safe, gentle, and contain active compounds beneficial for the skin. In beauty clinics, especially in body care treatments, body lotion is applied at the end of the session. The moisture provided by body lotion helps to firm, soften, and hydrate the skin. The scent or fragrance of the body lotion is also essential, as the sense of smell can promote a feeling of relaxation.

Natural ingredients are easy to find in the surrounding environment and are relatively inexpensive. Body lotion products made from these natural ingredients go through a process to ensure they meet expectations and serve their intended purposes. The trend of using natural ingredients is certainly beneficial for beauty care clinics, and they must continuously innovate with natural body lotions to attract more customers. One natural ingredient that has not been widely utilized for body lotion production is Kepok banana leaves.

In the journal written by Routray & Orsat (2012), it is stated that Kepok banana leaves (*Musa paradisiaca* L.) contain a variety of active components, including alkaloids, saponins, tannins, flavonoids, terpenes, and carbohydrates. [3]. The active compounds found in Kepok banana leaves offer several benefits, including weight loss, reduction of cellulite, antioxidant properties, prevention of premature aging (wrinkles), and maintenance of skin moisture and softness. [4]. Until now, Kepok banana leaves have primarily been utilized by the community for purposes such as making samir, wrapping food, and serving as dining mats, among others. Given the presence of natural compounds that are beneficial for the body and not harmful, it would be advantageous to utilize them for skincare and beauty. The active compounds in these leaves should be developed into a beauty product, such as a Kepok banana leaf mask. However, not many people are aware of the active compounds in Kepok banana leaves that contribute to skin smoothness and can help hydrate and soften the skin. The potential of Kepok banana leaves for use in body lotion has yet to be explored.

Banana plants are characteristic of tropical regions and thrive easily at low elevations and up to 1,300 meters above sea level. Banana plants can grow in almost all types of soil, particularly in clayey soil. They are beneficial to the community in various ways: the fruit can be consumed, the leaves are used as dining mats and food wrappers that do not leach, and steaming with banana leaves does not pose health risks. The banana trunk, commonly referred to as *gedebog*, is used by puppeteers to support leather puppets during performances, while the banana heart is utilized by the community to prepare dishes such as bamboo shoots. There are many types of bananas that grow in Indonesia, one of which is Kepok banana *(Musa paradisiaca* L), known for being consumed and processed into various foods, such as banana chips, dried bananas, fried bananas, and boiled bananas [5].

Kepok banana plants have broad, lance-shaped leaves that are long and distributed widely. The leaves are green, thick, and not easily torn. This plant is commonly found in people's yards due to its ease of growth, simple maintenance, and numerous benefits. Kepok banana leaves can also be found in traditional markets and supermarkets to meet community needs. The price of banana leaves is still affordable and can be considered inexpensive.

2. Method

This research is an experimental study aimed at developing a body lotion formula based on Kepok banana leaves. The primary focus of the study is to formulate and create a body lotion that harnesses the active compounds found in Kepok banana leaves, with the intent of enhancing beauty and body skincare benefits effectively. Additionally, this research seeks to explore the optimal extraction process to ensure high retention of active substances from Kepok banana leaves in the body lotion formulation. Therefore, the main objective is to create an innovative and beneficial body lotion product for skincare by utilizing Kepok banana leaves. The choice of an experimental study was made due to its scientific reliability, as it allows for the control of variables that may influence the experimental outcomes [6]. This research includes the following stages as outlined in Figure 1.

Work Procedure

a. Extraction process

The extraction of Kepok banana leaves begins with the selection and preparation of 1,000 g of fresh leaves, ensuring they are clean and free from dirt. These leaves are then placed in a maceration container and submerged in 96% ethanol. The mixture is stirred gently to promote the dissolution of active compounds, creating a homogeneous solution, and allowed to sit undisturbed at room temperature for 24 hours [3]. After this period, the liquid filtrate is separated from the solid residue using a filtration apparatus, and the filtrate is collected in a clean container. The solid residue undergoes a second maceration process with 96% ethanol for another 24 hours, after which it is filtered again to obtain additional filtrate. This step is repeated once more, resulting in a total of two extractions on the solid residue. The collected filtrates are then combined and gently evaporated using a rotary evaporator to remove the 96% ethanol. The process continues until a concentrated extract of Kepok banana leaves is obtained, free from solvent, and ready for further formulation into cosmetic products, such as body lotion or masks [7].

b. Formulation of Hand and Body Lotion

Referencing the research conducted by Rahmatullah et al. [5], which employs the same extraction method, the formulation of the body lotion can be found in Table 2. This study illustrates the effective utilization of natural extracts, emphasizing their beneficial properties for skin care. The formulation presented in Table 2 showcases the proportions of each ingredient, ensuring optimal performance and

stability of the body lotion while harnessing the advantages of the active compounds extracted from Kepok banana leaves. This approach aligns with the current trend of incorporating natural and sustainable ingredients in cosmetic products, aiming to enhance both efficacy and user experience.

c. Preparation of Body Lotion

All ingredients in the oil phase, including stearic acid, lanolin, acetyl alcohol, and propyl paraben, are dissolved in a water bath at temperatures ranging from 65°C to 75°C [8]. Meanwhile, the ingredients in the water phase, such as distilled water, glycerin, triethanolamine, and methyl paraben, are also dissolved separately at the same temperature range. Once all ingredients in both phases are fully dissolved, the water phase is slowly added to the oil phase in a mixing container, while continuously stirring to form an emulsion. The stirring process is maintained until the mixture forms a homogeneous emulsion.

Next, the extract of Kepok banana leaves is prepared and incorporated into the lotion formulation, along with the appropriate colorants and fragrances that complement the new extract. This careful blending process ensures that the resulting lotion not only achieves the desired color and aroma but also effectively captures the beneficial properties of the natural extracts used. Finally, the prepared lotion is transferred into containers for storage and further evaluation to assess its quality and characteristics. This meticulous preparation process is essential for maintaining the desired attributes of the lotion while maximizing the advantages of the ingredients incorporated.

d. Evaluation of Formula

Organoleptic Test: This test involves direct observation of the body lotion's color, aroma, and texture. The evaluation is conducted over a storage period of two weeks to assess any changes in these characteristics

pH Test: The pH test is conducted to determine the acidity or alkalinity of the prepared formulation. A pH meter is used for accurate measurement. According to SNI 16-4399-1996 standards, the recommended pH range for products applied to the skin is between 4.5 and 8.0. To perform the test, 5 grams of the body lotion is dissolved in 10 mL of distilled water, and the pH is measured using the pH meter.

Adhesion Test: A sample of 0.25 grams is placed on a glass slide that has been prepared for testing adhesion properties. The behavior of the lotion upon application and its ability to adhere to the surface will be evaluated.

Viscosity Test: The viscosity of the body lotion is measured to assess its thickness and flow characteristics, which are crucial for product performance and application. This test helps ensure the lotion has the desired consistency for effective use.

3. Results and Discussion

Contents of Kepok banana leaves

Kepok banana leaves (*Musa paradisiaca* L.) are rich in polyphenols. In addition, these banana leaves contain active compounds such as alkaloids, saponins, tannins, terpenes, and carbohydrates [1]. Kepok banana leaves (Musa paradisiaca L) can address skin problems such as dryness, acne, dark spots, brighten the skin, and even prevent premature aging. These leaves exhibit antibacterial activity [9] as well as antioxidant and anti-inflammatory properties [10]. The detailed composition of Kepok banana leaves that benefit the skin is presented in Table 2.

In addition, the content of Kepok banana leaves is superior compared to several other types of banana leaves based on the results of the GCMC test conducted to determine the contents of Kepok, Klutuk, and Ambon banana leaves. The detailed findings can be further analyzed in Table 3.

This demonstrates that Kepok banana leaves not only have higher flavonoid and antioxidant activity but also possess a more favorable profile of beneficial compounds when compared to the Klutuk and Ambon varieties, which highlights the specific active compounds and their concentrations in each type of banana leaf. Based on the test results of the three types of banana leaves, the following conclusions are, Kepok Banana Leaf, this variety has the highest flavonoid content and exhibits the best antioxidant activity, as well as a more significant potential for inhibiting the enzymes tyrosinase and elastase compared to the other banana leaves. Klutuk Banana Leaf, This type has a higher tannin content; however, its antioxidant activity and enzyme inhibition levels are slightly lower than those of

both the Kepok and Ambon varieties. And Ambon Banana Leaf This variety shows a fairly balanced performance across all parameters but does not reach the levels observed in the Kepok banana leaf.

Formulation of Hand and Body Lotion

A series of formulation processes can be seen in Figure 2, with stages:

a. Preparation of Banana Peel Extract, performed by preparing banana leaf extract according to the previously established formula with distinguishing compositions of 0.5 grams, 1 gram, and 1.5 grams.

b. Preparation of Ingredients,

Gather all necessary ingredients for the body lotion, including: Oil Phase: Olive oil, stearic acid, cetyl alcohol, lanolin, and preservatives; Water Phase: Distilled water (aquades), glycerin, triethanolamine (TEA), and the banana leaves extract; and fragrance

c. Emulsion Process, Heat the oil phase ingredients together in a water bath at a temperature of 65-75°C until they are fully melted and blended [11]. In a separate container, heat the water phase ingredients to the same temperature until dissolved. Slowly add the water phase to the oil phase while continuously stirring to create an emulsion. Continue stirring until the mixture becomes homogenous.

d. Quality Evaluation, Conduct organoleptic tests (appearance, color, smell, texture) and test the pH of the lotion to ensure it is within the recommended range (4.5-8.0) [12].

Evaluation of Formula

Result of Organoleptic Test,

Detailed result of the organoleptic test for the body lotion formulated with daun pisang kepok (banana leaf extract), focusing on its appearance, color, odor, texture, and overall acceptance for the three different formulas based on the varying concentrations of the extract. The detailed findings can be further analyzed in Table 4. Formula 2 stands out for its balanced texture, pleasant fragrance, and effective absorption, making it the most suitable choice for a body lotion.

Result of pH Test,

Formula 1: The pH was measured at 4.0. While this pH is slightly acidic and generally favorable for skin applications, it is lower than the ideal range for skin health, which is typically between 4.5 and 5.5.

Formula 2: This formulation exhibited a pH of 5.0, making it the most balanced among the three. This pH level is within the optimal range for skin health, supporting the skin's natural barrier and promoting overall skin integrity while allowing for effective absorption of active ingredients.

Formula 3: The pH for this formula was recorded at 6.0, indicating a slightly alkaline nature. Although this pH is still within a safe range for topical products, it is on the higher end and may not be as beneficial for maintaining skin acidity as the other two formulations. All of result pH test like Figure 3.

Result Adhesion Test

The adhesion test evaluates how well the body lotion formulated with daun pisang kepok (banana leaf extract) adheres to the skin upon application. The findings for each formula are summarized below,

Formula 1: Moderate adhesion observed, The lotion initially felt slightly slippery but adhered reasonably well after a short period. It maintained its position on the skin without excessive sliding, suggesting a decent formulation

Formula II: High adhesion noted, this formula adhered effectively to the skin without any sliding. Users reported a comfortable feel, indicating that the lotion maintained its integrity on the skin for an extended period. This high adhesion quality enhances its moisturizing effects.

Formula III: Strong adhesion experienced; the thicker consistency resulted in a more substantial feel on the skin. While the adhesion was excellent, it led to a perception of heaviness, which may not be preferred by all users. The lotion stayed in place for a longer duration, providing sustained moisturizing effects.

Result Viscosity Test

The viscosity test was conducted to evaluate the thickness and flow characteristics of the body lotion formulations containing daun pisang kepok (banana leaf extract). The results are summarized below, considering the optimal viscosity range for body lotions.

Formula I	50.640 cP
Formula II	32.240 cP
Formula III	57.840 cP

Formula I, this formula is at the upper limit of the desirable viscosity range for body lotions. According to cosmetic formulation guidelines, a viscosity of around 30-50 cP is ideal for a lotion that is easy to spread while maintaining a creamy texture, making it suitable for everyday use [13].

Formula II, this formulation is well within the optimal viscosity range, providing a lighter, more fluid lotion. As supported by literature, lower viscosity formulations (around 30 cP) are often favored for quick absorption and a non-greasy feel on the skin, appealing to consumers who prefer lighter products.

Formula III, this formula exceeds the typical viscosity range for body lotions, resulting in a thicker consistency. While higher viscosity can provide a richer moisturizing experience, it may not be suitable for users looking for lightweight options. According to cosmetic formulation studies, thicker lotions can sometimes lead to a heavier application that might not be preferred by all users [8].

The conclution are formula II is the most favorable option, falling comfortably within the ideal viscosity range of 30-50 cP, which is considered best for body lotions. Formula I is slightly higher but still acceptable for a creamy texture. Formula III, while offering enhanced moisturization, may need to be reformulated to decrease its viscosity for broader consumer acceptance.

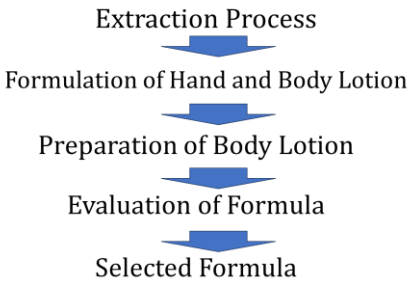


Figure 1. Research Procedure

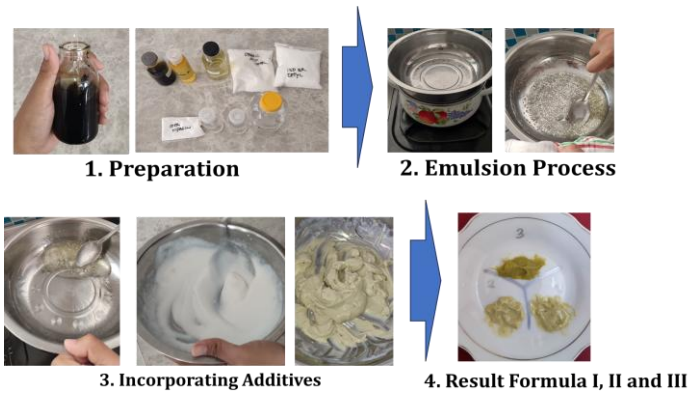


Figure 2. Formulation of Hand and Body Lotion

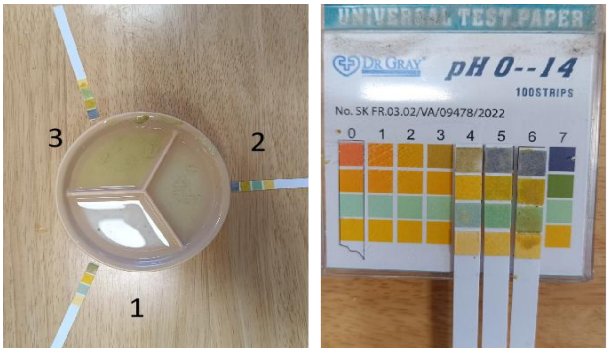


Figure 3. pH Test

Table 1. Formulation Body Lotion Modify by Rahmatullah et al. [2]

Bahan	F0	F1 (g)	F2 (g)	F3 (g)
Kepok banan leaf extract	-	0.5	1	1.5
Olive Oil	30	30	30	30
Tween 80	12	12	12	12
Cetyl Alkohol	3.3	3.3	3.3	3.3
As. Stearat	5	5	5	5
Gliserin	20	20	20	20
TEA	1.2	1.2	1.2	1.2
Nipagin	2.5	2.5	2.5	2.5
Green Tea Fragrance	1	1	1	1
Aquades	100 mL	100 mL	100 mL	100 mL

Tabel 2. Composition of Kepok banana leaves

Content	Active Compounds	Benefits	Source
Antioxsidants	Flavonoid dan Karotenoid	Helps combat free radicals that can damage skin cells and cause premature aging	[9]
Vitamins	Vitamin A (Beta-Carotene)	Maintains skin health, promotes skin cell regeneration, and helps reduce wrinkles	[9]
	Vitamin C	Helps stimulate collagen production, which is essential for skin elasticity	
	Vitamin E	Acts as an antioxidant that helps protect the skin from damage caused by UV exposure and other environmental factors	
Minerals	Kalium	Maintains skin hydration and preserves electrolyte balance	[14]
	Manganese and Magnesium	Helps repair skin damage and supports the cell rejuvenation process	
Anti-inflammatory and Antibacterial Compounds	Allantoin	It has anti-inflammatory properties and helps in healing the skin	[15]
	Natural Antibacterial Compounds	Helps fight infections and maintain skin cleanliness	
Enzymes and Amino Acids	Proteins and Amino Acids	Supports skin cell regeneration	[14]
	Bromelain Enzyme	Helps gently exfoliate the skin	

Tabel 3. GCMS Test Result Banana Leaf Extract

Test Parameters	Kepok Banana Leaf Extract	Klutuk Banana Leaf Extract	Ambon Banana Leaf Extract
Flavonoid Content (mg/g)	0.45	0.38	0.42
Tannin Content (mg/g)	1.20	1.35	1.10
Saponin Content (mg/g)	0.15	0.18	0.13
Antioxidant Activity (IC50 DPPH µg/mL)	78.50	85.00	80.25
Tyrosinase Inhibition Potential (%)	60.5	55.8	58.2
Elastase Inhibition Potential (%)	52.3	50.7	51.1

Tabel 4. Organoleptic Test

Characteristic	Formula I	Formula II	Formula III
Texture	Creamy, providing a smooth application	Smooth and uniform, indicating good formulation	Slightly thicker, which may be desirable for some users
Color	Light green, suggesting a lighter formulation	Rich golden, which is visually appealing	Deeper yellow, indicating a higher concentration of extract
Aroma	Mild with a subtle banana scent, making it gentle on the senses	Pleasant and refreshing fragrance reminiscent of green tea, enhancing the user experience	More pronounced scent that may be appealing to some but could be overwhelming for others
Skin Application	Spreads easily with a slightly oily feel initially. Absorbs well after a few minutes, indicating reasonable efficacy	Silky texture allows for easy application Absorbs quickly without leaving a greasy residue, making it the best formulation in terms of skin feel	Heavier feel on the skin, taking longer to absorb. Leaves a greasy feel that lingers, which might not be preferred.

4. Conclusion

Based on the results of the research conducted on the formulation of body lotion using banana leaf extract, several important points can be concluded as follows:

a. Active Ingredient: Banana leaf has the highest flavonoid content and good antioxidant activity, potentially providing significant benefits for skin health. Testing indicates that banana leaf extract is effective in inhibiting the enzymes tyrosinase and elastase, which contribute to skin aging.

b. Organoleptic Test Results: The results of the organoleptic test show that Formula II (with 1 g of extract) has the most appealing appearance and aroma, featuring a smooth consistency that absorbs easily without leaving a sticky feel. Formulas I and III also show good quality, but Formula II offers the best balance between viscosity and absorption ability.

c. pH Test Results: The pH test results indicate that all formulas fall within a safe range for skin application, with Formula I having a pH of 4, Formula II having a pH of 5, and Formula III having a pH of 6. Formula II demonstrates the most balanced pH, supporting product stability and safety.

d. Viscosity Test Results: The viscosity test shows that Formulas I and III have higher viscosities (50.640 cP and 57.840 cP) compared to Formula II (32.240 cP). Although the viscosity of Formula II is lower, it allows for easier application and quicker absorption into the skin.

e. Adhesion Test Results: The adhesion test results indicate that all three formulas have good adhesion properties; however, Formula II excels in terms of user comfort and ease of application on the skin.

Overall, Formula II with 1 gram of banana leaf extract is the most superior among the three tested formulas, providing an optimal balance of effectiveness, texture, and ease of use. This formulation can serve as an alternative cosmetic product beneficial for skin health and beauty. Further research is needed to explore the potential use of banana leaves in other cosmetic products.

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CAREER IMPROVEMENT THROUGH CLASSROOM ACTION RESEARCH (CAR) PROPOSAL PREPARATION TRAINING FOR TEACHERS AT SMK PIRI YOGYAKARTA

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Abstract

The skill of implementing Classroom Action Research (CAR) is very important for teachers because teachers are the main actors, who understand learning problems, and need solutions. These problems can be in the form of student behavior that is less participating in class, decreasing student enthusiasm for learning, decreasing student learning achievement, the possibility of inappropriate learning methods, media problems that are less supportive, to the accuracy of learning evaluations. The implication of this is that the solutions found are expected to be able to solve learning problems, which will ultimately improve the quality of learning. Based on the analysis of the situation, several problems faced by partners are: many problems arise from the learning process that have an impact on the decline in the quality of students, teachers are less skilled in conducting CAR research, compiling research proposals and conducting research, and reporting research results as teacher needs for career development requirements, and teachers are less able to find problems in the learning process, which arise when teaching. The methods used in this community service activity are lectures, discussions, and demonstrations. The PKM activity was successfully carried out on June 24, 2024 at SMK Piri 3 Yogyakarta. Several indicators of the success of the implementation of the activity are: 1). the number of participants who participated in writing scientific papers according to the target, 2) there was an increase in participant understanding in compiling Class Action Proposals (CAR), and 3) there was an increase in participant understanding in using the Mendeley application to support the preparation of Class Action Proposals (CAR).

Keywords: Classroom Action Research (CAR), career, Vocational High School Teachers.

1. Introduction

Classroom Action Research (CAR) is a research conducted in class to solve learning problems. Sukmadinata (2012) [1] explains that action research is a combination of data collection activities from an action carried out with data taken from the results of the research so that it will be continuously implemented so that it can form a spiral sequence, namely planning, action, observation, and reflection. Sugiyono (2019) [2] explains that action research is carried out to develop and improve the performance of an action carried out so as to produce knowledge about action procedures that are useful for achieving the desired results.

The skill of implementing CAR is very important for teachers because teachers are the main actors, who understand learning problems, and need solutions. These problems can be in the form of student behavior that is less participating in class, decreasing student enthusiasm for learning, decreasing student learning achievement, the possibility of inappropriate learning methods, media problems that are less supportive, to the accuracy of learning evaluations. The implication of this is that the solution found is expected to be able to solve learning problems, which will ultimately improve the quality of learning.

The implementation of CAR is carried out with several actions to improve a method, pattern, strategy, rule or concept in a program or learning activity (Fahmi, 2021) [3]. Through CAR, it will produce better concepts or procedures so that it can improve the quality of learning. Through the skills of conducting CAR research, learning problems can be resolved, both those related to the inaccuracy of the methods used in learning, media problems, inappropriate learning models, and the resolution of various student activities that do not support the achievement of quality.

Rober Pelton (2020) [4] provides an analogy that Action Research or CAR changes students to improve quality, which cannot be equated with architects building buildings. This means that solving problems related to behavior is very complex. For this reason, patience is needed with various observations of variables that affect both directly and indirectly. There are 5 stages in this study: 1) Issue Identification, 2) Data Collection, 3) Action Planning, 4 Plan Activation, and 5) Outcome Assessment. What is also important in learning is the issue of achieving learning goals or achievements (CPL). When CPL is not achieved, then the teacher needs to explore the weak points of the learning process. This is what will be solved from CAR research. Richard Sagor (2005) [5] describes it with a journey. When traveling, where to go needs to be clear, so that what must be planned for the provision of achieving the destination can run smoothly. Analogous to learning objectives, the objectives of learning research must be clear so that anything that might hinder learning objectives can be estimated.

SMK Piri 3 Yogyakarta is a private school. This institution produces graduates who are expected to be able to compete in the world of work. Students will have quality, including if the teachers are also qualified. One of the qualities that teachers need to have is how teachers are able to teach well. The indicators include when teachers are able to teach appropriately so that students can learn easily, there is an increase in the cognitive, affective, and psychomotor domains. To achieve this goal, teachers need to understand how to approach their students appropriately. For that, teachers need professional requirements: personality, social, professional, and pedagogical requirements. In addition, there are demands for teachers to use the right model, teachers teach systematically, the media used can trigger students to develop their thinking power and creativity. The reality that occurs in the classroom is that there are many problems arising from the learning process that have an impact on the decline in the quality of students. This needs to be solved. For this reason, Classroom Action Research is carried out. The purpose of CAR research is to improve the quality of learning. The aspects that are improved will depend on the existing problems and solutions are sought so that the problems can be resolved. For the first time, teachers need to identify problems in the classroom, find alternative solutions to be used as starting points for CAR research. Furthermore, research questions or research hypotheses need to be made.

Based on the analysis of the situation, several problems faced by partners are:

a. Many problems arise from the learning process that have an impact on the decline in the quality of students.
b. Teachers are less skilled in conducting CAR research.
c. Compiling research proposals and conducting research, as well as reporting research results are teacher needs for career development requirements.
d. Teachers are less able to find problems in the learning process, which arise when teaching.

Based on these problems, the team is interested in carrying out community service activities in order to improve teachers' understanding and skills in making CAR research proposals. It is hoped that after the activity is carried out, teachers will be able to find and identify the problems faced, be able to find alternative solutions through CAR research, and be able to make their research reports.

2. Method

In this community service activity, the implementing team chose the following activity methods:

a. Lecture
The lecture method is used to provide material on the introduction and writing of good CAR Proposals and in accordance with the rules of proposal writing.
b. Discussion
The discussion process between the resource person and participants was carried out from the stage of providing material and continued in the training session.
In addition, the discussion was carried out through a communication forum on Whatsapp. The discussion aims to find out the obstacles experienced by participants in making CAR proposals.
c. Demonstration
The demonstration process was carried out to provide participants with an overview of the proposal making process from start to finish, and using the Mendeley application.

3. Results and Discussion

The PKM activity was held on June 24, 2024 with the title "Career Improvement Through Classroom Action Research (CAR) Proposal Preparation Training for Teachers at SMK Piri Yogyakarta" with speakers namely Dr. Rosidah, M.Sc. and Arwan Nur Ramadhan, M.Pd. This activity was carried out offline at SMK Piri 3 Yogyakarta. The PKM activity was attended by 22 participants consisting of teachers from SMK Piri 3 Yogyakarta and teachers from SMA Piri 1 Yogyakarta. The material presented focused on two things. The first material is the preparation of CAR proposals starting from determining topics, exploring problems in schools, to introducing CAR and its procedures.

Participants were invited to discuss any problems that arose during the learning process, then based on these problems, the CAR proposal title was compiled. Teachers were also shown examples of finished CAR proposals and then studied them together.

Table 1. Level of participants after participating in PkM activities

No	Material	Answers			
		Very lessLess comprehensive	comprehensive	Comprehensive	Very comprehensive
1	Preparation of Classroom Action Research Proposals	0%	0%	71,43%	28,57%
2	Use of Mendeley Application to Support Preparation of Classroom Action Research Proposals	0%	9,52%	66,67%	23,81%

The next material was the use of the Mendeley application to support the preparation of Class Action Proposals (CAR). This topic was presented about Mendeley and its uses. In addition, it also explained how to access and operate Mendeley, how to cite, and how to add a bibliography. Furthermore, knowledge was also provided on how to find other references quickly, accurately, and efficiently.

The implementation of community service activities was evaluated to see their benefits. Table 1 is the data obtained regarding the level of understanding of participants after participating in the Community Service activities. After participating in the Community Service activities, 71.43% of participants understood how to prepare a CAR proposal and even 28.57% of participants understood it very well.

Meanwhile, the level of understanding of participants regarding the use of the Mendeley application to support the Preparation of Class Action Proposals (CAR) after participating in the PkM activity, 66.67% of participants understood the use of the Mendeley application to support the Preparation of Class Action Proposals (CAR), 23.81% understood very well, and only 9.52% of participants did not understand this application.

The increase in participant understanding shows that the activity was packaged effectively so that it can be useful for the self-development of PkM activity participants. Several things that cause this to happen are from the speaker and the material presented. Darmawan (2016) [6] stated that the competence of the instructor in the training process greatly influences the final competence of the training participants. One of the competencies that can influence this can be seen from their experience. In addition to the instructor's experience, another factor that can influence participants to give a high assessment of the attractiveness of the material is the material itself.

The attractiveness of the material can be seen from the number of participants who ask questions during the training activity. Here are some questions from participants:

1. Can CAR be done by a TEAM?
2. How to compile good indicators, because there are many sources?
3. What are the tips for finding a grand theory?
4. How to distinguish CAR from other types of research?
5. Are there any special guidelines for formulating CAR?
6. Can citations be made from Mendeley?

Based on these questions, it can be seen that participants have a lot of interest and attraction to the training topic.

The community service activities that have been carried out need to be evaluated regarding the quality of the implementation of PkM activities. In relation to this, the participants gave an assessment as seen in Figure 1. Based on the data in Figure 1, it can be seen that the quality of the implementation of PkM activities was assessed as very good by 61.90% of participants, 38.10% of participants assessed it as good, and no participants assessed it as less and very less good.

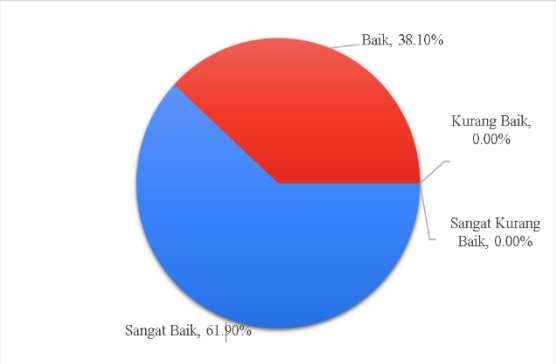


Figure 1. Quality of implementation of PkM activities

Table 2. Level of coverage of PkM activity materials

No	Material	Answers			
		Very less comprehensive	Less comprehensive	Comprehensive	Very comprehensive
1	Preparation of Classroom Action Research Proposals	0%	0%	66,67%	33,33%
2	Use of Mendeley Application to Support Preparation of Classroom Action Research Proposals	0%	0%	57,14%	42,86%

Regarding the material presented by the resource person, participants gave their opinion that the scope of the material was considered comprehensive. This can be seen in 2. The data in table 2 shows that the material for compiling CAR proposals is considered comprehensive by 66.67%, and very comprehensive by 33.33%. Meanwhile, regarding the material on using the Mendeley application to support the preparation of Classroom Action Research (CAR) proposals, 57.14% of participants considered the material on using the Mendeley application to support the preparation of Classroom Action Proposals (CAR) comprehensive and 42.86% of participants considered it very comprehensive.

One of the objectives of this activity is to improve teachers' skills in writing CAR proposals. Based on the results of the activity recap, it can be seen that teachers are enthusiastic about participating in this training. As many as 73% of the invited teachers attended the PkM activity until it was finished. The teachers' understanding of the material was also good and there were many discussions between the speakers and training participants. However, communication with teachers after the training is a major challenge. This is because teachers are very busy so they have not focused on being able to write well.

Overall, the PkM activity has been successfully implemented. Several factors supporting the success of PkM activities are: 1). Speakers who are resource persons are competent and experienced in writing CAR proposals and experts in information technology, so they are very proficient in the

Mendeley application. 2) The training facilities and infrastructure are very good, including a representative training location, a good LCD projector, a training room equipped with air conditioning that ensures participants feel comfortable carrying out training activities. 3) The number of service teams totaling 3 people and assisted by students are able to carry out their duties well as speakers, moderators, facilitators, assistants and as administrators of the participant administration section. 4) The location of the activity is at SMK Piri 3 Yogyakarta which is the work location of the participants so it is easier to attend, even though there are busy times. Meanwhile, several things that hinder the implementation of PkM include: 1) Limited meetings. Face-to-face training activities are limited due to limited activity budgets. Training activities should be held for a longer duration so that there is enough opportunity for consultation, guidance, and direction of participants in writing proposals. 2) Participant commitment. The commitment of participants to make proposals is still very low due to the busyness of educational and teaching activities and other activities as a teacher.

The following is the service team presenting the final documentation of the service activities that have been carried out.



Figure 2. Documentation of participants with resource persons.

4. Conclusion

Based on the results of the implementation and discussion, it can be concluded that the Community Service activities have been carried out very well. This is based on several things, namely:

1. The number of participants who participated in writing scientific papers according to the target.
2. There is an increase in participant understanding in compiling Class Action Proposals (CAR).
3. There is an increase in participant understanding in using the Mendeley application to support the preparation of Class Action Proposals (CAR).

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3. Teachers of SMK SMK Piri 3 and SMA Piri 1 Yogyakarta who have taken the time, energy and thoughts to follow the activity until it is finished.

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Validity of E-Books and E-Storytelling for Social Emotional Learning for Kindergarten Children

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Abstract

Social emotional learning needs to be done early. Underdeveloped children's social emotional development can inhibit other developments. This research aims to test the validity of e-books of concepts and varieties of social emotional learning for children, as well as e-storytelling about social emotional learning. This learning media has novelty because it focuses on developing media based on social emotional learning that has not previously existed. This research is quantitative in nature. This research conducted expert validation to obtain validation and then analyzed descriptively quantitatively. The results of the validation were calculated by Aiken's V formula. Based on the results of the expert assessment, it can be concluded that the e-book on the concept and variety of social emotional learning activities, and e-storytelling are declared valid. All items are declared valid because Vtabel is greater than 5% of Vcount. E-books and e-storytelling are declared valid and suitable for field trials.

Keywords: validity, e-book, social emotional learning

1. Introduction

Early childhood is the most important period in human life (Hardiansyah et al., 2021). This period is a golden age that needs to be optimized (Fauzi & Novikasari, 2019), because there is very rapid development (Mursid, 2015) and has an impact on later life. One aspect of development that needs to be stimulated is social emotional development. Stimulation of social emotional development aims to make children have social emotional competence.

Social and emotional competence is one of the important components to be stimulated early on. These competencies are needed so that children gain confidence and are able to build relationships in their environment, solve problems, and overcome challenges (Halle and Darling-Churchill, 2016). Children's social-emotional competencies can be developed through Social Emotional Learning (SEL), popularized by CASEL (Collaborative for Academic, Social, and Emotional Learning).

The CASEL framework consists of five groups of core competencies that underlie social and emotional skills, namely: 1) self-awareness (the ability to understand one's own emotions, thoughts, and values, 2) self-management (managing one's own emotions, thoughts, and behaviors effectively), 3) social awareness (the ability to understand and empathize with different perspectives), 4) relationship skills (building and maintaining healthy relationships), and 5) responsible decision-making (making constructive choices regarding personal behavior) (Borowski, 2019).

The interview results show that the implementation of SEL activities in kindergarten requires habituation in daily routines, both through morning meetings, core learning activities, during free play or rest, and closing activities. This habituation and various activities can help children strengthen the social emotional skills learned. Through play, children engage in active exploration, learn to solve problems and self-regulate in a social context. Children learn to cooperate and interact socially, helping to foster and develop social emotional competencies (Keung & Cheung, 2019).

Kindergarten plays an important role in fostering children's social-emotional development because children spend part of their time at school every day. In fact, some kindergarten teachers tend to train academic skills such as reading, counting, and spatial skills (Bahlmann Bollinger & Myers, 2020). Furthermore, research results from Pyle, DeLuca, Danniels, & Wickstrom (2022) show that teachers have not maximized the teaching of SEL skills in a structured manner.

Interview results with 20 kindergarten teachers stated that there are currently few books on the concept of social emotional learning and its application in classroom learning. Furthermore, the questionnaire distribution with 101 teachers showed that 92% need a book on social emotional learning,

which is practical, easy to understand, and contains various concrete examples of SEL activities for teachers to practice in the classroom. Other data shows that 86% of teachers proposed a form of media in the form of an e-book, which can be studied through a smartphone, and can be printed at any time when needed.

This study was conducted to test the validity of e-books of social emotional learning concepts, e-books of various social emotional learning activities, and e-storytelling about social emotional learning. This learning media has novelty because it focuses on the development of social-emotional learning-based media that has not previously existed.

2. Method

This research is a quantitative research to determine the validity of a product. This research was conducted in the Yogyakarta area. The data collection technique used was a scale and data analysis was quantitatively descriptive. Validators were asked to assess the guidelines developed based on aspects of feasibility, as well as provide written suggestions as a basis for revision. Validation was carried out until the product was declared feasible to be implemented in learning activities. The instrument is declared valid if it can measure what is measured (Widiyoko, 2016).

The validity of this study consists of content validity, namely using expert judgment opinions by several lecturers who are material experts, and media experts. Expert lecturers come from the PAUD, Guidance and Counseling, and Learning Technology departments. The measurement method uses a Likert scale by asking respondents to answer between five different answer options. The description of the assessment score is: 1 = Not suitable, 2 = Less suitable, 3 = Sufficient, 4 = Suitable, and 5 = Very suitable. Furthermore, researchers calculated the validation results using the Aiken's V formula. Aiken's V formula is as follows:

$$V = \sum S/[n(c-1)]$$

Description

V : Aiken's validity index

S : r-lo

n : The number of experts

c : The highest validity score

All items are considered valid if Vtable is greater than Vcount.

3. Results and Discussion

A. Material Validation Result

The results of material validation of the three products can be seen in the following .

Table 1. Results of material expert validation of the e-books application of social emotional learning

No	Item	Value Expert 1 2 3 4 5 6 7	V-count	V-table 5%	Conclusions
1.	Conformity with PSE concept	5 5 5 5 5 4 5	0.96	0.75	Valid
2.	Easy to practice	4 5 5 4 5 4 4	0.86	0.75	Valid
3.	Suitability to the characteristics of child development	5 5 4 4 5 4 4	0.86	0.75	Valid
4.	Comprehensiveness	5 5 4 5 4 5 5	0.92	0.75	Valid

In the validation calculation, the researcher set the same Vtabel value as the model validation, with an error of 5% or $p < 0.05$. That is, the chance of error is 5%, so the score can be seen in the second row of each rater number.

Based on Table 1, all items are declared valid because Vtabel is greater than Vcount. Thus, based on the assessment results of seven material experts, the e-book application of social emotional learning is declared valid and suitable for field trials.

Table 2. Material expert validation results of the e-book of variety social emotional learning activities for children

No	Item	Value Expert							V-count	V-table 5 %	Conclusions
		1	2	3	4	5	6	7			
1.	Conformity with PSE concept	5	4	5	4	5	5	5	0.92	0.75	Valid
2.	Easy to practice	5	5	5	4	5	5	5	0.96	0.75	Valid
3.	Suitability to the characteristics of child development	5	5	5	5	5	5	5	1	0.75	Valid
4	Comprehensiveness	5	5	5	4	4	5	4	0.92	0.75	Valid

In the validation calculation, the researcher set the same Vtabel value as the model validation, with an error of 5% or $p < 0.05$. That is, the chance of error is 5%, so the score can be seen in the second row of each rater number. Based on Table 2, all items are declared valid because Vtabel is greater than Vcount. Thus, based on the assessment results of seven material experts, the the e-book of variety social emotional learning activities for children is declared valid and suitable for field trials.

Table 3. Material expert validation results of e-storytelling

No	Item	Value Expert							V-count	V-table 5 %	Conclusions
		1	2	3	4	5	6	7			
1.	Conformity with PSE concept	4	5	5	4	4	4	4	0.82	0.75	Valid
2.	Easy to practice	5	5	5	4	5	5	5	0.96	0.75	Valid
3.	Suitability to the characteristics of child development	4	4	4	5	4	5	4	0.82	0.75	Valid
4	Comprehensiveness	5	5	5	4	5	4	4	0.92	0.75	Valid

Based on Table 3, it can be seen that Vtabel for each item is greater than Vcount. Thus, based on the assessment results of seven material experts, the social emotional learning e-storytelling is declared valid and suitable for field trials.



Picture1. E-book of SEL implementation, e-book of various SEL implementation activities, and e-storytelling

B. Media Validation Result

The results of media validation of the three products can be seen in the following tables.

Table 4. Result of media validation the e-books application of social emotional learning

No	Item	Expert Value							V-count	V-table 5 %	Conclusion
		1	2	3	4	5	6	7			
1.	Durability	5	5	4	5	4	5	5	0.92	0.75	Valid
2.	Security	5	4	5	5	5	5	5	0.96	0.75	Valid
3.	Practicality	5	5	4	5	5	5	4	0.92	0.75	Valid
4.	Conformity with learning objectives	5	5	4	5	4	5	5	0.92	0.75	Valid
5.	Size suitability	5	5	5	4	5	5	5	0.96	0.75	Valid
6.	Color compatibility	5	5	5	5	5	5	5	1	0.75	Valid
7.	Interesting image	5	5	4	5	5	5	4	0.92	0.75	Valid

Based on Table 4, it can be seen that the V_{table} for each item is greater than V_{count}. Therefore, e-book of aplication social emotional learning are valid and suitable for use in the field.

Table 5. Result of media validation of the e-book variety of social emotional learning activities

No	Item	Value Expert							V-count	V-table 5 %	Conclusion
		1	2	3	4	5	6	7			
1.	Durability	5	5	4	5	4	5	5	0.92	0.75	Valid
2.	Security	4	4	5	4	4	4	5	0.82	0.75	Valid
3.	Practicality	5	5	4	4	5	5	4	0.89	0.75	Valid
4.	Conformity with learning objectives	5	5	5	4	5	4	4	0.89	0.75	Valid
5.	Size suitability	4	5	5	4	4	4	4	0.82	0.75	Valid
6.	Conformity color	5	5	5	4	5	5	5	0.96	0.75	Valid
7.	Interesting image	4	4	4	5	4	5	4	0.82	0.75	Valid

Based on Table 5, it can be seen that the Vtable for each item is greater than Vcount. Therefore, the e-book variety of social emotional learning activities are valid and suitable for use in the field.

Table 6. Result of media validation of e-storytellling

No	Item	Value Expert							V-count	V-table 5 %	Conclusion
		1	2	3	4	5	6	7			
1.	Durability	4	5	5	4	4	4	4	0.82	0.75	Valid
2.	Security	5	5	5	4	5	5	5	0.96	0.75	Valid
3.	Practicality	4	4	4	5	4	5	4	0.82	0.75	Valid
4.	Conformity with learning objectives	5	5	5	4	5	4	4	0.89	0.75	Valid
5.	Size suitability	5	5	4	5	4	5	5	0.92	0.75	Valid
6.	Conformity color	4	4	5	4	4	4	5	0.82	0.75	Valid
7.	Interesting image	5	5	4	4	5	5	4	0.89	0.75	Valid

Based on Table 6, it can be seen that the Vtable for each item is greater than Vcount. Therefore, e-storytelling are valid and suitable for use in the field.

4. Discussion

Validity is the level of reliability and validity of the measuring instrument used. The instrument is said to be valid, meaning that the instrument used to obtain the data is valid or can be used to measure what should be measured (Sugiyono, 2010). Validity also refers to the accuracy and validity of a measuring instrument. Absolute validity measurement is carried out to ensure the similarity between the data collected and the data that occurs on the object under study. Measurement is done by asking experts to choose one answer among five answer options. The answer choice is a representation of the expert's assessment of the product produced. Furthermore, the researchers calculated the validation results using the V Aiken formula. All items were declared valid because the Vtabel of each item was greater than Vcount.

Based on the assessment results of the seven expert judgement materials, it can be concluded that the e-book of SEL concept, e-book of various SEL activities, and e-storytelling are valid and feasible to be used for field trials. The material experts stated that the e-books of SEL concepts, various SEL activities, and e-storytelling are valid in terms of conformity with the concept of PSE, ease of practice, conformity with child development characteristics, and sequence. Written input related to the material is that the activity steps or syntax need to be made more detailed, and the variety of activities added.

Expert assessment of media quality was also conducted. The calculation results showed that all items were declared valid because the Vtabel of each item was greater than Vcount. Media experts highlighted the media from suitability to instructional objectives, practicality, suitability to learning, suitability of size, color combination, and attractiveness of images, durability and safety. This is in accordance with the opinion of Abdullah (2020) that the selection of learning media should pay attention to the instructional objectives to be achieved, the level of effectiveness of the media, and the characteristics of the students who will use the media. Written input related to the media, namely the images used need to be adjusted to the story narrative, and added moral messages or conclusions tailored to the SEL objectives.

The learning media developed in this study were used to support the implementation of SEL. Learning media is a tool used to convey information in an educational context (Safira, 2020). The form of media produced is an e-book. (Electronic book). E-book is a digital publication that utilizes electronic files as an alternative to traditional print media. The use of e-books can help teachers convey material about values (Afif et al, 2023), increase children's interest (Lyla et al., 2022), and be effective in stimulating learning activities Hura et al. (2023). E-books have several advantages as learning media for early childhood (Makdis, 2020). E-books are more practical and easy to carry everywhere because

they can be accessed through electronic devices such as smartphones, laptops, and tablets that are familiar to children. Second, the use of E-books. E-books are also environmentally friendly because they do not require paper as the basic material for making them, so they can reduce the use of wood and paper in the production of printed books which can have an impact on the environment. Furthermore, e-books have durability because they are not easily damaged like printed books, so they can be used repeatedly by children.

By using digital files, documents become more concise and can be accessed at any time through computers and mobile devices (Hilir, 2021). The use of e-books allows children to avoid the hassle of buying physical books, as e-books can be accessed easily through devices such as smartphones, laptops, and computers. Another advantage of e-books is their ability to summarize material, which can attract interest and increase children's enjoyment in reading (Susilawati & Rusdinal, 2022). Modern e-books also offer interactive digital features that enrich the reading experience for users (Zipke, 2017).

The learning media developed in this research answers the needs of educators in helping teachers implement SEL. Based on input from experts, the learning media needs to be improved to make it more feasible before being used in research. New things in this research include: 1) The existence of e-books of social emotional learning concepts and e-books of various SEL activities that previously did not exist. This e-book can be a reference for educators in implementing SEL in the classroom; and 2) The existence of an e-book that leads to SEL, which can be used by educators and parents to develop children's social emotional competence

5. Conclusion

E-books on the concept and variety of social-emotional learning activities, and e-storytelling are valid. All items are valid because Vtabel is greater than 5% of Vcount. E-books and e-storytelling are declared valid and suitable for field trials.

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TYPOLOGY OF CIVIC EDUCATION IN INDONESIA

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Abstract

Civic education serves a significant role in the development of good and intelligent citizens (smart citizens). Civic education is provided at each level of educational units in many countries using different nomenclatures based on the country's curriculum model. The purpose of this study was to investigate the application of Civic Education learning in Junior High Schools, as well as to identify the typology of Civic Education in Junior High Schools. The research method employed was phenomenological research with a qualitative approach. The subjects for this study were SMP Negeri 1 Paliyan, SMP Negeri 2 Kalasan, SMP Negeri 1 Lendah, SMP Negeri 2 Dlingo, and SMP Negeri 8 Yogyakarta. Data was collected through interviews, observations, and documentation. In this study, data analysis approaches included: 1) completely describing the phenomena/experiences encountered by the research subjects; 2) the horizonalization step involves finding remarks in interviews regarding the focus of the study; 3) organizing statements in interviews into meaningful units; 4) constructing all explanations of the meaning and essence of the informants' experiences, and 5) writing a report by providing an understanding of how someone feels a phenomenon. The findings of the study revealed that the typology of Civic Education in junior high schools includes: 1) Civic Education is optimally organized, such as encouraging students' democratic attitudes through discussion, debate, and critical thinking activities, and is applied inclusively by involving students in the learning process in the classroom; 2) Civic education is defined as political education that teaches students how to participate in the world of politics while developing their own opinions; 3) Civic education is implemented using an educational approach that includes assessing possibilities based on available facts, emphasizing the growth and deepening of public discussion, long-term perspectives, and the establishment of clear conceptions and expectations; 4) Civic Education and teacher activities in the classroom are nationalistic, social, and personal in nature; 5) Civic Education stresses citizen understanding of community issues and the power to effect social change.

Keywords: typology, civic education, junior high school

1. Introduction

Democracy is defined simply as "of the people, by the people, and for the people," including values like popular sovereignty, law enforcement and justice, tolerance, and respect for human rights [1];[2]. These concepts are changed to support democracy as collaborative self-government that promotes inclusive empowerment [3]. Almost every country has a political education system in place to promote civic consciousness, which serves as a tool for political socialization [4];[5]. Democratic education is an important facet of political education [6]. Democratic education is also known as Citizenship Education [7]. According to Charles and John, democratic civic education is a set of core principles that are important for thoroughly comprehending democracy and democratic citizenship [8]. According to Nu'man Soemantri, civic education is an educational program based on political democracy that is supplemented with various sources of information, including the good influence of school education, society, and parents [9]. According to Monteiro, Civic Education is expected to produce scientists with a sense of nationality and love for their homeland, civilized democracy, and competitive citizens who are disciplined and actively participate in the construction of a common life based on the Pancasila value system [10].

However, in practice, there is sometimes a gap between the notion of civic education taught in schools and citizenship issues that arise in daily life. Peterson [11] provides an overview of typology by giving several assumptions, contexts, and behaviors that determine the possibilities for teaching Citizenship Education. The typology addressed in this paper is based on five ideal types of citizenship education. First, McLaughlin [12] identifies two types of Citizenship Education: minimum and maximum. Second, Lamm [13] described a Citizenship Education approach that included Ideological and Political Education. Third, Sears and Hughes [14] examined the use of Citizenship Education in indoctrination or education approaches. Fourth, Sim and Print [15] propose three ideal types of

citizenship education that assess teachers' orientation of citizenship understanding and classroom behaviors based on components of patriotism, social concern, and personal. Fifth, Castro differentiates Citizenship Education by conservative values and awareness [16]. These various typologies serve as a foundation for evaluating the reality of Citizenship Education in Indonesia from the perspective of schooling, the national Citizenship Education curriculum that is used in Indonesia, teacher professionalism in teaching, and the methods or forms of Citizenship Education teaching used in schools. Geboers et al. [17] found that students' citizenship orientation and knowledge (committed citizenship, indifferent citizenship, ordinary citizenship, and confident citizenship) are determined by their demographic characteristics and level of education. Patterson [18] conducted a similar study, exploring secondary school teachers' conceptualization of citizenship education in pre-service and in-service professional development. Three elements of teacher beliefs about citizenship are the level of perceived citizen involvement, the value and use of knowledge, and the position of citizenship education in the curriculum. Based on this description, the purpose of this study is to 1) analyze the implementation of Indonesia's national Citizenship Education curriculum; 2) investigate the implementation of Citizenship Education learning in Junior High Schools; and 3) identify the typology of Civic Education in Junior High Schools.

2. Method

This study employed a qualitative method. The purpose of this study, which employs qualitative research methodologies, is to identify the typology of Citizenship Education used in junior high schools throughout five sub-districts in the Special Region of Yogyakarta Province. The researcher reported their findings in the field in words [19]. This qualitative research method allows the researcher to discover, explore, construct meaning, and generate hypotheses during the research process [20]. The phenomenological approach was chosen in this study as a scientific approach that explores how members of society explore their everyday world, specifically how individuals with their awareness build/construct meaning from the results of interactions with other individuals [21];[22]. As a result, the objective of this study is to uncover the essence of human experience through a variety of subjects and direct researcher involvement in data collection to identify patterns and relationships of meaning [23].

The subjects in the study were Civic Education teachers from five junior high schools in the Special Region of Yogyakarta Province: SMP Negeri 8 Yogyakarta, SMP Negeri 2 Kalasan, SMP Negeri 1 Paliyan, SMP Negeri 1 Dlingo, and SMP Negeri 1 Lendah. Data collection techniques in this study included three methods: interviews, observations, and documentation. The study results were examined in the following steps [23]: The researcher fully explained the phenomena/experiences that the research participants had with the typology of civic education in civics learning in junior high schools. All results of in-depth interviews in the form of recordings were written down in written transcripts; 2) During the horizonalization stage, the researcher found statements (interview results) about the focus of the research, details of the statements, and each statement had an equivalent value; the details were then developed without repetition. At this stage, the researcher was not permitted to make any assessments; the transcript results had to be derived solely from the interview results; 3) The statements were then grouped into meaningful units; the researcher detailed the units and wrote a text explanation of the experience, accompanied by examples. The researcher starts removing redundant and overlapping statements. The researcher then reflects on his or her thoughts using imaginative variation or structural description, seeks the full meaning that is possible and through divergent perspectives, considers the phenomenon's frame of reference, and constructs how the phenomenon is experienced; 4) The researcher then constructs a comprehensive explanation of the meaning and essence of the informants' experiences. This is the essence description stage; 5) The researcher delivers her study report with a knowledge of how someone feels about a phenomenon. The research report reveals a singular meaning, unity of the total experience, with an urgent structure.

3. Result and Discussion

Citizenship derives from the Latin term civics, which means citizen, fellow citizen, or compatriot. Citizenship is defined scientifically as the study of the relationship between citizens and their country. Citizenship in a democracy encompasses membership in a political unit, shared beliefs, and involvement in political life [24]. This demonstrates that citizens are considered not just as members of a political community, but also as members of other communities, necessitating the implementation of an educational activity such as civic education or citizenship education. Civic education is defined as

an effort to develop individuals so that they can apply their knowledge, skills, and attitudes as responsible citizens. The specific definition and pedagogical approach of civic education are determined by a variety of contextual elements, including historical traditions, geographical location, sociopolitical structure, economic system, and global trends [25]. Civic education has become a major priority in many nations as a means of developing individuals capable of dealing intelligently with local and global challenges [26]. Civic education covers a wide range of theoretical and practical topics. Civic education encompasses both democracy education and political education [27]. Civic education, as addressed here, refers to formal education in schools that prepares young citizens for the social, national, and state environment.

Civic education taught in different countries differs from one another. First, McLaughlin [12] defines two types of civic education: basic and maximal civic education. Civic education is founded on a "thin" or "thick" understanding of human virtue or perfection [12]; [28]; [29]. Minimal civic education stresses civil rights and obligations but does not address diversity or the need for active participation. Civic education is solely based on knowledge. This method focuses on communicating accurate information regarding institutions, procedures, and civil rights. This method does not promote critical thought or comprehensive understanding, resulting in a static view of citizenship in which learners' perspectives are not actively promoted or developed. Maximal education, on the other hand, seeks to enhance engagement in democracy and community life by merging multiple viewpoints and experiences, as described by McLaughlin [12] as a strategy that promotes discussion, debate, active participation, and critical thinking. This method supports a more inclusive and participatory style of citizenship education, in which students are actively involved in the learning process and encouraged to think critically about their civic roles and obligations [30]. Second, the type of approach to Citizenship Education by [12] (2000) which includes Ideological Education & Political Education. According to Lamm, ideological education seeks to persuade students to adopt a specific partisan political ideology, whereas political education teaches students how to participate in the political sphere while forming their own opinions. Therefore, Lamm underlines that the primary purpose of CCE should be to promote the process of political education.

Third, Sears and Hughes [14] examined the use of Citizenship Education in the indoctrination or education method. Sears and Hughes' arguments about citizenship education are associated with the struggle between two opposing ideas: indoctrination and education. Indoctrination is the uncritical adoption of ideologies without regard for evidence, and it is frequently characterized by slogans, dogma, an emphasis on rapid fixes, and didactic teaching techniques. In contrast, citizenship education in the educational method entails assessing possibilities based on available evidence, emphasizing the growth and depth of public conversation, long-term perspectives, and the creation of clear conceptions and expectations [14]. Fourth, the type of Citizenship Education provides three ideal types that assess the orientation of teachers' civic thinking and classroom actions based on features of patriotism, societal concern, and personal [15]. Based on a survey of eight Singaporean social studies teachers, proposes three ideal types that address their civic understanding and classroom methods. These styles include nationalist, social concern, and person-oriented approaches, whereas each approach stresses the connected environment as part of the civic education process (country, society, or individual students) [15].

Fifth, Castro divides the implementation of Civic Education based on conservative and conscious values [16]. Castro presents a typology based on actual investigations of prospective teachers' approaches to citizenship at a university in the Midwest of the United States [16]. The primary assumption is that the worldview of citizenship serves as a basis for teachers' beliefs and activities. Castro identified a form of civic education based on conservative or conscious ideals. The first type focuses on teaching certain values, qualities, and morals, whereas the second type emphasizes citizens' awareness of community issues and abilities to effect social change.

These theories were then used by researcher to identify the practice of Citizenship Education in five schools, namely SMP Negeri 8 Yogyakarta, SMP Negeri 2 Kalasan, SMP Negeri 1 Paliyan, SMP Negeri 1 Lendah, and SMP Negeri 1 Dlingo. The results of the study showed that, first, Citizenship Education in junior high schools is included in the maximum type that encourages fuller participation in democracy and community life, by combining various perspectives and experiences that encourage discussion, debate, active participation, and critical thinking [12] This is shown from the learning process at SMP Negeri 1 Paliyan through discussion activities on the manuscript of the OSIS Chairperson/Vice Chairperson nomination oration, analyzing the application of the Pancasila spirit in community life, and criticizing issues in the surrounding environment about students who drop out of

school. Students at SMP Negeri 2 Kalasan also carried out discussion activities related to the topic of the formulation of Pancasila and made questions after watching a video about the formulation of Pancasila. Similarly, students at SMP Negeri 8 Yogyakarta participate in a variety of learning activities, including discussions about democracy, elections, and common school-related incidents such as brawls. The student's discussion outcomes are then used to create a short presentation, such as a poster or infographic, using Canva.

McLaughlin further stated that maximal type citizenship education supports a more inclusive and participatory style of citizenship education, in which students are actively engaged in the learning process and encouraged to think critically about their roles and responsibilities as citizens [12] This fact is proved by the results of research at SMP Negeri 1 Paliyan that during the learning process, students are actively engaged in learning activities through 1) game activities as a trigger at the beginning of learning, which aims to encourage students to get to know each other better; 2. "Let's Tell a Story" activity, students are asked to answer questions in front of the class regarding the differences in the surrounding environment; 3) "Let's Observe" activity, students are asked to observe the environment around the school about efforts to handle victims infected with the Covid-19 pandemic; 4) "Let's Show" activity, students are asked to display a campaign speech by the OSIS chairman; 5) "Let's Observe" activity, students are asked to carry out observation activities in the environment around the school or home regarding the issue of dropping out of school; 6) In the "Let's Discuss" activity, students are asked to discuss the application of Pancasila in community life. Furthermore, in SMP 2 Dlingo and SMP 1 Lendah, in civic learning, they relate more material to social problems experienced by students every day. Civic teachers at SMP 2 Dlingo provide groups with the opportunity to identify the application of the function of Pancasila in the family, community, and state environment, and after that students are asked to present the results of their analysis in front of the class. This shows that there is an effort to encourage student debate discussions and participation. Furthermore, in SMP Negeri 8, students' critical attitudes are shown by providing comments on the discussion of "The Relationship between Pancasila and the 1945 Constitution of the Republic of Indonesia", students ask about citizen rights.

Second, the approach to implementing Citizenship Education in junior high schools involves political education. According to Lamm [13] political education is the process of teaching students how to participate in the political realm while developing their perspectives. This is demonstrated by the findings of research conducted at SMP Negeri 1 Paliyan, where students were asked to explore the application of Pancasila in community life. Specifically, students were requested to express thoughts on the question "Has the spirit of Pancasila been applied in community life?". Furthermore, teachers guide students through the learning process by directing them to explore difficulties in their daily lives and assisting them in analyzing the causes and developing solutions to such problems. Furthermore, a study at SMP Negeri 2 Kalasan revealed that students were asked to voice their ideas and provide critical questions about Pancasila's place and role as the foundation of the state. Students are asked to reflect on how they use Pancasila values in their daily lives. The political education approach in Civic Education is also represented in the learning process of SMP 1 Lendah. In Civic learning, the teacher uses political education, particularly on democracy-related content, which is subsequently linked to the OSIS election. Meanwhile, at SMP N 2 Dlingo, the teacher sometimes discusses simpler political issues so that junior high school students can understand them because some junior high school students inquire about political issues that are currently popular and discussed in the media but do not understand what is going on, so the teacher provides an explanation that students can digest. Furthermore, in SMP Negeri 8, political education is incorporated into the Civic Education learning process through democracy-related discussions. Students in discussion activities inquire about participation options other than elections because they are not yet 17 years old or have an ID card; in this activity, the teacher directs students to participate in democratic life by electing a class president or OSIS chairman at school.

Third, civics education is implemented using an educational strategy that includes an assessment based on existing evidence, emphasizing the growth and depth of public discussion, long-term perspectives, and the creation of clear conceptions and expectations [14]. The results of the study at SMP Negeri 2 Kalasan showed that the Civics learning process is long-term oriented because students, in addition to being able to explain the birth process, formulation, and determination of Pancasila as the basis of the state, students must also practice the values of Pancasila in everyday life, so that students are expected to behave in accordance with the values of Pancasila in real life. Furthermore, at SMP Negeri 1 Paliyan in the Teaching Module for the Topic "The Spirit of Pancasila in National Life", the objectives of the learning activities are listed that students must understand Pancasila holistically so that

it is not only memorized but also practiced in everyday life. Likewise, SMPN 1 Lendah and SMPN 1 Dlingo, apply a student-centered learning approach. Furthermore, in SMP Negeri 8 Yogyakarta, the educational approach in the Civic learning process is shown in the learning process which not only emphasizes the knowledge aspect but also attempts to contextualize the material, for example by inviting students to discuss several cases that occur in the educational environment such as brawls. Students are asked to analyze "Is the brawl case a form of deviation from Pancasila?". The results of the students' analysis are then presented in the form of posters or infographics.

Fourth, Civic Education and teaching practices in the classroom promote nationalism, socialism, and personalism [15]. This category comprises nationalist, socially concerned, and individual-oriented approaches, all of which highlight the surrounding environment as part of the civic education process, whether for the nation, society, or individual students. The results of research at SMP Negeri 1 Paliyan in "Meaningful Understanding" demonstrate the sort of nationalist orientation that Pancasila serves as the direction and guideline for the existence of the Indonesian nation and state. As a result, Indonesian residents must embody the spirit of Pancasila in their everyday lives. Furthermore, the Pancasila Student Profile is integrated into the learning process at SMP Negeri 2 Kalasan, SMP Negeri 1 Lendah, and SMP Negeri 1 Dlingo, demonstrating gratitude for Pancasila as the state's foundation. Similarly, the results of research at SMP Negeri 2 Dlingo and SMP 1 Lendah demonstrate a nationalist orientation, resulting from the incorporation of the Pancasila Student Profile into the learning process, namely expressing gratitude for Pancasila as the foundation of the state. Related to the practice of socially oriented Citizenship Education, in SMP Negeri 1 Paliyan it is shown in the learning activity "Let's Observe: namely by observing the surrounding environment about cases of students who drop out or do not go to school and in SMP Negeri 2 Kalasan through attitude assessment (civic disposition) one of the attitude indicators used is emotional-social intelligence. Furthermore, based on the study's findings, the approach in the learning process at SMP Negeri 8 Yogyakarta is more oriented toward the nationalist orientation of "good citizens," as evidenced by the presence of a visit from the police to explain "Traffic Rules," which is one way to provide students with information about the rights and obligations carried out by drivers on the highway, thereby forming an obedient and traffic-rule-following personality.

Fifth, Citizenship Education emphasizes citizens' understanding of communal issues and their potential to effect social change. Castro explains that the form of awareness emphasizes citizens' understanding of communal issues and their potential to compel social change. [16]. According to the findings of a study conducted at SMP Negeri 1 Paliyan, citizen awareness of social concerns may be found in the learning activity "Let's Observe," which entails watching the surrounding environment for cases of students who drop out or do not attend school. SMP Negeri 2 Kalasan promotes citizen awareness of social concerns through reflection activities that encourage students to use Pancasila values in their daily lives. At SMP Negeri 8, while Civic learning is commonly associated with Havana, students must also apply Pancasila values from their family, school, or society.

3. Conclusion

Civic education implemented in various countries has different characteristics from each other. First, McLaughlin identifies two types of civic education: minimal and maximal civic education. Second, consider the Lamm Civic Education approach, which incorporates both ideological and political education. Third, Sears and Hughes Civic Education examines the use of Civic Education in the indoctrination or education approach. Fourth, Sim and Print propose three ideal types of Civic Education that analyze teachers' orientations of civic knowledge and classroom behaviors based on features of patriotism, social concern, and personal. Castro identifies a fifth type of civic education that focuses on conservative values and awareness.

The findings of this study revealed that the typology of Civic Education in junior high schools includes: 1) Civic Education is organized maximally, such as encouraging students' democratic attitudes through discussion activities, debates, and critical thinking, and is applied inclusively by involving students in the learning process in the classroom; 2) Civic education is defined as political education that teaches students how to participate in the political realm while developing their own perspectives; 3) Civic education is implemented using an educational approach that includes assessing possibilities based on available facts, emphasizing the development and deepening of public discussion, long-term perspectives, and the establishment of clear conceptions and expectations; 4) Civic education and teaching practices in the classroom are nationalist, social, and personal in nature; 5) Civic education highlights citizen understanding of community issues and the power to enforce social change.

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WOMEN'S INVOLVEMENT IN PRODUCTIVE ECONOMY THROUGH WOMEN FARMER GROUPS

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Abstract

This research aims to understand the role of Women Farmers Group (WFG) in increasing women's involvement in productive economy in the agricultural sector, with a case study on WFG Dadi Makmur in Wedomartani, Sleman. This research uses a quantitative approach with a case study method. Data were collected through in-depth questionnaires with 30 female WFG members and analysis of related documents. The results showed that membership in WFG significantly improved women's access to agricultural resources such as improved seeds, fertilisers, and equipment, as well as increasing their agricultural knowledge and skills. In addition, WFG facilitates income diversification through the processing of agricultural produce into value-added products and product marketing. This increased access and skills enable women farmers to improve productivity, quality of agricultural produce, and household economic stability. Participation in WFG also increases women's participation in decision-making at the household and community levels, improves food security, and reduces dependence on external resources. These findings support previous literature that emphasises the importance of women's groups in economic empowerment and poverty reduction. This research confirms the importance of continued support to women farmers' groups to enhance women's economic empowerment in the agricultural sector. For future research, it is recommended to conduct a longitudinal study to measure the long-term impact of involvement in WFG on women's economic empowerment and household welfare.

Keywords: empowerment, economic, women, farmers, WFG

1. Introduction

The role of women in the agricultural sector in developing countries has received increasing attention in recent decades. In Indonesia, especially in rural areas, women play an important role in agricultural activities and the household economy [1]. They are involved in various stages of agricultural production, from land preparation, planting, crop care, to harvesting and processing agricultural products. In addition, women are also often responsible for managing the household economy, including financial arrangements and fulfilling family needs. Despite this, their contributions are often under-recognised and under-valued. Many women farmers still face various constraints, such as limited access to resources, technology, training and markets. Gender inequality in access to these resources not only hampers their productivity, but also limits their potential to contribute more to family and community welfare [2].

Women's involvement in the productive sectors of the economy, particularly in agriculture, has been the focus of attention in efforts to empower women and alleviate poverty in many developing countries [3]. In many agrarian societies, women play an important role in food production, yet their contributions are often under-recognised and under-valued [4]. Women are involved in various stages of the agricultural process, from planting to harvesting, as well as processing agricultural products. However, their access to resources, training and technology is still limited compared to men, which hinders their productivity and ability to contribute maximally to household and community economies [5]. These inequalities are also exacerbated by cultural and social norms that consider agricultural work to be the domain of men, so women are often not properly recognised and rewarded for their hard work [6][7].

To overcome these challenges, Kelompok Wanita Tani (KWT) emerged to empower women farmers and increase their participation in the productive economy [8]. These groups serve as a platform for women to share knowledge, resources, and support with each other, which in turn improves their ability to access training, technology, and markets. In addition, women farmers' groups can play a role in championing women's rights and raising awareness about the importance of their contribution to agriculture. With these groups in place, women can more easily gain access to microcredit, improved

seeds, and more efficient farming techniques, all of which can increase their farm yields and, ultimately, the economic well-being of their families and communities. Women farmer groups also play an important role in changing community perceptions of women's role in agriculture, providing concrete examples of how women can be powerful agents of change in local economic development [9]. KWT provides a platform for women farmers to come together, share knowledge, and support each other in overcoming the various challenges they face. Through KWT, women farmers gain better access to training, agricultural technology, and market information. The group also assists women farmers in accessing microcredit and other resources needed to improve the productivity and sustainability of their farming businesses. In addition, KWT plays a role in championing the rights of women farmers and raising public awareness on the importance of women's contribution in the agricultural sector. With the KWT, women farmers can more easily participate in productive economic activities, ultimately improving their welfare and strengthening their household and community economies.

In many agrarian societies, women play a key role in food production and household management, yet their contributions are often under-recognised and under-valued. One promising approach to increase women's participation and empowerment in the agricultural sector is through women farmer groups. Research in Bangladesh showed that participation in women farmers' groups improved their access to resources and decision-making. These groups provide women with access to agricultural inputs such as improved seeds and fertilisers, as well as technical training that was previously difficult for individual women to access [4]. Active participation in groups also strengthens women's position in decision-making at the household and community levels, which has a positive impact on family welfare and the efficiency of agricultural production.

Increased gender equality is positively correlated with agricultural yields [10]. When women have equal access to resources such as land, credit and agricultural technology, crop yields increase significantly. Women's empowerment is also associated with improved quality of agricultural decisions, as women tend to consider more sustainability aspects in their farming practices. The impact of women's empowerment programmes on household food security in India found that women's participation in self-help groups improved food security [11]. Through self-help groups, women gain access to various resources, including training on better agricultural practices and financial support through micro-credit schemes. Increased household food production and food diversification resulting from this participation improves family nutritional intake.

Research on the effect of women's empowerment on agricultural technology adoption in Uganda, shows that more empowered women tend to adopt better agricultural practices [12]. Empowerment through education, training, and access to resources increases the adoption of more efficient and sustainable agricultural technologies. Women in empowerment groups are more open to innovation and active in finding solutions to agricultural challenges, which increases productivity and environmental sustainability. There is research exploring the role of women's groups in improving access to markets for smallholder farmers in Sub-Saharan Africa. These groups facilitate better access to information and resources and serve as a bridge between smallholder farmers and the wider market. This enables farmers to sell their products at better prices and reduce dependence on middlemen [13]. Women's groups also play a role in organising transport and logistics, as well as price negotiations, which increases women farmers' income and strengthens their position in agricultural value chains.

The literature illustrates that women farmers' groups play an important role in increasing women's involvement in the productive economy of the agricultural sector. Participation in these groups provides better access to resources, training and markets, and strengthens women's position in decision-making. Empowerment through women farmer groups not only improves productivity and food security but also contributes to environmental sustainability and the economic well-being of families and communities. Further research is needed to understand the dynamics of women farmer groups in different local contexts and how they can be more effective in empowering women and supporting economic development.

2. Method

This research uses a quantitative approach with a case study method to understand women's involvement in the productive economy through the Dadi Makmur Women Farmers Group (KWT) in Wedomartani, Sleman. Data were collected through in-depth interviews with 30 women members of KWT, participatory observation of group activities, and document analysis related to programmes and policies that support KWT. Thematic analysis was used to identify key patterns in women's

involvement, including their roles in agricultural activities, access to resources and training, and the impact of participation in KWT on their economic well-being [14]. The results of this study are expected to provide in-depth insights into women's contribution in the agricultural sector and how KWT can empower them to participate more actively in the productive economy.

3. Results and Discussion

Respondents

Respondents are women who are MSME actors in Wedomartani, Sleman. Based on the research data obtained, the data is grouped based on education level, marital status, and number of children. The following table describes the research respondents:

Table 1. Respondents

Characteristic	F	Percentage (%)
Education Level		
Primary School	3	10%
SMP	4	13%
High School	16	53%
Bachelor's degree	5	17%
Diploma	2	7%
Marital Status		
Married	27	90%
Unmarried	0	0%
Widowed	3	10%
Number of Children		
1 child	7	23%
2 children	15	50%
3 children	8	27%
More than 3 children	0	0%

Based on the table of respondent characteristics, the following conclusions can be drawn. In terms of education level, most respondents have a high school education level with 16 people or 53%, followed by a bachelor's degree with 5 people (17%), junior high school with 4 people (13%), elementary school with 3 people (10%), and diploma with 2 people (7%). This shows that most respondents have an upper secondary or higher education. In terms of marital status, most respondents were married, as many as 27 people or 90%. A total of 3 people (10%) were widowed, and no respondents were unmarried. As for the number of children, most respondents had 2 children, as many as 15 people or 50%. Respondents who had 3 children totalled 8 people (27%), while 7 people (23%) had 1 child. No respondents had more than 3 children.

From this data, it can be concluded that most respondents are married individuals who have a high school education, and most of them have 2 children. These characteristics provide a clear demographic picture of the respondent population in this study.

Involvement in productive economic activities

The results of this study show a very high level of participation in productive economic activities among respondents. The data shows that as many as 90% of the respondents reported active involvement in various productive economic activities, signalling a strong spirit and commitment in supporting the economy. Only 10% of respondents reported not being involved in productive economic activities, which may be due to various factors such as limited resources, lack of opportunities, or personal constraints. These findings indicate that most respondents have a significant contribution to make to local economic development, which could be the basis for designing more effective empowerment programmes to accommodate the needs of all community members.

Types of Productive Economic Activities for Women

To understand the distribution of the types of economic activities undertaken by respondents, we collected data covering various sectors of the economy. This data provides a comprehensive insight into the role and contribution of each type of economic activity to the lives and livelihoods of

respondents. This analysis is important to assess economic diversification and see how each sector plays a role in the local economy. The following is a breakdown of the types of economic activities undertaken by respondents, complete with the number of respondents and their percentages.

Table 2. Types of productive economic activities for women in Wedomartani

Types of productive economic activities	F	Percentage (%)
Livestock	5	17%
Trade	14	47%
Services	3	10%
Agriculture	5	17%
Labour	1	3%
Education	1	3%
Livestock and Services	1	3%
Total	30	100%

Based on the analysed data, the percentage of respondents' participation in various productive economic activities shows that trade is the dominant sector with 36.8% of respondents involved in it. The livestock sector also shows significant participation, with 26.3% of respondents. Agriculture is followed by 21.1% of respondents, while services attract 15.8% of respondents. Labour, education, and a combination of livestock and services were each followed by 5.3% of respondents. This analysis shows that there is diversification in the types of economic activities followed by respondents, with trade being the most popular sector. This diversification reflects the community's adaptation to the economic opportunities available in their neighbourhood and the importance of various sectors in supporting the local economy.

4. Discussion

This research shows that membership in the Dadi Makmur Women Farmers Group (KWT) significantly increases women's access to agricultural resources, including improved seeds, fertilisers, and equipment. This increased access enables women farmers to improve the productivity and quality of their agricultural produce. This finding is in line with research by Akter et al. (2020), which showed that participation in farmer groups increased women's access to previously hard-to-reach agricultural inputs [4]. This better access to resources also helps reduce women's dependence on external resources and increases their independence in managing farming businesses.

In addition, members of KWT Dadi Makmur reported significant improvements in their agricultural knowledge and skills. Through various trainings and experience-sharing sessions held by the group, women farmers gained new insights into more efficient and sustainable farming techniques. This increased capacity and skills not only improved productivity but also enabled women to adopt more advanced agricultural technologies. This supports the findings who stated that women's empowerment through education and training is closely related to the adoption of better agricultural technology [12].

Income diversification is also one of the main benefits of membership in KWT Dadi Makmur. The group has facilitated its members to process agricultural produce into value-added products and market these products, both in the local market and outside the region. This diversification helps reduce the risk of dependence on a single type of agricultural product and improves household economic stability. Research shows that women's groups play an important role in improving access to markets for smallholder farmers, allowing them to sell their products at better prices and reducing the role of middlemen who are often detrimental [13].

Finally, women's increased participation in decision-making at both the household and community levels is also one of the positive impacts of involvement in KWT. Group members report that they feel more confident and have a greater say in decisions related to agriculture and the family economy [15]. Women's empowerment is positively correlated with agricultural productivity as more empowered women tend to make better decisions and consider sustainability in their farming practices [15]. In addition, involvement in KWT also contributes to food security, with members able to provide nutritious food for their families. This supports on the positive impact of women's empowerment on

household food security, suggesting that participation in women's groups can improve family welfare and food security.

5. Conclusion

This research shows that KWT Dadi Makmur plays an important role in facilitating women's involvement in the productive economy. Through this group, women farmers gain better access to resources, knowledge, and markets, which in turn improves agricultural productivity and household welfare. The findings emphasise the importance of continued support to women farmers' groups as a strategy to enhance women's economic empowerment in the agricultural sector. For future research, it is recommended to conduct a longitudinal study to measure the long-term impact of involvement in KWT on women's economic empowerment and household welfare.

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PROSPECTIVE TEACHERS' VIEWS ON INDONESIAN EDUCATION (A PHOTOVOICE METHOD STUDY)

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Abstract

Photovoice is an art-based, qualitative participatory action research methodology derived from public health research that typically involves members of marginalized communities whose voices have been historically silenced. In this study, *photovoice* was implemented by involving 25 prospective teachers consisting of: 7 students fromWonosobo Al-Quran University of Science, 8 students from Sebelas Maret University Solo, 5 students from Muhammadiyah University of Lampung,and 5 students from the Open University. The 25 respondents in this studywill give their views on education in Indonesia through the media of photosthat have been taken by the respondents themselves. Education is one of the most important things in human life. Every human being has the rightto get a decent and equitable education. However, what is happening in Indonesia is the inequality of education for all Indonesian citizens. Apart from that, recently what has been the subject of discussion is the educationsystem in force in Indonesia which is considered to be rigid and also ineffective. Student teacher candidates provide views on the condition of education in Indonesia, such as educational policies that are not yeteffective and efficient, educational problems that are still very muchencountered, as well as the needs and expectations of education in Indonesia. Through this research, it is hoped that it will provide input to policy makers and the public regarding the views of prospective teacher students regarding education in Indonesia.

Keywords: Photovoice, Education, Prospective Teachers, Views

1. Introduction

Education is one of the human needs to be able to process and interact in the outside world with all the surrounding communities. Education is also one of the most important provisions for the future. We have knowneducation since the days before Indonesia's independence until now. Education isone of the main things that must be paid attention to because education is able toshape the personal character of everyone if they really pursue it. The preamble tothe 1945 Constitution article 28 C paragraph 1 explains that everyone has the rightto develop themselves through education and to benefit from science and technology, arts and culture, in order to improve the quality of life. In line with Law Number 20 of 2003 concerning the National Education System, Article 5 paragraph 1 stipulates that every citizen has the same right to obtain quality education. Education is one of the important things to increase public awarenessin Indonesia (Aini, 2021). Existing facts show that the portrait of education in Indonesia still adheres to a cluster system which results in categorizing school levels, starting from schools that receive superior predicates to coaching (Aditomo and Faridz, 2019).

Continuously managing the quality of education in the Covid-19 pandemic has been a unique challenge, and the government has acknowledged that it has shifted from conventional to screen adopting technology (Alfakrie andFaridz, 2021). Lots of developments have been made in the Indonesian educationsystem, the existence of the Covid-19 pandemic has caused changes in educationin almost all parts of the world. Without exception in Indonesia, research conducted by Philip (2021) shows that education in Indonesia has undergone many changes, seen from the culture of Indonesian students who began to learn self-taught. Modern, more individualized and context specific ways of educationwill develop, based sometimes on efficiency and cost of teaching and more oftenon effectiveness of learning (Meyer, 2022). From the opinion of several researchers, it shows that there are changes in the educational culture that have occurred and have led to improvements in every line of education.

Research conducted by Sri Utami (2019), comparing education in Indonesia with Finland, China, and Japan, in the study stated that there was a verylarge discrepancy in PISA scores between Indonesia and Finland, China, and Japan. In fact, the current condition of Indonesian education is still in unstable growth. Based on the data presented in the Social Progress Index, Indonesia is in38th position out of 50 countries in the world regarding the progress of a countryin which there are indicators in obtaining

access to proper education (Porter, Stren, & Loria, 2013). Success in education is the result of the collaboration of elements within the education system that mutually support one another (Sahlberg, 2010). Reflecting on a country like Finland which has always been theright model, partly because of the balance of interventions at all levels ofeducation, where teachers and schools work together to put student learning in animportant position so that it focuses on student performance and eliminates gaps and differences between students. school (Sahlberg, 2010). Based on the views of many of the studies above, this research will discuss how education in Indonesia is seen from the perspective of prospective teachers. To find out the views of prospective teachers regarding education in Indonesia, researchers used the photovoice method approach. The photovoice method is suitable for use, because the researcher wants to see someone's views based on the perspective of the daily life experienced by prospective teachers which can be shown by photographs of the daily experiences experienced by prospective teachers. Photovoice is a method that is a form of participatory action research and is considered an art-based research. In the photovoice method, research respondents document aspects of life and make reports from the picturesor photos they have taken.

As a method or tool, photovoice is the right approach to practice in order to increase community participation and as a talking space for the community to voice their needs to the government. Photovoice is a form of Participation Action Research (PAR) research that has long been known since the1900s. When using the photovoice method, respondents are actively involved inthe research by including photos or images that are able to reflect their experiences. The photovoice method is a method that is expected to be able to provide changes at the policy stage in solving social problems at hand. Tanhan and Francisco (2019) it is advisable to conduct more qualitative studies, such as those using photovoice, to understand how prospective teachers view education in Indonesia. Based on articles read by researchers, researchers have not found articles that discuss teachers' views on education, but many researchers focus onempowering other disenfranchised communities (Kim et al. 2019; Strack et al. 2004; Wang and Burris 1997) and suggest use of photovoice with underrepresented and under-educated populations. Some researchers also use photovoice with respondents who discuss health and explore their experiences related to different specific topics including health, people affected by certain diseases and the role of women (Bennett, 2019).

Tanhan and Francisco (2019) suggest conducting more qualitative studies using photovoice to find out the concerns experienced by someonedirectly. From several studies, no researchers use photovoice to find out the viewsof prospective teachers on education in Indonesia, many researchers focus on empowering disenfranchised communities (Kim et al. 2019; Strack et al. 2004; Wang and Burris 1997) and suggest using photovoice for someone who can't voice their voice directly. Some researchers also use photovoice to explore teachers' experiences related to different specific topics including physical exercise and the role of women (Eyres et al. 2019). Through the photovoice method, it can help people express their views, thoughts and ideas through photos.This is in line with the view of Royce (2006) which states that one of the alternative media that can be used by the public for expression is the media of photographs. Photos are used to strengthen community groups that are marginalized from government attention (Birowo, 2020).

2. Method

Photovoice is an art-based, qualitative participatory action research methodology derived from public health research that typically involves membersof marginalized communities whose voices have been historically silenced (Wang & Burris, 1997). Photovoice, as a flexible and inclusive approach (Cluley,2016), is in line with the communication support needs of participants and is increasingly being implemented in research involving people with learning disabilities (Hannes, 2020). Photovoice can support feedback recall and elicitation of responses for persons with disabilities through a combination of photography with interviews and narration about image content (Cluley, 2016). One of the significant advantages of photovoice is the ability to overcome communication barriers and involve people with learning disabilities in the research process, as research associates. The photographs themselves were not the only source of data, but rather responses during interviews and group discussions about photography taken by participants clarified the potential for ambiguous interpretations of visual representations. According to Wang (2006), the three main purposes of photovoice are: “(1) to record and represent their dailyreality; (2) promote critical dialogue and knowledge of personal and community strengths and concerns; and (3) reach policy makers”.

Data collection took eight weeks in 4 teaching universities in Indonesia. Data analysis involves thematic analysis (Patton, 2018), which occursin two stages. The initial phase involved three rounds of

analysis with students asresearch partners in the photovoice process. During the second phase, a cross-case thematic analysis was conducted by the study authors to answer research questions. In this study, photovoice was implemented by involving 25 prospective teachers consisting of: 7 students from Wonosobo Al-Quran University of Science, 8 students from Sebelas Maret University Solo, 5 students from Muhammadiyah University of Lampung, and 5 students from the Open University. The 25 respondents in this study will give their views on education inIndonesia through the media of photos that have been taken by the respondents themselves. According to O'Latz (2017), there are eight steps in conducting a photovoice, namely: identification, invitation, education, documentation, narration, ideation, presentation, and confirmation.

3. Research Result

After conducting thematic analysis in *photovoice* research, several themes emerged and were considered important by the researchers. There were several themes that were formed based on the results of the analysis of interviewsand discussions conducted and were relevant based on the research questions andviews of prospective teacher students regarding the condition of education in Indonesia.

Perceptions of prospective teachers regarding education policy

Education policy in Indonesia is considered to be one of the mainkeys to the implementation of Indonesian education. For example, one opinion states that education is the basic foundation and an important part of forming a young generation that can compete globally. Education policies must be able to represent the formation of the younger generation and be able to make education something that can change the nation. Education policy in Indonesia is considered to be still not optimal because there are several shortcomings such as political interference, still being experimentalmaterial, policies that often change, and the absence of maximum supervision from the government.

One of the important things in education policy is politicalinterference in the preparation of education policy in Indonesia. Education policy is often contaminated with bureaucratic behavior and is also likened to an investment for the Indonesian bureaucracy. This is in accordance withthe opinion of Gunawan Mardi who stated that "Education in Indonesia is contaminated by bureaucratic behavior". Bureaucratic elements often interfere with education which has an impact on education that is only concerned with the quantity of graduates without regard to the quality of graduates. Most student teacher candidates stated that education graduates were used as an investment, by providing convenience it was hoped that aftergraduating from education graduates would be used by bureaucratic elements. One opinion from student Dian Nurul Safitri stated that "Studentsseem to be passive objects where knowledge is invested, hoping that in the future they will be obedient to their superiors, so that at any time they can beused by the interests of those in power".

The link between education and politics is very close and even always connected so that with these circumstances we can see that state politics plays a very important role in determining the direction of the development of education in a country. It is no exaggeration if many expertsare of the opinion that education is one of the efforts or means to preserve state power. The responsibility of developing education becomes very heavyand it is a challenge in itself. In the midst of the current low economic capacity of our country, educational development should be a priority for development. There has been a lot of evidence in other developed countrieswhere the development of human resources which is prioritized can supportthe success of overall development. The political system that applies in a country is always related to policies made by the state, including policies inthe field of education.

Almost all student teacher candidates stated that education policies in Indonesia are often used as experimental material by policy makers. This is an implementation of the power they have and also a step tomake a *legacy* from policy makers. One of the interesting things is seen in teachers who are too preoccupied with administration according to policies and make teaching assignments a little forgotten. One of the students illustrated in Figure 2.1 that education policy in Indonesia is the same as biology learning practicum in schools.



Figure 1. Education policy is like a biology learning practicum

In Figure 2.1 above it can be seen that there are several experimental materials which are likened to elements or aspects of educational policy. If seen from the metaphorical perspective of Figure 2.1, education policy in Indonesia is still something that is used as experimentalmaterial and all aspects or elements of education are used as complementary materials for educational policy practicum. The opinion of Kumala studentsstated that "Education in Indonesia is not an experiment or malpractice. "Prospective students consider that education policies in Indonesia are not yetfeasible to implement with the many problems that occur. Student Andi Irawan stated that "In using the curriculum, for example, in the 2013 curriculum, teachers are preoccupied with assessing students so they don't focus on educating. We as teachers should not get stuck in curriculum issues,but we must be able to change education from traditional to modern education. Teachers are busy with administration, learning changes from traditional to modern, and implementing the curriculum is likened to materials for experiments as shown in Figure 2.1. Based on the opinions of respondents, it was found that according to respondents, education policy inIndonesia tends to be experimental material. This can be seen from the frequent changes in the curriculum and also the emergence of new policies from the ministry of education.

In Indonesia, changes in education policy are always followed bychanges in curriculum, including changes in assessment in education. The curriculum in Indonesia has undergone ten changes, starting from the 1947,1952, 1964, 1975, 1984, 1994, 1999, 2004, 2006 curricula to the 2013 curriculum and the newest curriculum, namely the independent curriculum.Several student teacher candidates stated that curriculum changes were madeto keep up with the times and were expected to bring about changes for the better. The opinion of student Nanik Nurma Kirana stated that "when the curriculum that is being implemented experiences problems or the curriculum that has been implemented experiences evaluation, then what thegovernment does is evaluate and issue the latest curriculum that can bring better changes to Indonesian education in the future". With the rapid changesin the curriculum, of course there are some problems in the field. All studentsexpressed the same opinion that the very fast change of curriculum caused implementation by teachers to be less than optimal. Teachers too often learna new curriculum that ultimately does not focus on learning but on implementing the curriculum. Qurtin's student stated that "a changing curriculum makes students and even educators confused by the ever-changing curriculum changes." Student Nanik Nurma Kirana illustrates the change in policy in Figure 2.2.



Figure 2. People who change color in painting the wall

Student Nanik Nurma Kirana describes changes in policy in Indonesia with people painting walls. In the picture, the person in the yellowshirt is likened to the owner of the house painting the wall with minimal skills so that the results are not good. In the picture of the person wearing a blue shirt, it looks like a more professional person is painting the wall with a changing color. This is the same as policy makers who often make policiesin a less professional manner and the results are less than optimal. So it mustbe addressed by professionals in the field of education with different policies. In formulating education policies, the government's role in overseeing the implementation of policies is still not optimal.

Most student teacher candidates stated that supervision of education policies in Indonesia was not optimal. Supervision that is less thanoptimal occurs because there is no good coordination at every level of the education bureaucracy. In addition to the lack of coordination, the government also does not always supervise schools directly. The opinion ofTisa Sani students stated that "the government needs to be directly involvedin overcoming education in Indonesia". The opinion of Tisa wasstrengthened by the opinion of a Qurin student who stated that "Every time there is a policy update, one must expect a good change. For those who are ready, it will definitely go well, but for those who are not ready it will go theother way." Based on the perspective of prospective teachers, education policy in Indonesia still does not represent a good system and good supervision. There are so many problems related to education policies that need to be addressed by the government. Prospective teachers get an idea because they have directly experienced and experienced what teachers feel in various schools in Indonesia. Education policy in Indonesia must be immediately addressed and designed to the maximum extent possible so thatIndonesian education can compete with other countries.

Educational Problems from the Eyes of Prospective Teacher Students

Education is one of the most important things in human life. Every human being has the right to get a decent and equitable education. Almost all prospective teacher students said that the problem that occurs in Indonesia is the inequality of education for all Indonesian citizens. Apart from that, recently what has been the subject of discussion is the education system in force in Indonesia which is considered to be rigid and also ineffective. We can see this from the lagging quality of education in Indonesia compared to other countries. The education system used in Indonesia is not much different from the education system in other countries.The only difference is the error during practice in the field. There are many fundamental mistakes that make the gap between the goals of the education system and its implementation in the field ultimately prevent all of these goals from being achieved and resolved properly.

One of the classic problems of education in Indonesia is education that is not evenly distributed and not balanced in every region. There are many studies that describe the condition of educational problems in Indonesia that are not balanced. All student teacher candidates thought that education in the villages was still lagging behind and also had very minimal facilities. One of the pictures 2.3 illustrates the condition of education in rural Indonesia.



Figure 3. Class conditions in the regions

Figure 2.3 is a direct description of what is happening in education in rural areas of Indonesia. Figure 2.3 shows the lack of educational facilities in rural areas of Indonesia. The opinion of Fitri Nur's students is an illustration of the opinions of all prospective teacher students involved in this study "There are still many schools mainly in rural areas thathave not been able to carry out semester assessments with a computer system, or in other words they still use a manual system with paper." . The inequality of education in Indonesia is closely related to the interests of the bureaucracy and individuals who are only concerned with education in urbanareas. Many schools in urban areas are competing with each other to create magnificent educational facilities regardless of educational facilities and infrastructure in rural areas. The opinion of student Anisa Amalia Sabila stated that "when a school is well known, both in terms of the building and the size of the school it will be easy to attract the interest of students, especially from the upper class". The problem of facilities is closely relatedto the inequality of education in Indonesia. Provision of facilities by the government is considered not on target because there are still many schoolsthat still lack facilities. One of the opinions of student Amalia Lisa said "education is not accompanied by an increase in the progress of learning support facilities, both facilities and infrastructure". The lack of facilities is one of the main problems in Indonesian education. The lack of equaldistribution of funds from the government is one of the factors causing the uneven distribution of educational facilities in Indonesia. Student Gunawan Mardi argues that "infrastructure in underdeveloped areas, there are still many inadequate buildings and facilities". To improve the quality of equity in Indonesia, the government must focus on the educational process not on the final value of education.

The focus of education is one implementation of the achievementof educational goals. Several students said that there were still many Indonesian educations where education only focused on the results achievedby students without prioritizing the process that was going through**.** One ofthe students, Anisa Amalia Sabila, said that "Because they have to pursue the target of graduating, many do anything to be able to meet the target, for example, cheating." There are still many educational exam practices in Indonesia where students justify any means to get good grades. Indonesiansthink that students who are smart and successful are students who have goodtest scores. This is actually not correct, because students will only focus on how to get good grades but do not learn the values that exist in education. Apart from only focusing on results, education in Indonesia is often used ascommercial material by irresponsible individuals. One example is the many corrupt practices involving education funds, corruption specifically in procurement, and abuse of office for personal gain. Kumala's students statedthat "in practice commercialization is often carried out with the intention ofmaking a profit and being enjoyed by a group of people holding capital or for other interests that have nothing to do with education".

Based on the opinions of prospective teacher students, it was concluded that education in Indonesia prioritizes results with a large numberof graduate targets without a definite eligibility test. In addition, education is also a material for commercialization which is carried out to reap the benefits of a group.

Education should function for the function of the schooltoday is also increasingly complex and complicated because it is used to prepare students to have qualities, namely students who are characterized, intelligent, and competitive. Schools are very much needed by students to obtain education, even though education does not only come from formal education, it's just that most students get an education from schools. Education is needed by humans. With education, we can create quality human beings so that together with other human beings we can create a goodeducation that is even better based on the development of world science andtechnology.

The problem that occurs a lot is the low use of technology in schools. Most student teacher candidates are of the opinion that learning in Indonesia tends to still rely on traditional systems of learning. This is due toseveral factors, teachers who are not innovative, students who do not have *gadgets*, and also lacking school facilities. Student Fitri Nur believes "another disadvantage is that learning still tends to use textbooks, even though there are many more effective modern media to increase enthusiasmfor learning". In the midst of the very rapid development of information technology, education in several regions in Indonesia is still running with thetraditional system. Student Hurri said that "there are many schools that do not allow students to bring cellphones". This is a slightly strange decision in the midst of the development of technology and information in the world. Stekholders must provide regulations governing the use of science and technology for education. Mahasisma Kumala said "This certainly shows thebackwardness of education amidst the growing science and technology".

Educational Needs and Expectations in Indonesia

Education in Indonesia is considered as the gateway to 100 yearsof independence for a prosperous Indonesia in 2045. With the view that education in Indonesia is the key to achieving prosperity, the government isfocusing more on the sustainability of education in Indonesia. In recent years, the government has always prioritized character education for studentsin schools. Character education is considered very important to form a quality young generation to advance the nation and state of Indonesia. Thereneeds to be a maximum character education method so that the younger generation has quality characters. Almost all student teacher candidates are of the opinion that character education is the main need for education in Indonesia. Cinta Nugraha student argues that "How very important is character education implemented in Indonesia to produce a generation that is not only knowledgeable, but also physically and mentally civilized". Fromthe opinion of Cinta Nugraha students, we can see that Indonesia needs a generation that is not only knowledgeable but must have good manners.

In addition to character education which must be maximized, in carrying out all educational policies and educational processes it is necessaryto have synergy from all elements. Most student teacher candidates are of the opinion that there needs to be unity between all elements and aspects ofeducation. Examples of educational elements are government, teachers, society, and many other supporting elements. Opinion from student Anis Ilyastated "There needs to be good cooperation between people who want to gainknowledge and the government itself, so that Indonesia can advance in education and not be left behind by other countries". This opinion was strengthened by the statement that "To be able to achieve educational goals, encouragement is needed such as from the government, the community itself, and, together, changing the education system to be suitable andequitable so that Indonesia can progress, one of which is in the world of education". From several opinions of prospective teacher students, it can beconcluded that good education is education that is supported by the unity ofall elements. In addition to the support and unity of all elements, theeducational process must also have a good evaluation system.

Evaluation is a very important thing for the sustainability of a program. Periodic and clear evaluations need to be carried out in the education process in Indonesia, so that the government always knows the needs and problems that occur in education in Indonesia. Several student teacher candidates stated that evaluations on education in Indonesia were still considered lacking and there was also no notification regarding the results of the evaluations carried out. Student Fatma said that "the education system may fluctuate and sometimes weaken, therefore it needs to be"charged" with a repair, evaluation and even renewal so that it remains stableand efficient as is done by the Ministry of Education and the like inIndonesia. ". From the opinion of Fatma's students, it can be concluded thatevaluation is very necessary so that there is an improvement made by the government to advance education in Indonesia. Apart from that, student DinaNurul Safitri also compared education in Indonesia with a picture of an *old cell phone* (picture 2.4).



Figure 4. Education is likened to an *old cell phone*

Education in Indonesia is like old school cellphones (tulalit) because the low quality of cellphones is the same as the low quality of education in our country due to changes in central government policies to the regions that have not focused on levels of education so it is very difficultfor us to measure the achievement of these educational goals. Alone. Therefore, it is necessary to have an in-depth study in all regions in Indonesiaso that in the future the distribution of educational services can be designedas well as possible to improve the quality of education in our country. In addition to opinions regarding the need for education in Indonesia, the resultsof the interviews also mentioned the various expectations desired by studentteacher candidates. Most student teacher candidates hope that education in Indonesia has a good system. One of the opinions of student Anis Ilya statedthat "Indonesia must totally revamp its education system if it wants to be sideby side with other countries in the international realm". From this opinion itis illustrated that there must be improvements regarding the educationsystem that must be carried out in Indonesia. Student Tamara Sari describesthe hope of education in Indonesia with a hot air balloon image in Figure 2.5below.



Figure 5. Education expectations in Indonesia are like hot air balloons.

A hot air balloon is an object that is lighter than an airplane whichcannot be propelled by an engine, but can fly because it is filled with gas which can float or by heating the air. Hot air balloons in Wonosobo are a competition to see the beauty of the motifs and the length of time they fly. Education can be said to be like a hot air balloon because there are many expectations to be achieved. Education is always related to beauty and goodresults to be proud of. Education in Indonesia cannot be said to be the best because there are still many deficiencies to be corrected together.

Education in Indonesia still needs a lot of support from many people, such as schools in remote areas which are expected to develop into adequate schools and increase the potential of students. The hot air balloon has a symbol that can be a motivation for education. Hot air balloons try to reach the sky and fly, which means that education in Indonesia can fly and succeed in achieving the goals of National Education by letting go of the badpast and being ready to face the present, which must be done even better to catch up with the world of education.

The government needs to be directly involved in addressing education in Indonesia. Students who have difficulty learning and prefer to be lazy can be given direction through government cooperation with schoolresidents who are lagging behind in education. Education in Indonesia will be more advanced in developing like a hot air balloon flying to give joy andgood results.

4. Discussion

Policy (policy) is etymologically (word origin) derived from the Greek, namely "Polis" which means city (city). In this case, the policy relates to the idea of organizational regulation and is a formal pattern that is equally accepted by the government/institution so that with that they try to pursue their goals (Monahan in Syafaruddin, 2008). Abidin (2006:17) explains that policy is a government decision that is general in nature and applies to all members of society. Policy is a written rule which is a formal organizational decision, whichis binding, which regulates behavior with the aim of creating new values in society. Policy will be the main reference for members of the organization or community members in behaving (Dunn, 1999). Policies in general are problem solving and proactive in nature. In contrast to Laws and Regulations, policies aremore adaptive and interpretive, although policies also regulate "what is allowed,and what is not allowed". Policies are also expected to be general in nature but without eliminating specific local features. Policies must provide opportunities tobe interpreted according to the specific conditions that exist.

Education policy in Indonesia is considered to be one of the main keys to the implementation of Indonesian education. For example, one opinion states that education is the basic foundation and an important part of forming a young generation that can compete globally. Education policies must be able to represent the formation of the younger generation and be able to make educationsomething that can change the nation. Education policy in Indonesia is consideredto be still not optimal because there are several shortcomings such as political interference, still being experimental material, policies that often change, and theabsence of maximum supervision from the government. Research conducted by Ahmad (2020), states that the main problem lies in inadequate facilities, knowledge and lack of experience, so it takes time to adapt and causes delays in the learning process, as well as differences in regional conditions where not all ofthem can be reached by the internet as a whole. One of the important things in education policy is political interference in the preparation of education policy inIndonesia. Education policy is often contaminated with bureaucratic behavior andis also likened to an investment for the Indonesian bureaucracy.

Research conducted by Nurtonio (2008), states that the link betweeneducation and politics is very close and even always connected so that with thesecircumstances we can see that state politics plays a very important role in determining the direction of the development of education in a country. It is no exaggeration if many experts are of the opinion that education is one of the effortsor means to preserve state power. The responsibility of developing education becomes very heavy and it is a challenge in itself. In the midst of the current loweconomic capacity of our country, educational development should be a priority for development. There has been a lot of evidence in other developed countries where the development of human resources which is prioritized can support the success of overall development. The political system that applies in a country is always related to policies made by the state, including policies in the field of education.

Education policy in Indonesia is often used as experimental materialby policy makers. This is an implementation of the power they have and also a step to make a legacy from policy makers. One of the interesting things is seen inteachers who are too preoccupied with administration according to policies and make teaching assignments a little forgotten. Based on the opinions of respondents, it was found that according to respondents, education policy in Indonesia tends to be experimental material. This can be seen from the frequent changes in the curriculum and also the emergence of new policies from the ministry of education. Research conducted by Widya (2020) provides an understanding of educational policy as a consideration based on a value system and several assessments of situational factors, these considerations serve as a basis for operating institutionalized education. These considerations are plans that serve as guidelines for making decisions.

In Indonesia, changes in education policy are always followed by changes in curriculum, including changes in assessment in education. The curriculum in Indonesia has undergone ten changes, starting from the 1947, 1952,1964, 1975, 1984, 1994, 1999, 2004, 2006 curriculum to the 2013 curriculum (Machali, 2014). Starting in 1994, namely the curriculum with the term 1994 curriculum was perfected from 1999 to the 2013 curriculum which is the Indonesian curriculum which has emphasized student-

centered learning activities. Starting in 2004, a Competency-Based Curriculum (CBC) was implemented which emphasized the achievement of student competence in learning. Improved with the KTSP curriculum in 2006 and the 2013 curriculum (Agustina, 2019). Supervision that is less than optimal occurs because there is nogood coordination at every level of the education bureaucracy. In addition to thelack of coordination, the government also does not always supervise schools directly.

Based on the perspective of prospective teachers, education policy in Indonesia still does not represent a good system and good supervision. There are so many problems related to education policies that need to be addressed by the government. Prospective teachers get an idea because they have directly experienced and experienced what teachers feel in various schools in Indonesia. Education policy in Indonesia must be immediately addressed and designed to the maximum extent possible so that Indonesian education can compete with other countries.

Education is one of the most important things in human life. Everyhuman being has the right to get a decent and equitable education. However, whatis happening in Indonesia is the inequality of education for all Indonesian citizens.Apart from that, recently what has been the subject of discussion is the educationsystem in force in Indonesia which is considered to be rigid and also ineffective.We can see this from the lagging quality of education in Indonesia compared toother countries. The education system used in Indonesia is not much differentfrom the education system in other countries. The only difference is the errorduring practice in the field. There are many fundamental mistakes that make thegap between the goals of the education system and its implementation in the fieldultimately prevent all of these goals from being achieved and resolved properly.

One classic problem of education in Indonesia is education that is not evenly distributed and not balanced in every region. Many children drop out of school because access to higher education is far from where they live. Anotherproblem that occurs is that schools are more concerned with things that look likebuildings than the competence of the teachers at the school. Based on the opinions of prospective teachers, it can be concluded that education in Indonesia is still uneven and also not balanced between regions. In addition, inequality also occursdue to socio-economic differences that exist in Indonesia. According to Anindito(2021), statistical tests show that compared to SES between individual students, collective SES (between schools) has a greater impact on students' literacy levels.In the estimation of this study, two schools that differ by one collective SES levelhave a difference in collective achievement equivalent to one academic year. These findings support the notion that in Indonesia, disparities between schools are real and have a serious impact on the quality of student learning outcomes.

The focus of education is one implementation of the achievement ofeducational goals. In Indonesia there are still many that education only focuses on the results achieved by students without prioritizing the process that has beenpassed**.** Based on the opinions of prospective teacher students, it was concluded that education in Indonesia prioritizes results with a large number of graduate targets without a definite eligibility test. In addition, education is also a material for commercialization which is carried out to reap the benefits of a group. Basedon the opinion of Karine (2020), states that education should function for the function of the school at this time is also increasingly complex and complicated because it is used to prepare students so that they have qualities, namely studentswho are characterized, intelligent, and competitive. Schools are very muchneeded by students to obtain education, even though education does not only come from formal education, it's just that most students get an education from schools. Education is needed by humans. With education can create quality human beings so that together with other human beings to be able to create a goodeducation that is even better.

The problem that occurs a lot is the low use of technology in schools.Learning in Indonesia tends to still rely on traditional learning systems. This is due to several factors, teachers who are not innovative, students who do not havegadgets, and also lacking school facilities. Technological developments in the millennial era like now have many benefits, especially in the field of education. Therefore, many people want to master and take advantage of technological developments. Based on the opinion above, it can be seen that learning in Indonesia still tends to be traditional because there are many influencing factors. The use of technology should be a teacher's concern so that learning is more effective and efficient amid the increasingly high development of science and technology. According to Akbar (2019), teachers and students must have access to digital technology and the internet in classrooms, schools and educational institutions. This means that schools must have adequate infrastructure related to information and communication technology, such as the availability of computers/laptops, internet networks, computer laboratories, multimedia equipment such as CDs, DVDs, and infocus.

The problem of facilities is closely related to the inequality of education in Indonesia. Provision of facilities by the government is considered not on target because there are still many schools that still lack facilities. The lackof facilities is one of the main problems in Indonesian education. The lack of equal distribution of funds from the government is one of the factors causing theuneven distribution of educational facilities in Indonesia. According to Mubarik (2017), while based on regional classification, the KGP for urban areas is 0.2320while the KGP for rural areas is 0.3227. This shows that people in urban areas have a more evenly distributed level of education than people in urban areas. Thisresult is in accordance with the theory put forward by Todaro and Smith (2011) which states that government spending in the form of direct investment inproductive economic sectors, one of which is spending on education, is greater for urban areas. As a result, facilities and access to education in urban areas have also become easier, thereby increasing community school participation in urban areas.

Education can be interpreted broadly, and is a learning process that can be done anywhere. Education has consumptive value. The consumptive valueof education is in the form of services that can provide benefits to users of educational services. According to this premise, the value of consumption is usually easier to obtain and feel than the value of investment in education. The cost and quality of education are directly related and have a positive influence through leadership and educational management factors, as well as educational staff who are competent in improving educational services through the quality ofthe factors that influence the learning process. The quality of education is a function of a number of input, process and context factors.

In the opinion of (Amin, 2014) SWOT analysis presumably it can be determined the needs specifically related to needs in the field of education, namely: (1) parents and society need to be continuously motivated, (2) increasingknowledge and skills among teachers and students, and (3) it is necessary to finda breakthrough for funding assistance. Based on interviews with prospective teachers, it was found that education needs in Indonesia are as follows, it needs support and unity from all elements of society, it needs character education, and it needs evaluation and innovation.

5. Conclusion

Education is one of the most important things in human life. Every human being has the right to get a decent and equitable education. However, what is happening in Indonesia is the inequality of education for all Indonesian citizens. Apart from that, recently what has been the subject of discussion is the educationsystem in force in Indonesia which is considered to be rigid and also ineffective.We can see this from the lagging quality of education in Indonesia compared to other countries. The education system used in Indonesia is not much different from the education system in other countries. The only difference is the error during practice in the field. There are many fundamental mistakes that make the gap between the goals of the education system and its implementation in the fieldultimately prevent all of these goals from being achieved and resolved properly. Student teacher candidates provide views on the condition of education in Indonesia, such as educational policies that are not yet effective and efficient, educational problems that are still very much encountered, as well as the needs and expectations of education in Indonesia. Through this research, it is hoped thatit will provide input to policy makers and the public regarding the views of prospective teacher students regarding education in Indonesia.

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Assessment of the Center of Excellence Vocational School's Implementation in Yogyakarta

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Abstract

The KEMDIKBUD Vocational High School Center of Excellence (SMK PK) program introduced the paradigm of independent learning in vocational education. The goal of this program is to foster understanding and alignment between the business and industry sectors and the educational sector. To assess the effectiveness of the Institution, the degree to which SMK PK has been implemented in DIY must be determined. Additionally, the evaluation results can be taken into account when developing new programs, replacing existing ones, identifying programs that require support, or developing innovative programs with a greater overall impact. It is a qualitative descriptive research type. DIY SMK schools with PK applied make up the research sample. Five DIY schools with business and finance specialist programs served as the sample. Two methods are utilized to collect data: documentation and in-depth interviews with teachers and principals of the schools that serve as samples. Phase-in, program implementation, and effect aspects are the components that are visible. First, the phasing aspect, which starts when SMK is labeled as SMK PK, according to the study's findings. With the participation of the MOU, SMK PK is socialized to all parties involved in the vocational environment. Leadership and management in schools develop and become more dynamic. SMK and DUDI/stakeholders jointly fulfill their commitment to the prepared program agreement. The second is implementation, which is making sure that all programs are successfully and effectively carried out. Every SMK has the potential to achieve its set program objectives. Third, schools are encouraged by SMK PK to continuously enhance institutional performance through school administration and a dedication to developing the status of SMK PK.

1. Introduction

Indonesia has implemented a new paradigm in education, particularly in vocational schools, through the Merdeka Belajar program, which includes the Center of Excellence (PK) program. The Center of Excellence SMK program specifically caters to vocational high schools (SMK). Since the Ministry of Education, Culture, Research, and Higher Education implemented the Merdeka Belajar paradigm, vocational education in Indonesia has undergone a significant transformation. The Center of Excellence Vocational High School (SMK) is one of the flagship programs of the MBKM policy, which aims to increase the relevance of education to business and industry requirements. The SMK program is also a strategic effort to overcome the problem of high unemployment among vocational school graduates. The SMK PK program aims to align school curriculum with industry needs, fostering graduates who can either enter the workforce or pursue entrepreneurship. There are eight aspects that the program aims to link and match. First, we compile the curriculum to enhance soft skills, hard skills, and work character, aligning with the demands of the professional world. Second, we attempt to base learning on real projects from the world of work (project-based learning), ensuring strong hard skills, soft skills, and character. Thirdly, the number and role of industry-based teachers and instructors, as well as experts from the workplace, are being expanded. "Increasing significantly to a minimum of 50 hours/semester/expertise program," said the Minister of Education and Culture. Fourth, students must complete a minimum of one semester of field or industry work experience. Fifth, for graduates and for teachers and instructors, competency certification must be in accordance with the standards and needs of the world of work for graduates, teachers, and instructors. Sixth, it is necessary for teachers and instructors to emphasize updating technology through routine training. Seventh, conducting applied research that supports teaching factories based on real cases or industry needs. The eighth step involves the dedication to integrating graduates into the workforce. Subsequently, the Ministry of Education and Culture fosters enhanced collaboration with the workforce, utilizing avenues such as scholarship partnerships, civil service bonds, donations of laboratory equipment, and more. The Center of Excellence (PK) Vocational School is not only an important government program in designing the future of vocational school graduates, but also a bridge between the world of education and industry. One of the main problems in vocational education is the mismatch between graduate competencies and

the needs of the labor market. With the existence of SMK PK, the government hopes to improve this situation through a more structured link-and-match approach.

In the industrial revolution era, the eight aspects above are to grow and equip students with good character, skills, and superior competencies. Fundamentally, the acceptance and development of students in the work world hinge on their good character and work competency. Student character plays a crucial role in determining their ability to adapt in the work environment, foster creativity, solve work-related problems, and contribute creatively to the advancement of the environment. Furthermore, the way students approach the professional world Regrettably, the issue facing vocational high school graduates is their youthful mindset, leading them to delay the development of their work competencies, accumulate minimal experience, maintain minimal relationships with the professional world, and exhibit poor work discipline.e low work discipline.

We expect the Center of Excellence Vocational School (SMK PK) program to address the fundamental issues in vocational education. The main objective of the SMK PK program is to create graduates who not only have technical skills (hard skills), but also non-technical skills (soft skills) and strong work character. We intensively adjust the curriculum to the demands of the work world to equip graduates for competitiveness in the labor market. Furthermore, this program fosters the active participation of the industrial sector in the educational process within schools. The vocational education curriculum is still considered lagging behind the needs of the industrial world and the world of work. In addition, problems related to teacher capacity that do not support learning and laboratories for practice are still major problems in vocational education. Another fundamental problem is the scarcity of productive subject teachers. The absorption of vocational school graduates is still considered low, so it is the highest contributor to unemployment in Indonesia at 13.5%. 8 This is due to the significant gap between supply and demand in the world of industry and work. In this case, the role of the regional government to have data on current labor needs and predictions of future needs is greatly needed so that human resources in the region can be absorbed by their workforce. The context of the Merdeka Belajar program is related to the existence of SMK PK; it is important to conduct an evaluation so that the planned and implemented programs will be more effective in the future.

In addition, SMK PK encourages closer cooperation between schools and the business and industrial world (IDUKA) through internship programs and teaching with industry practitioners. This program also aims to improve school infrastructure, such as laboratories that meet industry standards. Students must gain learning experiences that are relevant to the work world. The SMK PK program also introduces numerous learning innovations. Project-based learning and problem-based learning are the main strategies to improve the quality of learning in SMK. With this method, it is hoped that students will not only master the theory but also be able to apply their knowledge in real-life work situations. However, the SMK PK program faces many problems. These include the limited number of educators and the lack of facilities in all schools. Furthermore, despite the expectation that SMK graduates are prepared for the workforce, there are still several significant issues that need attention. This includes the problem of insufficient industrial absorption. The local government plays a crucial role in identifying the local workforce needs, ensuring optimal absorption of SMK PK graduates.

It is important to evaluate the SMK PK program to determine how well it addresses vocational education issues. To make this program have a greater impact in the future, evaluation allows for continuous improvement of various policies and strategies. Therefore, evaluating the program's implementation is crucial to ensuring its survival and relevance in Indonesia. This study will examine the implementation of SMK PK in various schools within the Special Region of Yogyakarta (DIY) that have adopted the program. This study will evaluate not only the program's implementation effectiveness but also its impact on the vocational education landscape in DIY. Therefore, we hope this study will significantly contribute to the advancement of vocational education in Indonesia.

Theoretical Study

Evaluation of the Center of Excellence The Vocational School is a program within the Independent Learning Curriculum. The PK Vocational School is putting into action a program that both the school and IDUKA (the industrial sector and the workforce) have mutually agreed upon. According to Billings & Haistead (2007), program evaluation, as a concept, is the process of considering, interpreting, and then making assessments of data collected from various components of educational planning. Billings & Halstead (2007) emphasize that program evaluation, especially in vocational education, must consider important things such as curriculum, teacher performance, and student achievement. We carry out this evaluation not only to evaluate the implementation results, but also to identify areas that require

improvement in the learning procThe public, non-profit, and private organizational sectors widely use program evaluation, a combination and variation of theories and practices, to produce information for planning, design, and implementation (James McDavid, 2005). 05). McDavid, Huse, and Hawthorn (2005) use program evaluation to make strategic decisions about the program's future and to assess if it is operating according to plan. Educational policymakers at the Center of Excellence Vocational High School can use program evaluation to determine whether to continue, terminate, or improve the program. An effective evaluation must incorporate both quantitative and qualitative data gathered from stakeholders such as students, industry, and schools. Therefore, this evaluation is crucial to determine how well the program meets the changing needs of the workforce.

Program evaluation is also an assessment of the results of efforts to overcome and resolve problems in policies and programs. In the same case, Arikunto & Jabar (2008) stated that program evaluation is an effort to carefully determine the level of implementation of a policy by knowing the effectiveness of each component. In a nutshell, program evaluation aims to gauge the extent of a policy's implementation. Program evaluation is an important part of ensuring that a policy or program achieves its goals. Program evaluation measures program achievement by evaluating the implementation level and effectiveness of each involved element. This evaluation assesses the effectiveness of the program and finds elements that support or hinder the achievement of goals. The evaluation of the SMK Pusat Keunggulan (PK) program aims to assess the degree of success in achieving related policies and aligning vocational education with the workforce. Arikunto & Jabar underscored the significance of program evaluation in ensuring the smooth operation of all program components, from planning to implementation, and their clear measurement. In addition, this evaluation allows policymakers to make necessary changes to improve program performance. The book Program Evaluation: Alternative Approaches and Practical Guidelines by Worthen, Sanders, and Fitzpatrick (2004) also outlines an approach for evaluating the SMK PK program. The book emphasizes performance-based evaluation, which evaluates not only the program's outcomes but also its implementation process to ascertain the appropriate and effective use of resources. This performance-based evaluation can help determine which areas need improvement and ensure that the program will fully benefit all parties involved. In the book Evaluation and Performance Measurement: An Introduction to Practice by McDavid and Huse, Hawthorn (2022) emphasizes the need for consistent evaluation to guarantee optimal results and adaptability to evolving needs. We can use this ongoing program evaluation to improve program implementation in the future.

Furthermore, Daniel L. Stufflebeam and Anthony J. Shinkfield (2007) classify program evaluation approaches into two categories, namely a) the first category, an approach that develops invalid or incomplete findings, and b) the second category of approaches that are more or less the same as the definitions (questions, method orientation, development/accountability, social agenda, advocacy). This study concludes that conducting program evaluations requires consideration of three key factors: 1) the significance of a process with a series of systematic plans; 2) the establishment of clear and measurable standards, criteria, or indicators prior to the evaluation; and 3) the need for objective consideration and decision-making. They emphasize that systematicity in the evaluation process is very important, as is the determination of clear standards and measurable criteria before the evaluation begins. A positive evaluation must also include accountable decisions made based on evaluation findings. The Center of Excellence (PK) Vocational High School Program is very relevant because this evaluation aims to ensure that education is in accordance with the needs of the work world. Based on Stufflebeam and Shinkfield's evaluation theory, the evaluation of this program fits into the development-focused and accountability approach. Clear criteria and standards are necessary to ensure that the results can measure the program's impact both qualitatively and quantitatively. For instance, we can assess the SMK PK program by looking at the enhancement of student skills, the collaboration between schools and businesses, and the quantity of graduates entering the workforce.

According to Arikunto & Jabar (2008), there are four possible policies that can be implemented based on the results of the program implementation evaluation, namely: 1) stopping the program because it is considered that it has no benefits or cannot be implemented as expected; 2) Revising the program to address parts that do not align with expectations, including a few errors; 3) Proceeding with the program, as its execution has met all expectations and yielded valuable outcomes. 4) Disseminating the program involves either implementing it in other locations or repeating it at a different time. Given the program's success, it makes sense to repeat it in different locations and at different times.

Ralph Tyler (1949) defines evaluation as a process that establishes the degree of achievement of educational goals. This evaluation is based on the idea of assessing student behavior. According to

Tyler, evaluation is an effort to examine whether there is a relationship between the desired educational goals and the learning outcomes achieved. The evaluation approach developed by Tyler focuses on the relationship between the desired educational goals and the results achieved by students. The curriculum at vocational education institutions like SMK Pusat Keunggulan tailors its approach to produce graduates prepared for the workforce. Tyler also underscored the significance of objectively measuring outcomes to ascertain the degree of achievement of educational objectives. The Prior to conducting the evaluation, it's crucial to establish unambiguous and quantifiable objectives, and integrate both quantitative and qualitative techniques to generate insights that can enhance the quality of education (Shadish, 2022). h Tyler suggests using Daniel Stufflebeam's CIPP Evaluation Model Theory to strengthen the analysis of educational evaluation. This model offers a more comprehensive evaluation framework that focuses on four main elements: context, input, process, and product. This is relevant for SMK Pusat Keunggulan as it enables a comprehensive evaluation that encompasses not only student learning outcomes, as Tyler suggested, but also the program's implementation and alignment with industry needs. According to Stufflebeam, a satisfactory evaluation should be able to look at the program from multiple perspectives, including the relevance of the context (program objectives), the quality of the resources used (inputs), the implementation (process), and the final outcome. SMK Pusat Kelebihan can conduct a more comprehensive evaluation using this model, ensuring that each program element operates in accordance with the expected standards and objectives.

Scriven (1991) explains that professional evaluation is defined as a systematic determination of the quality or value of something. According to Scriven, evaluation is a systematic study of the benefits of several objects. Programs, organizations, performance, policies, and so on are among the objects that can underIn Tyler's model, the evaluator consistently monitors the achievement of the objectives, but Scriven's model eliminates this need. he objectives. The goal-free evaluation model requires consideration of the program's operation, which involves identifying both positive and negative performance outcomes. The reason for this is that the evaluator tends to focus excessively on each individual objective, neglecting to consider the extent to which each performance can contribute to the overall program. The Goal-Free Evaluation approach eliminates the preconceived notion of success or failure based on stated goals, enabling an objective assessment of program performance, regardless of anticipated outcomes (Scriven, 1991, p. 64). According to Scriven (1991), the actual performance of a program is more important than its initial objectives. This method allows for a more objective evaluation because it avoids bias that may occur when the evaluator focuses too much on achieving predetermined goals. In addition, Scriven stated that this method allows for the identification of unexpected program effects, both positive and negative. This is especially relevant when evaluating educational programs such as the Center of Excellence Vocational Schools because the evaluation must consider the achievement of formal goals and other potential outcomes. Stufflebeam (2007) highlights the importance of carrying out evaluation from four aspects: context, input, process, and product. The CIPP Model prioritizes the assessment of the process and results, yet permits contextual evaluation that remains independent of the initial goals. On the other hand, the Objective-Free Evaluation Model emphasizes actual performance without limiting itself to any goals. In addition, in Basic Principles of Curriculum and Instruction, Tyler (1949) focused on an objective-based approach, which is very different from Scriven. Tyler argued that educational goals should be the main benchmark for evaluation. This objective-based approach, however, is often less flexible in dealing with the changing dynamics of the world of work, especially in vocational education. This is where goal-based evaluation provides flexibility, ensuring that the evaluation remains relevant and evolves with the current needs of the program. Combining these two theories provides a broader view of evaluating educational programs, such as SMK PK. Tyler's goal-based model provides a clear framework for achieving objectives, while Scriven's goal-based evaluation enables deeper and more comprehensive results from the implemented program.

According to Fathansyah (2019), evaluation is a structured process that generates and synthesizes information to lessen stakeholder uncertainty about a set program or policy. According to James C. McDavid, evaluation is defined as a structured process that produces information to reduce uncertainty for stakeholders. McDavid (2005) underscored the need for a data-based approach in evaluation to accurately depict the effectiveness of a policy or program. In this context, evaluation aims to provide an assessment based on the program's actual results so that policymakers can understand how the program works. Kristi D. Menix (2007) defines evaluation as an assessment process that utilizes predetermined criteria or results. According to Djaali & Mulyono (2000), evaluation involves assessing an object using predetermined criteria or objectives, followed by a decision on the object under evaluation. In the book Evaluation, Theory, Model, and Application, Stufflebeam and Shinkfiled state

that evaluation is the systematic process of delineating, obtaining, reporting, and applying descriptive and judgmental information about some object's merit, worth, probability, feasibility, significance, and/or equity (Daniel L. Stufflebeam and Anthony J. Shinkfield, 2007).

The Vocational High School (SMK) Center of Excellence is a program that aims to improve the quality of vocational education in Indonesia. The Ministry of Education and Culture (Kemendikbud) initiated this program to produce competent and industry-ready graduates. This program has several main objectives, including improving the quality and relevance of vocational education, providing adequate facilities and infrastructure, developing a curriculum that is in accordance with market needs, and increasing cooperation with the industrial world. Vocational education in Indonesia is often considered less popular than general education. However, with the increasing need for skilled workers, the government launched the SMK Center of Excellence program to change this view and make vocational education an attractive and quality option. The criteria for becoming a SMK Center of Excellence include: a) Good accreditation from the National Accreditation Board (BAN); b) Solid cooperation with industry; c) Adequate facilities, including laboratories and practical equipment; d). Relevant curriculum and project-based learning.

2. Methodology, Data, Analysis

This study is a qualitative descriptive study. The research sample consists of DIY vocational schools that have implemented PK. The sample consists of five DIY schools that offer business and finance expertise programs. The data collection used documentation and in-depth interviews with principals and teachers in the sampled schools. Data validation was done with FGDs. As for the theme, it was classified into 3 aspects: staging, program implementation, and impact. We analyzed the data through three stages: data collection, data reduction, and presentation.

3. Results and Discussion

Upon assessing the Yogyakarta implementation of SMK PK, it becomes clear that SMK in DIY has successfully introduced SMK PK-related socialization to all stakeholders in the vocational environment. The partner institutions (industry and business world) responded well. Cooperation in the form of MoUs with IDUKA also increased after the establishment of PK schools. The leadership and management of the school have become more dynamic and continue to grow. Both parties, namely teachers, benefit from the existence of SMK PK, as it provides them with the opportunity to learn through internships in IDUKA. Teachers can enhance their insight, knowledge, skills, and understanding of the work culture. In the place of internship teachers/mmiddle education, students receive guidance from school instructors to make curriculum adjustments in line with the needs of work, do internship activities, and are guided to become entrepreneurs so that talented students are able to be independent to be entrepreneurial. When an instructor joins the school, the internship students at IDUKA experience a sense of support.

The evaluation of the implementation of SMK PK in Yogyakarta, which showed good cooperation between the school and IDUKA, is in line with the ideal concept of school-industry partnerships theory. According to this theory, collaboration between the world of education and industry is essential to enhancing the relevance of vocational education to the world of work. As put forward by Rojewski (2009) in his book Career and Technical Education Research, an effective relationship between schools and industry should be based on mutually beneficial synergies. Yogyakarta provides teachers and educational personnel (tendik) with internship opportunities at IDUKA, enabling them to enhance their skills and knowledge for future teaching applications. However, although significant Despite the significant progress, vocational education theory emphasizes that ideal conditions for apprenticeship programs should not only enhance teachers' technical competencies but also fortify their pedagogical capabilities. Lynch's (1996) research on workplace learning expects teachers to acquire practical skills and understand their translation into more eAlthough industry instructors provide guidance to teachers and tendik in Yogyakarta, no systematic evaluation has demonstrated the application of this knowledge in classroom learning. To achieve ideal conditions, we need to strengthen these elements. From the student side, the theory of work-based learning advocated by Billett (2011) underlines the importance of integration between theory and practice in the field. Ideally, internships undertaken by vocational students not only teach technical skills but also enhance non-technical skills such as problem solving, teamwork, and communication that are much needed in the modern world of work. The Yogyakarta evaluation confirms that students receive guidance to become entrepreneurs, but the theory underscores the importance of real-world experience in the working environment to cultivate these soft skills. We

should further evaluate the internship programs at IDUKA to determine if students fully acquire these skills. Yogyakarta's vocational schools align their curriculum with industry needs, a concept known as curriculum alignment (Lamb & McKenzie, 2001). This theory suggests that aligning the curriculum with job market needs enhances students' readiness for the workforce post-graduation. In Yogyakarta, a process of cuYogyakarta has initiated a curriculum adjustment process with IDUKA, but the challenge lies in keeping the curriculum adaptable to the constantly changing demands of the highly dynamic industry. We need a more responsive monitoring and evaluation system to ensure that curriculum adjustments not only happen initially but also adapt continuously to changes in the industrial world. ership and management becoming more dynamic is in line with the theory of transformational leadership put forward by Bass (1985), where adaptive and innovative leadership is essential in managing change in schools. In Yogyakarta, school principals showed dynamism in managing the relationship with IDUKA and driving change in the school's internal environment. However, the theory also emphasizes the need for more active participation of the entire school staff in strategic decision-making. In other words, leadership should not only be dynamic but also inclusive, so that all parties in the school can be involved in the process of improving and developing the vocational PK program on a sustainable basis. Finally, from IDUKA's point of view, the corporate social responsibility theory (Carroll, 1991) suggests that collaboration with schools in the form of internships and instructor guidance is not only economically beneficial to the industry but also enhances the company's image in the community. The Yogyakarta evaluation revealed that IDUKA added value by engaging in education, which also facilitated the acquisition of skilled labor through apprenticeship programs. However, for this collaboration to be sustainable, IDUKA needs to play a more active role, not only as an internship site, but also as a strategic partner in the skill development of students and educators in vocational schools.

Second, the SMK PK program's implementation is already underway. The Yogyakarta neighborhood's SMK PK has executed all its programs according to plan, fulfilling the school's mission as stipulated by the Independent Curriculum. All programs have supported 8-link and match missions. It caThe explanation is as follows: 1) The vocational schools' curriculum aligns with IDUKA in a synergistic way, enhancing both soft and hard skills. 2) The use of technology in learning activities is on the rise, with a focus on project-based and problem-based learning models that enhance student character. chool collaborated with IDUKA by opening a mini bank at the school, Teaching Factory. 3) It3) The SMK PK program has demonstrated its ability to enhance the number of teachers with specialized knowledge in specific fields through internships, subsequently bringing in more instructors to support students in their real or prototype learning. e more students who practice industry for 6 months / 1 semester, 5) The more increased teachers who have competence certification according to the standards of the world of work, 6) Increasingly teachers and instructors teach using LMS platforms, with the help of Whashap. Conduct trainings in teaching techniques, 7) The existence of the Teaching Factory program in schools, 8) Schools and Dudi commitment to improve graduates can be absorbed in the world of work. The implementation of the program has been progressing according to plan; however, there is a slight laxity related to the absorption of graduates, as in the institution there are certain rules in the recruitment of employees.

The implementation of the Center of Excellence (CE) vocational program in Yogyakarta, which has proceeded as planned and supports the link and match mission, is a step forward in improving the quality of vocational education. However, in order to conduct a more in-depth logical analysis, it is important to compare this implementation with the ideal conditions described in vocational education theory and related literature, particularly in terms of curriculum alignment, strengthening of soft skills and hard skills, use of technology, upskilling of teachers, and absorption of graduates into the world of work. McFadden and Shepard's (2002) theory of curriculum alignment posits that the vocational education curriculum should ideally align with industrial needs to produce competent and work-ready graduates. In the context of SMK PK in Yogyakarta, curriculum alignment with IDUKA has proceeded synergistically, which is an important step towards achieving industry standards. However, the theory also emphasizes that curriculum alignment should be dynamic in nature, constantly adjusted to changes in the world of work. Despite the formation of synergies, a real-time monitoring mechanism is necessary to quickly adapt the curriculum to changing industry needs. In vocational education, the strengthening of soft and hard skills constitutes two inseparable aspects. According to the 21st Century Skills theory by Trilling and Fadel (2009), work-ready graduates need not only technical skills (hardskills) but also non-technical skills such as communication, teamwork, and problem-solving (softskills). The vocational PK program has strengthened these two skills through project-based learning and problem-based learning methods. However, additional assessment is necessary to ascertain the students' ability

to utilize these soft skills in authentic work scenarios. According to the theory, strengthening soft skills necessitates a holistic approach, not only through projects, but also in everyday learning integrated with the formal curriculum.

The use of technology in education is increasing in PK vocational schools, in line with the theory of blended learning put forward by Graham (2006). Ideally, we use technology as a tool to enhance the learning process, expand access to learning resources, and foster greater interaction between teachers and students. SMK PK has begun using LMS platforms and communication media, such as WhatsApp, in learning, which is a positive step. However, based on the theory, the successful use of technology in education depends on the infrastructural readiness and digital competencies of teachers as well as students. In this regard, the enhancement of teachers' digital skills through technology training becomes crucial in order for them to optimally utilize technology in teaching. The Teaching Factory program at SMK PK aims to bring real working situations into the school environment, a concept that aligns with Lave and Wenger's (1991) theory of situated learning. In an ideal situation, students not only learn theory but also apply it in contexts relevant to the world of work. At SMK PK, the Teaching Factory program is well underway, including the opening of a Mini Bank as part of the cooperation with IDUKA. However, additional assessment is necessary to guarantee that this initiative genuinely offers students a comprehensive practice experience, enabling them to comprehend the intricacies of the professional world. One of the important achievements of the vocational PK program is the increase in the number of teachers who have specific expertise through apprenticeship programs in industry. Billett (2001) advocates the workplace learning theory, stating that hands-on experience in the workplace is one of the most effective ways to enhance teachers' practical competencies. However, the theory also emphasizes the importance of assessing the transferability of these experiences into classroom teaching practices. In-industry training would be more optimal if followed by reflective sessions and coaching in the school environment to ensure teachers can truly adapt and integrate their new skills in the learning process.

The increase in the number of instructors from the industrial world accompanying students in the learning process is also a positive step. The theory of mentorship in vocational education (Boud & Middleton, 2003) emphasizes the crucial role of industry instructors in bridging the gap between classroom theory and field practice. However, the theory underscores the importance of building the relationship between industry instructors and students on effective communication and a deep understanding of vocational education's goals. Therefore, it is necessary to ensure that industrial instructors not only provide technical training but also guide students in the development of softskills that are essential for the world of work. The increase in the number of teachers who have competence certification according to the standards of the world of work is also an important step in the development of vocational education. According to the theory of professional competence by Eraut (1994), competency certification serves not only as a formal recognition but also as an indicator of a teacher's ability to teach skills relevant to industry needs. However, it is worth noting that certification is only the first step. Continuous professional development should ideally follow certification, enabling teachers to continuously enhance their competencies as technology and industry needs evolve.

The use of LMS platforms and social media in teaching is also an important element in the era of digital education. According to Garrison and Vaughan's e-learning theory (2008), the use of technology in learning should be based on the principle of effective interaction and collaboration between students and teachers. SMK PK has utilized LMS and WhatsApp platforms to enhance learning, but further evaluation is necessary to determine their effectiveness. According to the theory, the ideal learning technology not only facilitates communication but also enriches the learning process through interactive features that enable students to learn independently and collaboratively. Training programs on teaching techniques are crucial for teachers, enabling them to adapt the latest learning methods to meet the needs of vocational students. According to Shulman's (1987) theory of pedagogical content knowledge, vocational teachers must not only grasp the material's content but also learn how to teach it effectively and relevantly. The training programs organized in SMK PK already cover these aspects; however, it is important to ensure that such training delivers tangible results in improving the quality of classroom teaching. The school's and IDUKA's commitment to improving the absorption of graduates into the workforce is a key objective of the link and match program. Hillage and Pollard's (1998) theory of employability posits that the degree of absorption of graduates into the workforce is not solely based on their technical skills, but also on their capacity to adapt to a dynamic work environment. This commitment already exists in SMK PK; however, due to certain rules in the relevant institutions, there are still obstacles in the absorption of graduates. In an ideal scenario, schools and IDUKA should

collaborate to incorporate flexibility in recruitment rules, thereby increasing the likelihood of industry absorption for vocational PK graduates.

Overall, the implementation of the SMK PK program in Yogyakarta went according to plan and supported the achievement of the link and match mission. However, based on the logical analysis compared with the ideal conditions of vocational education theory, there are still some areas that need to be improved, such as the adaptation of the curriculum to industry changes, the application of soft skills in practice, as well as the optimization of the use of technology and the involvement of industrial instructors. With continuous evaluation and improvement in several aspects, PK vocational programs can achieve more ideal conditions and have a greater impact on graduates' employment readiness.

An analysis has been conducted to determine the positive impact that SMK PK has on various programs currently in operation. Various added values include: 1) encouraging schools to always improve the performance of the institute through school management; 2) awareness of the commitment to maintain or develop the acquisition of the status of becoming a SMK PK; 3) encouraging those who do not have the status of SMK PK by improving the quality of management of the institute. 4) Teachers and teachers have insight into knowledge, skills, and attitudes that can meet the demands of schools; 5) the quantity and quality of facilities and infrastructure increases; 6) vocational school graduates are more confident, which leads them to have high competitiveness; 7) funds that launched for SMK PK are very beneficial and contribute to the improvement of school quality and have an impact on improving the quality of learning and student output.

The Centers of Excellence (CE) vocational programs have had a significant positive impact on improving the quality of education in various schools. However, to understand more deeply the reported impacts in the context of educational management theory and vocational education theory, it is important to compare them with the ideal conditions of the academic literature. Various theories can evaluate some of the main aspects mentioned, including improved institutional performance, school management, teachers' skills, infrastructural facilities, and graduates' confidence, to determine how these impacts align or deviate from the expected ideal concept. First, the encouragement for schools to always improve institutional performance through school management reflects the continuous improvement theory put forward by Deming (1986). According to this concept, schools, as organizations, should consistently enhance their performance through ongoing cycles of evaluation and improvement. SMK PK positively influences schools to consistently assess and enhance their performance. However, according to Deming's theory, this improvement should be systematic and structured through the application of Total Quality Management (TQM) in the educational environment. Under ideal conditions, school management should involve all school components, including teachers, staff, students, and parents, in improvement efforts to foster a holistic quality improvement environment. The awareness of maintaining and developing the acquisition of PK vocational status demonstrates the application of organizational commitment principles expressed by Meyer and Allen (1991). According to this theory, organizational commitment is key to sustaining the success of a program. At SMK PK, the commitment to maintaining an excellent status provides the motivation for the school to continue to grow. However, in accordance with human resource management theory, we need to complement this commitment with an optimal resource management strategy. Ideally, SMK PK should develop a long-term strategic plan that includes the development of the school's internal competencies and strengthens collaboration with the world of business and industry (IDUKA).

Bass and Riggio's (2006) motivational leadership theory aligns with the eagerness of schools not yet attained SMK PK status to enhance the quality of their institutional management. According to this theory, leadership that inspires and motivates the organization can drive performance improvement. The vocational PK program seems to have a positive effect on non-vocational PK schools by creating awareness about the importance of improving management quality. According to Bass and Riggio, effective transformational leadership must be able to communicate a clear vision and goals, as well as motivate every member of the organization to participate in the process of change and performance improvement. Teachers and educational personnel (tendik) who have insights, skills, and attitudes that meet the demands of the school are in line with the concept of professional development put forward by Darling-Hammond et al. (2009). Teachers should receive not only increased technical competencies but also ongoing training focusing on modern pedagogy, technological proficiency, and interpersonal skills. Internship and training programs initiated by SMK PK make a significant contribution towards the improvement of such skills. However, in order to get closer to the ideal conditions, vocational PK needs to develop professional development programs that are based on school needs as well as global educational trends, such as technology-based education and innovation. The improvement in the

quantity and quality of facilities and infrastructure reported by SMK PK is consistent with Earthman's (2002) school facilities and student outcomes theory. According to Earthman, the quality of facilities and infrastructure has a strong correlation with student learning outcomes. Ideally, adequate facilities not only enhance the effectiveness of learning, but also create a conducive learning environment for students. The improvement of facilities such as classrooms, laboratories, and technological devices in vocational PK has helped to create an environment that is more supportive of the learning process. However, for these facilities to be more effective, proper utilization and optimal utilization training for teachers and students are necessary.

Bandura's (1997) self-efficacy theory aligns with the more confident and competitive vocational school graduates. According to Bandura, a person's confidence in their abilities greatly influences their performance in the face of challenges. Students involved in industrial internship programs, teaching factories, and practical skills training seem to acquire more confidence in the context of vocational schools. However, under ideal conditions, schools should provide programs that continue to support students' self-efficacy development through deep and reflective learning experiences, as well as career guidance support that helps students understand their potential in the world of work. The funds launched for vocational PK programs contribute to improving school quality and learning, which is in line with Hanushek's (1996) theory of resource allocation in education. According to Hanushek, the proper allocation of resources in education is highly influential on student learning outcomes. Under ideal conditions, we not only use the granted funds for facility procurement, but also enhance the quality of learning through teacher training, curriculum development, and the provision of technologically advanced learning tools. The application of this theory in vocational PK seems to be well underway, although further evaluation is required regarding the efficiency and effectiveness of the use of such funds. In terms of school management, vocational PK programs appear to have adopted elements of the school-based management theory put forward by Caldwell and Spinks (1998). This theory emphasizes the importance of decentralization and school autonomy in resource management and decision-making. PK vocational programs allow schools to have more flexibility in managing teaching and training programs, which is a key element in achieving vocational education success. Under ideal conditions, school management should also possess strong self-evaluation capabilities, enabling them to reflect on their strengths and weaknesses and continuously improve. The improvement in the quality of vocational school graduates who are better prepared to compete in the world of work is consistent with Becker's human capital theory (1964), which states that investment in education and skills is the key to increasing individual productivity in the job market. PK vocational schools have provided students with access to skills training that is more relevant to the industrial world, which ultimately increases their competitiveness in the job market. However, to be more optimal, vocational education programs in vocational PK should continuously adapt their curriculum to the ever-evolving needs of the market, as well as equip students with high adaptability to face changes in the world of work.

King (2004) emphasizes the importance of the school's role in helping students manage their careers, from the perspective of increasing graduates' confidence. PK vocational schools have had a positive impact in increasing students' self-confidence; however, under ideal conditions, schools should provide more career guidance programs and non-technical skill development, such as communication, time management, and problem solving, which will help students in managing their career journeys after graduation. Reports indicate that channeling funds to vocational PKs enhances school quality and aligns with the principles of Psacharopoulos and Patrinos' (2004) theory of public finance in education. This theoryposits that government investment in education should be done strategically to ensureThis theory suggests that the government should strategically invest in education to maximize its returns. ng the quality of learning. However, further evaluation is needed to ensure that the allocation of funds is done equitably and appropriately targeted, as well as focused on improving the quality of teaching and facilities that support practice-based learning. PK vocational programs also play a role in improving teacher and teaching skills, in line with the theory of lifelong learning by Aspin and Chapman (2007). According to this theory, skill development for educational personnel should be carried out continuously to adapt to the development of technology and the changing needs of the world of work. The vocational PK program already includes training and internships for teachers; however, to be more ideal, schools need to ensure that professional development programs are conducted continuously and not only focus on short-term training but also on long-term development integrated with national educational objectives.

According to Fraser's (2012) theory of learning environments, improving facilities and infrastructure in vocational PK supports better learning. This theory emphasizes the importance of

learning environments that support students' cognitive and social development. Good facilities, such as laboratories and modern technological equipment, help students in learning more effectively. Under ideal conditions, students should utilize these facilities with an appropriate pedagogical approach to maximize their potential for practical learning and innovation. Ultimately, the effectiveness of vocational PK programs in enhancing the quality of graduates ready for the workforce indicates the significant potential of well-crafted vocational education in bridging the gap between education and industry. However, to achieve maximum results, we must constantly evaluate and adapt vocational education programs to changes in the labor market, fostering greater collaboration between schools, industry, and government to create a more responsive education system.

4. Conclusion

SMK PK demonstrated that it was able to meet the demands of the Independent Curriculum. Link and Match makes vocational schools more dynamic by implementing various activities related to learning achievements, the school's mission, and the expectations of the world of work. Furthermore, I think the government can allocate supplementary funds for vocational schools that have good school management, both those that have the status of SMK PK and have not yet become SMK PK.

The increase in self-confidence and competitiveness of vocational school graduates also shows alignment with self-efficacy and career self-management theories, where internship and training programs based on real practice successfully improve students' ability to adapt and compete in the job market. However, such confidence must continue to be nurtured through career guidance programs and ongoing learning support so that graduates are not only technically prepared but also able to manage their future career journeys.

Therefore, it is crucial to consistently uphold the success of vocational PK programs by enhancing the quality of school management, enhancing teacher competence, managing infrastructural facilities, and providing optimal financial support. This is not only important to sustain the current successes but also to ensure that all vocational schools, both those that have achieved PK vocational status and those that have not, can achieve the expected standard of vocational education in accordance with the demands of the Independent Curriculum and the needs of the world of work.

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THE DIGITAL REVOLUTION IN LEARNING: TEACHERS' USE OF CLOUD APPLICATIONS

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Abstract

The potential of cloud-based applications in education is immense, as these applications provide access to a variety of educational resources, encourage collaboration between students and teachers, and facilitate technology-based learning. Effective implementation of this technology requires active participation from teachers to integrate it into daily learning activities. The utilization of these applications is hindered by various challenges such as time constraints, limited technological knowledge, and restricted access. Additionally, the lack of adequate training and support for teachers in utilizing technology poses further challenges. These limitations impede the development of innovative learning approaches and restrict students' access to digital educational materials. The community service activities target participants who are elementary school teachers in Kulon Progo, Yogyakarta Province, Indonesia. The main components of these activities include training and mentoring. These activities are conducted to deepen the use of cloud-based applications in education. The primary goal of the training and mentoring is to equip teachers with a thorough understanding and new skills in utilizing cloud-based applications in teaching. Through focused training and continuous mentoring, it is hoped that teachers will understand the potential of this technology and successfully integrate it into their teaching practices.

Keywords: cloud-based applications, learning innovation, digital revolution, cloud computing

1. Introduction

Indonesia is currently facing challenges related to the lack of teachers who innovate to present fun and technology-integrated learning, such as implementing cloud-based applications in learning. The application of this technology is still limited and less than optimal in schools. Learning using cloud-based applications refers to an education model that uses cloud computing technology to access, store, and deliver learning materials (Kurniawan et al., 2023; Li, 2021). In this approach, learning materials and data are stored on servers that can be accessed online. Teachers and students can access it from anywhere with an internet connection. Therefore, learning using the cloud can enable more flexible and collaborative learning (Raza & Khan, 2022; Khan, 2021). Cloud computing has revolutionized the learning process and allows teachers and students to collaborate (Falade et al., 2021). By storing data in cloud applications, teachers can enable students to access and share learning from anywhere, anytime. This increased flexibility and accessibility has resulted in increased productivity. On the other hand, the use of cloud-based applications in learning is increasingly essential to increase innovation in the learning process (Kiswani et al., 2021). However, the lack of utilization by teachers can hinder the optimal implementation of this technology. The use of cloud-based applications in learning has offered great potential. These applications enable access to rich and diverse educational resources, collaboration between students and teachers, and technology-based learning (El Mhouti et al., 2018). However, the implementation of this technology requires adequate teacher involvement to facilitate the use of these applications in everyday learning.

Time constraints, technological knowledge, and limited access are barriers to optimal use of technology. In addition, the lack of training and support for teachers in adopting new technologies is also a serious obstacle. These limitations result in a lack of innovation in learning methods and limited access to digital educational resources. This can hinder students' ability to make maximum use of technology in the learning process. In fact, relevant and varied digital educational content is key to improving the quality of technology-based learning.

The integration of cloud-based applications into the learning process can help make significant progress for education (Baldassarre et al., 2018). This innovative technology provides many benefits,

allowing teachers to improve learning efficiency and provide a fun learning experience (Saputra & Muharni, 2023). As technology continues to develop, teachers can anticipate more interesting opportunities to utilize cloud-based applications in the learning process. Although there is potential for implementing cloud-based applications in learning, its use in schools is still limited. The main obstacles include limited knowledge about the benefits of this technology and lack of training for teachers. Based on the results of the situation analysis, it was found that there are still elementary school teachers in Kulon Progo Regency who have limited abilities to apply cloud-based applications in learning so that it can hinder increasing innovation in the learning process. To overcome this problem, one of the activities that can be carried out is Community Service (CS) by providing structured training and mentoring. By offering comprehensive training and guidance, teachers can effectively utilize technology to improve innovation in learning. Based on the existing situation analysis, this CS activity aims to; 1) provide teachers with an understanding of the use of cloud-based applications in learning; and 2) improve teachers' abilities to be able to utilize cloud-based applications in learning. This community service activity is carried out by organizing training and mentoring for teachers to be able to develop cloud-based learning media as an effort to improve learning innovation in elementary schools in Kulon Progo Regency.

2. Method

This CS is carried out using the lecture, discussion, Q&A, and practice methods of creating cloud-based learning media. The lecture, discussion, and Q&A methods are used in providing material that is knowledge or insight into the use of cloud-based applications in learning. The practice method is used to provide training to teachers to be able to develop cloud-based learning media. The details of the community service activity methods are as follows:

a. Lecture, used to provide an understanding to training participants in understanding the use of cloud-based applications in learning.

b. Discussion and Q&A, intended to provide an opportunity to discuss things that may not be well understood regarding the use of cloud-based applications in learning.

c. Practice, intended to provide an opportunity for learning experiences for training participants through practice to develop cloud-based learning media.

d. Mentoring, used to provide guidance to training participants in completing the practice of developing cloud-based learning media.

This community service activity was carried out from May to June 2024 which included understanding the material, practice, and mentoring in developing cloud-based learning media. This activity covers various materials related to the use of cloud-based applications in learning, including:

a. Utilization of cloud-based applications in learning: This session focuses on how cloud-based applications can be used to help improve the learning process.

b. Implementation of the use of cloud-based applications in learning: This session is a practical session where teachers are given training to utilize cloud-based applications in learning.

In addition to training, participants also benefit from ongoing mentoring as an important aspect of this activity. The mentoring component aims to provide guidance and support to participants as they apply their newly acquired technology skills in their work environment. By offering assistance in overcoming potential challenges during implementation, the mentoring process facilitates the exchange of experiences and the application of best practices.

The effectiveness of this training and mentoring program is measured through pre-tests and post-tests as well as participant practice results. If participants achieve an average score of 79 or higher, this indicates their proficiency in utilizing cloud-based applications in learning. In addition, to assess the results of the practice, the team created a rubric using portfolio assessment.

3. Results and Discussion

a. Results

The implementation of this CS activity was held in Kulon Progo Regency. This activity was carried out in seven stages as in Figure 1.

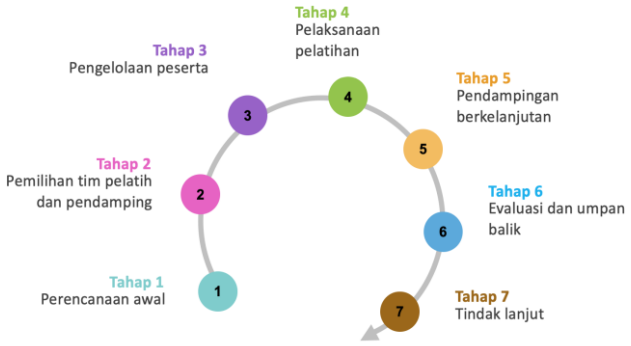


Figure 1. Stages of CS activities

Based on Figure 1, here are seven stages of implementing community service activities on the use of cloud-based applications.

1) Initial planning

Identification of needs: based on the needs analysis, the area that requires training and assistance to utilize cloud-based applications is elementary school teachers. Target determination: the target of this study is elementary school teachers in Kulon Progo Regency. Scheduling: the implementation of training and assistance will be carried out from May to June 2024.

2) Selection of the training and assistance team

Team identification: the training and assistance team in this activity are lecturers from Yogyakarta State University who have expertise and experience in utilizing cloud-based applications. Material preparation: the training and assistance team prepares training and assistance materials on the use of cloud-based applications.

3) Participant management

Participant information: this stage is carried out to collect information on participants who take part in the training and assistance, such as their background, level of understanding of technology, and their expectations regarding the training. Group division: participants are divided into several small groups to collaborate in developing cloud-based learning media.

4) Training implementation

Practical session: the training team provides practice that includes predetermined material on the application of cloud-based applications in learning. Demonstration: the coaching team provides a practical demonstration on how to use cloud-based applications in learning.

5) Ongoing mentoring

Discussion session: discussion and question and answer sessions are held so that participants can share experiences, challenges, and ideas related to the application of cloud technology in learning. Guidance: the mentoring team provides guidance to participants who need assistance.

6) Evaluation and feedback

Pre-test and post-test: This test is conducted to see the extent of participants' understanding of the use of cloud-based applications in learning before and after the activity. Analysis of participant practice results: Evaluation of practice results is carried out to evaluate the success of training and mentoring on the abilities of participants using portfolio assessments.

7) Follow-up

Documentation and publication: the results of the documentation are published on social media as a form of promotion and archive of activities. Follow-up mentoring for participants: follow-up mentoring is provided to participants who need additional assistance to implement the cloud in learning.

This activity was carried out during May and June 2024 which included understanding the material, practice, and mentoring in developing cloud-based learning media in learning. The number of participants in this activity was 36 elementary school teachers in Kulon Progo Regency. The training and mentoring activities went well and smoothly with indications of success, namely increased educator knowledge based on the results of the pre-test and post-test and educators were able to develop cloud-based learning media. The results of the pre-test (Figure 2) conducted before the provision of material showed that teacher knowledge was in the range of 50 - 90 with an average score of 75.29, while after the provision of material, teacher knowledge increased significantly, this can be seen from the results of the post-test (Figure 3) with values in the range of 70 - 100 and an average score of 92.

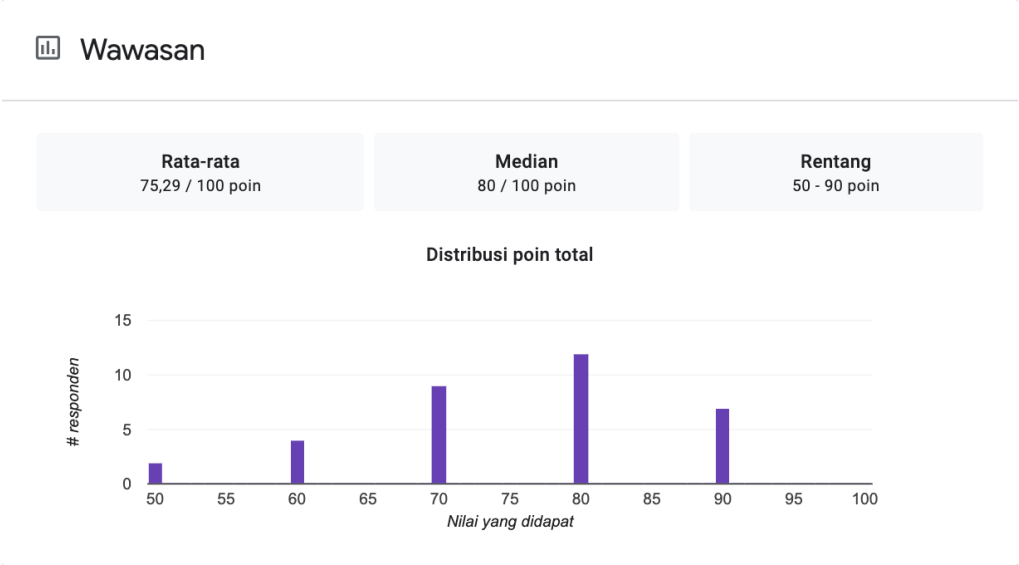


Figure 2. Pre-test results

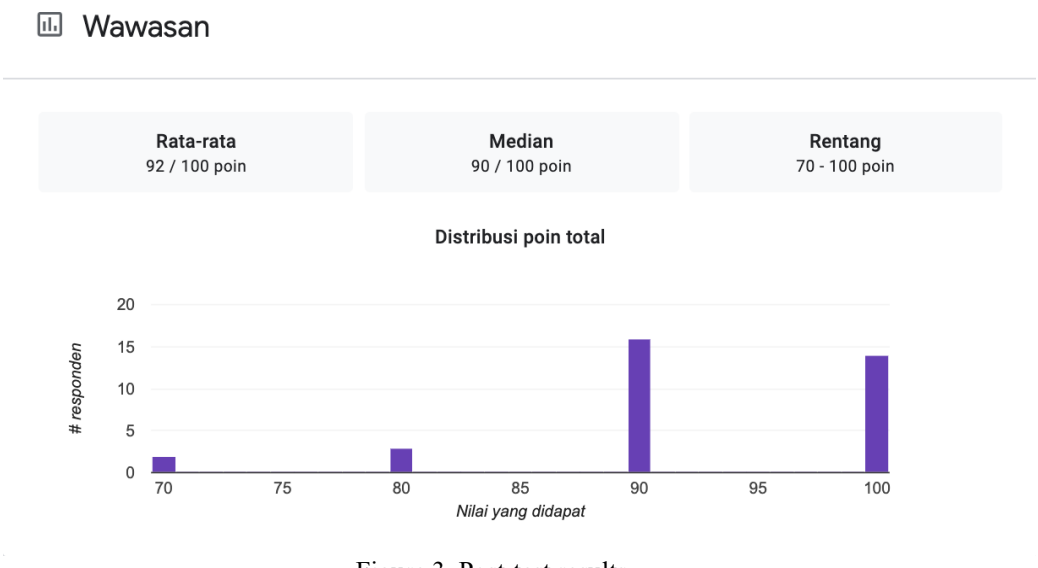


Figure 3. Post-test results

After getting the pre-test and post-test results of the participants, the results are continued by conducting an N-gain score test to measure the effectiveness of the activity. The N-gain score is used to determine the extent to which participants' understanding has increased and to assess how effective

the material provided is after participating in the CS activity. The N-gain score is grouped into three categories including low N-gain if the N-gain score <0.3 with the interpretation that the increase in knowledge that occurs is low, medium N-gain if 0.3 ≤ N-gain score <0.7 with the interpretation that the increase in knowledge that occurs is moderate, and high N-gain if the N-gain score ≥ 0.7 with the interpretation that the increase in knowledge that occurs is high (Gok, 2014; Hake, 1998). The result, based on the suitability of filling both tests (pre-test and post-test) namely 33 respondents, it was found that the average N-gain score of participants was 0.62 (62%) as in Table 1. This result shows that the increase in knowledge of CS participants is in the moderate category but at a high limit because it is close to a value of 0.7.

In addition, the final result of this activity, teachers have been able to develop products in the form of learning media (Figure 4 and Figure 5). The products developed by teachers are carried out by collaborating with other teachers. Teachers are asked to form small groups consisting of teachers from several schools.

The learning media that teachers develop are then assessed by the community service team using a portfolio assessment rubric (Table 2). Portfolio assessment is used to measure participants' achievements in completing tasks given from training activities.

Table 1. N-gain score

Respondent	Post-test Score	Pre-test Score	N gain-score	N gain-score(%)
1	70	60	0,25	25
2	90	80	0,50	50
3	100	80	1,00	100
4	100	90	1,00	100
5	90	80	0,50	50
6	80	90	-1,00	-100
7	90	70	0,67	66,67
8	70	60	0,25	25
9	90	60	0,75	75
10	90	80	0,50	50
11	90	60	0,75	75
12	100	80	1,00	100
13	90	80	0,50	50
14	100	90	1,00	100
15	100	70	1,00	100
16	90	80	0,50	50
17	90	80	0,50	50
18	90	70	0,67	66,67
19	100	80	1,00	100
20	100	50	1,00	100
21	80	70	0,33	33,33
22	90	80	0,50	50
23	90	70	0,67	66,67
24	80	80	0,00	0
25	100	90	1,00	100
26	90	70	0,67	66,67
27	100	70	1,00	100
28	100	80	1,00	100
29	100	70	1,00	100
30	100	90	1,00	100
31	90	90	0,00	0
32	90	90	0,00	0
33	100	50	1,00	100
Mean	91,82	75,45	0,62	62,12



Figure 4. CS group 1 activity products



Figure 5. CS group 2 activity products

Table 2. Portfolio assessment rubric

Assessment Aspects	Assessment Criteria
Learning objectives	Measurability of learning objectives
Design and structure	Quality of navigation, readability, and visual layout
Content and materials	Accuracy, depth, and topicality of information
Interactivity	Level of interactivity and user engagement
Audience appropriateness	Appropriateness to the education level, background, and learning preferences of the audience
Use of technology	Technical performance, usability, and accessibility of the media
Creativity and innovation	Creative elements in the design and approach used

Material on the use of cloud-based applications in education; 1) Material on techniques for creating learning media using slides; 2) Practice of developing cloud-based learning media. During the training, the participants were very enthusiastic because some participants shared their experiences and also asked questions related to the material presented. In addition, the practical activities attracted the attention of the participants because they enthusiastically collaborated together to develop cloud-based learning media, then two representative groups presented drafts of the results of the learning media that had been developed.

The implementation of this community service activity was carried out by a service team consisting of lecturers and students. The materials and practices presented consisted of; 1) Material on the use of cloud-based applications in education; 2) Material on techniques for creating learning media using slides; 3) Practice of developing cloud-based learning media. During the training, the participants were very enthusiastic because several participants shared their experiences and also asked questions related to the material presented. In addition, the practical activities attracted the attention of the participants because they enthusiastically collaborated together to develop cloud-based learning media, then two representative groups presented drafts of the results of the learning media that had been developed.

b. Discussion

This Community Service activity was carried out as an effort to improve the quality of learning. This activity aims to increase the knowledge of teachers in understanding the use of cloud-based applications and being able to apply them in learning through the development of learning media. This activity also aims to target teachers to have the skills to be able to develop cloud-based learning media.

Teachers need to understand and utilize the potential of cloud technology to improve students' learning experiences. This involves ongoing training and professional development to ensure that teachers have the skills and knowledge needed to use this technology effectively in their learning practices (Wijaya, 2022).

In this CS activity, teachers have received training and mentoring. They are also recommended to share knowledge with other teachers in their respective schools. That way, the knowledge and skills gained can be useful and utilized by many teachers in schools. The training and mentoring activities carried out include several components consisting of:

1) Achievement of the target number of training and mentoring participants

In this activity, the targeted participants were 30 elementary school teachers and in its implementation there were 36 teachers who took part in the training and community service activities, and 33 teachers who took the pre-test and post-test. That way, the achievement of the number of participants has met the target and can be said to be very achievable. The achievement of this participant target shows that this community service activity is interesting and needed by teachers to improve their knowledge and skills so that teachers are enthusiastic about registering.

2) Achievement of the objectives of community service activities

This community service activity aims to provide knowledge, training, and mentoring to teachers. The objectives of this activity have been achieved well through the provision of materials, practices, and mentoring for teachers. In its implementation, materials and practices are provided with the help of various media to help teachers understand and follow the activities. Afterwards, mentoring is carried out to help teachers complete the tasks given, namely creating cloud-based learning media.

3) Achievement of participant knowledge

The achievement of participant knowledge can be seen from the results of the post-test carried out by the teachers. The average score obtained increased significantly from the pre-test results and exceeded the target, namely the average score of participants reached 92. The achievement of teacher knowledge has been very much achieved when viewed from the initial average target planned of 79. Thus, the teachers can be said to have understood the material that has been given well.

4) Achievement of participant ability in developing cloud-based learning media

The achievement of participant ability to be able to develop cloud-based learning media has been achieved well. This can be seen from the results collected by teachers in the form of learning media from the results of collaboration carried out by teachers. Previously, teachers were divided into small groups to collaborate on creating learning media.

Increasing teacher knowledge regarding the use of technology in learning is very essential because learning contains important components, one of which is learning media (Patonah et al., 2019). Learning media is a tool for teachers to transform knowledge to their students. The use of technology in learning media can be used to support the learning process and increase interaction between students and learning materials (Al-Samarraie & Saeed, 2018; Shiau & Chau, 2016).

In addition, learning media needs to be designed as well as possible because effective design can improve students' understanding and retention of learning materials (Chen & Gao, 2024). Learning media also needs to be integrated with games as learning evaluation materials because this is effective in improving n student ability and engagement (Patonah et al., 2019). Student engagement in the learning process is very important because learning media can be used to increase the level of engagement (Chang et al., 2016).

The development of learning media by integrating the cloud in learning has become a major focus in the context of modern education today. The integration of cloud technology in the development of

learning media brings a number of significant benefits. The use of cloud services allows greater accessibility to learning materials (Attaran et al., 2017). By storing learning content in the cloud, students and teachers can access it from anywhere and anytime, as long as they have an internet connection. This eliminates geographical and time limitations that are often obstacles in traditional learning. In addition, the flexibility offered by cloud technology allows for learning that is tailored to individual needs (Cheng, 2019).

One important aspect of developing learning media with cloud technology is the provision of reliable infrastructure to store and manage learning data. Cloud services provide extensive storage space that can be expanded as needed, so that teachers can store various types of learning content, ranging from text, images, and videos (Wang et al., 2017). In addition, cloud technology also provides tools to easily manage and organize this content, including sophisticated search features to help students and teachers find the information they need (Hew & Kadir, 2016). The challenges that may be faced in developing learning media with cloud technology also need to be considered, one of which is the issue of data security. By storing data in the cloud, there is a risk of information leakage or cyber attacks that can compromise the integrity of learning content (Ali, 2018; Ghorbel et al., 2017). Therefore, appropriate security measures must be implemented to protect sensitive data and prevent unauthorized access. However, efforts to overcome these challenges have been identified in recent literature. Some solutions include the development of stronger security systems, such as end-to-end data encryption and two-factor authentication, to protect learning data (Tissir et al., 2021; Senyo et al., 2018). Server redundancy and disaster recovery can also help ensure optimal service availability. Developing reliable and responsive systems is also important to improve user experience and prevent unwanted disruptions to learning. In addition, it is important to consider ethical and privacy aspects in the use of cloud technologies in education (Ghorbel et al., 2017). Teachers must ensure that the use of student data for learning analytics or personalization purposes adheres to strict privacy standards and that students have control over the use of their data. This requires a clear regulatory and policy framework to govern the use and protection of data in the context of digital learning.

4. Conclusion

This community service activity was well organized and ran successfully. Activities like this are very much needed by teachers to help them improve their abilities in developing learning media as an effort to improve the quality of learning. The enthusiasm of the teachers in participating in the training and support from stakeholders are important in the success of this activity. By considering the benefits, challenges, and solutions related to the integration of cloud technology in the development of learning media, it can be seen that the use of this technology has great potential to change the way of learning and teaching. By utilizing the potential of cloud technology effectively and overcoming existing challenges, education can become more inclusive, accessible, and adaptive for students and teachers. This is an important step towards realizing the vision of student-centered education and preparing future generations to face future challenges.

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DEVELOPMENT OF PROJECT-BASED LEARNING MODELS TO IMPROVE THE INDEPENDENCE OF KINDERGARTEN CHILDREN

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Abstarct

Independence is one of the most important things that humans must have in their lives. This study aims to produce a feasible, practical, and effective project-based learning model to improve the independence of kindergarten children. This study is based on the phenomenon of low independence of kindergarten children because of the implementation of conventional learning models. This study intends to develop a project-based learning model to improve the independence of kindergarten children. The research method developed in this study is development research with stages: (1) research and information collection; (2) planning, (3) developing a preliminary form of product, (4) preliminary field testing, (5) main product revision, (6) main field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, (10) dissemination and implementation. The data collection techniques used in this study are questionnaires, observations, and interviews. The data collection instruments used in this study consist of 1) a questionnaire on the feasibility of project-based learning models by material experts, 2) a questionnaire on the feasibility of project-based learning models by model experts, and 3) a questionnaire on the practicality of project-based learning models by teachers, 4) observation sheets (to measure children's independence), and 5) interview guides. The study results showed that (1) the project-based learning (PjBL) learning model has met the characteristics of a learning model to improve student independence. The PjBL learning model is equipped with RPPH, Student Worksheets (LKS), learning media, and student independence assessment sheets. (2) The project-based learning (PjBL) learning model is considered very feasible by material experts and model experts to increase student independence. (3) The project-based learning (PjBL) learning model is considered very practical by teachers to increase student independence.

Keyword: project-based learning model, independence

1. Introduction

Education is a program consisting of several elements, such as curriculum, facilities and infrastructure, methods, students, and teachers, that are interrelated to achieving educational goals. One of the most critical elements is the teacher element. Education has a learning process that requires elements from teachers in teaching and learning activities. Education functions as a transmission of knowledge, values, and cultural wisdom to society, which occurs through the process of personality development.

Independence is one of the most important things that humans must have in their lives. If someone does not have an independent attitude, it will be difficult for them to achieve something optimally because they depend on the help of others. In principle, independence must be fostered from an early age because childhood is a transition period between the full attention and support of adults and the decreasing support of adults.

Children's independence does not happen suddenly, but it takes effort and a process to foster children's independence. Parents' efforts alone are not enough; it takes mutual understanding and cooperation with the environment to foster children's independent personalities. This effort certainly requires a process that does not happen in a short time. The goal of children's independence is to train children to be responsible for themselves and others. The development of children's independent personalities can begin by gradually giving easier tasks to more complex tasks. The level of independence possessed by each child is different; this is caused by several influencing factors. There are two factors that influence children's independence, namely internal factors and external factors (Wiyani, 2015). Internal factors consist of physiological and psychological conditions. External factors

include genes from parents, parenting patterns, the education system in schools, and the life system in society (Ali & Asrori, 2008).

The results of limited observations in several early childhood education institutions show that children's independence still tends to be low. This is caused by several factors, including parents' ignorance in educating their children to be independent. Low independence in early childhood is an obstacle for children to pursue higher education (Wahyuni & Rasyid, 2022). Independence needs to be taught to children; without being taught, children will not know how to form themselves (Wiyani, 2015). In addition, the problem that occurs is that children's involvement in learning in kindergarten has not received a sufficient portion for children to be creative, active, and able to express their thoughts well. However, in reality, children still need help when learning to walk, learn to eat, practice speaking, train body coordination, express feelings in the environment, interact with others, develop understanding, and learn morals. Children are not yet able to do their own tasks (Saleh et al., 2022).

Independence should be introduced to children as early as possible. Independence will prevent children from being dependent on other people or adults, and the most important thing in instilling independence is to foster courage, self-confidence, and motivation in children to continue to explore new knowledge (Saleh et al., 2022). Independence is important to instil because it can encourage children to be responsible for their own choices, become disciplined, and get to know themselves better. This attitude aims so that children are expected to be able to control their behaviour in accordance with the rules that apply in community life (Aghniarrahmah et al., 2021; Côté-Lecaldare et al., 2016). Independent character in early childhood is carried out to develop children's moral values and personality, especially in the ability to carry out tasks and activities according to their needs and age stages (Danauwiyah & Dimyati, 2021). Children who have an independent attitude will certainly find it easier to deal with diversity and social dynamics (Chasani & Izzaty, 2019).

Independence allows children to make choices, be responsible for accepting the consequences that accompany their choices, gain self-confidence, direct and develop themselves, adapt to the environment, and dare to take risks for their choices. Children's independence can be developed in learning that requires cooperation. One of the right learning models to develop children's independence through cooperation and the ability to actively involve children in the learning process is the project-based learning (PjBL) learning model.

The PjBL model is a learning model that uses problems as a first step in collecting and integrating new knowledge based on experiences in real activities (Farrow et al., 2022; Yusri et al., 2021; Tika & Agustiana, 2021). The PjBL model is a learning model that guides students to produce a product in learning (Payoungkiattikun et al., 2022; Syawaludin et al., 2022; Jalinus et al., 2020; Girgin, 2020). PjBL aims for children to be able to build knowledge about their own content and demonstrate new understanding through various forms of representation (NYC Department of Education, 2009). This model helps students explore learning materials effectively and deeply (Asfihana et al., 2022; Dinantika et al., 2019). In addition, it is also able to encourage creativity and innovation in learning among students (Brewer et al., 2022).

Through learning activities, PjBL provides opportunities for students to gain knowledge, improve understanding, and acquire new skills (ChanLin, 2008). The advantage of the PjBL model is that it can accommodate students' learning interests (Umar & Ko, 2022). This is because the freedom to plan learning activities, determine projects to solve problems, and carry out tasks collaboratively can improve student cooperation, build attitudes, and develop skills (Alharbi et al., 2018; Parker, 2020; Jalinus et al., 2020; Sirisrimangkorn, 2021), and can improve creative thinking skills through real experiences or simulations so that they become autonomous and independent learners (Martiani, 2021).

Through the PjBL model, children can develop their independence because they are directly involved in the learning process. In this case, learning must be packaged in such a way that children can work independently, follow the rules, and be responsible for the tasks given, with the final result being a project or work. The PjBL learning model has various advantages over other learning models. Unfortunately, much evidence shows that this model has not been developed and implemented in early childhood education institutions.

2. Methods

The design applied in this study is research and development, which refers to the stages of the Borg and Gall (1983) model. According to the stages of the R&D research model, the research stages

are divided into two stages, namely the pre-development and development stages. The pre-development stage has its output in the form of a prototype model that has been validated and revised through FGD. For the development stage, small-scale trials, large-scale trials, and implementation activities are carried out. Revisions are made according to observer information. In the implementation activity, assessment actions are carried out to evaluate using an assessment rubric as a measuring tool for the level of achievement of student independence. Data analysis is carried out descriptively and qualitatively, namely describing the results of the development, validator responses, and trial results by providing a logical narrative in accordance with the interests of the research.

3. Results

Initial Product Development Results

The initial product of the project-based learning model was developed based on the results of research and information collection. In the research and information collection stages, field studies have been conducted through analysis of learning devices, observation of learning at TK Al Amien Purwomartan Kalasan, evaluation of the independence of kindergarten children, and analysis of needs in learning in kindergarten.

The results of the analysis of the Daily Learning Implementation Plan (RPPH) at Al Amin Kindergarten were carried out to determine the plans and arrangements regarding learning outcomes, processes, and assessments. The results of the RPPH analysis showed that the preparation of the RPPH refers to the direction of the Education Office through the Kindergarten supervisor. In addition, the results of the RPPH analysis found that one of the student competency achievements to be achieved is learning independence.

Meanwhile, the results of learning observations have been conducted to determine the learning process implemented in TK Al Amien Purwomatani Kalasan. Observation findings indicate that learning is still dominated by teachers with little student activity. Learning activities in the form of assignments for kindergarten students to draw, fold, do certain movements, and count were observed in the observation process. The application of project-based learning models has not been implemented optimally and has not focused on efforts to increase student independence.

The results of the field study at the research and information-gathering stage were obtained through interviews with teachers. The results showed that the teachers admitted that student independence was still in the low category. These results were reinforced by the results of observations conducted by the researcher. The results of the observation showed that there were still students who could not put on their own shoes, did not dare to go to the bathroom alone, still asked for help to put toothpaste on their toothbrushes when they were about to go home from school, still forgot to bring their school bags, and so on.

Table 1. Description of Initial Data on Student Independence

No	Indicator	Teacher Assessment
1	Responsibility	20% good
2	Ability to take care of yourself	13.3% good
3	Self-control	26.6% good
4	Ability to regulate behavior	30% good
5	Ability to make your own decisions	30% good
6	The ability to solve problems without the help of others	20% good
7	Dependence on parents/teachers	30% good (not dependent)
8	The ability to choose right and wrong	40% good

Based on the data in Table 1 shows that the level of student independence is still in the low category. The number of students who have good independence in all aspects of independence has not reached 50%. The lowest aspect of independence is the ability to take care of oneself (13.3%). The highest aspect of independence is the ability to choose right or wrong (40%).

A needs analysis was conducted to obtain information about the needs of teachers who need to implement the PjBL learning model. Needs analysis is an important part of the development of the initial product of the learning model being developed. Data were obtained through interviews on the

needs analysis of the development of the PjBL learning model to 10 teachers. The results of the needs analysis are presented in Table 2.

Table 2. Analysis of Needs for Developing PjBL Learning Models

No	Question	Teacher's Answer	
		Yes	No
1	Do teachers need a learning model that can increase student independence?	90%	10%
2	Do teachers need LKPD that can increase student independence?	80%	20%
3	Do teachers need RPPH that can increase student independence?	80%	20%
4	Do teachers need media that can increase student independence?	90%	10%
5	Do teachers need assessment instruments to measure student independence?	80%	20%

The data in Table 2 shows that most teachers need a PjBL learning model along with its learning tools to improve students' learning independence. Based on the results of the needs analysis at the preliminary study stage of the research above, the PjBL learning model design was developed. The development of the PjBL model was specifically designed with the aim of improving the independence of kindergarten students.

The development of the PjBL model design refers to the opinion of Joyce et al. (2011), which consists of syntax, social system, reaction principle, support system, instructional impact, and accompanying impact. The initial product of the PjBL model was developed according to the PjBL model design, which was based on field needs. As a concept, the learning model can be applied and supported by the Daily Learning Implementation Plan (RPPH), Student Worksheets (LKS), and independence assessment sheets.

After obtaining the initial product of the PjBL learning model in kindergarten learning, it is necessary to conduct a feasibility test (validation) of the initial product by experts (material experts and model experts). The implementation of initial product validation uses expert judgment with the Think Aloud Protocol (TAPs) method and is analyzed using descriptive statistics.

The results of the feasibility test of the PjBL learning model, according to material experts, show that the PjBL learning model obtained an average score of 3.57, including the very feasible category. Furthermore, the results of the feasibility test of the PjBL learning model, according to model experts, show that the PjBL learning model obtained an average score of 3.57, including the very feasible category. Based on the results of the feasibility test of the PjBL learning model by material experts and by model experts, it can be concluded that the PjBL learning model is declared very feasible.

Product Trial Phase

Stages of what the researcher did after the initial product of the PjBL learning model were declared feasible by material experts and model experts; the researcher implemented the initial product learning model in limited trials and extensive field trials.

Limited Trial Results

Limited trials have been implemented at TK Al Amien Purwomartani Kalasan. The number of students who were the subjects of the limited trial research was 15 students. Learning uses learning devices (RPPH, Media, LKS) that have been declared feasible by experts. The results of implementing learning by applying the PjBL learning model are observed in the implementation of each stage of the PjBL model through observation. Three observers observed learning by applying the PjBL learning model, and the results are shown in Table 3.

Table 3. Implementation of the PjBL Model in Limited Testing

No	Indicator	Teacher		Student	
		Score	Category	Score	Category

1	Project determination stages	3.3	Good	3.2	Good
2	Design stages of project completion steps	5.7	Very good	3.6	Very good
3	Stage ppreparation of project implementation schedule	5.6	Very good	5.6	Very good
4	Stage pproject completion with teacher facilitation and monitoring	3.1	Good	3.0	Good
5	Stage ppreparation of reports and presentation/publication of project results	3.8	Very good	3.7	Very good
6	Stage pproject process and outcome assessment	3.7	Very good	3.6	Very good

The results of observations of the implementation of learning in kindergarten by implementing the PjBL learning model in Table 3 are the average of three observers. The results of observations of the learning process with the PjBL learning model show that the implementation of the initial product of the PjBL learning model is very good, both in the observations of teachers and students. Implementation at the stages, designing project completion steps, preparation of project implementation schedule, preparation of reports and presentation of project results, and project process and outcome assessment obtained an average in the very good category. The stages of determining the project, project process, and outcome assessment were categorized as good.

Meanwhile, at the end of the learning in the limited trial of the initial product of the PjBL learning model, a response questionnaire was given to the teacher. The questionnaire aims to determine the practicality of the PjBL learning model. The results of the teacher response questionnaire to the PjBL learning model showed a very practical category. The teacher's response to the PjBL learning model on four statements obtained a score in the practical category and eight statements in the very practical category. Although the results of the teacher response questionnaire showed a very practical category, there were several inputs from teachers regarding the implementation of the limited trial of the initial product of the PjBL learning model.

Improvement of the PjBL learning model product is explained in the product revision sub-chapter. In addition to providing responses to the practicality of the PjBL learning model, teachers are also asked to provide an assessment of student independence. The results of the assessment of student independence by teachers can be seen in Table 4.

Table 4. Student Independence Data in Limited Tests

No	Indicator	Teacher Assessment
1	Responsibility	40% good
2	Ability to take care of yourself	46.6% good
3	Self-control	53.3% good
4	Ability to regulate behavior	60% good
5	Ability to make your own decisions	40% good
6	The ability to solve problems without the help of others	53.3% good
7	Dependence on parents/teachers	40% good (not dependent)
8	The ability to choose right and wrong	66.6% good

Table 4 shows that student independence has increased compared to the initial data on student independence. The highest aspect of independence is the aspect of the ability to choose right or wrong (66.6).

Extensive Trial Results

The implementation of the extensive trial was applied to 30 students of TL Al Amien Purwomartani Kalasan. The application of the PjBL learning model in the extensive trial was carried out after the PjBL learning model was declared feasible, and improvements were made based on the results of the limited test. After being improved, the PjBL learning model was applied to the learning process. At the beginning of learning, a pretest of student independence was carried out. Students and teachers then carried out learning with the PjBL learning model. At the end of learning, a posttest of

learning independence was carried out. The results of the pretest and posttest in the extensive field test are presented in Table 5.

Table 5. Pretest and Posttest Data on Student Independence

No	Indicator	*Pretest*	*Posttest*
1	Responsibility	20% good	40% good
2	Ability to take care of yourself	13.3% good	46.6% good
3	Self-control	26.6% good	53.3% good
4	Ability to regulate behavior	30% good	60% good
5	Ability to make your own decisions	30% good	40% good
6	The ability to solve problems without the help of others	20% good	53.3% good
7	Dependence on parents/teachers	30% good (not dependent)	40% good (not dependent)
8	The ability to choose right and wrong	40% good	66.6% good

Based on the data in Table 13, it is known that all aspects of student independence have increased. There are four aspects that are greater than 50%, namely self-control, the ability to regulate behaviour, the ability to solve problems without the help of others, and the ability to choose right from wrong.

Final Product Review

The results of the study showed that the PjBL learning model was declared very feasible by both material experts and model experts. This is reasonable because, according to Venugopal (2016), the impact of this project learning model can help children meet their needs and develop interests and individual strengths so that children become independent individuals. In addition, Hasni & Amanda (2022), this model gives children the freedom to explore their ideas or child-centred learning. Through this concept, children can get the freedom to explore their abilities. Throughout the study process, children seemed enthusiastic about carrying out activities, as seen from their expressions and body language.

Lau et al. (2017) showed that project-based learning has the effect of stimulating children's ability to explore problems in depth by conducting simple planning and research to find answers to existing problems. This shows that the model has distinctive characteristics. As a solution, the project model is based on a natural curiosity that allows children to interact, network, communicate, ask questions, and solve problems. Maros et al. (2021) explained that PjBL has proven to be effective and interesting for students and is considered effective in replacing traditional learning approaches and methods. Students feel that they are not only learning new material but also that their critical thinking skills, problem-solving, information literacy, collaboration, leadership, and interpersonal communication have also increased.

Teachers also stated that the PjBL learning model was very practical. This is natural because, according toKimsesiz & Konca (2017), this project-based learning can be applied to all levels of education, from PAUD to higher education. Pietila & Virkkula in Lasauskiene Rauduvaite (2015) and Kimsesiz & Konca (2017) reported that PjBL could improve the quality of learning and contribute to the development of children's high-level cognitive abilities that can shape learned behaviour in children. Venugopal (2016) states that this project-based learning model supports children in meeting their needs and attention and strengthens children's ability to be active at their own pace.

Devi et al. (2019) stated that PjBL is indeed considered to have an impact on increasing student independence and learning outcomes. Furthermore, Damayanti (2019), stated that independence can be stimulated by implementing fun and active learning. Meanwhile, according to Nikmah et al. (2023), PjBL can develop the creativity of early childhood because it accommodates children to develop their projects so that they can channel their feelings and thoughts. In addition, Nisfa et al. (2022) stated that PjBL has a positive impact on children's social-emotional development, which encourages them to be able to socialize with friends and their environment and be better able to solve the problems they face.

This is also in accordance with research presented by (Nahdliyati et al., 2016) that the PjBL model can foster learning independence in students because the PjBL model makes learning more meaningful by actively involving students in the process of finding and solving problems during learning and

instilling an internal attitude. In students, it makes them able to take the initiative to solve problems and have the confidence to learn on their own without the help of others. In line with research presented by (Puspitasari et al., 2018), project-based learning has an influence on student learning independence, where students are more independent in the learning process and can create other products after learning. Namaskara et al. (2023), the impact of PjBL on student independence is being able to do simple homework, starting to have social sensitivity, having a sense of responsibility, starting to have self-confidence in public, being able to express emotions in a non-excessive manner, and being more skilled in communicating.

4. Conclusion

Based on the research results, the author can draw the following conclusions: (1) The project-based learning (PjBL) learning model has fulfilled the characteristics of a learning model to improve student independence. The PjBL learning model has the following syntax: a) project determination, b) designing project completion steps, c) preparing a project implementation schedule, d) completing the project with teacher facilitation and monitoring, e) preparing reports and presentation/publication of project results, f) assessing the project process and results. The PjBL learning model is equipped with RPPH, Student Worksheets (LKS), learning media, and student independence assessment sheets. (2) The project-based learning (PjBL) learning model is considered very feasible by material experts and model experts to increase student independence. (3) The project-based learning (PjBL) learning model is considered very practical by teachers to increase student independence.

Suggestions

For Teachers

The product of the PjBL learning model can be utilized as an alternative learning model in kindergarten that can improve student independence. The utilization of the PjBL learning model should be preceded by analyzing local wisdom to determine the type of project chosen. In addition, the readiness of facilities and infrastructure and learning time really need to be considered to achieve effective learning goals. The PjBL learning model is expected to improve kindergarten teachers' creativity in developing learning tools.

For Further Researchers

The PjBL learning model was developed with the specific aim of increasing the independence of kindergarten students. Meanwhile, the results of the study on the research and development of the PjBL learning model can be used by further researchers as a reference related to the research and development of learning models in kindergarten. The researcher recommends the use of the PjBL learning model for further research on dependent variables other than learning independence and a larger and more representative sample size.

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THE COMMODIFICATION OF HEDONISM AND MATERIALISM IN THE REPRESENTATION OF ADVERTISING AESTHETIC LANGUAGE LANDSCAPE

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Abstract

These The Modern advertising exerts a profound influence on society, not only pervading the political economy of marketing but also shaping social and cultural dimensions. This research critically examines the widespread commodification of hedonism in advertising aesthetics, focusing on two key areas: forms of representation and underlying causes. Using a qualitative methodology grounded in a critical 'weltanschauung' perspective, this research examines digital adverts, particularly those saturated with images of hedonism. The researcher, acting as the main instrument, used documentation guidelines to collect and analyse data through a qualitative descriptive approach. The analysis proceeded through the stages of data reduction, presentation, discussion, and conclusion drawing. The research findings reveal that the commodification of hedonistic imagery in Indonesian mass media advertisements is manifested both verbally and visually. Advertisements use terms such as 'luxurious,' 'fantastic,' and 'exclusive,' in addition to imagery depicting luxury and affluence. The main driver of this phenomenon is identified as the strong influence of postcolonialism, which is perpetuated through the mass media. This study not only explains the mechanisms of hedonistic imagery in advertising but also seeks to uncover strategies to counteract its widespread impact.

Keywords: hedonism commodification, advertising aesthetics, postcolonial influence, digital advertisements, media representation.

1. Introduction

Modern advertising exerts a widespread and significant impact on today's society, infiltrating many areas of daily life and influencing both personal and societal awareness (1). Advertising plays a vital role in the political economy of marketing, functioning as an essential tool for influencing consumer behavior and fostering economic growth (2). Nevertheless, its influence goes well beyond the sphere of business, becoming deeply ingrained in the social and cultural fabric of societies across the globe.

As a potent form of communication, advertising employs a wide range of strategies to grab attention and trigger emotional reactions (3). These tactics frequently include the use of captivating visual and verbal elements aimed at connecting with audiences on various levels. Although the main goal of advertising is to market products and services, it also acts as a cultural influence, both mirroring and reinforcing the values, norms, and ideologies of society. In doing so, advertising not only shapes consumer behavior but also plays a role in the broader cultural landscape, reflecting the beliefs and attitudes prevalent within a given community or era (4). In this role, advertising significantly contributes to shaping social reality, affecting how people view themselves and the world they live in.

One of the most prominent and controversial features of contemporary advertising is its tendency to promote hedonistic and materialistic ways of living. This often involves encouraging a focus on pleasure, luxury, and the accumulation of material goods, which can foster a culture centered around consumption and self-indulgence. As a result, advertising not only drives consumer behavior but also shapes societal aspirations and desires, making this aspect of its influence particularly debated and scrutinized (5). Through the strategic use of imagery and language, advertisements often glorify luxury, excess, and the pursuit of pleasure, thereby shaping consumer aspirations and desires (6). The commercialization of hedonism is not just a mirror of current cultural trends but also a driving force behind consumer culture. It sustains a continuous cycle of desire and consumption that is intricately woven into the fabric of the capitalist system.

The depiction of hedonism and materialism in advertising aesthetics prompts important questions regarding the core values and messages communicated to the audience. Advertisements often showcase highly stylized and idealized images of wealth, which are frequently detached from the realities of daily life. This gap between representation and actual experience can significantly impact both individual and societal well-being, cultivating unrealistic expectations and contributing to a culture characterized by dissatisfaction and an ongoing craving for more.

Furthermore, the worldwide influence of contemporary advertising ensures that these hedonistic and materialistic ideals are spread across various cultural settings, resulting in a blending of cultural values and the diminishing of local traditions and identities (7). The impact of postcolonialism is especially apparent in this process, as the prevalence of Western advertising models frequently sidelines and undermines indigenous cultural expressions. This situation highlights the necessity of critically analyzing how advertising both mirrors and influences cultural and social dynamics.

Given these factors, it is essential to conduct a thorough and critical examination of the commodification of hedonism within advertising aesthetics. This analysis requires a multidisciplinary perspective, incorporating insights from cultural studies, media studies, sociology, and critical theory, among other disciplines. By unravelling the intricate relationship between advertising, culture, and society, this research seeks to clarify how hedonistic and materialistic imagery is created and propagated, while also investigating potential strategies to reduce its widespread impact.

Grasping the cultural and social implications of advertising aesthetics is essential because of the significant impact that advertisements have on societal norms, values, and personal behaviors. Advertising not only encourages consumer actions but also molds cultural narratives and social frameworks by showcasing idealized representations of beauty, success, and happiness. Such representations frequently set societal benchmarks that can reinforce stereotypes and marginalize individuals who do not align with these ideals. Additionally, advertising plays a major role in shaping individual identity and behavior by tapping into emotions and desires, which results in the internalization of commercial values and lifestyles (8). Globally, advertising aesthetics play a significant role in cultural homogenization, frequently eclipsing local traditions and advancing a standardized set of ideals focused on consumerism and materialism. This phenomenon of cultural imperialism endangers cultural diversity and intensifies social inequalities by primarily appealing to wealthy consumers and reinforcing economic disparities. As a result, it is crucial to analyze the effects of advertising aesthetics to cultivate critical media literacy, enhance consumer awareness, and promote ethical advertising practices that prioritize social welfare and inclusivity (9).

The main objective of this study is to examine the commodification of hedonism and materialism in advertising, specifically concentrating on the types of representation and their underlying causes. By critically analyzing how hedonistic and materialistic imagery is created and spread in advertisements, the study aims to reveal the mechanisms that fuel this phenomenon. The research intends to identify the verbal and visual techniques used in advertisements to promote luxury and wealth, while also exploring the socio-cultural and historical factors that sustain these representations.

This study is important for several reasons. Firstly, it aims to deepen the understanding of the dominance of hedonistic imagery in advertisements, shedding light on how such imagery influences consumer perceptions and societal values. By exploring the complex relationships between advertising, culture, and society, the research enhances our grasp of the cultural dynamics involved. Moreover, the study seeks to identify potential strategies for reducing the widespread effects of hedonistic and materialistic advertising. These strategies might include promoting media literacy, advocating for ethical advertising practices, and encouraging critical awareness among consumers. Ultimately, the findings of this study can contribute to efforts aimed at establishing a more inclusive and socially responsible advertising environment that prioritizes the well-being of individuals and communities.

2. Method

The research conducted in this study is qualitative in nature, characterized by a natural and holistic-contextual approach (Flick, 2013; Grønmo, 2019), especially related to the issue of commodification of hedonism in advertising aesthetics. Specifically, the qualitative research employed in this study adopts a critical worldview model, aimed at "challenging" specific socio-cultural realities or phenomena. The goal is to develop a new concept that is considered more effective or preferable (12). The "lawsuit" against socio-cultural realities or phenomena referred to in this research is related to the hegemony of the commodification of hedonism in advertising aesthetics in Indonesia.

Regarding the data and data sources for this research, the focus is primarily on advertisements found in the digital mass media category, particularly those from websites. One key consideration is that online advertisements are distributed more widely, which allows them to exert a substantial sociocultural influence on society.

Secondly, this research specifically focuses on the advertising sign system that illustrates the meaning of the commodification of hedonism in advertising aesthetics. Thirdly, regarding the temporal aspect of the advertising data being examined, the study is limited to advertisements categorized as contemporary, which are more relevant to the context of "modern times" (Elsom, 2003; Boucher, D., & Kelly, 2017), namely advertisements around the latest year.

The data collection method used in this research is purposive sampling, which involves selectively analyzing specific data characteristics by focusing on particular unique categories (Engel, R.J. & Schutt, 2010; Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, 2013), which in this case is in accordance with the topic of this research problem. In this study, the primary instrument, as is common in qualitative research, is the researcher themselves, serving as a human instrument (Maykut, P., & Morehouse, 2002; Fortune, A. E., Reid, W. J., & Miller Jr, 2013), assisted by documentation guidelines, as well as various relevant mechanical devices (check lists, etc.).

Consistent with the qualitative nature of this research, the data analysis technique employed in this study utilizes descriptive analysis methods (19); Hennink, M., Hutter, I., & Bailey, 2020), especially the model developed by (21). The application of the Miles and Huberman descriptive analysis model occurs concurrently and continuously throughout the research process, encompassing three main components: data reduction, data display (presentation), and conclusion drawing.

3. Results and Discussion

Forms of Commodification of Hedonism in the Aesthetic Representation of Advertisements in Indonesia

The issue related to the form of representation of the hegemony of hedonism commodification in the representation of the aesthetic language landscape of advertisements in Indonesia needs to be conveyed in the form of a sign system that classically exists in advertisements, especially those based on visual texts, namely in the form of images (pictorial) and verbal words written as a unified message. Some examples of these issues are as shown in Figures 1 to 3 below.



Figure 1. Hegemony and Commodification of Hedonism Image Advertisements.
(Source: https://moas.muf.co.id/news/menilik-kemewahan-suv-x1, Juni 2024)

Figure 1 illustrates an advertisement that embodies the hegemony and commodification of hedonism and luxury materialism through both visual and textual elements. The portrayal of the BMW X1 as a symbol of social status and economic power is enhanced by the sponsorship from Mandiri Utama Finance, which highlights the exclusivity of its financial products aimed at luxury items. The tagline “Reviewing the Luxury of the BMW X1” alongside the prominent visual of the car in the center of the ad suggests that owning this vehicle is integral to a lavish lifestyle. The live review session appeals to an audience interested in high-end goods, underscoring a sense of exclusivity. The vibrant colors and contemporary design of the advertisement contribute to its overall glamour. Ultimately, the ad conveys the message that possessing a luxury item like the BMW X1 signifies a desired social status for those who wish to showcase their success and affluence.



Figure 2. Perfume Ad with Commodified Hedonism Concept
(Source: https://www.raenabeauty.com/product/implora-eau-de-parfum-edp-for-her-luxury-gold-268-100-ml)

The advertisement showcases the commodification of hedonistic imagery and materialistic luxury through both visual and verbal components. Visually, the prominent gold perfume bottle with its distinctive design signifies exclusivity and affluence, while the gold gradient background enhances the overall luxurious impression. Verbally, phrases like "INSPIRED BY LUXURY" and "Soft touch on the skin with a captivating fragrance" highlight themes of sensuality and opulence. Additionally, the image of a woman with red nail polish holding the perfume near her neck further reinforces the message of hedonism and materialism.



Figure 3. Funeral Advert With A Commodified Image of Hedonism.
(Source: https://www.sandiegohills.co.id/)

The advertisement presents "Cherry Blossom Mansion at Garden of Prosperity & Joy," which embodies luxury and hedonism through the depiction of an opulent cemetery complex featuring manicured gardens, expansive water features, and open green spaces. The term "mansion" and the phrase "prosperity & joy" suggest affluence and an aspirational lifestyle. The cemetery's pristine environment and well-organized landscape idealize nature in a way that aligns with luxurious living, further reflecting hedonism. Overall, the ad communicates the commodification of hedonistic imagery and material luxury.

Based on the data analysis, it can be concluded that the advertisements examined effectively illustrate the roles of hegemony and commodification in promoting hedonism and materialistic luxury. These ads position products like luxury cars, exclusive cosmetics, and even graves as symbols of elevated social status. This strategy not only seeks to sell these items but also conveys the notion that achieving luxury is a benchmark for being recognized and valued in society. Such advertisements reinforce social norms that link individual success with the ownership of costly and prestigious goods.

The aspect of commodification is evident in how these ads transform goods and experiences into consumer products that promise hedonistic fulfillment. Through eye-catching designs, vibrant colors, and enticing offers, they make luxury appear more attainable while still highlighting its exclusivity. This approach fosters consumer aspirations to obtain luxury items as a means of achieving desired happiness and social standing.

Overall, the marketing strategies employed in these advertisements not only promote products but also cultivate a social ideology that connects luxury and prestige with hedonistic and materialistic

values. They reinforce the belief that personal success and satisfaction can be attained through the consumption of luxury goods, perpetuating the idea that happiness and high social status are intertwined with the ability to possess symbols of luxury.

Factors Causing the Strong Hegemony and Commodification of Hedonism in Advertising Aesthetics in Indonesia

The intricate issue of materialism and hedonism in aesthetic representation in Indonesia is merely a small part of what is referred to as the tip of the iceberg. This suggests that the dominance of materialism and hedonism is only a fraction of the broader challenges and issues facing Indonesian culture, which are evident in nearly all cultural institutions throughout the country.

Hegemony, as stated by Gramsci (2020) in "Selections from the Prison Notebooks", functions to strengthen and maintain existing social structures through ideological dominance. In the context of advertising, this hegemony is clearly visible in the way products such as luxury cars, exclusive cosmetics, and expensive properties are positioned as symbols of high social status. These advertisements not only offer goods to consumers but also spread the message that luxury and aesthetic beauty are standards that must be achieved for someone to gain recognition in society. This phenomenon reflects the dominance of the ideology of materialism and hedonism in contemporary society.

Foucault's intricate concept of power can provide a theoretical foundation for a postcolonial perspective that seeks to diminish the binary tendencies commonly found in the analysis of colonialism and postcolonialism. Postcolonial studies frequently become ensnared in the binary opposition between the colonized and the colonizer, as articulated by figures such as Franz Fanon, Albert Memmi, and other earlier proponents of this approach. The view developed by Foucault (2020) offers an alternative to understanding power not only in the context of antagonistic relations in the colonial system but also in broader and more complex power dynamics. For example, in the study of postcolonialism in Indonesia, especially after the end of the Dutch colonial period, references to the former colonial country in the context of contemporary culture often seem minimal.

The language used in post-colonial Indonesia is not a language directly inherited from the colonizers, so that resistance to the colonizer's culture as the only benchmark for postcolonial studies becomes less relevant. Budianta (2008:18) argues that a narrow understanding of postcolonialism, which only focuses on the relationship between the colonizing country and the colonized country during the colonial period or after, tends to limit the study to a rigid and exclusive area. In certain instances, the traditional relationship may become irrelevant, particularly when new forms of colonization emerge from the colonized against weaker subcultures. Thus, within the Indonesian context, it is crucial to adopt a more holistic approach that considers the broader and more complex power dynamics to achieve a deeper and more comprehensive understanding of postcolonial relations.

This explanation provides insight into the often-asked question of why hegemonic imperialism persists even after former colonized countries gain independence. In the case of Indonesia, for example, despite its independence, many aspects of life, including hedonistic values. This suggests that even though physical colonialism has ended, Western hegemonic power continues through subtle cultural mechanisms, reinforcing Western cultural dominance and influence in postcolonial societies such as Indonesia.

4. Conclusion

The study offers an in-depth analysis of the commodification of hedonism in advertising, illustrating how advertisements reinforce hedonistic values through both verbal and visual elements. It identifies key representations, including the frequent use of terms such as "luxurious," "fantastic," and "exclusive," alongside imagery that evokes wealth and luxury. The root causes of this phenomenon are linked to the significant impact of postcolonialism, which continues to influence media portrayals and cultural narratives. This commodification goes beyond a mere marketing tactic; it acts as a cultural force that upholds specific socio-economic ideologies and consumer behaviors.

The findings highlight the substantial cultural and social ramifications of hedonistic advertising. By promoting materialism and luxury, these advertisements contribute to social inequalities and the degradation of local cultural values. The study emphasizes the need to confront the postcolonial influences that sustain these representations, as they play a critical role in perpetuating Western ideals

and consumerist values in non-Western societies. Understanding this dynamic is essential for developing advertising practices that are more inclusive and culturally aware.

To lessen the influence of hedonistic imagery in advertising, the study proposes several strategies. These include enhancing critical media literacy to empower consumers to recognize and resist manipulative advertising techniques, urging advertisers to adopt more ethical and inclusive representation practices, and advocating for regulatory measures to curb the spread of such imagery. Additionally, the study encourages future research to explore the dynamics of hedonistic advertising and its broader socio-cultural impacts. These investigations could focus on alternative advertising models that prioritize cultural diversity and social equity, ultimately promoting a more balanced and ethical media landscape.

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INTERNALIZATION OF SOCIOPRENEUR VALUES IN LEARNING IN EARLY CHILDHOOD EDUCATION

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Abstract

The urgency of this research is to explain how the integration of social entrepreneurship values in learning practices in Early Childhood Education (ECE) so that it is necessary to find solutions on how to make learning practices integrated with social entrepreneurship values can be implemented properly so that students can have a strong social entrepreneurship character or behavior while still prioritizing Strengthening the Pancasila Student Profile. The purpose of this study is to evaluate the extent to which social entrepreneurship values are integrated in learning practices in Early Childhood Education. This research falls into the category of qualitative research, where researchers aim to describe and explain the issues being discussed. The method used in this research is a qualitative method, where the researcher seeks to provide a detailed description of the findings in the field during the learning process. The results of the initial survey showed that entrepreneurial values, including social entrepreneurship, can be integrated through various areas of development at the early childhood education level. These areas include moral and religious values, social, emotional, independence, language, cognitive, physical/motor, and art. The integration of social entrepreneurship values in the context of Strengthening the Pancasila Learner Profile is carried out using various learning methods, cooperative learning strategies, and involves daily activities in Early Childhood Education and is developed in the PAUD school culture. The output of this research is an integration model that can be implemented in PAUD, mandatory output in the form of publications in national research journals indexed by Sinta, speakers at national seminars and additional output in the form of models, guidebooks, and publications on the official social media of FEB UNY. The targeted TKT is 2, namely concept formulation and or technology.

Keywords: Early childhood education, entrepreneurial values, strengthening the profile of Pancasila students.

1. Introduction

Curriculum change in education is a must, but it is also not always easy to deal with, especially for teachers as the frontline who will implement the curriculum. From this simple definition, it can be said that reflection can make people learn from past experiences to prepare for changes that may occur in the future. With reflection, questions such as “Why does the curriculum need to change? or ”What adjustments can be made with curriculum changes. Whose interests are the curriculum changes actually for? If the changes are for the benefit of students, who are actually the main actors in an education system. To gain an understanding of curriculum change, a chart of curriculum change, the merdek curriculum in PAUD, is presented below.

Based on the independent curriculum framework chart above, if you look closely, you can see that there are things that are different between the independent curriculum and the 2013 curriculum. These things characterize the independent curriculum. The following are part of the characteristics of the independent curriculum in PAUD, namely:

a. Reformulation of Learning Outcomes

In learning with this new paradigm, Learning Outcomes (CP) have a position like Core Competencies (KI) and Basic Competencies (KD) in the 2013 curriculum. In its formulation, CP merges the competencies of attitude, knowledge, and skills holistically. Another thing that is also characteristic of CP, namely CP is an achievement at the end of the foundation phase (TK B) or when students finish learning in PAUD units. The formulation of Learning Outcomes at the end of PAUD is that at the end of the foundation phase, learners show a penchant for practicing the basics of religious values and character; pride in their identity; literacy skills and the basics of science, technology, engineering, art, and mathematics to build pleasure in learning and readiness to follow basic education. The scope of learning outcomes in ECD includes three integrated elements of stimulation. Each stimulation element

explores aspects of development as a whole and not separately. There are three elements of Learning Outcomes in ECD in this curriculum, namely (1) CP of Religious Values and Ethics, (2) CP of Identity; (3) CP of Literacy and STEAM Basics. In an implementation of learning, the three CP elements are taught holistically integratively and not separately because they support each other. What is meant by holistic integrative in ECD learning principles.

b. The focus of learning in this curriculum is at the end of the ECD period (TK B or 5-6 year old learners).

This means that the three elements of Learning Outcomes set out in the new learning paradigm are expected to be achieved by learners at the end of the ECD period before they enter primary school. By focusing on the end of the ECD period, teachers are more flexible in providing space for learners to process during their ECD period.

c. The integration of the Pancasila Learner Profile concept as a mission that supports national education goals.

Profil Pelajar Pancasila is the answer to the question, "What are the characteristics of Indonesian learners?". The answer is summarized in one sentence: "Indonesian students are lifelong learners who are competent, have character, and behave according to the values of Pancasila." This statement contains three keywords: competent lifelong learner, character, and Pancasila values. This indicates a blend between strengthening the distinctive identity of the Indonesian nation, namely Pancasila as a reference for the character of Indonesian students; with competencies that are in accordance with the needs of Indonesian human resource development in the context of 21st Century development. The emergence of the three CP elements at the end of PAUD is the initial foundation in a series of journeys designed by the curriculum to achieve the Pancasila Learner Profile. The role of PAUD is as a foundation phase, which is to build basic abilities that support achievements in the next stage.

Furthermore, from the statement of the Pancasila Learner Profile, six characters/competencies are formulated as key dimensions. Six dimensions need to be built optimally and balanced to realize the Profile of Pancasila Students. The six are interrelated and reinforcing so that efforts to realize a complete Pancasila Learner Profile require the development of all six dimensions simultaneously, not partially. The six dimensions of the Pancasila Learner Profile must be understood as a complementary unity, which shows the relationship between one dimension and another will give birth to more specific and concrete abilities. These six dimensions show that the Pancasila Learner Profile does not only focus on cognitive abilities, but also attitudes and behaviors according to their identity as Indonesians and citizens of the world.

The six dimensions are: (1) faith, devotion to God Almighty, and noble character, (2) global diversity, (3) mutual cooperation, (4) independence, (5) critical reasoning, and (6) creativity. The six dimensions can be seen holistically in the chart below and developed according to the learning approach for the ECD context. Dimensions 3 to 6 are part of the social entrepreneurship character traits.

Building the character of social entrepreneurship in early childhood is not a difficult task. Building social entrepreneurship in children requires gradual training, but it is not complicated. The development of social entrepreneurship traits in children can start with simple things that are integrated into children's daily lives. For example, getting children used to eating at the table, training them to tidy up toys after playing, and putting toys away in its place. The next step can involve managing money well, and at the next stage, children can be taught to do small business activities.

In educational institutions, social entrepreneurship values can be integrated through various subjects. Although the PAUD level does not use the term subject, social entrepreneurship values can be integrated through various areas of development in kindergarten, including moral and religious values, social, emotional, independence, language, cognitive, physical/motor, and art. Learning is done through various activities that are interesting, safe, comfortable, and fun for children, with the aim of developing their skills and abilities.

The implementation of social entrepreneurship values in Early Childhood Education (ECE) requires an attitude, spirit, and ability to create new things that are valuable and useful, both for oneself and others. Social entrepreneurship is seen as a mental attitude that is always active, creative, empowered, and strives to achieve success. Experts believe that there are several entrepreneurial values, including social entrepreneurship that are fundamental and appropriate to the level of development of students. However, the implementation of these values is done in stages. The initial stage includes eight

core values, namely independence, creativity, risk-taking, action-oriented, leadership, and hard work, empathy, and helping others, especially in the context of strengthening the Pancasila Student Profile.

The problem that is the focus of this research is the low attitude and behavior of PAUD children related to social entrepreneurship values. Thus, this research seeks to develop a model of integration of social entrepreneurship values in learning in PAUD. In an effort to find solutions, the research at the beginning of this study aims to evaluate the extent to which social entrepreneurship values are implemented in learning practices in PAUD. This study used a qualitative approach, in which the researcher attempted to describe and explain the issues being discussed. The qualitative method was used to provide a detailed description of the findings in the field during the learning process in PAUD as well as in the school culture that was built.

Results from the initial research survey indicate that entrepreneurial values, including social entrepreneurship, can be integrated through various areas of development in early childhood education. These areas include moral and religious values, social, emotional, independence, language, cognitive, physical/motor, and art. The integration of social entrepreneurship values is done by using various learning methods, cooperative learning strategies, and involving daily activities in the PAUD environment. These steps are taken with the aim of forming a strong social entrepreneurship character or behavior in learners, while still promoting the strengthening of the Pancasila learner profile.

This research is in accordance with the RIRN research focus area regarding the integration of character in education and is also in line with the university's research strategic plan regarding the implementation of quality education.

Entrepreneurship is an attitude, spirit and ability to create something new that is very valuable and useful for himself and others. Entrepreneurship is a mental attitude and spirit that is always active or creative in empowering, creating, working, and trying in order to achieve success. According to experts, there are many values that are considered the most important and in accordance with the level of development of students, but the implementation of these entrepreneurial values is carried out in stages. The first stage of the implementation of entrepreneurial values is taken 6 (six) points, namely: independent, creative, risk-taking, action-oriented, leadership, and hard work in the context of strengthening the Pancasila Student Profile. Entrepreneurship in this case is focused on social entrepreneurship or often called social entrepreneurship.

The problem in this study is the low values of socio-entrepreneurship/social entrepreneurship owned by students. The solution chosen to overcome these problems is to map the integrated social entrepreneurship values in learning practices in Early Childhood Education, so it is necessary to formulate a model of integrating social entrepreneurship values that can be implemented properly, the impact of which is that students can have a tough character or behavior while still promoting the Strengthening of the Pancasila Student Profile.

The problem identification from the context of this research is:

a. The low character of social entrepreneurship in early childhood.
b. Internalization of social entrepreneurship values in learning that is not optimal.
c. Institutional curricula in PAUD in general have not been able to form the character of social entrepreneurship.
d. Teaching materials for early childhood have not been integrated with social entrepreneurship values.
e. School vision and mission have not optimally incorporated social entrepreneurship values.
f. Learning outcomes have not optimally incorporated social entrepreneurship values.

In order for this research to focus, not all problems will be studied. This research is focused on the problem of low social entrepreneurship character in early childhood. The low character of social entrepreneurship in early childhood, one of the factors that cause it is not optimal internalization of social entrepreneurship values in learning in early childhood. Therefore, this research seeks to map entrepreneurial values in early childhood.

Based on the background and problem identification, the following problems can be formulated: (1) How is the map of entrepreneurial values in early childhood learning; (2) How is the integration model of entrepreneurial values in early childhood learning. Meanwhile, the objectives of

this study are: (1) Mapping entrepreneurial values in early childhood learning; (2) Formulating a draft model of integration of entrepreneurial values in early childhood learning.

Early Childhood Education (ECE) is a form of formal or non-formal education aimed at children aged 0-6 years which aims to provide stimulation and early learning experiences to support optimal development in various aspects of children's lives (Soejiningsih, 2019). PAUD according to the law is a form of formal and non-formal education aimed at children from birth to six years of age which is carried out before entering kindergarten (Kemdikbud, 2014). It is more clearly stated that PAUD is a learning process directed at developing the potential and personality of children from an early age, through providing fun and stimulating learning experiences in various areas of child development (Suryosubroto, 2015). From a child development perspective, ECD is a critical phase in child development, where through playful learning activities, children build the basic foundation of skills and knowledge that will help them succeed in the future (Bredekamp & Copple, 2014). For this reason, early childhood education plays an important role in shaping the basic child development and achieve the goals of early childhood education (Suryosubroto, 2018). Based on national education policy, PAUD management is a series of activities involving planning, organizing, directing, and supervising the resources of PAUD institutions, with the aim of improving the quality of PAUD (Kemdikbud, 2016). More clearly elaborated is the definition of ECD management according to the system approach, which is a complex system involving interactions between various components such as curriculum, human resources, facilities and infrastructure, and parental involvement, in order to achieve optimal educational goals (Trianto, 2019). In addition, ECD management by definition from a leadership perspective is the need for effective leadership, where a leader must be able to motivate, direct, and optimize the potential of resources to achieve educational goals (Sergiovanni, 1992). Trianto (2019) describes four aspects of PAUD management: planning, organizing, directing and supervising. Planning involves the identification of educational objectives, curriculum preparation, and resource development. Careful planning forms the basis for achieving optimal educational outcomes. Organizing relates to organizational structure, resource allocation, and the formation of teaching teams. A good organizational structure supports efficiency in the implementation of ECD programs. Directing involves motivation, communication and leadership. Effective leadership will encourage the motivation and commitment of teachers and parents in supporting early childhood education. Oversight includes monitoring program implementation, performance assessment and continuous improvement. Good supervision ensures that the ECD program runs according to plan and has a positive impact on children's development.

Judging from the parties involved in PAUD management, a good school is largely determined by the parties that help the implementation of PAUD well. The parties involved include the principal. Principals are responsible for designing policies, managing resources, ensuring program implementation in accordance with the vision and mission of PAUD (Soenarjo, 2015). In addition, PAUD teachers. PAUD teachers are responsible for developing and implementing the curriculum, observing and documenting child development, and collaborating with parents (Siregar, 2017). Parents are involved in the sustainability of the school. Parents are responsible for sustaining children's learning at home, participating in school activities, as well as support school policies and programs (Epstein, 2018). Administrative staff are responsible for managing documentation, providing learning resources and supporting day-to-day administration (Verlejs & Schonfeld, 2016). School supervisors or education offices are responsible for monitoring and assessing school performance, providing guidance and supporting the implementation of education policies (Sergiovanni & Starratt, 2019). The collaboration of these various parties helps the implementation of good education and educational institutions that respond to the needs of society.

Measuring the implementation of management

support school policies and programs (Epstein, 2018). Administrative staff are responsible for managing documentation, providing learning resources and supporting day-to-day administration (Verlejs & Schonfeld, 2016). School supervisors or education offices are responsible for monitoring and assessing school performance, providing guidance and supporting the implementation of education policies (Sergiovanni & Starratt, 2019). The collaboration of these various parties helps the implementation of good education and educational institutions that respond to the needs of society. Measuring the implementation of good ECD management involves monitoring and evaluating various aspects of ECD provision. Several ways can be used to measure the effectiveness of ECD management, including;

a. Use of performance indicators. The way this can be done is by setting performance indicators that cover aspects of planning, organizing, directing and supervising, and conducting regular monitoring of the achievement of these indicators (Kemdikbud, 2019).

b. Conducting parent and teacher satisfaction surveys. Conducting surveys is done to assess parents' satisfaction with the quality of their child's education. Also, to gather feedback from teachers regarding management and support received (Epstein, 2018). Conduct internal audits. Internal audits are conducted to assess policy compliance, resource management efficiency and education program implementation, and analyze audit findings for continuous improvement (Heeringa, West, & Berglund, 2017).

c. Conduct program quality assessment. This activity is conducted to assess the quality of the classroom environment and interaction. The impact is to develop an action plan based on the assessment results. Tools that can be used such as ECERS (Early Childhood Environment Rating Scale) (Harms, Clifford, & Cryer, 2005).

d. Analyzing children's achievement data. This activity is carried out to evaluate the extent of achievement of learning objectives, and to develop remedial or corrective programs based on the findings of data analysis (Marzano, 2003).

e. Increase community participation in ECD activities as an indicator of community support and engagement, and develop community engagement programs to support ECD management (Neuman, 2013).

Some of the aspects in ECERS that are used to assess are;

a. Quality of the physical environment, assessing the cleanliness, tidiness and functionality of the room and its furnishings. This section is used to assess whether the room and furniture support children's learning and activities.

b. Quality of time and activities, this activity is to assess the quality of time spent on daily activities such as eating, sleeping, and personal hygiene. The aim is to check whether or not these activities are carried out in a way that is responsive to the child's needs.

c. Quality of learning materials, this assessment is used to assess the availability and quality of learning materials such as books, toys and other materials. This research focuses on how the materials support children's development and thinking.

d. Quality of the teaching environment, this assesses the activities provided and the extent to which they stimulate children's development so that it can be known whether or not these activities engage children's various skills and interests.

e. Relationship with children, this assessment looks at the relationship between staff and children, checking whether or not staff interact with children in a positive way and stimulate children's social and emotional development.

f. Quality of the lesson plan, this assessment is done to assess whether or not there is a structured and consistently executed lesson plan. It also checks whether the availability of daily plans and policies support children's development.

g. Quality of the health and safety environment, this assessment aims to assess policies and procedures to safeguard children's health and safety and check whether measures are taken to prevent accidents and maintain hygiene.

Some of the things that can be done to improve PAUD management are evaluating policies and procedures, developing staff skills in the form of providing training according to the needs of teachers and staff, increasing collaboration with parents, optimizing the use of resources, improving the learning environment, implementing learning quality evaluation, using technology in education, developing structured lesson plans, improving the quality of teacher-child interaction, monitoring and evaluating performance, involving the local community, focusing on child welfare, developing a responsive curriculum, and monitoring individual child development.

Early childhood education is a coaching effort aimed at children from birth to 6 years of age, carried out through educational stimuli to support physical and spiritual growth and development. The

goal is to provide readiness for children to enter further education (Delitasari et al., n.d.; Rusnaini et al., 2021; Sari et al., 2024; Suardi & Samad, 2002). In the context of entrepreneurship education studies, the concept of Early Childhood Education (ECED) does not include the development of children from birth, but focuses on the education of children at the PlayGroup/Kindergarten level.

According to Piaget's theory, early childhood is included in the preoperational stage (ages 2-7 years) with several characteristics, including:

a. Learn about objects using pictures and language/words.
b. His thinking is still egocentric.
c. Difficulty seeing from another person's point of view.
d. imajinatif dalam berpikir.
e. Assuming that inanimate objects also have feelings.
f. Ability to classify objects with one feature.
g. Intuitive reasoning that is not logical.

In designing entrepreneurial values, including social entrepreneurship that can be integrated at the PAUD education unit level, it is necessary to adapt to the characteristics of child development at this stage. These values should also be in line with the functions and objectives of ECD to create holistic education and support the development of children as a whole (Fithriyana, 2016; Rukmana et al., 2023; Sugianti et al., 2020).

Based on the characteristics, objectives, and functions of PAUD, the design of entrepreneurial values and entrepreneurial competencies at the Early Childhood Education (ECE) level can be arranged as follows:

Table 1: Indicators of Social Entrepreneurship Achievement at the Early Childhood Level

Social Entrepreneurship Values	Achievement Indicator		
	Individuals	Class	School
standalone	Able to do tasks on his/her own Picking up and putting objects in place (such as school equipment, and toys)	Create a classroom atmosphere that gives learners the ability to work independently	Create a school situation that builds learners' independence
Creative	Make art/writing from materials available in the classroom Ask questions whenever you see something strange.	Creating learning situations that foster creative thinking and action. Providing tasks that challenge the emergence of new works both authentic and modified	Creating a school situation that fosters creative thinking and action
Dare to take risks	Likes challenging work Courageous and able to take risks in completing tasks	Create a learning situation that fosters children's love for completing challenging tasks. Create a learning environment that fosters a sense of risk-taking	Creating a school situation that fosters children's courage to take risks
Leadership	Demonstrates behavior that is always open to suggestions and criticism Easy to get along with Able to cooperate with friends Reprimand friends who are considered wrong	Creating learning situations that encourage children to have the character of a leader	Creating a school situation that encourages children to act like leaders
Berorientasi pada tindakan	Doing everything known Taking the initiative to act	creating a learning situation that can encourage children to do something acquired in learning.	Creating a school situation that encourages children to do what they understand.
Hard work	Ask friends/teachers if you see/hear something you don't know. Spend most of the class time studying	Create a learning situation that encourages children to work hard	Create a school situation that encourages children to work hard.
Empathy	Listens attentively when a friend/teacher tells a story	Creating learning situations that encourage children to	Creating a school situation that encourages

Social Entrepreneurship Values	Achievement Indicator		
	Individuals	Class	School
	Showing concern when a friend/teacher is sick/sad	empathize	children to empathize
Oriented towards helping others	Offering help to friends/teachers in class Shares something (food, toys) with a friend/teacher	Creating learning situations that encourage children to help others	Creating a school situation that encourages children to help others

Early Childhood Socio Entrepreneurship Attitudes/Values

a. Creative

Children's ability to explore their potential, express creative thoughts, create something different, and have a perspective that is different from other children.

b. Responsible

The ability to behave consciously in carrying out inherent duties and obligations and strive to complete each task and obligation properly while upholding the value of trust.

c. Leadership

The child's ability to be a leader in their environment who is open to criticism and suggestions and easily makes friends and cooperates with other children.

d. Hard work

The child's ability to complete the task according to the target that has been set in earnest.

e. Risk-taking

A child's ability to be committed and cautious in taking action.

f. Action-oriented

The child's ability to think and act quickly and find the best solution.

g. Empathy

children's ability to have a good understanding when making comments and expressing the same feelings as other children/friends in the environment.

h. Oriented towards helping others

Children's ability to respect and contribute to each other and the positive atmosphere during unconditional communication with their friends.

Lifelong learning is in line with the concept of the Pancasila learner profile described in Permendikbud Number 22 of 2020. The Permendikbud states that students are expected to be lifelong learners with global competence, thinking and acting in accordance with the values of Pancasila. The Pancasila learner profile includes six main characteristics, namely faith, devotion to God Almighty, noble character, global diversity, mutual cooperation, independence, critical reasoning, and creativity. Therefore, value education is needed to strengthen the profile of Pancasila learners and support the concept of lifelong learners (Rachmawati et al., 2022; Rusnaini et al., 2021; Siwiyanti, 2017).

Strengthening the profile of Pancasila students focuses on the formation of national character and the ability to implement these values in various environments. This is done through integration in the learning process, both in the classroom (intra) and extracurricular activities. In addition, school culture and work culture are realized in the project of strengthening the profile of Pancasila students. This approach, as expressed by Fithriyana, (2016) emphasizes the importance of involving students in a thorough learning experience to ensure understanding and implementation of Pancasila values in students' daily lives. One form of project organized by the school in order to integrate the value of social entrepreneurship in strengthening the profile of Pancasila students is in activity I.

A number of studies, such as those conducted by (Rondli, (2022) and Siwiyanti, (2017) have discussed instilling entrepreneurial values in children through market day activities. The research identified six entrepreneurial values that can be integrated in market day, and explained the implementation of these activities as a means to instill entrepreneurial values in children. However, the

focus of this article is to reveal the learning process of the project market day activities, including the planning, implementation and assessment stages. The objectives of this approach are to understand how entrepreneurial values are embedded through the whole learning process, in the hope of improving the profile of Pancasila students.

In another study conducted by Prasetyaningsih et al. (2016), it was stated that achieving the Pancasila learner profile requires two main strategies and one value/character model. Thus, this research seeks to explore further the process of project market day activities as a method to improve the profile of Pancasila students, by paying attention to planning, implementation, and assessment in an effort to instill entrepreneurial values in children. Research conducted by Ningsih et al. (2022) states that the application of entrepreneurial values in the form of activities is carried out every Friday by introducing market day activities to children such as bringing food and drinks, accessories and other skills made at home so that children can sell to their friends at school, this activity is a fun activity. By doing so, children can learn how to transact, how to exchange change, and how to buy and sell. Children are involved in the production, distribution and consumer processes. There are entrepreneurial values that appear in children, such as leadership, responsibility, independence, especially in the seller group, discipline to queue as buyers, wait for food, honesty when food has been taken or paid for, creativity and also foster an attitude of independence in children. Previous studies that have examined entrepreneurial values in PAUD and no one has specifically discussed the values of social entrepreneurship in PAUD. The value of social entrepreneurship has a priority in the formation of social aspects so it is important to be instilled in students since PAUD, so this research will discuss the integration of social entrepreneurship values in PAUD both in learning and existing school culture to strengthen the profile of Pancasila students.

2. Method

This research is a quantitative descriptive research that uses various sources, namely interviews, field notes, photographs, personal documents, and official documents. Descriptive research aims to describe natural phenomena or human engineering, emphasizing the characteristics, quality, and interrelationships between activities. This research does not conduct treatment, manipulation, or alteration of variables The researcher chose the descriptive method to reveal comprehensive facts about the integration of social entrepreneurship values in Early Childhood Education, both in the aspect of learning, as well as school culture to strengthen the profile of Pancasila students. Researchers chose the descriptive method to comprehensively reveal facts about the integration of social entrepreneurship values in Early Childhood Education, both in the learning aspect, as well as the school culture for strengthening the profile of Pancasila students.

The data collection techniques used are instruments and forms of interview guidelines. The instrument of this research is the researcher himself, with data collection techniques by interview using interview guidelines, observation, and documentation. The data collected involved photos, interview recordings, and files related to social entrepreneurship at the school.

In this study, data collection used several techniques, as follows:

a. Observation

Dalam penelitian ini, observasi Observations were conducted to see how the application of internalization of social entrepreneurship values in learning and institutional culture. This observation is structured and conducted by utilizing an observation sheet that has been designed with an observation framework.

b. Documentation study

The document study in this research is to see data about the principal, teachers, and students.

c. Questionnaire

In this study using a closed questionnaire using a Likert scale consisting of 4 alternative answers where score 1 can be interpreted as “very unsuitable, score 2 Less Suitable, score 3 Suitable, score 4 Very Suitable.

d. Interview

In this study, interviews were conducted to explore data from the aspect of learning planning. Interviews in this study were conducted with teachers and principals.

The research instrument was the researcher himself, with data collection techniques involving in-depth interviews using interview guidelines, observation, and documentation. The data collected involved photographs, interview recordings, and files related to social entrepreneurship at the school. Place of Research. The research was conducted in PAUD with the research subjects involving the principal and teachers. The subjects of this research were the principal and teachers of PAUD in Sukorejo village, Wedi sub-district, Klaten district. The data analysis technique used in this research is descriptive technique using tables. To describe the data following an interactive model that includes data reduction, data presentation, and conclusion making.

3. Results and Discussion

a. Integration of Social Entrepreneurship Values in Early Childhood Learning

Before examining the integration of social entrepreneurship values, it is necessary to first describe the principles used in the development of entrepreneurship education, as follows:

1) The process of developing social entrepreneurship values is a long and continuous process starting from the beginning of students entering until they finish from an educational unit
2) The material of social entrepreneurship values is not an ordinary teaching material. That is, these values are not used as the subject matter presented as is the case when teaching a concept, theory, procedure, or fact in the subject, integrated into each subject. Integration into subjects can be through materials, methods, and assessments.
3) In the implementation of learning in the classroom, teachers do not need to change the existing subject matter but use the subject matter to develop social entrepreneurship values. Likewise, teachers do not have to develop specific learning processes to develop values.
4) Active and fun learning methods are used. This principle states that the process of social entrepreneurship values education is done by the learners not by the teacher. The learning process is conducted in a learning atmosphere that creates a sense of fun.

The integration of entrepreneurial values in learning is carried out starting from the planning, implementation and evaluation stages of learning. In this planning stage, the teaching module is designed so that the content and learning activities facilitate the integration of social entrepreneurship values. How to organize teaching modules that are integrated with social entrepreneurship values is done by adding social entrepreneurship values to the material, learning steps or assessment. The learning principles used in integrating social entrepreneurship values seek to make learners recognize and accept social entrepreneurship values as their own and take responsibility for the decisions they make through the stages of recognizing choices, assessing choices, determining a stance, and then making a value in accordance with self-belief. With this principle, learners learn through the process of thinking, behaving and doing. These three processes are intended to develop learners' ability to carry out activities related to social entrepreneurship values. Integrating entrepreneurial values in teaching modules can be done through the following steps:

1) Review the SK and KD to determine whether the values of social entrepreneurship have been covered.
2) Include the social entrepreneurship values that have been listed in the SK and KD into the teaching module.
3) Develop active learner learning steps that allow learners to have the opportunity to integrate values and demonstrate them in behavior.
4) Incorporating active learning steps integrated with entrepreneurial values into the teaching module.

b. Embedding Entrepreneurship Education through School Culture

School culture is the atmosphere of school life where learners interact with each other, teachers with teachers, counselors with each other, administrative staff with each other, and between members of the school community. the life of the nation, aims to develop the potential of students to become human beings who are faithful and devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. The development of values in entrepreneurship education in school culture includes activities carried out by principals, teachers, counselors, administrative personnel when communicating with students and using school facilities, such as honesty, responsibility, discipline, commitment and entrepreneurial culture in the school environment (all school members carry out

entrepreneurial activities in the school environment). equip students with basic skills (life skills) as a provision in life so that they can create jobs. For example, children who live around the beach should be able to capture local potential as an opportunity to manage it into products that have added value, which they are then expected to be able to sell in order to generate income. This can be done by:

1) The integration of entrepreneurship education in mulok, almost the same as the integration of integrated entrepreneurship education in subjects, is carried out starting from the planning, implementation, and evaluation stages of learning in all subjects. At this planning stage, lesson plans are designed so that the content and learning activities of MULOK facilitate the integration of entrepreneurial values. How to develop MULOK lesson plans that are integrated with entrepreneurial values is done by adapting existing MULOK lesson plans by adding to the material, learning steps or assessment with entrepreneurial values. The learning principles used in the development of entrepreneurship education seek to make learners recognize and accept entrepreneurial values as their own and take responsibility for the decisions they make through the stages of recognizing choices, assessing choices, determining stances, and then making a value in accordance with self-belief. With this principle, learners learn through the process of thinking, behaving, and doing. These three processes are intended to develop the ability of learners to carry out activities related to entrepreneurial values.
2) Examples of MULOK lesson plans that integrate entrepreneurial values can be seen in appendix 2.

   The integration of entrepreneurial values in learning is carried out starting from the planning, implementation and evaluation stages of learning. In this planning stage, the teaching module is designed so that the content and learning activities facilitate the integration of social entrepreneurship values. How to organize teaching modules that are integrated with social entrepreneurship values is done by adding social entrepreneurship values to the material, learning steps or assessment. The learning principles used in integrating social entrepreneurship values seek to make learners recognize and accept social entrepreneurship values as their own and take responsibility for the decisions they make through the stages of recognizing choices, assessing choices, determining a stance, and then making a value in accordance with self-belief. With this principle, learners learn through the process of thinking, behaving and doing. These three processes are intended to develop learners' ability to carry out activities related to social entrepreneurship values.

   Integrating entrepreneurial values in teaching modules can be done through the following steps:

   a) Reviewing the SK and KD to determine whether social entrepreneurship values are already included.
   b) Include the social entrepreneurship values that have been listed in the SK and KD in the teaching module.
   c) Develop active learner learning steps that allow learners to have the opportunity to integrate values and demonstrate them in behavior.
   d) Incorporating active learning steps integrated with entrepreneurial values into the teaching module.

c. Integrating Entrepreneurship Education through School Culture

School culture is the atmosphere of school life where learners interact with each other, teachers with teachers, counselors with each other, administrative staff with each other, and between members of the school community. the life of the nation, aims to develop the potential of students to become human beings who are faithful and devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. The development of values in entrepreneurship education in school culture includes activities carried out by principals, teachers, counselors, administrative personnel when communicating with students and using school facilities, such as honesty, responsibility, discipline, commitment and entrepreneurial culture in the school environment (all school members carry out entrepreneurial activities in the school environment). equip students with basic skills (life skills) as a provision in life so that they can create jobs. For example, children in the environment around the beach must be able to capture local potential as an opportunity to manage it into products that

have added value, which the children are then expected to be able to sell in order to generate income.

d. The integration of entrepreneurship education in mulok, almost the same as the integration of integrated entrepreneurship education in subjects, is carried out starting from the planning, implementation, and implementation stages. At this planning stage, the lesson plan is designed so that the content and learning activities of MULOK facilitate the integration of entrepreneurial values. How to prepare MULOK lesson plans that are integrated with entrepreneurial values is done by adapting existing MULOK lesson plans by adding to the material, learning steps or assessment with entrepreneurial values. The learning principles used in the development of entrepreneurship education seek to make learners recognize and accept entrepreneurial values as their own and take responsibility for the decisions they make through the stages of recognizing choices, assessing choices, determining stances, and then making a value in accordance with self-belief. With this principle, learners learn through the process of thinking, behaving, and doing. These three processes are intended to develop learners' ability to carry out activities related to entrepreneurial values.

   Examples of MULOK lesson plans integrated with entrepreneurial values can be seen in appendix 2.

4. Conclusion

Based on the results of the research and discussion that has been stated, the conclusions in this study are:

1.1. There is a social vision that is implicitly written by all PAUD Schools in Klaten District, Central Java who are respondents with the terms community empowerment and village community welfare.

1.2. There are 8 sociopreneur values that have been implemented in the organization of PAUD curriculum and learning, namely Social Prolem Targeted, Social Mission, Social Value, Social Capital, Social Innovation, social empowerment, social change, and social collaboration.

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DEVELOPMENT OF DIGITAL MODULES FOR STRENGTHENING CULTURAL LITERACY & CITIZENSHIP AND GROWING INSIGHTS IN GLOBAL DIVERSITY THROUGH INTRACURRICULAR ACTIVITIES IN PRIMARY SCHOOLS

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Abstract

The flow of globalization that society cannot filter can shift Indonesian culture and turn it into bad habits. Strengthening civic literacy is essential to overcome the country's problems due to the lack of literacy in society, and it also has the potential to form good citizens. Data collection techniques use tests to measure students' insight into global diversity. The treatment for the control class uses a module from the Ministry of Education and Culture, while the experimental class uses a digital module that was developed. Data analysis was done using non-parametric statistics, the Mann Whitney and N-gain tests, considering that the resulting data was not normally distributed. This is shown by the N-Gain test results of 0.034 in the control class 0.038 in the experimental class of 0.038 in the low category. The results of the Mann-Whitney test showed data of 0.817 with a significance of >0.05, meaning that Ho was accepted and Ha was rejected. Acceptance of Ho means no difference in global diversity insight data between classes that use digital modules and those that do not. The results of the analysis of this data make it possible for both students in the control class and the experimental class to be actively involved in using existing learning resources. The only difference is that the experimental class received learning experiences using a variety of multimedia and visual messages, while the control class did not.

Keywords: Digital modules, elementary school, insight into global diversity, intracurricular activities.

1. Introduction

The unfiltered flow of globalization can lead to the adoption of certain behaviors and practices that are not in line with our cultural values, which we may consider as 'bad habits '. These could include a lack of respect for traditional customs, a disregard for the environment, or an over-reliance on technology. Therefore, it's important to filter this flow, especially for children in elementary school education units. The influence of globalization is pervasive, affecting all aspects of life, from science and technology to social and cultural norms.

Progress over time and society's literacy skills must be balanced, especially for millennials [1]. Indonesia must be able to develop an essential literacy culture for students as a way to fulfill 21st-century skills [2]. Civic literacy can develop knowledge and form a sense of love for the homeland and national insight, increase unity and integrity, and implement the values of Pancasila [3]. Civic literacy must be demonstrated continuously so that change occurs [4], knowing information and being sensitive to government [5], actively participating in society [6], and having tolerance for local and global differences in decisions taken [7].

A module is a set of teaching materials arranged structurally and systematically to help teaching staff create a good learning atmosphere for students so that the learning objectives created previously are achieved [8]. A flipbook is grammatically defined as a flipping book [9]. The principle of digital flipbook-based E-modules is the same as manual teaching materials [10]. Technological developments have innovated the concept of the Flipbook digitally to become a three-dimensional e-book, with page displays that can be opened like reading a book on a monitor screen. [11] explains that Flipbook (e-book) has hypermedia characteristics with animation, music, and video features, which makes it more interesting than printed books. Flipbook.

Electronic modules play a crucial role in the learning process, particularly in promoting independent learning. As [22] points out, these modules are teaching materials that enable students to study subject matter on their own, using electronic media. This view is echoed by [23] and [24], who argue that electronic modules can enhance student learning outcomes through independent learning. By

displaying text, images, animations, and videos via computer, electronic modules can significantly improve students' understanding of concepts and their overall learning outcomes [25].

Thus, cultural and civic literacy is the ability of individuals and society to behave towards their social environment as part of a culture and nation. The principles of cultural literacy and citizenship [12] include 1) culture as a realm of thought through language and behavior, 2) art as a cultural product, 3) multicultural and participatory citizenship, 4) nationalism, 5) inclusivity, and 6) direct experience. Cultural and civic literacy can be applied when learning is in progress or has been completed. Whether or not the goals of cultural literacy and citizenship are achieved is also determined by the readiness of materials for teachers and students and for teacher development.

Global diversity is one of the dimensions in which Pancasila students maintain their noble culture, locality, and identity and have an open mind towards other cultures [13] to foster a sense of mutual respect and the possibility of forming a new culture that is positive and does not conflict with the nation's noble culture. The critical elements of global diversity are recognizing and appreciating, building intercultural communication, reflection and responsibility, and social justice.

2. Method

This research method uses a quasi-experimental, non-equivalent control group design with a control class (not given treatment) and an experimental class (given treatment in the form of implementing a module). Students are given pre-test and post-test questions, which are prepared based on global diversity insight indicators provided by the government.

R O1 x1 O2

R O1 O2

Figure1. Non Equivalent Pretest-Posttest Control Group Design

Information:
O: Pretest or Posttest
X : Treatment in the experimental class
---------: Subjects are not randomly grouped

Data from the test results regarding insight into global diversity were analyzed using the dependent t test, independent t test, MANOVA test and n gain test. An independent t test was carried out to determine whether there were differences in students' insight into global diversity in the control class and the experimental class. The test process in this research was carried out with the help of an application program, namely IBM Statistical Product and Service Solution (SPSS) version 25 with a significance value of <0.05, which indicates a high level of confidence in the results.

The level of effectiveness was analyzed using the n-gain test to measure how much the value of students' insight into diversity increased from the pretest and post-test results in the control and experimental classes. The gain test is carried out when data has been declared effective according to the independent sample t-test calculation. The research was conducted on 4th-grade elementary school students in Yogyakarta, and the practicality of the digital module was examined by administering a questionnaire to the teacher.

3. Results and Discussion

In the data results, the average pretest score in the experimental class was 25.33. Next, the learning process was carried out using a digital module, and the results were measured at the end of the meeting (posttest) with a score of 28.38. The pretest and posttest results of the control class show that insight into global diversity has increased by 3.05. Based on this data, an N gain test was then carried out, which showed a result of 0.038, so if it was categorized based on gain, it was included in the low criteria.

Table.1 N-gain Test Results

Class	Average value		Gain	Criteria
	Pretest	Posttest		
Control	25.94	28.58	0.034	Low
Experiment	25.33	28.38	0.038	Low

Normality test

The normality test for insight into global diversity was carried out with the help of the SPSS program through the one-sample Kolmogrov-Smirnovi test. Data is normally distributed if it meets a significance value of > 0.05. The normality test results for concept mastery are detailed in the following table.

Table. 2 Normality Test Results

No	class	Data	Nilai sig 2 tailed	Information
1	control	Pretest	0.000	Not normally distributed
		Posttest	0.000	Not normally distributed
2	experiment	Pretest	0.000	Not normally distributed
		Posttest	0.000	Not normally distributed

Given the non-normality of the global diversity insight variable, as revealed by the data above, we conducted our data processing with the utmost rigor, using non-parametric statistics.

Homogeneity Test

The homogeneity test was conducted using the SPSS program via the Levene test. Data is declared homogeneous if it has (p) > 0.05. The global diversity insight homogeneity test results are detailed in the following table...

Table 3 Homogeneity Test

class	Data	Mean	Sig	Information
control	Posttest	28.38	0.731	Homogen
experiment	Posttest	28.58		

Based on the results of the homogeneity test of insight into global diversity in the control and experimental classes, the significance value (p) was > 0.05; it can be concluded that the data is homogeneous.

Independent t-test

In this case, the criteria used are if the significance value is > 0.05, then H0 is accepted, and if the significance value is < 0.05, then H0 is rejected. The results of the independent t-test on the results of the global diversity insight post-test are detailed in the following table:

Table 4. Independent t-test

Data	Kelas	Z	Sig (p)	Keterangan
Posttest	Kontrol	-.232	0.817	Ho diterima (tidak ada perbedaan)

Conclusion: The Mann Whitney results on the global diversity insight variable in the control and experimental classes, as shown in the table above, obtained a significance value of > 0.05. This indicates that H0 was accepted and Ha was rejected. Therefore, it can be concluded that there is no significant difference in the global diversity insight of students who use digital modules and those who do not.

4. Discussion

Based on the research results, data was obtained that there was no difference in global diversity insight data between students in classes that used digital modules and those that did not. The two classes show the same level of insight into global diversity, as evidenced by the N-gain test and the Mann Whitney test with N-Gain test results of 0.034 in the control class, and 0.038 in the experimental class of 0.038 in the low category. The results of the Mann Whitney test showed data of 0.817 with a significance of >0.05.

This condition is possible because both classes that use digital modules and those that do not both involve students in discussions. The difference lies in that classes that use digital modules gain more learning experiences through visuals and multimedia. The effectiveness of using digital modules,

which serve as supplementary learning tools, will be more effective if they are integrated with digital media so that they have a greater impact on students' understanding [16]. This aims to make learning more interesting so as to increase students' learning motivation. The national insight variable is included in the cognitive aspect whose achievement is measured by tests, the position is the same as the results of the research findings.

Based on previous research conducted, it was found that motivation to increase reading interest can be done by analyzing approaches to reading interest [17]. This research is relevant as it provides a framework for understanding how to increase students' interest in learning. Teachers can strive for this by using innovative learning methods and prioritizing student involvement through group discussions to form self-awareness regarding interest in reading. Similar research was carried out on the implementation of cultural and civic literacy using 1 principal, 4 teachers, 4 students and 4 parents as subjects. It was found that elementary schools had implemented cultural literacy by 80%. [14]. research conducted by [15] developing interactive media in increasing cultural and civic literacy obtained an average response from students from small groups of 92% in large groups of 95% and experienced an increase in the average pretest of 69 and posttest of 89. These results show that interactive media can improve cultural literacy and citizenship in thematic learning in elementary schools.

Another reason for the less effective use of digital modules for students is the need for more interactivity in the digital modules being developed. Interactive is an activity that occurs in two directions, meaning that there are activities carried out by students rather than just focusing on one activity. This can be done with simulations, educational games and online quizzes. Effectiveness in learning can be done by providing complete information, which is related to information processing theory which states that the more senses are involved in the learning process, the greater the chance of complete information being captured by the senses [18].

Based on previous research found in research [19] states that the use of digital modules is only effective enough to be applied in the learning process. This is due to the design of the e-module being developed and its activities. Thus, teachers in developing digital modules must pay attention to interactive activities to create student involvement in the learning process. This is in line with research findings that Kudus batik digital comics influence the cultural literacy of elementary school students because of the suitability of learning styles, where currently is the era of digitalization which makes it easier to obtain and share information [20]. Additionally, using digital modules will be more meaningful in increasing students' understanding of national insight if packaged in an interactive form. [21] explained that interactive books can significantly increase students' understanding of the material on the cooperation lifestyle.

5. Conclusion

Based on the research data, there is no difference in the influence of digital modules on insight into global diversity compared to classes that do not use them. This is possible because in both control and experimental classes, students were both actively involved in learning and obtained the same information from learning sources. The difference is that in the experimental class, students get more learning experience using multimedia and visual messages, while in the control class, they don't.

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PETANQUE SPORTS TRAINING FOR ELEMENTARY SCHOOL PHYSICAL EDUCATION TEACHERS IN YOGYAKARTA CITY

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Abstract

The problem partners face is the need for training in the sport of petanque. The service team collaborated to establish cooperation with Muhammadiyah elementary schools in Yogyakarta City. This Community Service activity for Off-Campus Activities Lecturers was held to provide Petanque Sports training for elementary physical education teachers in Yogyakarta City. The implementation of training is carried out using practical methods and friendly matches. Participants were carried out among elementary physical education teachers in Yogyakarta City, with as many as 30 people. The activity was held for three days. Activity methods include theoretical training on the basics of petanque, hands-on practice, and simulation of petanque games. The instrument for measuring knowledge tests participants' knowledge of the sport of petanque has 14 items. Measuring the increase in participants' knowledge is done by comparing the results before and after training. The higher post-test results compared to the pre-test, with an average gain of 20.11%, indicate the resounding success of the training method, instilling confidence and reassurance in the teachers.

Keywords: pétanque, training, adult

1. Introduction

The main problem faced by physical education teachers in Muhammadiyah Yogyakarta primary schools is the lack of knowledge and understanding of the sport of petanque. Many of these teachers have never known or played petanque before, let alone taught it in the context of physical education at school. This results in limitations in introducing new sports variations that can enrich physical education learning for students. However, petanque, with its potential to significantly enhance the physical education curriculum, offers a hopeful and optimistic outlook for its implementation in elementary schools. Despite its relative unpopularity among teachers in Indonesia, especially in Yogyakarta, petanque's basic rules, techniques, and benefits as a competitive and recreational sport can be a valuable addition to the school curriculum.

The sport of petanque, although still not very well known in Indonesia, has several advantages that support its application in the context of physical education in elementary schools. Pétanque originated in Provence, France, and has become popular in various European countries [1]. The game uses a ball with a diameter between 70 to 80 mm and a weight of about 650 to 800 grams [1]. The ball's weight can be adjusted based on the thickness of the metal shell or using filler material, especially in cheaper balls. Some of the great potentials of this sport include:

a. Simple and easy to learn. Petanque does not require complicated equipment or expensive unique venues. The game can be played on various ground surfaces with a simple ball, making it suitable for implementation in schools with limited sports facilities.

b. Improves Fine and Gross Motor Skills. Petanque involves fine motor movements in controlling and throwing the ball and gross motor skills in maintaining balance and posture during the game. This helps the motor development of students in elementary school age.

c. Trains Focus and Strategy. Petanque teaches students to focus, plan strategies, and make quick decisions while playing. This is beneficial in developing critical thinking and problem-solving skills, which are essential in holistic learning.

d. Social and Recreational Value. Petanque is also a game that can be played in groups, thus fostering social values such as cooperation, communication, and sportsmanship. This makes it a sport that is not only competitive but also recreational that students can enjoy together.

Although Petanque has excellent potential, some challenges must be overcome before this sport can be integrated into school physical education learning. These challenges include:

a. Lack of Access to Information and Training: The lack of information about petanque, in terms of playing techniques, rules, and benefits, makes it difficult for teachers to get started. The lack of formal training prevents teachers from gaining the necessary skills and knowledge.

b. Limited Facilities in Schools: Some schools may not have adequate areas to implement petanque, especially if the school grounds are full of facilities for more popular sports such as soccer or basketball.

c. Lack of Support from Curriculum Policies. Although the sport of petanque has great potential, there are still no guidelines or policies from the Ministry of Education that explicitly encourage the implementation of this sport in the physical education curriculum. This makes many schools not consider petanque as a priority in sports activities.

d. Teacher Training and Development Needs. To overcome this challenge, one solution that can be implemented is to organize training specifically designed for physical education teachers.

Teaching methods for adults need to consider their experiences and involve them in the learning process [2]. Through training, teachers can:

a. Acquire Basic Knowledge and Techniques of Petanque: The training will provide an understanding of the game rules, basic techniques, and strategies needed to teach Petanque effectively.

b. Improve Competence in Teaching Petanque: Teachers can practice live Petanque games in simulated games during the training. This will boost their confidence in teaching the sport to students.

c. Introducing the Pedagogical Benefits of Petanque: In addition to playing techniques, the training should also emphasize the pedagogical benefits of Petanque, such as improving motor skills, social-emotional development, and teaching the values of cooperation and sportsmanship.

The goal of this program is to provide Petanque Sports training for elementary physical education teachers in Yogyakarta City

2. Method

The problem was solved by providing theoretical and practical training to teachers and organizing petanque game simulations to improve their skills directly. Activity methods include theoretical training on the basics of petanque, hands-on practice, and simulation of petanque games. The target audience was 30 physical education teachers from Muhammadiyah elementary schools in Yogyakarta City. Measuring the increase in participants' knowledge is done by comparing the results before and after training.

3. Results and Discussion

The activities were held on Thursday, Saturday, and Sunday, August 8, 10, and 11, 2024. The activity went according to plan, with increased participants' knowledge of the game of petanque. The instrument for measuring knowledge tests participants' knowledge of the sport of petanque has 14 items. Measuring the increase in participants' knowledge is done by comparing the results before and after training. The following are the steps taken to measure the increase in participants' knowledge:

a. Pre-Test

Pre-Test: Conducted before the training started. The pre-test contained the same questions as the post-test. The instrument measured the participants' initial knowledge of the sport of pétanque. The average pre-test score of 30 participants reached 65.30.

b. Post-Test

Post-Test: Conducted after the training was completed. Participants answered the same questions to measure changes in their knowledge after the training. The average post-test score of the 30 participants was 78.43.

c. Calculate Knowledge Improvement

The pre-test and post-test scores of each participant are compared. The average increase in participants' knowledge was about 20.11%, falling into the high category.

Implementing Petanque Sports Training for Elementary School Physical Education Teachers in Yogyakarta City went according to plan, significantly increasing the participants' knowledge. Based on the results of the analysis conducted through the pre-test and post-test, there was an increase in participants' knowledge after attending the training.

The measurement of participants' knowledge was conducted with a pre-test before the training and a post-test after the training, using the same instrument. From the pre-test results obtained, the average initial knowledge of the participants reached 65.30. This shows that before the training, participants had basic knowledge about the sport of petanque, although the level of understanding was still quite limited.

After the training was completed, the post-test results showed that the average score of the participants increased to 78.43, indicating a significant increase in knowledge. The average growth of 20.11% suggests that the training successfully enriched participants' understanding of the material taught. This increase was categorized as high, indicating the effectiveness of the training in improving participants' competence in petanque. In his book, Popham [3] research highlights the efficacy of pre-test and post-test methods to measure the improvement of knowledge or skills in training. The pre-test serves to measure initial knowledge, while the post-test is used to assess understanding after training. This method is often used in training as it can show significant changes in participants' competencies. The higher post-test results compared to the pre-test, with an average increase of 20.11%, indicate the success of the training method. This is consistent with Popham's [3] findings that this method effectively assesses trainees' knowledge development.

Referring to Malcolm Knowles' theory of adult learning or andragogy [4], practical training for adults should consider principles such as the relevance of the material to the participants' tasks and pragmatic approaches. In the context of this training, the petanque sports material is considered relevant for physical education teachers because they can apply this knowledge when learning at school. In addition, the practical approach in the game simulation allows participants to learn through hands-on experience, which is very much in line with adult learning styles. The principles of andragogy support this training method, where the participants, who are physical education teachers, showed a significant increase in knowledge after the training. Knowles emphasized the relevance of materials and teaching based on participants' experiences.

This training uses a combined approach between theory and practice. During the three days of activities, participants were given theoretical material on the fundamentals and strategies of petanque games, which were then applied in game simulations. This method allowed participants to learn the technical aspects of the game and test and develop their skills through hands-on practice.

Supporting factors include the enthusiasm of the participants and adequate facilities. The inhibiting factor is the relatively short training time to master the basic techniques of petanque in depth.

4. Conclusion

The main problem faced by physical education teachers in Muhammadiyah Yogyakarta primary schools is the lack of knowledge and understanding of the sport of petanque. Many of these teachers have never known or played petanque before, let alone taught it in the context of physical education at school. This results in limitations in introducing new sports variations that can enrich physical education learning for students. However, petanque, with its potential to significantly enhance the physical education curriculum, offers a hopeful outlook for its implementation in elementary schools. The problem was solved by providing theoretical and practical training to teachers and organizing petanque game simulations to improve their skills directly. Activity methods include theoretical training on the basics of petanque, hands-on practice, and simulation of petanque games. The higher post-test results compared to the pre-test, with an average gain of 20.11%, indicate the resounding success of the training method, instilling confidence and reassurance in the teachers.

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SOCIAL INNOVATION IN VOEs: MAPPING AND ANALYSIS IN THE SOCIAL ENTREPRENEURSHIP CONTEXT IN INDONESIA

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Abstract

Indonesia, as a country that has many people living in rural areas, faces challenges in the form of problems with the welfare of its people. BUMDes or Village-Owned Enterprises (VOEs) are business entities mandated by the central government to village governments to play a role in solving the problem of rural poverty in Indonesia through the social innovation. This research examines various social innovation in the context of social entrepreneurship through VOEs and the mapping and analysis also. This study is qualitative and descriptive. The data used came from the in-depth interviews conducted with informants which selected using purposive sampling technique (VOEs leader, managers and empolyees). The data also identified through observation and documentation. In the Indonesian Special Region Provinces of Yogyakarta and Central Java, 6 VOEs serves as the unit of analysis for this study. The data were analyzed using Miles & Hubberman's interactive analysis technique which includes data collection, data reduction, data presentation, and verification. The research results show that there are 3 types of social innovation in the VOEs as a social entrepreneurship, namely 1) socio-ecological innovation; 2) socio-economic innovationt; and 3) socio-technical innovation. The research results can be followed up with training programs required by VOEs to increase social innovation as an effort to improve the welfare of rural communities in Indonesia. The government needs to analyze the social innovation mapping that has been carried out by VOEs so that it can be followed up as a program or policy to improve community welfare.

Keywords: social innovation, social entrepreneurship, VOEs (BUMDes)

1. Introduction

Acute multidimensional poverty affects 1.1 billion people worldwide (or little over 18%), living in 110 countries, according to the Global Multidimensional Poverty Index 2023 [9]. Poverty is a problem that occurs in many countries, including Indonesia. Indonesia, as a country with a large population living in rural areas, faces challenges in the form of problems with the welfare of its people. This is shown by the large number of poor people in Indonesia. According to BPS data, the number of poor people in Indonesia in March 2024 will be 25.22 million. Of this number, the percentage of poor people in rural areas is 11.79% more than the poor population in urban areas, namely 7.09% [1]. This shows that there are still many poor people in rural areas who need attention from various parties, especially the government.

The Indonesian government has an agenda to improve the welfare of Indonesian society through sustainable development goals (SDGs). SDGs include 17 global goals and targets for 2030 declared by the UN in September 2015 which include: 1) no poverty; 2) non-violent; 3) healthy and prosperous life; 4) quality education; 5) gender equality; 6) clean water and proper sanitation; 7) clean and affordable energy; 8) decent work and economic growth; 9) industry, innovation, and infrastructure; 10) reduced inequality; 11) sustainable cities and settlements; 12) responsible consumption and production; 13) handling climate change; 14) ocean ecosystem; 15) land ecosystem; 16) peace, justice and strong institutions; 17) partnership to achieve goals [2]. All sustainable development goals formulated by the government must be accelerated appropriately.

The link between sustainable development goals and the conditions of rural communities is the focus on SDGs 1 (no poverty) and SDGs 8 (decent work and economic growth). Efforts to reduce poverty in rural areas can be made by expanding employment opportunities to encourage rural economic growth so that rural development is more optimal. Rural development is the process of increasing the standard of living, economic opportunities, and social welfare of individuals living in rural areas [19].

One of the efforts that the government has made is the establishment of VOEs. VOEs are business entities mandated by the central government to village governments to play a role in creating prosperity by solving the problem of rural poverty in Indonesia [3]. VOEs is the most ideal social entrepreneurship for solving problems in rural areas to create social value. The area of business where entrepreneurs design their operations with the ultimate objective of generating social value is known as social entrepreneurship [20].

This effort to create social value can be completed through social innovation carried out by VOEs. Social innovation is about innovative ways that individuals engage with one other and with their surroundings; these interactions involve both thinking and acting (behavior) [4]. Social innovation is the act of creating and implementing workable solutions to difficult, frequently systemic social and environmental problems, in order to promote social progress [5]. The following are the five vital roles that social innovation plays in community development: establish alliances and partnerships, decrease poverty, and create new opportunities, encourage social responsibility, environmental stewardship, and social development [8]. VOEs are expected to be able to carry out social innovation to produce effective solutions to solve problems in rural areas by collaborating with various parties. Many times, finding solutions necessitates the active participation of stakeholders from the public, private, and nonprofit sectors [5].

Previous research on VOEs in Indonesia mostly discussed the management and role of VOEs in the village's original income [24;25], improving the village economy [26], and supporting poverty alleviation [27]. Previous research has not focused on VOEs' social innovation, even though social innovation is an important thing that VOEs must be able to do as a solution to social problems. This article discusses what social innovations are carried out by VOEs in the context of social entrepreneurship so that they can solve social problems in society. Apart from that, mapping and analysis of types of social innovation are also described.

2. Method

This study is qualitative and descriptive. The data used came from the in-depth interviews conducted with informants which selected using purposive sampling technique. They were VOEs leader, managers and empolyees. The data also identified through observation and documentation in 6 VOEs in the Yogyakarta and Central Java Provinces, Indonesia namely: BUMDes Amarta, BUMDes Tridadi Makmur, BUMDes Guwosari Maju Sejahtera, BUMDes Binangun Jati Unggul, BUMDes Tirta Mandiri, and BUMDes Gemblegan. The data were analyzed using Miles & Hubberman's interactive analysis technique which includes data collection, data reduction, data presentation, and verification [16].

3. Results and Discussion

The six VOEs have different areas of movement. These areas of movement influence the social innovation carried out by each VOEs. The typology of social innovation can be categorized into ten types, namely: 1) socio-juridical innovation; 2) socio-cultural innovation; 3) socio-political innovation; 4) socio-ideological innovation; 5) socio-ethical innovation; 6) socio-economic innovation; 7) socio-organisational innovation; 8) socio-technical innovation; 9) socio-ecological innovaton; 10) socio-analytical innovation [5]. This typology can be used as a basis for mapping social innovation carried out by VOEs. In general, social innovation can be classified into three levels: process-based, product-based, and socially transformational [6].

Based on the research results obtained, social innovation carried out by VOEs is mapped into three types, namely: socio-economic innovation; socio-technical innovation; socio-ecological innovaton.

VOEs social innovation is described in the following table:

Table 3. Mapping of VOEs Social Innovation

No.	VOEs	Form of Social Innovation	Social Innovation Type
1.	Amarta	Expansion of centers, networks, and business partners.	Socio-economic Innovation

		Producing maggot products from organic waste that can help reduce and utilize organic waste	Socio-ecological innovation
2.	Binangun Jati Unggul	Implementation of software in managing finances, and the use of barcodes in product sales. Innovation in the field of agriculture in the form of instant rice.	Socio-technical innovation Socio-economic innovation
3.	Guwosari Maju Sejahtera	Business unit innovation (Go-Sari/Omah Maggot Bantul, Wisata Banjaran, Lumbung Matraman, Warung Kita) The Go-Sari unit focuses on waste management and is developed into maggot cultivation to overcome environmental problems.	Socio-economic innovation Socio-ecological innovation
4.	Tridadi Makmur	Expansion of Aglaonema Park business unit as a buying and selling product & tourist attraction	Socio-economic innovation
5.	Tirta Mandiri	Clean water management innovation. Innovation of Umbul Ponggok business unit, water tourism.	Socio-ecological innovation Socio-economic innovation
6.	Gemblegan	Utilization of information & communication technology in marketing/promotion and product sales. Management of tourism businesses, swimming pool parks, and minimarkets	Socio-technical innovation Socio-economic innovation

Based on the table above, we can see the product and process forms of VOEs social innovation. Social innovation involves the development and advancement of ideas, products, services, and new models that impact the improvement of individual and collective well-being [10;11]. Social innovation is a process or product that has a practical solution or change for social problems or environmental problems in support of sustainable development [8]. The social innovation is directed at the sustainable development goals as formulated in the existing SDGs. The social innovation above shows the existence of a social mission with various efforts by utilizing the resources available in each village. This is very closely related to social entrepreneurship. Social entrepreneurship is a movement with a social mission that seeks opportunities and processes them with innovation and continuous learning. This is supported by the readiness to act with limited resources [21].

The social innovation carried out by VOEs above also shows the development of VOEs as a business entity that reflects the growth of social entrepreneurship and has the potential to become a driver of village economic growth. Two key things in social entrepreneurship put forward by Bill Dayton, founder of the Ashoka Foundation, are the existence of social innovation that can change society and the existence of individuals with vision, creativity, and innovation [23].

The existence of innovation indicates the increasing progress of VOEs as a form of social entrepreneurship in villages from time to time, where what VOEs does refers to the development and implementation of new solutions in solving social problems in rural areas. Social innovation is the process of creating and putting into practice innovative ways to successfully solve social concerns [7]. The list of social innovations in table 1 further expands community opportunities and services. Through the creation of creative solutions or inventions, social innovation opens up new options for the community, including more business or market opportunities, employment prospects, and more effective public services [8].

Based on the results of research in six VOEs, socio-economic innovation is a social innovation carried out by all VOEs. Socio-economic innovation ini is an innovation of economic models and business model [5]. VOEs has implemented a more advanced business model with the innovation of business units and expanding business centers, networks, and business partners so that the field of movement and reach of VOEs business becomes more. The products produced by VOEs are also increasingly marketed to other areas not only for consumption by the local community. This can certainly increase community income and expand employment opportunities.

Socio-technical innovation is innovation in human-technology interaction [5]. Some real examples carried out by BUMDes Binangun Jati Unggul and Gemblegan are the use of financial software, product sales with barcodes, and the use of IT in product promotion. This shows the interaction between humans and technology in the operationalization of VOEs. If VOEs can continue to encourage socio-technical innovation, it is hoped that it will increase VOEs' income which will have an impact on the welfare of rural communities.

Socio-ecological innovation is an innovation in human-environmental interaction [5]. Human and environmental interaction is demonstrated by concern for caring for and preserving the environment. BUMDes Amarta, BUMDes Guwosari Maju Sejahtera, and BUMDes Tirta Mandiri have carried out a series of social innovations by processing waste and clean water management. The waste problem which is currently a major problem in Yogyakarta due to the closure of the TPA in Yogyakarta which has caused a lot of piles of waste around the community has inspired VOEs to process the waste into products with sales value such as maggots. VOEs collaborates with waste banks, youth organizations, PKK, and the community to sort waste and then process it. This collaboration produces ideas and resources, which lead to holistic and sustainable solutions to complex social problems [13;14;15]. If VOEs can continue to optimize this collaboration, it will allow for the emergence of other social innovations in the future. This seems simple but becomes a social innovation because it plays a role in achieving social goals, namely solving social problems. Social innovation is new ideas that succeed in achieving social goals [12].

Social problems in each village are different, but in general, the problems faced are poverty and lack of job opportunities. With the potential in each village, the ways to solve social problems as a form of social innovation can also be different, all of which are aimed at community development. The more social problems solved, the more community development promoted [8].

Social innovation carried out by VOEs will have an impact on social change in rural communities. Rural community development can be achieved with optimal and targeted social innovation in solving social problems. The above matters are closely related to social entrepreneurship. In social entrepreneurship, entrepreneurial principles are used to create, improve, and maintain initiatives that have a positive impact on society [17;18]. Initiatives that emerge in the form of VOEs social innovation have a positive impact on rural communities, especially in achieving SDGs 1 (no poverty) and SDGs 8 (decent work & economic growth).

These social innovations are very relevant to social entrepreneurship where there is the development of new ideas and the utilization of opportunities to solve existing problems [22]. Social innovation carried out by VOEs needs to be supported by various parties, especially the government, to ensure its sustainability and achievement. Social collaboration is an important element in realizing VOEs' social innovation in the next period so that it can become an agent of social change through solving various social problems, especially achieving SDGs 1 and SDGs 8.

4. Conclusion

The finding show that the 3 types of social innovation in the VOEs as a social entrepreneurship, can be followed up with training programs and assistance required by VOEs to increase social innovation as an effort to improve the welfare of rural communities in Indonesia. The government needs to analyze the social innovation mapping that has been carried out by VOEs so that it can be followed up as a program or policy to improve community welfare.

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Cognition, Depression Tendency, and Body Mass Index Profile in the Elderly who Regularly Exercise

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Abstract

Background. Elderly is the age group above 60 years. The aging process is a process that cannot be avoided by someone who is blessed with longevity (elderly). The aging process occurs due to the functional deterioration of the body with a decrease in the anatomical, physiological, and biochemical functions of the body. This makes the elderly very vulnerable to several conditions related to physical, mental, cognitive functions, as well as other degenerative diseases. **Objective**. Describing cognition, depression tendency, and Body Mass Index profile in elderly who regularly exercise. **Methods.** This study is an analytic descriptive study with a cross-sectional design. The instruments used were personal data questionnaire, Mini Mental State Examination (MMSE), Geriatric Depression Scale (GDS)-15, weight measurement, and height. The research subjects were elderly participants of Posyandu Lansia PKK Teratai Perum Nogotirto Gamping Sleman. **Conclusion.** The study subjects were 30 elderly people with an average age of 66,57 ± 5,22 years, mostly female with high school education, and married. Based on MMSE, 86.7% had no cognitive function impairment. Based on GDS-15, most of the subjects had results within normal limits (96.7%) and based on the measurement of Boddy Mass Index (BMI), 46,7% of BMI was found to be within normal limits. The results of this study indicate a statistical relationship between educational factors and the level of cognition and there is no statistical relationship between cognitive impairment based on MMSE, depressive symptoms based on GDS-15, and BMI (based on height and weight) in the Teratai Posyandu group in Nogotirto, Gamping Sleman.

Keywords: Body Mass Index, cognition, depression, elderly, and exercise.

1. Introduction

The mental and physical health of the elderly is a health problem that still requires great attention from both the Government and the community, especially at this time where there is an increase in life expectancy which of course will be accompanied by an increase in the number of elderly people.

According to Law No. 13 of 1998, the elderly are individuals who are 60 years old and above. At 2020 there were 727 million people aged 65 years or older in the world and this number is projected to continue to grow to 1.5 billion by 2050 (BPS 2021). Indonesia itself experienced an increase in the number of elderly people from 18 million (7.56%) in 2010 to 25.9 million (BPS 2021). 2010 increased to 25.9 million people (9.7%) in 2019 and is expected to continue to increase to 48.2 million people (15.77%) in 2035 (Pusat Data dan Informasi Kementrian Kesehatan RI, 2019).

The elderly begin to experience the aging process, both in terms of physical, biological, social and also psychological. The changes that occur are in the form of physical fragility, reduced memory and energy, the appearance of wrinkles, generative diseases, the loss of spouses or family members or friends because they have died, and not having an income because they can no longer work. The changes experienced require the elderly to always adapt or adjust to the conditions of themselves or their environment (Qonita, 2021; Wahid, 2024).

It is estimated that more than 20% of the elderly suffer from mental and neurological disorders, with depression being the most common mental disorder resulting in, impaired physical, social, and cognitive functioning, increased health costs, increased risk of morbidity and suicide, associated with increased disability and mortality. (Bay & Pedersen, 2020; Kadariya et al., 2019; López-Torres Hidalgo et al., 2019).

In addition to the risk of depression, there is also an increased risk of various diseases, such as coronary heart disease, diabetes mellitus, hypertension, metabolic syndrome, cancer, asthma, cognitive disability and dementia. Obesity is a condition where there is an accumulation of fat in the body, exceeding the threshold that will increase the risk of cardiometabolic diseases, cancer, respiratory

disorders, and also joints that will affect the function and quality of life of the elderly. This condition is usually measured using the Body Mass Index (BMI).

2. Method

This study is an analytic descriptive study with a cross-sectional design. The instruments used were personal data questionnaire, Mini Mental State Examination (MMSE), Geriatric Depression Scale (GDS)-15, weight measurement, and height. The research subjects were elderly participants of Posyandu Lansia PKK Teratai Perum Nogotirto Gamping Sleman.

3. Results and Discussion

Sleman Regency is geographically located between 110° 33′ 00″ and 110° 13′ 00″ East Longitude, 7° 34′ 51″ and 7° 47′ 30″ South Latitude. The northern part is bordered by Boyolali Regency (Central Java Province), the eastern part is bordered by Klaten Regency (Central Java Province), the western part is bordered by Kulon Progo Regency (DIY Province) and Magelang Regency (Central Java Province), while the southern part is bordered by Yogyakarta City, Bantul Regency and Gunung Kidul Regency (DIY Province). The area of Sleman Regency is 57,482 Ha or 574.82 Km2 or about 18% of the area of Jogjakarta Special Region Province. The elderly population in Sleman Regency currently reaches 168,527 people. This is about 15 percent of the total population. The life expectancy of the population in Sleman Regency reaches 75.04. This is the highest rate compared to other regencies or cities in Indonesia.

Table 1. Characteristics of research subjects

Variabel	Mean ±SD	N=30	%
Respondent's age (years)	66,57±5,22		
Gender of respondents			
Female		23	76,7
Male		7	23,3
Education level of respondents			
Elementary school		2	6,7
Junior high school		4	13,3
High school		13	43,3
Diploma		4	13.3
Bachelor		6	20
Post-graduate		1	3,3
Marital status			
Married		18	60
Widow/widower		12	40

The study subjects were 30 elderly people with an average age of 66,57±5,22 years. Most of the respondents were female, 27 people (76.7%), 13 people (43.3%) had high school education, and 18 people (60%) were married. Education in Indonesia requires 9 years of study or junior high school level, based on the table of respondent characteristics, only 6 respondents with educational backgrounds up to junior high school (20%) and education above 24 people (80%), so it can be said that most of the research respondents have a fairly high level of education. The high level of education is a common thing because Yogyakarta is a city of education, has easy access to education, and is also located near several well-known universities in Indonesia.

The results of the study state that 60% of the elderly are married (have a partner), this result is not much different from BPS data (2021) where the overall percentage of the elderly who have a partner is 62.91%, more than those who do not have a partner.

Table 2. Mini Mental State Examination (MMSE)

MMSE	N=30	%
Normal	26	86,7
Mild cognitive impairment	3	10
Severe cognitive impairment	1	3,3

Based on the table above (MMSE), 86.7% of respondents did not have cognitive impairment, whilw some respondents had mild cognitive impairment (10%), and severe cognitive impairment (3.3%). The total number of respondents who experienced impaired cognition was 4 people or 13.3%. The results of this study resemble the research at 2021 from Muhammad and Meher in India, which was 13.7% and the research of Giri et al. (2016) in China by 12.6%.

Table 3. Geriatric Depression Scale (GDS-15)

GDS-15	N=30	%
Normal	29	96,7
Depresi	1	3,3

Based on the table above (GDS-15), 96.7% of respondents did not show depressive disorders and only one respondent showed depressive disorders (3%).

The results of this study are higher than the results of Callow et al (2020) who both used the GDS-15 instrument. The study found 63.1% of respondents were not depressed. Nguyen Hang Nguyet et al's research (2021) also found that the majority of respondents were not depressed (73.9%).

Table 4. Body Mass Index (BMI).

BMI	N=30	%
Normal	14	46,7
Less	3	10
Over	13	43,3

BMI assessment of respondents is based on the height and weight (kg/m2) of the respondent. The World Health Organization (WHO) categorizes BMI for adults over the age of 20 years as follows:

a. underweight, < 18.5 kg/m2;
b. normal weight, 18.5–24.9 kg/m2;
c. pre-obesity, 25–29.9 kg/m2;
d. stage 1 obesity, 30–34.9 kg/m2;
e. stage 2 obesity, 35–39 kg/m2;
f. stage 3 obesity, > 40 kg/m2.

Based on the table above (BMI), 46.7% of respondents have BMI values within normal limits, some respondents get results below normal limits (10%) and above normal limits (43.3%). The results of this study are interesting and need to be examined further, because Present study by Kıskaç M. et.al., (2022) suggests that the ideal BMI ranges for young and middle-aged individuals are not ideal for older patients (WHO categorizes BMI). BMI may optimal for a healthy elderly are between 25 and 35 kg/m2, elder with BMI values < 25 and > 35 kg/m2 have a higher risk of balance, mobilization disorders, walking, fall risk, decreased functional capacity, reduction in muscle strength, and malnutrition. Data from that study suggest that the optimum BMI range is 31–32 kg/m2 for female and 27–28 kg/m2 for male.

Based on the table of the relationship between the demographic characteristics of the elderly on the MMSE, GDS-15, and BMI scores (table 5.), a statistical relationship was found between the level of education and the level of cognition. This is shown in the chi square test where the p value is 0.03 (less than 0.05). Elderly with a high level of education will have more “brain reserve” than elderly with a low level of education.

A chi square test was then conducted to find the relationship between MMSE, GDS-15, and BMI scores. The test showed that there was no statistical relationship between the level of cognition, depressive disorders, and BMI. The results of this study are not in line with the results of research by Li et al., (2017) which states that the cognitive function scores of elderly people with depressive disorders are significantly lower than those of elderly people who are not depressed ($p<0.001$). The

results of Muhammad and Meher's research (2021) state that depression in the elderly has a strong and significant relationship with impaired cognitive function. Elderly people who experience depressive disorders accompanied by cognitive impairment/dysfunction will increase the risk of dementia in the future. Failure to detect depressive conditions in the elderly early will have a considerable impact.

Table 5. Relationship between demographic characteristics of the elderly and MMSE, GDS-15, and BMI scores

Variabel (n=30)	MMSE					GDS-15					BMI				
	Normal	Cognition disorder	X^2	df	p	Normal	Depres-sion	X^2	df	p	Normal	Less/ Over	X^2	df	p
Age			0,9	1	1			0,9	1	0,3			0,3	1	0,4
Elderly	19	3				22	0				9	13			
High risk	7	1				7	1				5	3			
Gender			0,2	1	0,5			0,5	1	1			0,5	1	0,6
Female	19	4				22	1				10	13			
Male	7	0				7	0				4	3			
Education			0,03	1	0,02			0,04	1	0,2			0,9	1	1
High	23	1				24	0				11	13			
Low	3	3				5	1				3	3			
Status			0,5	1	0,6			0,2	1	0,4			0,1	1	0,1
Married	15	3				18	0				6	12			
Widow/ widower	11	1				11	1				8	4			

4. Conclusion

The results of this study indicate a statistical relationship between educational factors and the level of cognition, where the relationship increases in strength with the high level of education, seen in the magnitude of cognitive impairment found in elderly respondents with low levels of education.

There is no statistical relationship between cognitive impairment based on MMSE, depressive symptoms based on GDS-15, and BMI (based on height and weight) in the Teratai 2 Posyandu group in Nogotirto, Gamping Sleman. These results may indicate the involvement of other factors that contribute to the occurrence of depression or cognition disorders. Such as exercise that is routinely carried out by this elderly Posyandu group, this needs to be researched further..

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Introducing Indonesian Cultural Heritage: Batik Training with the People of Taipei, Taiwan

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Abstract

The people of Taipei have a high enthusiasm for the arts, creating an environment that supports creative expression and appreciation of culture. With a blend of traditional and modern values, Taipei residents participate in various arts activities, including interactive workshops that positively impact student education, well-being, and creativity. Interest in Indonesian batik has also grown significantly in Taipei, as reflected by various art events and trainings. UNESCO recognizes batik as Indonesia's Intangible Cultural Heritage, highlighting the techniques, symbolism, and culture intertwined in the Indonesian people's daily lives. The collaboration between Yogyakarta State University (UNY) and the National Yunlin University of Science and Technology, Taipei, opens up batik training opportunities in Taipei. This program aims to introduce Indonesian batik, strengthen relations between nations, and enrich art cooperation. The batik workshop UNY organized provides technical knowledge and builds a broader collaboration between Indonesian and Taipei artists. The main goal of this collaboration is to strengthen cultural bridges through the active participation of art communities from both countries. On a larger scale, it is hoped that this collaboration can encourage the development of joint arts education programs, strengthening bilateral relations in arts and crafts.

Keywords: Enthusiasm, Taipei people, batik workshop

1. Introduction

Taipei's people love art, creating an environment that promotes creative expression and appreciation of various art forms. With a rich cultural heritage and rapid development in the creative industry, Taipei residents are often involved in art activities such as painting exhibitions, theater performances, and diverse art festivals. This art culture reflects traditional values while exploring modern ideas, creating a space for collaboration and innovation among artists and art enthusiasts in the city. As such, Taipei has become a vibrant and attractive cultural hub for those who appreciate the beauty and diversity of the arts.

Taiwanese society has a rich background of love for the arts, which is deeply integrated into its cultural identity and social practices. This enthusiasm for the arts is evident in various forms, including traditional performances, contemporary art, and educational initiatives to foster artistic appreciation among the youth. One significant aspect of this artistic engagement is the emphasis on multicultural art education in Taiwan. This educational approach incorporates local cultural elements and engages with global visual culture, allowing for a dynamic exchange of ideas and practices (Mason, 2009). The unique context of Taiwan, characterized by its complex historical and political landscape, provides a fertile ground for artistic expression that reflects local traditions and contemporary influences. This blending of cultures is crucial in shaping a distinctive Taiwanese identity that values artistic diversity.

Moreover, the Taiwanese government actively supports the arts as a means of cultural diplomacy and national identity formation. Promoting local art forms is essential for enhancing Taiwan's global presence and fostering a sense of citizen pride. This governmental backing has led to increased cultural events, exhibitions, and festivals that celebrate Taiwanese art, further embedding the arts into the fabric of society. The role of the arts in promoting social cohesion and individual well-being is also noteworthy. Research indicates that participation in artistic activities, such as dance and music, can improve emotional health and social integration (Horwitz et al., 2022). This trend highlights the societal recognition of the arts as a vital component of community life and personal development.

Additionally, the arts serve as a platform for addressing social issues and fostering dialogue within Taiwanese society. Artistic expressions often reflect the complexities of identity, nationalism, and cultural heritage, allowing for critical engagement with these themes (Chiung, 2007). This capacity for

the arts to provoke thought and discussion underscores their importance in Taiwanese society, as they entertain, educate, and inspire. Taiwanese society's rich background of love for the arts is evident through its educational frameworks, governmental support, and the integral role of the arts in promoting social well-being and cultural identity. This multifaceted engagement with the arts illustrates a deep-rooted appreciation that continues to evolve and shape the Taiwanese cultural landscape.

Based on a journal article reviewed by the service team, students in the Taipei community enjoyed the art workshop because it was interactive and direct, positively impacted education and welfare, and was a means of expression and creativity for students in developing entrepreneurial skills. The study's results also found a process in which the teacher demonstrates the image slowly, and then the students apply it so that a direct and interactive approach occurs. Then, in higher education (W. Lai, 1999). Furthermore, there is student involvement in the importance of art-based interventions in formal education, where art workshops can involve observation and discussion of painted portraits (M. Perry, 2011). This shows that interactive activities that stimulate visuals can attract students' interest. Art and psychological health are essential for students participating in art workshops (G. Kuhn, 2022). An example of an emerging art workshop is a puppet show with the support of various other arts, such as dance, music, and fine arts, as a forum for expressing their creativity and entrepreneurial skills. The relevance of artworks produced by medical students in humanistic medical care education shows that art workshops can facilitate a deep understanding of human experiences and emotions (J. et al., 2014).

The people of Taipei understand that art workshops are a creative activity and a means to build community, exchange ideas, and strengthen cultural ties. With a high enthusiasm for art workshops, the Taipei community demonstrates their dedication to continuously developing and enriching their art and cultural heritage, making art workshops an inspiring medium and a part of their daily lives.

The people of Taipei are very interested in Batik; several events display Indonesian Batik in the Taipei Community. For example, in 2024, 35 Indonesian migrant workers exhibited Nusantara Batik in the Taipei Community and received a warm welcome (T. News, 2024). In addition, a batik fashion show by Indonesian citizens in the center of Taipei City also received a warm welcome from the media in the Taipei community through reviews in its report (Ilmie, 2024). In fact, about 300 more Taipei and other foreign citizens are learning Batik in Taipei (P. Ariefana, 2024). This shows that Indonesian Batik is quite famous in the Taipei community, and the people of Taipei are interested in learning more about the art of Indonesian Batik.

UNESCO recognized Indonesian Batik as an Intangible Cultural Heritage on October 2, 2009. UNESCO considers that Indonesian Batik is made with techniques, symbolism, and culture very attached to Indonesian culture. Indonesian Batik officially became the 3rd Indonesian Intangible Cultural Heritage (WBTb) after the keris and puppets. Batik deserves to be recognized by the world because Indonesian people interpret Batik from birth procession to death. Batik is also a reflection of the cultural diversity in Indonesia, which can be seen from several motifs. Just as the ornamental motifs that appear in the art of calligraphy are acculturation from the influence of Arab culture, then the phoenix motif (firebird) is an acculturation of cultural influences to Indian and Persian influences that appear in peacock motif artworks. Batik-making techniques include written Batik, stamp batik, printing Batik, and screen printing batik. Indonesian Batik is one of the original cultures owned by the Indonesian nation (T. Sujatmiko, 2024), (L. Tysara, 2024), (B. Galih, 2024).

Batik deserves world recognition because it is made with techniques, has symbolism, and a culture that is considered very attached to Indonesian culture[1]. Amid the spirit of cross-border cooperation, Yogyakarta State University (UNY) has established a cooperation agreement (MoU) with the National Yunlin University of Science and Technology of Science and Technology, Taipei Community. This collaboration opens up new opportunities for UNY to expand its positive impact on education and culture on an international scale. With the existence of this agreement, UNY has great potential to support and create a training program in the art of Batik that accommodates the international art community. One of the initiatives that can be realized is a special batik training aimed at the general public in Taipei Society.

By involving residents (Taipei Community), UNY can play a role in introducing the beauty and uniqueness of Indonesian Batik to the Taipei Community community. In addition, UNY can also take advantage of this agreement to provide opportunities for students and students in the Taipei community to learn and explore the art of Batik directly. This will increase their understanding of Indonesia's cultural heritage and strengthen relations between nations in the fields of education and the arts. With the synergy between UNY and the National Yunlin University of Science and Technology of Science

and Technology, this potential collaboration is an essential momentum in expanding the reach of the positive influence of State Universities in Indonesia to the international level.

This activity is supported by foreign cooperation with overseas campuses, namely the National Yunlin University of Science and Technology of Science and Technology, which organized this activity considering the importance of this program for the local community in the Taipei Community. Of course, this will support the improvement of the quality of UNY as well as the achievement of the Main Higher Education Cooperation Indicators (IKU) related to IKU 2, namely students who have experience outside the campus, IKU 3, which is lecturers who carry out activities outside the campus, IKU 5, which is the work of lecturers used by the international community, and IKU 6, which is a study program in collaboration with world-class or international partners.

The batik workshop planned by Yogyakarta State University (UNY) is not only directed at providing and sharing knowledge about the art of Batik. However, it is also expected to open up wider opportunities for art collaboration between Indonesia and the Taipei community. Through this activity, it is hoped that there will be active involvement of the art enthusiast community from both countries, creating a space for exchanging ideas and in-depth experiences. On a more significant level, this workshop aims to build a solid and sustainable cultural bridge between Indonesia and the Taipei Community.

The art collaboration formed through this activity is expected to be the foundation for broader cooperation in art education. The focus can be establishing a collaborative program between the UNY Craft Education Study Program and the Taipei Community. Thus, this cooperation is expected to be the first step to strengthening bilateral relations between the two countries' universities, especially in supporting the exchange of knowledge and culture in the realm of arts and crafts.

The description in the introduction above shows a need for training to introduce Indonesian cultural heritage in the form of a traditional batik workshop that will be held in Taiwan. Based on this exposure, the problems in the field can be identified as follows: 1) Lack of sharing ideas, establishing an international art community and strengthening the culture between Indonesia and the people of Taipei; 2) The need for training/workshops as a forum that inspires and is rooted in daily life related to traditional arts; 3) The people of Taipei are interested in Batik, which is shown by the attitude of wanting to know and learn about Batik but lacking facilities from Indonesian academics/practitioners.

Based on the above problems, the FBSB UNY Foreign Cooperation PKM team will provide solutions in traditional batik training/workshop activities in the Taipei Community. Appropriate problem-solving efforts are carried out in the form of training/workshops. This training/workshop is conducted offline to make it more meaningful and possible to teach and share batik techniques and variations of motifs directly. This training/workshop activity is carried out systematically, from theoretical to practical.

Several steps can be taken to address the need for more idea-sharing and strengthen cultural ties between Indonesia and the Taipei People. First, it is necessary to form an international art forum that is a meeting place for artists, art actors, and art lovers from both countries. Through artist exchanges, art project collaborations, and joint art programs, we can enrich art life in both countries and strengthen intercultural ties. In addition, constructing an international art center can be a concrete symbol of cross-border art collaboration.

Meanwhile, periodic training programs must be organized to meet the need for training and workshops related to traditional arts that inspire and take root in daily life. Collaboration with local communities can ensure the relevance and involvement of the community in traditional arts programs. Using technology to provide distance training can also provide more comprehensive access and support independent learning.

The Taipei people's interest in Batik requires a unique approach. The knowledge and skills exchange program between Indonesian Batik academics and the Taipei community can improve understanding and skills related to Batik. Workshops in the Taipei Society involving Indonesian batik academics can provide a direct opportunity to learn and interact. Encouraging institutional cooperation between Indonesian art institutions and the Taipei Community can also provide the necessary support to meet the learning needs of the Taipei Community related to Batik. With this approach, it is hoped that a closer and mutually enriching artistic relationship can be realized between Indonesia, South Korea, and the Taipei community.

Traditional batik training/workshops are held specifically for beginners who hope to make it easier to learn and make Batik more enjoyable for the people of Taipei. This is expected to improve soft skills, especially batik skills in Indonesian art and culture, which can be used as a form of cultural exchange. The achievement indicators for this second problem will be seen from participants completing questionnaires before and after the workshop activities. The expected target is for 80% of participants to improve their skills in Batik. In addition, workshop products can also be seen from this activity. Apart from the questionnaire, the achievement indicators can be seen from the performance of the training participants. At least 80% of participants participated in this traditional batik workshop activity.

2. Methods

Through discussions and coordination with target partners, this training activity will be carried out online through training and workshops. The presentation of the material is adjusted to the conditions and needs of the participants. The methods applied in this service activity are as follows. 1) Socialization of Activities: At the beginning of the activity, socialization needs to be carried out to convey information widely and build a network of cooperation. Socialization was carried out with flyers by involving partners and the target audience (the general public of the Taipei Society). The role of partners in this activity is to connect activity information to the target audience (the general public of the Taipei Society). The socialization activity will continue with participant registration by the UNY service team with foreign partners (National Yunlin University of Science and Technology of Science and Technology). 2) Presentation of material with lectures, questions, and answers: The following activity is presenting material offline. Participants will be given material on the introduction of Traditional Batik in Indonesia. The material was presented interactively through lectures and question-and-answer techniques. 3) Traditional Indonesian Batik Workshop and cultural arts workshop activities are designed to be carried out offline. The activity venue is in Taipei, and the partner (National Yunlin University of Science and Technology of Science and Technology) has prepared it. The activity is designed to introduce and work together with traditional Indonesian batik. Partners help organize activity venues and offline needs. 4) Simulation and Demonstration (Best Practice): simulation and demonstration activities give concrete examples of traditional Indonesian batik. The UNY team will give direct examples and practice them with participants. 5) Evaluation and Brainstorming: evaluation to measure the success of this program is carried out by product evaluation and evaluation of the meaning of the program. For product evaluation, after the presentation of the material, the results of the training participants' work in the form of batik works will be observed. The activity was declared successful if 80% of the participants could practice until the end. For the evaluation of meaning, at the end of the training, participants and teams will brainstorm to reflect on the training results and the process. This activity was declared successful if at least 80% of the participants stated that they were satisfied and that this activity was beneficial. Furthermore, the details of the materials, activities, time, and roles in the training designed for the participants of this activity are presented in the following table.

Table 3 Training Materials, Time, and PIC

No.	Material	Method	Number of Hours	Executive
1.	Introduction to Indonesian Cultural Heritage: Variety of Indonesian Batik Motifs	Offline, Lectures and Q&A	2 JP	UNY and Partners
2.	Demonstration of the process of writing batik and combination batik (writing and stamp)	Offline, Lectures and Q&A	5 JPY	UNY and Partners
3.	Workshop on batik making	Offline, workshop	5 JPY	UNY and Partners
4	Workshop on batik making	Offline, workshop	5 JPY	UNY and Partners
5	Workshop on batik making	Offline, workshop	5 JPY	UNY and Partners
Number of Hours	22 JP			

The target audience in this program is the people in Taipei, both students and the general public. The target participants of this activity are a total of 25 participants. Based on the target audience, this service team consists of lecturers who will act as presenters of training materials. The training material

is based on the field of each lecturer member of this service team. A service team from the Department of Craft Education will carry out this traditional batik training.

In addition to lecturers, the service team also consists of students. In this activity, students will be tasked with accompanying the training presentation team by lecturers. The role of students in this activity is the preparation for the implementation of training, documentation, and assistance to participants, and several additional activities that are tentative. This activity can also provide credit recognition for students, which can be beneficial for their academic and personal growth. The description of recognition for students is presented in the following table.

Table 4 Recognition of Student Credits

Learning Outcomes	Student Activities	*Learning Hour*	Credits and MK
Hard Skill Students are able to understand and carry out training activities in helping the lecturer service team *Soft Skill* - Collaborate in a team - Time management - *Leadership* - Communication skills - *Critical thinking* - Improvisation skills - Managerial skills	1. Team consolidation (lecturers and students) 2. Assisting with training preparation 3. Assist in the preparation of training modules 4. Help organize meetings 5. Assist with training documentation 6. Assisting in the archive of training activities	45—90	1— 2 MK Customized MHS Study Program

Implementing Science and Technology (IPTEKS) in the batik workshop aims to improve knowledge, skills, and innovation in the art of batik. Some examples of science and technology that can be implemented in the batik workshop between UNY and the Taipei Community are: 1) Batik Making Techniques: The application of technology in the batik-making process, including using more efficient tools and materials. It also introduced various batik-making techniques such as written batik, stamp batik, printing batik, and screen-printing batik; 2) Digital Design for Batik: Using graphic design software to create modern batik motifs. As well as the application of digital technology in developing and regulating batik patterns and designs; 3) Online Interactivity and Education: The use of online platforms (zoom meetings, Google Meeting, cisco Webex, or Big Blue Button) to provide batik training virtually at the advanced service stage. Then, interactive technology can support education and students' understanding of the batik-making process.

In this activity using this online platform, participants in the traditional batik Lukis workshop will learn about: a) Getting to know the basics of batik, such as batik tools and materials. b) Understanding common mistakes and how to correct them. c) Preparation and processing of materials needed in batik. d) Batik practice that is easy for beginners to do. e) Practice making types of designs that are easy for beginners. f) A question-and-answer session will be held to learn more about the richness of Indonesian batik. Applying science and technology in batik workshops is hoped to provide a richer experience, support innovation in batik art, and create a closer relationship between Indonesia and the Taipei people in art and culture.

3. Research and Discussion

Batik training at the National Yunlin University of Science and Technology

The Service Team held the first day of training at the National Yunlin University of Science and Technology with 30 participants. This training began with introductory material about batik, including the history, philosophy, and basic techniques of making batik. Participants were given an understanding of the cultural values contained in each batik motif and the importance of preserving this traditional heritage.

Following the theoretical session, participants engaged in a hands-on learning experience. Guided by the service team, they learned to create batik patterns on cloth using night (batik candles). The dyeing process was also a part of this practical session, where participants experimented with various traditional and modern batik dyeing techniques. The session concluded with each participant successfully creating a unique batik work, and a group photo was taken to commemorate the moment and their batik work. Here's the documentation.



Figure 1. Provision of batik introductory materials



Figure 2. Batik Practice Assistance



Figure 3. Assistance with batik coloring



Figure 4. Batik works

Batik training at the National Yunlin University of Science and Technology

The service team, with their expertise and dedication, held a batik training at PKBM PPI Taiwan, with 25 enthusiastic participants. This activity began with the delivery of introductory material about batik, which explained the history, philosophy, and basic techniques of batik making. Participants were invited to understand the meaning of batik motifs and how batik art has become an important part of Indonesian culture. This introduction is an important foundation for participants to appreciate the process of batik while increasing their knowledge of the traditional art.

Following the introductory session, participants actively engaged in the hands-on practice of making batik under the guidance of the service team. They were taught how to create patterns on the fabric using canting and night (batik candles) and then proceeded to the batik dyeing process. The instructor carefully supervised each stage to ensure participants grasped the correct technique. By the end of the training, each participant had successfully produced their unique batik work. The activity concluded with a group photo session, during which the participants proudly displayed the batik works they had created, marking a successful and fulfilling end to the event.



Figure 5. Providing introductory materials and assisting batik memola



Figure 6. Assistance in batik practice



Figure 7. Assistance with batik coloring



Figure 8. Batik finish

4. Conclusion

The batik training at the National Yunlin University of Science and Technology and PKBM PPI Taiwan showed high enthusiasm from the participants in understanding and practicing the art of batik. In both locations, the introductory material about batik gave the participants an in-depth understanding of the philosophy and basic techniques of batik. Assistance in the practice of batik making and dyeing that is carried out intensively also helps participants master technical skills well so that they can produce unique and meaningful batik works. The resulting works show creativity and a better understanding of traditional Indonesian batik art. Both at PKBM PPI and Yunlin, participants completed their batik works satisfactorily, supported by assistance from a team of experts. The group photo session at the end of the activity is a moment to capture the works and a symbol of togetherness and the success of this training in introducing and preserving Indonesian cultural heritage abroad.

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HOW SHOULD INDIVIDUAL PLANNING BE CARRIED OUT IN GUIDANCE AND COUNSELING PROGRAMS?

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Abstract

Individual planning is one of the components of a comprehensive guidance and counseling program in schools. There are four domains that can be developed through individual planning including academic, personal, social and career. However, in terms of implementation, individual planning has not been well administered compared to basic and responsive services. There are several factors including knowledge of the procedures and implementation of individual planning services themselves in comprehensive guidance and counseling programs. The purpose of this study was to review, identify and analyze various literature findings related to the procedures and implementation of individual planning services in guidance and counseling programs in schools. Through a systematic literature review, it is hoped that it will be able to present a picture of the individual planning service process in various places, both nationally and internationally. The data sources used are reputable e-books and journal articles. Data analysis uses inclusion-exclusion criteria followed up with PRISMA. The results of the literature review provide data that: (1) the core procedures that must be present in individual planning services must start from initial measurement activities, set goals, compile relevant activities, time commitment, create a priority scale, and end with reflection and follow-up plans. (2) The implementation of individual planning services can be started from elementary school age to high school, certainly through various adjustments and needs for student development tasks at that time. The recommendation of this research is that it is necessary to follow up basic, development and applied research so that individual planning services can contribute and be implemented in all schools in Indonesia in particular. A practical and efficient individual planning service model is the dream of guidance and counseling teachers in schools.

Keywords: Individual; Planning; Guidance; Counseling; Programs

1. Introduction

One of the core components of career preparation steps is reaching a career decision [1]. Individuals, especially those entering the transition to adolescence, need to make decisions about higher education [2]. To do this, individuals need to try various ways to identify alternative career choices, and consider the various probabilities of each career possibility, which is known as career exploration behavior [3].

Career exploration is a very important stage in career development, because it is considered as one of the basics or main elements in making career decisions. Career exploration is a time when individuals strive to have a better understanding, especially about information, alternatives, and career choices. Through career exploration, individuals can have a level of self-awareness and knowledge about future work needed in forming a commitment to a career choice. Career exploration behavior as a form of self-assessment and external search activity that provides information to support choices and adjustments. So that career exploration is highly believed to be able to produce positive career development among students [4]; [5]; [6]. Career exploration is part of the stages of career management theory by Briscoe et al., [7] where the orientation of protean career management is related to self-discovery, autonomy, and self-direction [8]. The idea of the concept of protean career management was first put forward by Hall who stated that an individual who adopts a protean career management attitude will have the ability to repackage various knowledge, skills, and abilities themselves to be able to adapt to changes in the environment. A protean attitude will increase awareness of identity in oneself and prepare individuals to be able to manage all changes that occur in the world of the future better [8].

Furthermore, through research by Germeijs and Verschueren cited in Dietrich et al., [9], it was found that career exploration can predict individual adjustment in the transition to high school, for example in terms of commitment to the learning process at school or academic motivation. Other influences can be in the form of career identity achievement by Gushue, Clarke, Pantzer, & Scanlan,

cited in [10]. It is known that this career identity plays a major role in the formation of overall identity according to Erikson, cited in [11]. In addition, career exploration behavior has also been found to influence career decisions and efficacy in making these decisions [6].

Furthermore, the behavior of seeking and processing information related to this career will not only make individuals better understand the suitability of their career to themselves, but also about the career opportunities available, and then prepare themselves to face challenges in career transitions [12]. In addition, in general, this career exploration behavior will help the development of a coherent identity or self [13].

Educational experiences that shape career exploration patterns are consistent with the mainstay of Bandura's Social Cognitive Career Theory (SCCT), which emphasizes how a person's behavior and the environment influence each other. SCCT assumes that people have the capacity to exercise some degree of self-planning or self-direction and that they also encounter multiple factors (e.g., environmental supports and barriers) that can strengthen, weaken, or even override personal plans/goals. SCCT highlights the interaction among three cognitive variables that some people may be able to use to plan and develop their careers: self-efficacy, expectancies of success, and personal goals.

Self-efficacy refers to people's judgments about their own abilities to organize and carry out the actions necessary to achieve a given type of goal (Bandura). This belief is one of the most important determinants of thought and action in Bandura's theory. Self-efficacy is not a unitary or global trait, but is understood as a dynamic set of self-beliefs related to specific action domains and activities. Outcome expectancies refer to beliefs about the consequences or outcomes of performing a particular behavior. Success expectancies involve the imagined consequences of a particular action, for example, "if I do this, what will happen?".

According to the SCCT interest model, self-efficacy and outcome expectancies help shape career interests (i.e., a person's patterns of likes, dislikes, and indifferences in relation to career-relevant tasks). Interest in an activity is likely to develop and persist when people: (a) view themselves as competent (self-efficacy) at the activity and (b) anticipate that engaging in the activity will result in something worthwhile (positive outcome expectancies). When interest is present, it, along with self-efficacy and outcome expectancies, fosters intentions, or goals, to maintain or increase one's involvement in the activity. Furthermore, personal goals, seeking to increase the likelihood of practicing an activity in a particular pattern of achieving good or bad performance, help to refine self-efficacy and outcome expectancies in a continuous feedback loop.

Self-efficacy, success expectations and personal goals in the Social Cognitive Career Theory (SCCT) interest model are important moderators or predictors in career exploration. This needs to be stimulated by a process that increases the relevance of learning opportunities in school and outside school, providing students with access to career development opportunities that combine self-exploration, career exploration, and career planning activities and the development of management skills referred to as individual plans or individual planning [14]. The individual planning service component is the need for all students to work together with teachers and parents/guardians, to systematically plan, monitor, and manage student growth and development and to consider and take action on the next steps, both personally, academically, and career [15]. The process during individual planning services is a collaborative effort carried out together by students, student families, and educators involved (not limited to school counselors). The individual planning service component is the main substance of the counselor's work. Individual planning services provide opportunities for students to develop competencies in attitudes, knowledge, and skills according to their interests, talents, and academic abilities in a group of scientific subjects, as well as abilities in areas of expertise or expertise programs. The identified reality is that only 24% of respondents from 500 students actually visit career counselors [16]. The implementation of individual planning programs in Malang is still far from standard [17]. Counselors also have a lack of confidence in their ability to collect and analyze data, and utilize the results to develop guidance and counseling programs in schools [18]. Counselors who already have the skills to evaluate guidance and counseling programs are afraid of the results of the evaluations that have been carried out, both positive and negative [19].

The results of an exploratory study in the form of a survey of 5 (five) Junior High School Guidance and Counseling Teachers in Surakarta showed that 4 out of 5 Guidance and Counseling Teachers have implemented individual planning services for students. The service strategies chosen include classical guidance and individual counseling, while 1 (one) other teacher has not implemented individual planning services at all. So far, three out of five Guidance and Counseling teachers have developed their

own individual planning service models according to their knowledge in a paper-based manner. When the researcher provided an alternative individual planning service model assisted by a website, the Guidance and Counseling teachers welcomed it very positively, enthusiastically and said that this product was needed and could be implemented in schools. What further strengthened this was that teachers and students had been familiar with and accustomed to using websites to access and receive information on the teaching and learning process at school. However, they hoped that the individual planning service model that would be developed should be easily accessible to students and teachers, simple, and practical. The individual planning service model assisted by a website must be easy to use, interactive, and not reduce the meaning and purpose of the service itself.

On several occasions of the Junior High School Guidance and Counseling Teachers' Conference (MGBK) in Surakarta, the Guidance and Counseling Teachers are eagerly awaiting innovation and individual planning service models, especially as a product of the current independent learning curriculum implementation. One of the Guidance and Counseling Teachers stated that the contribution of individual planning as one of the components of comprehensive guidance and counseling services in the independent learning curriculum is very crucial, especially regarding the understanding of talents, interests and career information that needs to be constructed from the start, so that when entering the next phase as a form of effort to continue individual development. So that through this design, Guidance and Counseling Teachers already have a history of student career exploration packaged through individual planning services.

The term individual planning can sometimes be confusing to those learning about school counseling programs. One might logically assume that because the word individual appears in the name of a component of guidance and counseling, that this service is associated with a form of intervention for students on an individual basis. As it relates to this program element, the word individual actually means that the counselor uses whatever methods are most appropriate to help individuals make plans for their future [20]. School counselors want to help adolescents make informed decisions by exploring all of their options, using multiple sources of information, and identifying possible outcomes. The purpose of this article is to review, identify, and analyze the literature related to the procedures and implementation of individual planning services in guidance and counseling programs.

2. Method

A systematic literature review consolidates a summary of publications in a particular field. A literature review is conducted with the aim of defining relevant concepts, synthesizing evidence, identifying methodologies, and identifying research gaps [22]. The methodology used in this review is PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which was initiated by Liberati et al., with the aim of organizing the evidence on individual planning in schools using a structured method [23].

Steps in the development of a systematic review include: (1) formulating research questions; (2) establishing inclusion and exclusion criteria for the articles to be used; (3) formulating a literature search plan; (4) identifying articles in the selected databases; (5) providing an assessment or rating of the quality of the articles identified according to predetermined criteria; (6) systematizing the information; and (7) interpreting and presenting the results obtained.

The purpose of using the wildcard (*) in the search formula is to obtain all the necessary information. The criteria for articles to be included in this review are: a) related to the central topic of individual planning in schools, b) research conducted between 2018 and 2023, and c) full-text articles in English. As stated by González-Pereira et al., a three-year period is broad and dynamic enough to cover the majority of citations and to measure the evolution of scientific journals [24].

Together with other articles, the articles used by the researcher present data on individual planning in schools, as well as related variables and approaches that can be used for future research. In doing so, the researchers followed a four-step review process recommended by PRISMA (see Figure 1).

Table 1. Basic Inclusion Criteria

1	Studies published above 2000
2	Primary studies published in journals Web of Science (WOS) or Scopus
3	Papers that are written in English

4	Research that has a central theme or an explicit connection to individual plan in schools
5	Articles in the social science, included: academic, career, psychology and education

Table 2. Basic Exclusion Criteria

1	Studies older than 2000
2	Literature review, as well as books, book chapters, working papers and conference proceedings
3	Papers that are not written in English
4	Research that has not central theme or an explicit connection to individual plan in schools
5	Articles in the non-social science

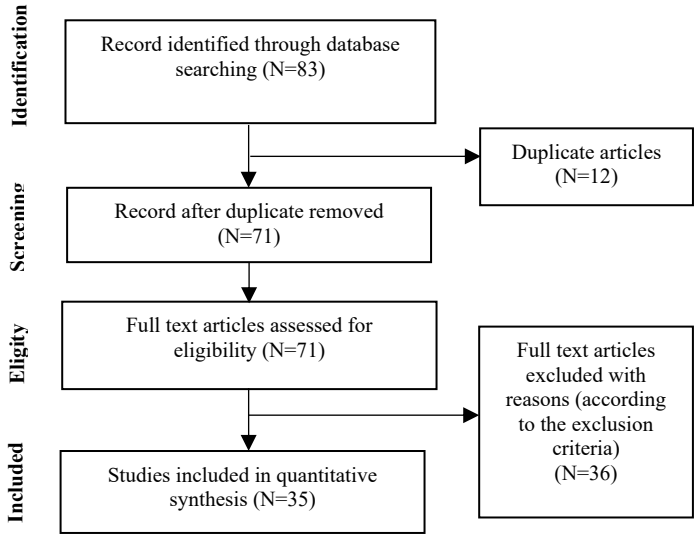


Figure 1: Flow Diagram Prisma

3. Results and Discussion

3.1. Individual planning service procedures

The term individual planning can sometimes be confusing to those learning about school counseling programs. One might logically assume that because the word individual appears in the name of the guidance and counseling component, this service is associated with a form of intervention for students on an individual basis. As it relates to this program element, the word individual actually means that the counselor uses whatever methods are most appropriate to help individuals make plans for their future [20]. School counselors want to help adolescents make informed decisions by exploring all of their options, using multiple sources of information, and identifying possible outcomes.

The individual planning service process is a collaborative effort between students, their families, and the educators involved (not limited to school counselors). [21] provides the following explanation of roles and responsibilities:

a. Students:

(1) All students develop and maintain their individual plans with guidance and support from parents/families and school personnel. (2) Students learn and practice skills to become independent and support their learning. (3) Through the individual planning process, students become reflective individuals who discover and reflect on their personal strengths, interests, and needs, and how they learn best.

b. Educators:

(1) All educators share responsibility for facilitating the development and implementation of individual plans. (2) Ensure that students have regular and adequate opportunities to review and revise goals, plans, and reflect. (3) Educators use individual planning data to identify additional experiences that can lead students to achieve their goals, including course selection and/or scheduling at the secondary school level

c. Families:

(1) Families have access to their child's individual plan and are actively involved in the individual planning process. (2) This allows families to engage in conversations with their children about their choices, learning experiences, and future goals and allows families to provide input into their child's education.

d. Administrators/Principals:

(1) Are responsible for developing policies that support a responsive individual planning process, including monitoring its effectiveness. (2) Support this process by providing adequate resources and communicating with the community or professional community at large about the benefits of the individual planning process.

Practitioners work with clients to develop individualized plans that identify a sequence of resources and activities to help clients achieve their goals for career problem solving and decision making. Creating an individualized plan involves a modified brainstorming process designed to first maximize creative elaboration of possible resource and activity options, then select and sequence the most promising options. Brown's [26] sequence for completing an individualized plan involves (1) identifying resources or activities, (2) recording the purpose for using the resource or completing the activity, (3) recording the estimated time commitment, (4) recording the purpose achieved by using the resource or completing the activity, and (5) selecting a priority order for using all resources and completing all activities.

Furthermore, Gysbers & Henderson [15] added that in an effort to implement an individualized planning system through the use of effective guidance skills, it is necessary to (1) plan sessions carefully; (2) present accurate, relevant, unbiased information; (3) involve students in educational and career planning; (4) interpret test results accurately and appropriately; (5) select individualized planning activities that are consistent with the student's needs and are identified as the highest priority based on established goals.

As one of the components of comprehensive guidance and counseling services, individual planning is chosen as an intervention strategy to improve career exploration because it describes a series of strategies to address students' special educational needs in various situations. They can keep students engaged in their learning process and help them to be confident about themselves. Individual planning must be: (1) holistic in its approach to student characteristics (2) age and developmentally appropriate (3) flexible and future-oriented (4) based on student strengths with a focus on potential. Furthermore, the stages in individual planning are; (1) Understanding students; (2) Setting goal plans; (3) Planning programs; (4) Implementing programs; (5) Monitoring and evaluating [25].

In developing individual planning, practitioners (teachers) work with students to identify the sequence of individual resources and activities to achieve their goals, for career problem solving and decision making. Individual planning involves a modified brainstorming process designed to maximize the creative elaboration of possible resources and activities, then selecting and sequencing the most promising options. The sequence of individual planning involves (1) identifying resources or activities, (2) recording the purpose of using resources or completing activities, (3) recording the estimated time commitment, (4) recording the goals achieved by using resources or completing activities, and (5) selecting the priority sequence for using all resources and completing all activities. Then the article [26]

states the 5 (five) stages of developing individual planning services: (1) Develop learning goals: Planning goals to develop or improve individual abilities in the current role or to plan career advancement. (2) Conduct a self-assessment (Melakukan aset diri): This is the stage where individuals not only learn to identify their strengths and weaknesses, but think ahead to assess whether they have the relevant skills needed to advance from their current career stage. (3) Determine the learning styles (Menentukan gaya belajar): At this stage, individuals identify and analyze their learning habits. (4) Identify learning activities to support the goals (Mengidentifikasi aktivitas belajar untuk mendukung tujuan): At this stage, individuals must consider what actions they will take or learning activities they will do to achieve their goals. (5) Put your plan into action (Melaksanakan Rencana): The stage of reviewing self-progress to ensure that learning is going according to plan and working on the next follow-up plan.

3.2. Implementation of individual planning services

The individual planning services process should ensure that all students are given the opportunity to develop and revise transition goals that encompass successfully moving from elementary to middle school, from high school to college opportunities. Educators, students, and families involved need to agree on and document the supports, programs, resources, and placements needed to help students progress through grade levels. In a timely manner, the individual planning services process will provide meaningful opportunities to develop postsecondary goals that are informed by reviewing assessments and activities in which students have participated over time [21].

Gysbers & Henderson [15] stated that forms of individual planning include assessment, educational and vocational planning, and placement. Research has shown that individual planning interventions can have a positive impact on the development of students' career plans. There is some support for both basic and responsive service activities such as social skills training, family support programs, and peer counseling [27]. Individual planning activities help all students plan, monitor, and manage their academic achievement as well as their personal/social and career development. Building on this foundation, the individual planning component of the guidance program will help high school students begin planning for the future and will continue to support them in their planning efforts through graduation.

Furthermore, the goal of individual planning by Gysbers & Henderson [15] is to provide effective educational and career planning services in assisting all students, starting in high school, to develop a personal study plan: which is organized around personally valued educational and career goals, which promotes participation in relevant co-curricular and community activities, and which provides a smooth transition to post-secondary options. Gysbers & Henderson [15] added that in an effort to implement an individual planning system through the use of effective guidance skills, it is necessary to (1) plan sessions carefully; (2) present accurate, relevant, unbiased information; (3) involve students in educational and career planning; (4) interpret test results accurately and appropriately; (5) select individual planning activities that are consistent with student needs and identified as the highest priority based on established goals. As a form of support for the above opinion, Sampson, Peterson, Reardon, and Lenz [28] stated that individual planning is one of the stages of the Seven-Step Service Delivery Sequence as a form of Individual Case-Managed Services involving the use of career resources in oneself guided by practitioners (teachers) in the office space individually, in the classroom, or in group settings with students who have low career choice readiness. One district in the United States according to Schwellie-Giddis & Kobylarz [29] to achieve the integration of career and academic development, the following steps are presented: (1) Grades 1-5: students develop self-awareness and work values. They are introduced to careers and technology. (2) Grade 6: counselors, teachers, and parents help students assess their talents, abilities, and personal interests and then connect those qualities to the future. Students also learn the role of technology in work. (3) Grades 7-9: students set career-oriented goals and develop a 3-year study plan for junior high school that supports their goals. Students, parents, and educators review each other's plans. (4) Grades 10-12: During high school, students are exposed to an "applied curriculum" that relates academic concepts to the workplace.

Several individual planning models are provided in an effort to help all students and parents understand, monitor their growth and development, solve problems, and make informed decisions. These models include assessment activities, information, and planning that are tailored to developmental needs appropriately and effectively. The hope is that students will be able to plan, monitor, and take the next steps in implementing their plans. Relevant to the above, [30], [31] and [32] identify various ways in which school counselors can use computer technology to work more efficiently

and help students succeed. They provide and disseminate information through e-mail, Web sites, e-newsletters, and online journals; distance learning through video conferencing and other online learning; helping students develop individual plans through computerized data storage and electronic registration (telephone and Internet); exploring college and career information through Web sites and guidance information systems; using computers as counseling tools; networking; coaching and supervision. Research suggests that individual planning interventions can have a positive impact on the development of students' career plans. Individual planning activities according to Gysbers & Henderson, [15] are one component of comprehensive guidance and counseling services in helping all students plan, monitor, and manage their academic achievement as well as their personal/social and career development. The foundation for individual planning will be established during the elementary and middle school years through guidance activities. Building on this foundation, the individual planning service component of the guidance program will assist high school students as they begin to plan for the future and will continue to support students in their planning efforts through graduation.

Individual planning is a student-directed activity to customize learning opportunities and experiences during high school, broaden perspectives and support goal achievement. Individual planning represents interests, needs, supports, training options (including access to college majors), transition placement, and other learning experiences both in and out of school. This information results in a program of study or major that leads to postsecondary skills [21].

Individual planning is designed to be used in a one-to-one service setting where teachers and students together will identify and periodically review students' progress toward their career goals [33]. Individual planning describes a series of strategies to address students' specific educational and career needs in a variety of situations. They can keep students engaged in their learning process and help them become confident about themselves [26].

Thus, individual planning is a promising practice that has been described as an effective strategy to help students with school and career readiness goals [14]. Individual planning is a strategy and process that students use with support from school counselors, teachers, and parents to determine career goals and postsecondary plans [34].

Individual planning system according to Gysbers & Henderson [15] is available and helps all students and parents to understand and monitor student growth and development, solve problems, and make wise decisions. This system includes assessment activities, information, and placement according to career levels and meets the developmental needs of students appropriately and effectively in planning, monitoring, and taking the next steps in implementing their plans. Individual planning also has goals, including fully involving individuals with other people or relevant environments in the planning process, by allowing the use of media for service coordination, and identifying valuable information for individual self-development [35]. Individual planning becomes a flexible roadmap that students can follow during their junior and senior high school years and as they transition to post-secondary education, either to college, courses, or the world of work [34].

Individual planning supports personalization and skills by identifying information about a student, it is a dynamic process that maps academic plans, and reflects the unique set of interests, needs, learning goals, and graduation requirements of each student. The American School Counselor Association's individual planning services direct each student's development to meet the ASCA standards contained in the Rhode Island Framework for Comprehensive K-12 School Counseling Programs, culminating in the student's achievement of goals in three domains: academic, career, and personal/social.

a. Academic domain:

(1) All students will acquire attitudes, knowledge, and skills that contribute to effective learning in school and throughout life. (2) They will leave school with the academic preparation essential to choosing from a variety of postsecondary options, including employment and postsecondary education. (3) They will understand the relationship of academics to the world of work and to life at home and in the community.

b. Career domain:

(1) All students will acquire the skills to explore the world of work in relation to self-knowledge and to make appropriate career decisions. (2) They will implement strategies to achieve future career goals with success and satisfaction and they will understand the relationship between personal qualities, education, training, and the world of work. (3) Career-related activities in

individual planning include: goal setting, career exploration and awareness, plans to achieve career goals, and reflection.

c. Personal-social domain:

(1) All students will acquire knowledge, attitudes and interpersonal skills to help them understand and respect themselves and others. (2) The personal/social component of individual planning includes at least the following features: exploring interests and activities, meeting needs, setting goals, reflecting on decisions that will shape the course of life. It is expected that through individual planning services all students will acquire the skills to explore career and work options in relation to self-knowledge and to make informed career decisions. They will use strategies to achieve future career goals with success and satisfaction and will understand the relationship between personal qualities, education, training and the world of work (ASCA). Career-related activities that students should document in career planning services include: goal setting, career exploration and awareness, plans to achieve career goals, and reflection. If necessary in special cases, internships and experiences and skills related to career plans or jobs should also be prepared.

4. Conclusion

This study highlights the importance of individual planning as an integral component in guidance and counseling services. The findings of the study indicate that individual planning can help individuals cope with various challenges faced, such as learning difficulties, social problems, and future uncertainty. Thus, individual planning can contribute to improving the overall well-being of individuals.

Individual planning in the context of guidance and counseling has a very crucial role in supporting individual self-development. Through a structured planning process, individuals can gain a deeper understanding of their potential, interests, values, and life goals. Thus, they are able to formulate realistic goals and develop effective action plans to achieve these goals.

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BRANDING STRATEGY OF PUBLIC ELEMENTARY SCHOOLS IN THE CITY YOGYAKARTA

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Abstract

School branding is a strategic effort to create a positive identity and image for schools in the eyes of the community. The majority of public elementary schools in Yogyakarta have yet to implement effective strategies. This study aims to analyze the branding strategies applied by four public elementary schools in Yogyakarta: SD Negeri Puro Pakualaman 1, SD Negeri Sayidan, SD Negeri Ungaran 1, and SD Negeri Pujokusuman I. The selection of these schools is based on student interest over the past three years. Additionally, this research examines the challenges in implementing school branding strategies. The approach used is qualitative, with data collection techniques including in-depth interviews, observations, and documentation. Data analysis follows the Miles and Huberman model, which involves an interactive analysis method that includes data collection, data reduction, data presentation, and conclusion drawing. Triangulation in this study employs both technique and source triangulation. The results indicate that the branding strategies of public elementary schools in Yogyakarta include: (1) the implementation of flagship programs and unique school characteristics, (2) the creation of school slogans, (3) the maximization of graduate quality, and (4) the utilization of information technology and social media. The challenges faced in implementation include community stigma towards the schools, limited resources, and suboptimal use of digital platforms.

Keywords: strategy, school branding, school existence, elementary school

1. Introduction

Primary education is an important stage in building the foundation of knowledge and character of the younger generation. Primary education provides basic knowledge and skills essential for continuing education to the next level [1]. Children learn reading, writing, numeracy, science, and social sciences which serve as a foundation for studying various other fields of science. Primary education instills important moral and character values such as honesty, discipline, cooperation, and responsibility. This helps children to grow into moral and responsible individuals in society. In this era of globalization, schools are not only required to provide quality education, but also need to have competitiveness in order to attract the interest of prospective students. One strategy that schools can take to improve their competitiveness is to build strong branding [2].

School branding is an attempt to create a unique and positive identity and image for the school in the eyes of the community. School branding can help increase public awareness of the existence and excellence of schools, build trust and credibility of schools, increase prospective students' interest in enrolling in schools, and strengthen student and parent loyalty to schools [3] .Effective branding can also increase public awareness of the existence and educational offerings of schools. This can attract new students and make old students feel at home and loyal to the school. Good branding can strengthen ties with school stakeholders, such as parents, alumni, and the surrounding community. This can be a valuable source of support and collaboration for schools. Branding that engages the entire school community can reinforce a positive school culture, uphold certain values, and foster pride and belonging for the school. As such, implementing a proper and effective branding strategy becomes an important decision for schools that want to grow, compete, and provide the best education for their students.

State Elementary Schools in Yogyakarta City are faced with fierce competition in attracting the interest of prospective students [4]. In addition, the number of students from year to year has decreased. Demographic factors, namely the small number of people of productive age, thus affecting the number of school-age children also add to the problems of elementary school. This happened because the number of state elementary schools is quite large, based on the latest data there are 89 state elementary schools from 14 sub-districts. The availability of private schools that offer various excellent programs also makes it mandatory for State Elementary Schools to do branding, there are at least 76 private

elementary schools in Yogyakarta City. In addition, people today already have many sources of information so that their expectations for the quality of basic education are very high.

School branding has emerged as a critical strategy for educational institutions to establish a strong identity and attract students in a competitive academic landscape. In Yogyakarta City, Indonesia, public primary schools increasingly recognize the importance of branding to enhance their reputation and enrollment. This study focuses on the **branding strategies** implemented by primary schools in Yogyakarta City and the factors influencing their effectiveness.

By examining the various branding initiatives these schools undertake, this research aims to identify successful practices and challenges faced in the context of Yogyakarta City's educational landscape. The study will delve into specific branding elements such as **school logos, slogans, websites, social media presence, and community engagement activities**. Additionally, it will explore the factors that contribute to the perception and acceptance of school brands among parents, students, and the wider community.

Understanding the dynamics of school branding in Yogyakarta City can provide valuable insights for educational policymakers, school administrators, and branding professionals. The findings of this study may inform the development of effective branding strategies that can enhance the overall quality and attractiveness of primary education in the city.

Based on this background, this research describes the branding strategy carried out by public elementary schools in Yogyakarta City and its challenges.

2. Method

This research uses a qualitative approach. The qualitative research methodology was employed to delve deeply into the branding strategies of primary schools in Yogyakarta City. Data collection involved a combination of semi-structured in-depth interviews with school administrators, teachers, and parents, participant observations of school activities and events, and document analysis of school materials such as brochures, websites, social media content, and annual reports.

Data analysis was conducted using the grounded theory approach, following the iterative process outlined by Miles and Huberman. This involved cycles of open, axial, and selective coding to identify key themes and patterns emerging from the data.

To enhance the validity and reliability of the findings, triangulation was implemented. Methodological triangulation was achieved by using multiple data collection methods, while source triangulation involved cross-referencing data from different sources, such as interviews, observations, and documents.

3. Results and Discussion

The analysis of the promotional strategies employed by the four elementary schools in Yogyakarta revealed distinct approaches tailored to their unique identities and objectives.

SDN Pujokusuman I, a heritage school, leveraged its cultural significance through community engagement activities and publications. The school's focus on extracurricular excellence and quality education was a key selling point.

SDN Ungaran, known for its academic achievements, emphasized its prestasi (achievements) through various channels, including social media and website content. The school's international collaborations and digitalization efforts showcased its commitment to innovation.

SDN Puro Pakualaman I, a school rooted in local culture, highlighted its Yogyakarta-based identity and community partnerships. The school's unique programs, such as archery and batik, attracted students interested in cultural experiences.

SDN Sayidan focused on character development and religious education. The school's madrasah diniyah program and emphasis on moral values were attractive to parents seeking a holistic education for their children.

In terms of digital platforms, all four schools utilized social media, primarily Instagram and Facebook, to disseminate information about their activities and achievements. However, the extent of social media engagement and the quality of content varied across the schools.

Overall, the results suggest that effective school branding in Yogyakarta involves a combination of strategies that align with the school's identity, leverage its unique strengths, and engage with the community through both traditional and digital channels. While each school adopted different approaches, the common thread was a focus on showcasing the school's distinctive qualities and benefits to prospective students and parents.

The findings of this study offer valuable insights into the diverse promotional strategies employed by elementary schools in Yogyakarta and their effectiveness in attracting students and building positive school reputations.

The analysis revealed that schools with distinct identities and unique selling points were more successful in differentiating themselves from competitors. SDN Pujokusuman I's heritage status, SDN Ungaran's academic achievements, SDN Puro Pakualaman I's cultural focus, and SDN Sayidan's emphasis on character development all contributed to their unique appeal.

Social media played a crucial role in promoting schools, but the quality and frequency of content varied significantly. Schools that consistently engaged with their audience through informative and engaging posts were more likely to attract and retain followers.

Community involvement emerged as another key factor in successful school branding. Schools that actively participated in community events and fostered partnerships with local organizations demonstrated their commitment to social responsibility and strengthened their connections with the community.

However, challenges remain in implementing effective school branding strategies. Limited resources, lack of expertise in marketing and communications, and competition from other schools can hinder efforts to create a strong brand identity. Additionally, negative perceptions or stigma associated with certain schools can be difficult to overcome.

To address these challenges, schools may consider.

Developing a comprehensive branding strategy that aligns with their mission, vision, and values.

Investing in professional development for school staff to enhance their marketing and communication skills.

Leveraging technology to create engaging and informative digital content.

Building strong relationships with the community through partnerships and collaborations.

Monitoring and evaluating the effectiveness of branding efforts to make data-driven adjustments.

Future research could explore the long-term impact of school branding strategies on student enrollment, academic performance, and overall school satisfaction. Additionally, investigating the role of branding in fostering a positive school culture and climate would be a valuable area of study.

4. Conclusion

The results indicate that the branding strategies of public elementary schools in Yogyakarta include: (1) the implementation of flagship programs and unique school characteristics, (2) the creation of school slogans, (3) the maximization of graduate quality, and (4) the utilization of information technology and social media. The challenges faced in implementation include community stigma towards the schools, limited resources, and suboptimal use of digital platforms.

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EDUCATION AND EMPOWERMENT SERVICE PROGRAM AT HALFWAY HOUSE IN THE SPECIAL REGION OF YOGYAKARTA

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Abstract

This research focuses on developing educational and empowerment service programs at halfway houses in the Special Region of Yogyakarta with the objectives of: 1) producing an education and empowerment service model that is feasible and effective for use in halfway houses in the Special Region of Yogyakarta; (2) knowing the feasibility of the service model; (3) knowing the practicality of the model; and (4) determine the effectiveness of the education and empowerment service model at halfway houses in the Special Region of Yogyakarta. The research method used is Research & Development (R&D) which refers to the Borg & Gall development procedure which consists of the steps of analyzing the potential and problems of education and empowerment program services, data collection and planning, making initial products, initial trials, product revisions, testing. product trials, field use trials, final product revisions, product dissemination. The research location is a halfway house in the Special Region of Yogyakarta. Validation test subjects were carried out by experts in the field of community empowerment. The product trial subjects were residents of the halfway house. Data collection techniques use questionnaire instruments and test questions in the form of pre-test and post-test. Data from feasibility testing and practicality testing are analyzed by calculating the average score which is then categorized using product feasibility criteria. The results of this research produced a prototype for developing educational and empowerment service programs at halfway houses through the input, process and termination stages. In addition, the education and empowerment service program uses a partnership and collaborative model with various parties.

Keywords: service programs, education, empowerment, halfway houses

1. Introduction

The Special Region of Yogyakarta has a number of halfway houses which function as temporary residences for people who are vulnerable to social problems. Halfway houses are a vital environment for residents to receive physical and mental support.

A halfway house is a facility or temporary shelter that provides shelter for individuals or groups who need protection or support in special situations. The concept of a halfway house has the aim of providing temporary shelter, providing protection, and supporting recovery or independence for those in need [1-6]

In the midst of attention to the recovery of social problems faced, aspects of education and empowerment at Halfway houses need serious attention. Education is considered the primary means of empowering individuals and groups. By providing access to quality education, a person can develop the skills, knowledge and attitudes needed to participate actively in community life [7-11]

The concept of "Education as a Means of Empowerment" refers to the idea that education is not only a process of imparting knowledge and skills, but also as a tool or means for empowering individuals and society at large. In this framework, education is considered a means of providing individuals with the power, knowledge, and skills so that they can take an active role in everyday life, overcome challenges, and participate productively in society.

Education can be an instrument for achieving equality and justice in society. Through inclusive and human rights-oriented education, social differences can be overcome, and access to opportunities can be expanded. Education for Equality and Justice is a concept that emphasizes the importance of creating an education system that provides equal access, opportunities and treatment for all individuals, regardless of social, economic, ethnic or physical background. This concept seeks to overcome

disparities and inequalities that may arise in the educational context, as well as ensuring that every student has an equal opportunity to develop his or her full potential [12-18]

Empowerment can be achieved by providing knowledge and skills to individuals. Education that facilitates the development of practical skills and contextual knowledge can empower a person to overcome challenges in everyday life. Empowerment through knowledge and skills is a concept that emphasizes the importance of giving individuals the tools necessary to take control over their lives through the development of relevant knowledge and skills [19-21]. This concept believes that by empowering individuals through education and skills development, they can become agents of change in their own lives and in society.

Education in halfway houses is often faced with a number of challenges, including limited access and a lack of programs that meet residents' specific needs. Residents of halfway houses, the majority of whom require intensive care, often have difficulty accessing educational services. This can result in a reduction in the quality of life and educational opportunities they would otherwise enjoy. The low involvement and participation of Shelter Home residents in education and empowerment programs can be a serious problem. Factors such as lack of understanding, lack of motivation, or health conditions that make it impossible can become obstacles. Halfway Houses also face difficulties in recruiting teaching staff or facilitators who have special expertise in designing and delivering educational programs that suit the needs of Halfway House residents, especially those undergoing health care. A deep understanding of these challenges can help in designing appropriate and effective solutions to improve education and empowerment programs in Halfway houses in DIY.

Apart from that, the empowerment aspect is also crucial for residents of Halfway houses. Empowerment allows them to develop independence and skills that can improve their lives after leaving the Halfway Home. However, existing empowerment programs may not be optimal according to the needs and potential of residents [22].

Lack of public understanding and awareness about the importance of education and empowerment in Halfway houses can hinder community support and participation in the development of these programs. To overcome weak education and empowerment programs, comprehensive efforts are needed, including strategic planning, increasing resources, and close collaboration with related parties. Regular evaluation and active involvement of Shelter Home residents are also important factors in improving the quality and impact of these programs.

Therefore, this research aims to develop an education and empowerment service program that is appropriate to the context of Halfway houses in the Special Region of Yogyakarta. By applying the Research and Development (R&D) method, it is hoped that this research can provide innovative and sustainable solutions, answer the challenges of access to education and independence for residents of Halfway houses, as well as making a positive contribution to the development of the surrounding community. By understanding and improving these aspects, it is hoped that the Shelter Home can become an environment that better supports the recovery and improvement of the quality of life of its residents.

2. Method

The research uses development research methods in the form of Research and Development using the Borg & Gall development model. The research procedure for developing the Borg & Gall development model has 10 stages, namely: Problem Definition, Initial Information Collection, Planning, Initial Development, Expert Validation, revision, Initial Field Trial, Continuous Revision, Full Implementation, and Evaluation.

Validation test subjects are carried out by experts, namely material validation and media validation. The product trial subjects were residents of the halfway house. Data collection techniques use questionnaire instruments and test questions in the form of pre-test and post-test. Data from feasibility testing and practicality testing are analyzed by calculating the average score which is then categorized using product feasibility criteria. Meanwhile, the test results data were analyzed by comparing the average pre-test and post-test scores and then calculating the increase using the Normalized Gain Hake formula.

3. Results and Discussion

The government's special attention to street children only emerged around 1998, namely by establishing halfway houses for street children. The establishment of a halfway house is an effort to provide social welfare services to street children which is based on Article 34 of the 1945 Constitution. A halfway house is a vehicle that will be prepared as an intermediary between street children and parties who will help them. A shelter is an informal process that provides an atmosphere for street children to realize the system of values and norms that apply in society. A halfway house is also said to be the initial stage for a child to obtain further services. Therefore, it is important to create a shelter as a safe, comfortable, attractive and fun place for street children.

Based on the results of research at the information gathering and needs analysis stage which was carried out involving 6 halfway houses in Yogyakarta. The six halfway houses are the Mandiri Children's Halfway House, the Indonesian Dream House Foundation, the Ahmad Dahlan Halfway House, the Realino Community Service Section Foundation, the Indriyanati Foundation, and the Indonesian Children's House.

A description of the information collection and needs analysis from each halfway house is as follows. The Realino halfway house explains that its activities include creating non-formal study groups; mentoring is carried out by getting to know the ins and outs of the child; children who live in dormitories attend formal schools; obstacles in training street children to work, having plans to try to make something to earn income.

The information collection and needs analysis of the LKSA Indonesian Children's House (RAI) includes 49 assisted children; Targeting Kali Code street children and orphans, RAI also accommodates eastern, Papuan children, victims of the KKB war, from Papuan congregations; mentoring through strengthening human resources by providing a kind of seminar for assisted children; The obstacle faced is that the location has not been settled yet.

The Indriyanati Foundation reports that the specifications for assisted children are girls, because there are relatively many problems for women, they focus more on child protection, assisted children prefer friendship because they are less fortunate in life, so the companion is present as a friend; The obstacle experienced was that the foundation experienced ups and downs.

The Indonesian Dream House Foundation companion said that children who have left the mentoring period are given the same opportunity to make changes in their lives. The Foundation also collaborates with stakeholders to make the dreams of the children it supports come true. The obstacle experienced by the foundation is that it is difficult to get assistance.

Representatives from the Ahmad Dahlan Halfway House in the FGD activity expressed their complaints that the conditions of street children in the past were different from now. In the past, children took to the streets because they had no money to meet their food needs, but nowadays they take to the streets to look for money to buy cellphones or motorbike loans. Several cases of street children after completing the mentoring period do not want to be sent home for various reasons, so they are returned to the Social Services of their area of origin [23].

Based on the results of the analysis from data collection and needs analysis, several things can be synthesized related to the need for developing education and empowerment service programs at halfway houses in general, including: the need for standard rules regarding the management of halfway houses, assistance tailored to the needs and background of children, the need for skills training as a provision for children to be independent after leaving the halfway house, there needs to be a change in mindset for street children so that they do not return to the streets, it is necessary to carry out regular evaluations of the programs that have been implemented.

The results of the analysis are then used as the basis for the planning stage. This stage is carried out by planning the initial design of the development model, determining the objectives, scope and general development steps, also identifying the parameters that will be measured to evaluate the effectiveness of the model.

Planning continues at the initial development stage. The initial development stage was prepared in the form of a prototype model for developing educational and empowerment service programs at halfway houses as outlined in Fig. 1 below.

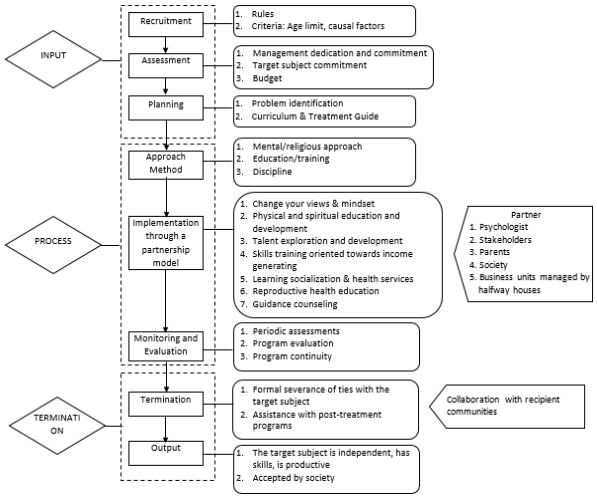


Figure 1. The stages of developing educational and empowerment service programs at halfway houses

Input Stage

Based on this prototype, the stages of developing educational and empowerment service programs at halfway houses include input, process and termination. The input stage consists of recruitment, assessment, and planning. The recruitment process for street children to enter halfway houses needs to be tightened. If the rules for entering a halfway house are too loose, it is feared that the orientation of street children entering the halfway house is just to get the various facilities available at the halfway house, even though in fact the essence of them entering the halfway house is apart from being a temporary shelter, they can also gain experience and provisions. skills and maybe even business capital so that they don't become street children again. Criteria for recruiting street children, for example, need to be done by setting age limits for children, factors causing street children (street children with certain factors such as being neglected, economically limited who can enter halfway houses).

Selanjutnya setelah proses recruitment yakni assessment process. In this process, the dedication and professionalism of halfway house managers is very necessary to support the programs above. Halfway house managers must be truly resilient and have a strong work ethic. This is because handling street children requires a long process. One year may not be enough to eradicate street children, but it requires a fairly long process. Furthermore, target commitment is also an assessment criterion, where only street children who have a high willingness and motivation to change can enter a halfway house. Interviews need to be conducted as a form of assessment to determine the seriousness of the target in participating in the mentoring program. This is important because in the next stage there are many things that must be completed by the target, so commitment and seriousness are absolute factors for achieving program success. The final assessment factor is budget. The halfway house must ensure that its budget is sufficient to be able to implement the assistance program. So far, most halfway houses only depend on government subsidies. However, the small budget subsidy from the government is the reason why many halfway houses have to close down and their activities have decreased. Therefore, halfway houses need to take the initiative to collaborate with the private sector. If the government experiences budget limitations, the government can actually facilitate collaboration between halfway houses and private companies through CSR programs.

The process after the assessment is planning. After the street children/targets are officially accepted as residents of the halfway house, the management begins to identify problems with the targets. This needs to be done to determine alternative solutions that should be provided to overcome the problem of street children. The problem identification process can take place several times until sufficient complete information is obtained from the target subject. In the planning process, it is necessary to prepare a curriculum and guidelines for handling street children in halfway houses so that the program can be sustainable and can be right on target, as well as serving as a guideline for implementing shelter home programs.

Process Stage

The second stage in developing educational and empowerment service programs at halfway houses is the process stage. The process stage includes approach, implementation, monitoring and evaluation methods. Approach methods include mental/religious approaches, education and training, and discipline. A religious mental approach through a family approach also allows halfway house managers to touch on improving the mentality of street children in more depth. Thus, the existence of a halfway house will support the effectiveness of handling street children.

The model for handling street children must be guided by the principle that handling street children is not just about removing children from the streets but must be able to improve their quality of life or at least be able to protect them from exploitative situations. As in the education and training approach, street children must be given education and skills to be able to gain access to resources. Mental development based on education and spiritual and physical development will make street children better prepared to face problems that occur in the surrounding environment while also preparing street children to be able to re-socialize with the surrounding community.

Education and training programs held in halfway houses must also be oriented towards changing the mindset of street children [24]. There is no meaning in implementing educational programs, training and economic capital assistance provided by the government if it is not followed by changing the views and mindset of street children. Education and training programs implemented in halfway houses must be directed at how to prepare children to work in the informal sector and small/medium businesses. Psychological approach methods are also important so that after completing their education and training from the shelter home, street children are truly ready to be accepted into society.

In the disciplinary approach, street child managers need to apply a kind of punishment to street children who are disorderly and violate the rules set by the halfway house. By accustoming children to be disciplined, it is hoped that the strong mental character of street children will be formed and later when they return to society they will be able to comply with various rules and norms that have developed in society.

Implementation of the development of education and empowerment service programs at halfway houses is carried out through a partnership model. The success of coaching street children is also determined by the ability to change the views and mindset of street children from negative to positive. There is no meaning in implementing educational programs, training and economic capital assistance provided by the government if it is not followed by changing the views and mindset of street children. Apart from that, mental development based on education and spiritual and physical development will make street children better prepared to face problems that occur in the surrounding environment while also preparing street children to be able to re-socialize with the surrounding community.

The mental development carried out should also be based on exploring and developing the talents of street children, supported by socialization learning and health services so that it is hoped that it will have a positive impact on the formation of the self-concept of street children. Skills training oriented towards income generating should be the main stream in the process of handling street children in shelters, such as screen printing, motorbike, music and computer repair training. To support these economically oriented training programs, there needs to be more serious management of the business units managed by halfway houses. The existence of these business units can become a training ground for street children in developing their businesses.

Reproductive health education programs must also be placed as an important part in handling street children in shelters. This is to anticipate sexual harassment and violence, easy targets for pedophilia sufferers, up to the level of abuse [25].

Guidance counseling is carried out as an alternative in implementing this psychological approach. Zastrow suggests that the counseling process must include several aspects, namely how to build a good relationship between the counselor and the client, identifying children's problems and the escalation of alternative solutions to overcome the problems of street children [26].

The success of handling street children carried out by halfway houses will also be determined by the synergy between halfway houses and partners. In order for the implementation of the development of education and empowerment service programs at halfway houses to run optimally, the implementation is based on partnerships and in collaboration with various partners, including psychologists, stakeholders, parents, the community, and business units managed by the shelter [27].

After implementation, the process stage is monitoring and evaluation. The purpose of monitoring is to observe developments and progress, identify problems and anticipate/resolve them. Monitoring aims to obtain feedback on ongoing program needs, to identify gaps between planning and targets. By knowing these needs, program implementation can make adjustments by utilizing this feedback.

Monitoring and evaluation is carried out through regular program assessments, program evaluations and program continuity evaluations. Assessments are carried out to determine the development of street children while participating in the program. Assessments are carried out on all aspects, including physical, mental, psychological, knowledge, skills and views and goals in life. The assessment is carried out by adjusting the needs of each street child's condition. Evaluation of education and empowerment service programs aims to determine the level of success of the program using indicators prepared according to the criteria of each shelter home.

Continuity of programs including skills training organized by halfway houses is focused on follow-up by paying attention to the program's relevance to the world of work and market needs. This really needs to be done considering the limited network that shelter home managers have with employers and the stigma that is often still attached to street children as children who tend to be naughty so that many job owners are reluctant to use street children as workers. As a result, this program only stops when the skills providing activities end. Street children who have been trained cannot be channeled into the job market, so many street children then end up on the streets again [28].

Termination Stage

After going through the input stage and the child handling process stage, the next step is the termination stage. This stage is the stage of formal "termination" of relations with the target community. This stage is ideally carried out when the target community (in this context street children) is considered capable of independence. In this context, there needs to be uniformity regarding indicators of success in handling street children. The government can determine indicators of this success based on input from halfway house managers.

This assistance after formal termination of relations needs to be carried out continuously until the community is able to become independent. Officers continue to provide assistance during the process of returning street children to society to avoid rejection from the community and ensure that street children are independent. Officers should leave the community slowly and not suddenly. This needs to be done so that the target community does not feel abandoned unilaterally and without being prepared by officers.

The expected output from the development of education and empowerment service programs at the target shelter is that street children can be removed from the streets, becoming independent, skilled and productive individuals. It is also hoped that street children who have participated in the assistance program provided by the shelter will be well received by the community.

4. Conclusion

The existence of halfway houses needs to be optimized in its role as the spearhead for handling street children. To make this happen, there needs to be an improvement in the model for handling street children. The results of this research produced a prototype for developing educational and empowerment service programs at halfway houses through the input, process and termination stages. In addition, the education and empowerment service program uses a partnership and collaborative model with various parties.

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Workshop on Introduction to Indonesian Culture through the Creation of Puppet Puppets with the Sungging Technique for Students and the Community in Taipei, Taiwan

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Abstract

The people of Taipei have a high enthusiasm for the arts, creating an environment that supports creative expression and appreciation of artworks. With a blend of traditional and modern values, Taipei residents actively participate in various arts activities, including interactive workshops that positively impact student education, well-being, and creativity. The various events and trainings held reflect the great interest in Indonesian batik. UNESCO recognizes batik as Indonesia's Intangible Cultural Heritage, which reflects techniques, symbolism, and culture in the daily lives of the Indonesian people. The collaboration between Yogyakarta State University (UNY) and the National Yunlin University of Science and Technology opens up training opportunities for puppet-making in Taipei. This program aims to introduce Indonesian traditions and cultural heritage and strengthen relations between nations in education, art, and culture. This workshop not only provides knowledge about the art of puppetry but also opens up opportunities for broader art collaboration between Indonesia and Taipei. The main goal of this collaboration is to build strong and sustainable cultural bridges through the active participation of both countries. This collaboration will also encourage the development of joint art education programs and strengthen bilateral relations in arts and crafts.

1. Introduction

The people of Taipei show a rich interest in the arts, creating an environment that encourages creative expression and appreciation of the arts in its various forms. With a rich cultural heritage and rapid development in the creative industry, Taipei residents are actively involved in various art activities such as painting exhibitions, theater performances, and art festivals. This art culture reflects traditional values while exploring modern ideas, creating space for collaboration and innovation among artists and art enthusiasts in the city. As a result of research conducted by the service team, it is evident that students in Taipei enjoy interactive art workshops, as this not only has a positive impact on education and well-being but also as a means for the expression and development of students' creativity in developing entrepreneurial skills.

Taiwanese people exhibit a notable enthusiasm for art, reflected in various aspects of their cultural practices and educational systems. This enthusiasm can be observed through the engagement of children in formal art education, which has been shown to enhance their creativity and drawing skills. Research indicates that urban Taiwanese children with greater access to structured art training demonstrate more mature and creative artistic expressions than their peers from different cultural backgrounds (Wei & Dzeng, 2013). This suggests that the Taiwanese educational framework values and promotes artistic development from a young age, fostering a culture that appreciates and participates in the arts.

Moreover, the role of art extends beyond mere education; it serves as a therapeutic tool within the Taiwanese healthcare system. Studies have demonstrated that art therapy significantly benefits terminal cancer patients in hospice care, enhancing their quality of life and emotional well-being (Wei, 2015; Lin et al., 2012). This therapeutic use of art underscores its importance in Taiwanese society, indicating a broader cultural acceptance and appreciation of artistic expression as a means of coping with life's challenges. Participation in art-related activities is also linked to positive social outcomes. Adolescents involved in structured artistic pursuits, such as art clubs, are less likely to engage in problem behaviors, highlighting the social integration aspect of art participation (Dowla et al., 2019). This connection between art and social behavior further illustrates the enthusiasm for art in Taiwan, as it is recognized for its aesthetic value and its role in fostering community and individual well-being.

The Taiwanese government has also recognized the significance of culture and the arts in shaping national identity and international diplomacy. Promoting local art forms and cultural participation is a strategy to enhance Taiwan's global presence and cultural narrative (Chao et al., 2017; Figueira, 2020). This governmental support reflects a societal consensus on the importance of art in both personal and collective identity formation. In conclusion, Taiwanese people's high enthusiasm for art is evident through their educational practices, therapeutic applications, social benefits, and governmental support. This multifaceted engagement with the arts illustrates a deep-rooted cultural appreciation that continues to evolve and influence various aspects of Taiwanese life.

The people of Taipei understand that art workshops are not just creative activities but also a means to build community, exchange ideas, and strengthen cultural ties. With a high enthusiasm for art workshops, the Taipei community demonstrates their dedication to continuously developing and enriching their art and cultural heritage, making art workshops an inspiring medium and a part of their daily lives. In addition to the great interest in art, the people of Taipei also show a significant interest in Indonesian batik. Several events in the Taipei community have displayed Indonesian culture, which has received a warm welcome from residents. About 300 more Taipei and other foreigners have learned Indonesian culture in Taipei. This shows the popularity of Indonesian batik in the Taipei community and the Taipei people's interest in learning and understanding Indonesian batik more deeply art.

Wayang kulit is a traditional art form that originated, developed, and grew in Javanese society. (Fauzan et al., 2017; Puddin et al., 2021) More than just a show, puppetry was initially used to achieve a spiritual understanding of the gods. The term "puppet" is thought to come from the word "ma Hyang," which refers to the search for spirituality or a relationship with Power. Some state that "puppetry" may have originated from a performance technique that relies on shadows projected on the screen.

The background of the activities conveyed above shows that the enthusiasm of the Taipei people for Indonesian culture is very high. Therefore, UNY, as a campus that implements MBKM and Educational Institutions, feels the need to organize training to introduce Indonesian cultural heritage as a workshop on creating traditional puppets in Taipei. Based on this description, the problems in the field can be identified as follows: 1) Lack of sharing ideas, establishing an international art community, and strengthening the culture between Indonesia and the people of Taipei; 2) The need for training/workshops as a forum that inspires and is rooted in daily life related to traditional arts; 3) The people of Taipei are interested in batik, which is shown by the attitude of wanting to know and learn about batik but lacking facilities from Indonesian academics/practitioners.

Based on the problems mentioned above, the FBSB UNY Foreign Cooperation PKM team will offer solutions in the form of training or traditional batik workshops in the Taipei Community. The right problem-solving approach is through the direct implementation of training or workshops to provide direct teaching about batik techniques and various variations of motifs. This activity will be carried out in stages, from theoretical to practical.

Several steps can be taken to overcome the shortcomings in sharing ideas and strengthen cultural ties between Indonesia and the Taipei People. First, it is essential to establish an international art forum as a forum for artists, art practitioners, and art enthusiasts from both countries. Through this forum, there will be an exchange of ideas, collaboration of art projects, and the implementation of joint art programs, which can enrich the art life in both countries and strengthen intercultural ties. In addition, constructing an international art center can be a concrete symbol of cross-border art collaboration.

Meanwhile, it is necessary to hold training programs regularly to meet the need for training and workshops related to traditional arts that inspire and permeate daily life. Collaboration with local communities can ensure the relevance and involvement of the community in the traditional arts program. Using technology to provide distance training can provide more comprehensive access and support for self-paced learning. The Taipei People's interest in batik requires a unique approach. Knowledge and skill exchange programs between Indonesian academics, cultural experts, and the Taipei Community can improve batik-related understanding and skills. The workshop involving Indonesian batik academics in the Taipei community provides a direct opportunity to learn and interact. The encouragement of institutional cooperation between Indonesian art institutions and the Taipei Society can also provide the necessary support to meet the learning needs of the Taipei Community regarding batik. With this approach, it is hoped that Indonesia, South Korea, and the Taipei community will have a closer and mutually enriching artistic relationship.

Traditional batik training or workshops are specially designed for beginners to learn how to make batik more enjoyable for the people of Taipei. This is expected to improve soft skills, especially batik skills in Indonesian art and culture, which can be used as a form of cultural exchange. Achievement indicators for this problem will be assessed based on the participants' completion of questionnaires before and after the workshop activities. The expected target is for 80% of participants to improve their skills in batik. In addition, workshop products will also be reflected in the activity. Apart from the questionnaire, the success rate can also be seen from the active participation of participants in the workshop on the creation of traditional puppets, where at least 80% of participants actively participated.

Wayang kulit, which is made from buffalo skin, is considered the embryo of the various types of puppets that exist today. The puppet show is led by a puppeteer, accompanied by gamelan music played by Malaga (gamelan players) and tembang sung by the president. Each part of the puppet show has a solid philosophical symbol and meaning. In addition, the stories raised in puppetry always contain noble moral teachings, such as loving and respecting each other, while sometimes inserting social criticism and elements of humor through goro-goro scenes. (Anggoro, 2018)

Wayang kulit has its origins in Java and has a long history. (Puddin et al., 2021) The oldest records of wayang kulit or wayang purwa can be found in the Kuti Inscription, dating back to 840 AD in Joho, Sidoarjo, East Java. At that time, puppeteers led and played puppet shows in the palace environment. There is also speculation that the early form of wayang kulit may have been different from the current one, using palm leaves instead of animal skin.

However, some archaeologists have questioned the conjecture, stating that puppets have been made of leather since the beginning. There is also evidence of puppet performances in reliefs in several temples in East Java in the 10th century. Wayang kulit flourished during the Islamic sultanate when Islamic preachers brought wayang kulit to the general public and changed it to conform to Islamic teachings. (Ari Indriyanto & Swastika, 2018) The arrival of Europeans to the archipelago also had a new influence on wayang kulit, with Catholic propagators using wayang kulit as a medium for spreading religion. (Nurgiyantoro, n.d.)

Although wayang kulit has undergone changes and innovations, especially in some areas open to new influences, the tradition of wayang kulit in Yogyakarta and Surakarta still maintains the pakem model. Since independence, Indonesia has had a high school majoring in puppetry, which has become a place for new developments and experiments in shadow puppet shows. (Herum Marwoto, 2012; Suyanto, 2013)

Despite this, Wayang Kulit is still alluring and sustainable, with different types of performances having their fans. (Shalifah, 2022) People from various countries come to Indonesia to learn the history and form of wayang kulit performances and adapt them to their culture. The local wisdom of wayang kulit, which was born and developed in Indonesia, has spread throughout the world, and it is not surprising that Unesco has designated wayang kulit as a world cultural heritage of Indonesia. (Fauzan et al., 2017).

Finding/creating works of art reflects human values and ideas expressed aesthetically in various mediums, such as looks, movements, sounds, and words, that can give transcendental meanings, both spiritual and intellectual, to humans and humanity. As science works, works of art can also be made by all teachers, not necessarily art teachers or language and literature teachers. Artworks have the following criteria: Artworks are the products of human culture that reflect human values and ideas that are expressed aesthetically in various mediums such as looks, movements, sounds, and words that can provide transcendental meanings, both spiritual and intellectual for humans and humanity or educational meanings for individuals and their communities.

Artworks recognized by the community are works of art performed/published/exhibited/published to the community, at least at the district/city level. (Guidelines for the Implementation of PK Teachers.Ministry of National Education: 2011). The types of artworks are divided into two, namely: 1) Artworks whose physical evidence can be included directly for the assessment of teacher credit scores are literary arts (novels, short story collections, poetry collections, drama/theater/film scripts), fine arts (a.l.: small ceramics, souvenirs), graphic design arts (a.l.: book covers, posters, brochures, photography), recorded music art, films, and so on; 2) Works of art whose physical evidence cannot be included directly for the assessment of the credit score of the teacher's position: fine arts (a.l.: paintings, sculptures, carvings, large-size ceramics, billboards, clothing), performing arts (a.l.: theater, dance,

sendratasik, music ensemble), and so on. Guidelines for the Implementation of PK Teachers.Ministry of National Education: 2011).

2. Method

Through discussions and coordination with target partners, this training activity will be carried out online through training and workshops. The presentation of the material is adjusted to the conditions and needs of the participants. The methods applied in this service activity are as follows: 1) Socialization of Activities: At the beginning of the activity, the socialization of this activity needs to be carried out to convey information widely and build more cooperation networks. Socialization was carried out with flyers by involving partners and the target audience (the general public of the Taipei Society). The role of partners in this activity is to connect activity information to the target audience (the general public of the Taipei Society). The socialization activity will continue with participant registration by the UNY service team with foreign partners (National Yunlin University of Science and Technology of Science and Technology). 2) Presentation of material with lectures, questions, and answers: The following activity is presenting material offline. Participants will be given material on introducing the Traditional Wayang Kulit Culture in Indonesia. The material was presented with lectures and interactive questions and answers. 3) Traditional Indonesian Batik Workshop and cultural arts workshop activities are designed to be carried out offline. The activity venue is in Taipei, and the partner (National Yunlin University of Science and Technology of Science and Technology) has prepared it. The activity is designed to introduce and work with Indonesian Traditional Puppets. Partners assist in the organization of activity venues and needs. 4) Simulation and Demonstration (Best Practice): Simulation and demonstration activities give concrete examples of how to make traditional Indonesian Wayang Kulit. The UNY team will give direct examples and practice them with participants. 5) Evaluation and Brainstorming: evaluation to measure the success of this program is carried out by product evaluation and evaluation of the meaning of the program. For product evaluation, after the presentation of the material, the results of the training participants' work in the form of batik works will be observed. The activity was declared successful if 80% of the participants could practice until the end. For the evaluation of meaning, at the end of the training, participants and teams will brainstorm to reflect on the training results and the process. This activity was declared successful if at least 80% of the participants stated that they were satisfied and that this activity was beneficial. Furthermore, the details of the materials, activities, time, and roles in the training designed for the participants of this activity are presented in the following table

Table 5 Training Materials, Timings, and PICs

No.	Material	Method	Number of Hours	Executive
1.	Introduction to Indonesian Cultural Heritage: History Movie and Culture Indonesian	Offline, Lectures and Q&A	2 JP	UNY and Partners
2.	Demonstration of the process of making Wayang Kuit	Offline, Lectures and Q&A	5 JPY	UNY and Partners
3.	Joint workshop to make Wayang Kulit decorations	Offline, workshop	5 JPY	UNY and Partners
4	Joint workshop to make Wayang Kulit decorations	Offline, workshop	5 JPY	UNY and Partners
5	Joint workshop to make Wayang Kulit decorations	Offline, workshop	5 JPY	UNY and Partners
Number of Hours			22 JP	

The target audience in this program is the people in Taipei, both students and the general public. The target participants of this activity are a total of 25 participants. Based on the target audience, this service team consists of lecturers who will act as presenters of training materials. The training material is based on the field of each lecturer member of this service team. A service team from the Department of Craft Education will carry out this traditional batik training.

In addition to lecturers, the service team also consists of students. In this activity, students will be tasked by lecturers to accompany the training presentation team. The role of students in this activity is to prepare for the implementation of training, documentation, and assistance to participants, as well as several additional tentative activities. This activity can also provide credit recognition for students.

3. Research and Discussion

The workshop on introducing Indonesian culture through creating a book skat of the singing technique was held at PKBM PPI Taiwan and attended by 25 enthusiastic participants. This activity aims to introduce traditional Indonesian arts, especially the singing technique, to the Taiwanese people. The book skat, a form of visual representation, is used to illustrate the nuances and intricacies of the singing technique. Participants were invited to understand how this art is a practical skill and an essential part of Indonesia's cultural heritage. By holding this workshop, it is hoped that participants can get to know more deeply about the techniques and artistic values contained in Indonesian culture.

The activity began with providing introductory material on the singing technique and how to mix colors. In this session, participants were taught various basic techniques needed to create an aesthetic and attractive book skate. The provision of informative and interactive material made it easier for participants to understand the basic concepts of the art of sending and the importance of color selection in the creation process. This explanation became a strong foundation before participants entered the practice session.

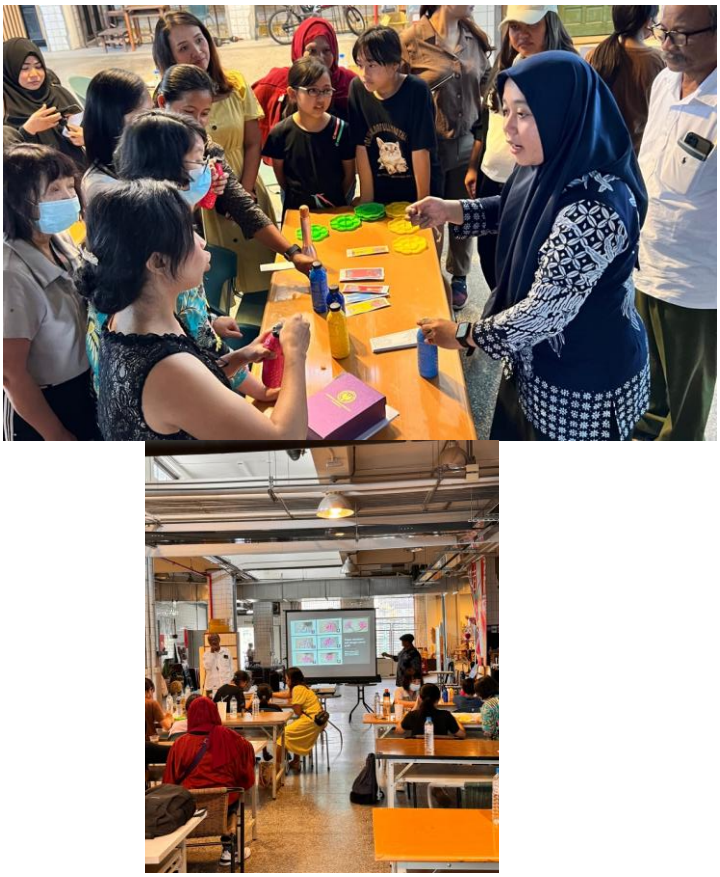


Figure 1. Providing introductory materials on the technique of strangulation and mixing colors

After gaining a basic understanding, participants proceed to a hands-on session to learn to mix the right colors for the singing technique. Mentoring is carried out intensively by experienced instructors, ensuring that each participant can master the technique well.



Figure 2. Practice mixing colors for sungging

After that, participants apply the knowledge they have gained by skipping books, creating unique works of art, and reflecting on their creativity.



Figure 3. Practice of skipping books

The participants' works were displayed in a group photo session, which was not only a documentation of their work but also a moment of togetherness in celebrating the success of introducing Indonesian culture through this creative art. This workshop created a positive and collaborative atmosphere, where participants learn new skills and build a closer relationship with Indonesian culture. Thus, this activity enriched the participants' insights and contributed to preserving and promoting Indonesian culture at the international level.





Figure 4. Artwork



Figure 5. Overall Works

4. Conclusion

The workshop on introducing Indonesian culture by creating a skat book on the singing technique at PKBM PPI Taiwan shows success in introducing and promoting traditional Indonesian arts to the Taiwanese people. This activity not only provides an in-depth understanding of the technique of strangling and color mixing but also improves participants' practical skills in creating aesthetic works of art. Through informative materials and intensive practice sessions, participants can master the technique of squeezing well and produce a unique book skat. In addition, the group photo session at the end of the activity symbolized togetherness and success in celebrating Indonesian art and culture. This workshop has succeeded in creating a collaborative atmosphere that supports intercultural relations and

positively impacts preserving Indonesia's cultural heritage abroad. Thus, this activity is essential in introducing Indonesia's cultural wealth to the international community.

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Exploring Creative Potential: Analysis of Students' Creative Thinking Abilit in Solving SPLDV Problems

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Abstract

Creative thinking skills are the ability to generate logical and innovative ideas and solutions based on the information provided. This study aims to identify and describe creative thinking skills in the context of mathematics. The indicators of students' creative thinking skills used are fluency, flexibility, originality, and elaboration. The research aims to determine the creative thinking abilities of junior high school students in Yogyakarta, focusing on the topic of systems of linear equations in two variables (SPLDV). This type of research is descriptive qualitative. The instrument used in this study is a creative thinking skills test, presented in the form of essay questions, given to eighth-grade students at a junior high school in Yogyakarta. The results showed that students' creative thinking skills in the System of Linear Equations in Two Variables (SPLDV) material were still low, with only 34% of students' answers reaching the maximum score. The percentage of the flexibility indicator was 25%, the originality indicator was 19%, the elaboration indicator was 22%, and the lowest percentage was on the fluency indicator, at 16%.

Keywords: Creative thinking ability, Mathematics, SPLDV.

1. Introduction

Current education should be oriented toward 21st-century education. It should equip students with the competencies needed in the 21st century, namely critical thinking and problem-solving, communication, collaboration, and creativity and innovation. [1]. Referring to this, in facing the challenges of the 21st century, creative thinking skills have become one of the essential abilities that students must possess..

Creative thinking ability are important for every individual to compete in the era of a global society. Creative thinking is one of the higher-order thinking skills. Higher-order thinking skills refer to the ability to process thoughts to generate new ideas. [2]. Creativity is the ability to develop new ideas and to find new ways of viewing problems and opportunities. Creative individuals see problems as challenges to be faced rather than avoided. They also approach problems from various perspectives, allowing them to obtain a range of alternative solutions. [3].

According to the 2015 report from The Global Creativity Index, Indonesia ranks 115 out of 139 countries with a GCI score of 0.202. In line with this report, Indonesia's innovation capability is still very low. The Global Innovation Index (GII) places Indonesia at 85th out of 129 countries. Supporting this report, research conducted by Widiani et al. (2016) found that students' creative thinking abilities in aspects of fluency, flexibility, originality, and elaboration at Madrasah Aliyah Negeri (MAN) 1 Pontianak are also classified as low. [4]. Other research has found that mathematical creative thinking skills in aspects of fluency, flexibility, originality, and elaboration are classified as adequate. [5].

Creative thinking skills refer to the ability to generate varied and novel solutions to open-ended problems. Creative thinking is the capacity to produce new ideas or methods for creating a product. [3].

Creative thinking skills are essential to develop and need to be practiced by students from the elementary education level to the secondary education level. [6]

To measure creative thinking skills, four indicators are used: fluency, flexibility, originality, and elaboration. [7]. Fluency is the ability to generate a large number of ideas or concepts to solve problems or questions smoothly, as well as the capacity to think of more than one answer. Originality can also be defined as the ability to produce a solution through unique or unconventional problem-solving methods. Elaboration refers to the ability to develop alternative answers by specifying an idea, object, or situation related to the problem. [8]. Flexibility means the ability to provide various perspectives or solutions to solve a problem. [9].

Based on the above description, it can be concluded that creative thinking skills encompass the ability to solve a problem using many ideas and methods, generate diverse concepts, create new and unique approaches, and develop an idea. From this statement, the indicators used for the research are fluency, flexibility, originality, and elaboration. This study aims to analyze students' creative thinking skills in the topic of systems of linear equations in two variables (SPLDV).

2. Method

This type of research is descriptive qualitative. Research using this method aims to describe the conditions that occur during the study, specifically regarding the topic of systems of linear equations in two variables (SPLDV) [10]**.** The subjects in this study are 32 eighth-grade students selected randomly from a junior high school in Yogyakarta. The research was conducted during the even semester of the 2024 academic year. The instrument used in this study is an essay test consisting of 4 questions designed to assess creative thinking skills.

3. Results and Discussion

a. Result

This research was conducted in one of the eighth-grade classes at a junior high school in Yogyakarta. The data from this study consist of students' learning outcomes, which were collected using a test instrument consisting of 4 essay questions. In question number 1, the indicators include fluency, elaboration, and originality; question number 2 focuses on elaboration and originality; question number 3 encompasses all four indicators: fluency, flexibility, originality, and elaboration; and question number 4 covers originality and elaboration. The data were obtained from the analysis of answers based on the scoring rubric guidelines for mathematical creative thinking skills in the topic of systems of linear equations in two variables (SPLDV).

Table 1. Description of the Fluency Indicator

Responses to Questions	Score	Average Number of Sudents (%)
Fluency		
Provides more than one relevant and correct solution to the problem.	4	5 (16%)
Provides more than one relevant solution to the problem, but one of the final results is incorrect.	3	2 (6%)
Provides one relevant and correct solution to the problem.	2	19 (60%)
Provides one relevant solution to the problem, but the final result is incorrect.	1	3 (9%)
Provides more than one relevant and correct solution to the problem.	0	3 (9%)

Based on Table 1, it can be seen that for the fluency indicator, an average of 5 students scored 4, 2 students scored 3, 19 students scored 2, 3 students scored 1, and 3 students answered 0. Thus, Table 1 shows the fluency thinking ability on questions number 1 and 2 with a percentage of 16%.

Table 2. Description of the Flexibility Indicator

Responses to Questions	Score	Average Number of Sudents (%)
Flexibility		
Provides answers in more than one way (varied), with the solution process and final results being correct.	4	8 (25%)
Provides answers in more than one way (varied), but there is an error in one of the solution processes.	3	4 (13%)
Provides an answer in one way, with the solution process and final result being correct.	2	16 (50%)
Provides an answer in one way, with some errors in the solution process.	1	3 (9%)
Does not answer or provides several answers, but all are incorrect.	0	1 (3%)

Based on Table 2, it can be seen that for the flexibility indicator, an average of 8 students scored 4, 4 students scored 3, 16 students scored 2, 3 students scored 1, and 1 student answered 0. Thus, Table 2 shows the flexibility thinking ability on question number 2 with a percentage of 25%.

Table 3. Description Originality Indicator

Responses to Questions	Score	Average Number of Sudents (%)
Originality		
Less than 40% of students provide answers in the same way as other students.	4	6 (19%)
40% - 59% of students provide answers in the same way as other students.	3	10 (31%)
60% - 79% of students provide answers in the same way as other students.	2	7 (22%)
80% - 100% of students provide answers in the same way as other students.	1	2 (6%)
Do not answer or provide incorrect answers.	0	7 (22%)

Based on Table 3, it can be seen that for the originality indicator, an average of 6 students scored 4, 10 students scored 3, 7 students scored 2, 2 students scored 1, and 7 students answered 0. Thus, Table 3 shows the originality thinking ability across all questions with a percentage of 19%.

Table 4. Description Elaboration Indicator

Responses to Questions	Score	Average Number of Sudents (%)
Elaboration		
The problem is solved correctly, accompanied by correct, sequential, and detailed steps.	4	7 (22%)
The problem is solved correctly, accompanied by correct and detailed steps, but not in sequence.	3	2 (6%)
The problem is solved correctly, accompanied by correct steps, but not in sequence and lacking detail.	2	14 (44%)
The problem is not solved correctly, accompanied by some correct steps that are sequential and detailed.	1	8 (25%)
Does not answer or provides an incorrect answer.	0	1 (3%)

Table 4 shows that for the elaboration indicator, an average of 7 students scored 4, 2 students scored 3, 14 students scored 2, 8 students scored 1, and 1 student answered 0. Thus, Table 4 indicates the elaboration thinking ability across all questions with an average percentage of 22%.

4. Discussion

Looking at the average percentage of all indicators, none exceed 50%. However, the highest average percentage is found in the flexibility indicator, which is 25%. Therefore, it can be concluded that students' creative thinking abilities are still low.

Question Number 1

Reza bought 2 kg of grapes and 1 kg of oranges for Rp47,000.00, while Dita bought 1 kg of grapes and 3 kg of oranges for Rp58,500.00. Determine more than one way to find the price to be paid for 3 kg of grapes and 2 kg of oranges.

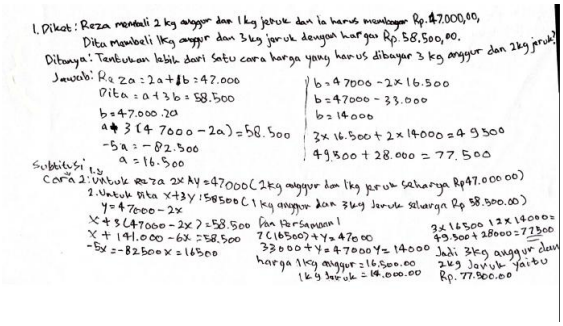


Figure 1. Example of a Student Answer with High Ability in the Fluency Aspect

Based on Figure 1, it can be seen that students provided answers with more than one relevant and correct solution, accompanied by correct, sequential, and detailed steps, as well as provided answers with more than one relevant and correct solution. In the fluency indicator, the average percentage of students reached 16%, indicating answers with more than one relevant and correct solution.

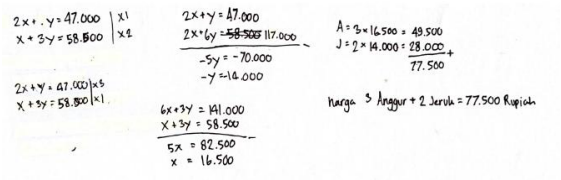


Figure 2. Example of a Student Answer with Moderate Ability in the Fluency Aspect

Based on Figure 2, it can be seen that students are able to continue the solution to the problem in the next steps. However, they are unaware of other possible solutions to the problem presented in the question. This results in students achieving less than optimal scores on Question 1. There are 60% of students who provided a relevant and correct solution to the problem..

Question number 2

A runner runs from home to the sports center, a distance of 8 km. Initially, they run at a speed of 11 km/h, then switch to walking at a speed of 5 km/h. The total time taken to reach the sports center is 1 hour and 20 minutes. Determine the distance covered by running and the distance covered by walking.



Figure 3. Example of answers from high-ability students in the aspect of originality

In image 3, examples of answers can be seen where less than 40% of students gave answers in the same way as other students.

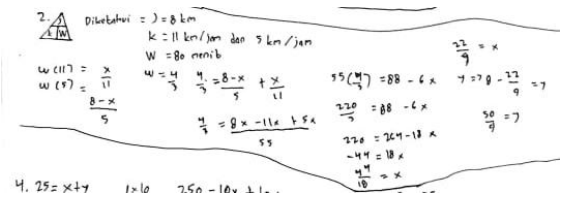


Figure 4. Example of answers from low-ability students in the aspect of originality

Based on image 4 related to question number 2, which shows the originality indicator where 40% - 59% of students gave answers in the same way as other students, the low increase in the originality indicator is caused by the lack of ideas produced by the students

Question number 3

Aini bought 1 portion of meatballs and 2 drinks for 110,000, and Tika bought 3 portions of meatballs and 6 drinks for 280,000. Determine the price for each portion of meatballs and each drink. Can the answers be determined? If so, calculate them! If not, how much should be paid so that the price of each portion of meatballs and each drink can be determined?

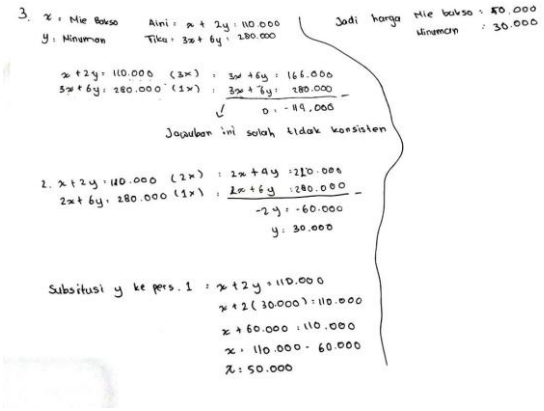


Figure 5. example of answers from high-ability students in the aspect of flexibility

Based on image 5, it can be seen that students are able to provide two different possible answers along with the problem-solving process and also provide the correct final result. In the flexibility indicator, the average percentage of students reaching 25% shows two different possible answers along with the problem-solving process and provides the correct final result.

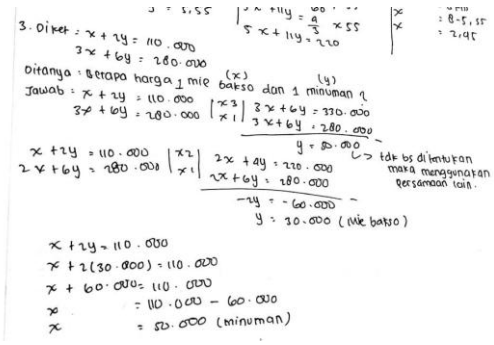


Figure 6. Example of answers from medium-ability students in the aspect of flexibility

In image 6, it can be seen that students are able to provide more than one answer (varied), but one of them contains an error in the problem-solving process. There are 13% of students who obtained more than one answer, but one of them contains a mistak.

Question number 4

In a company, there are two types of employees: senior employees and junior employees. Senior employees receive a salary of 10 million, while junior employees receive 6 million. The total number of employees is 25, and the total salary paid each month is 225 million rupiah. Find the solution to the system of linear equations (SPLDV) and explain how the company can arrange the number of senior and junior employees according to the salary distribution.

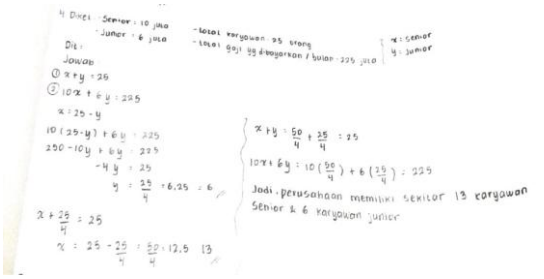


Figure 7. Example of answers from high-ability students in the aspect of elaboration."

In image 7, it can be seen that 22% of students are able to solve the problem correctly, accompanied by the correct, sequential, and detailed steps of the solution.

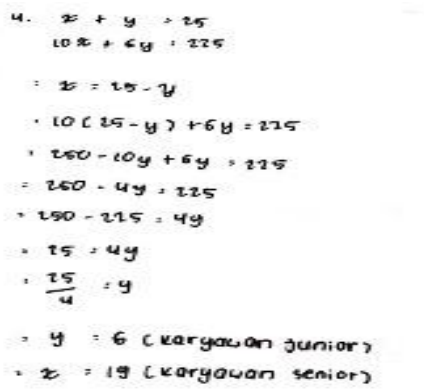


Figure 8. Example of answers from medium-ability students in the aspect of elaboration

In image 8, it can be seen that 44% of students are able to solve the problem correctly, accompanied by the solution steps, but not in a sequential and detailed manner

From the results above, it can be seen that creative thinking skills are still classified as low, with an average percentage of 34% of students' answers reaching the maximum score and an average percentage of the highest scores for all indicators at 20.5%. The fluency indicator is 16%, the flexibility indicator is 25%, the originality indicator is 19%, and the elaboration indicator is 22%. The results of this study align with previous research, which shows that students' creative thinking skills are still classified as low, with the fluency indicator being one of the indicators with the lowest score, while the flexibility indicator has the highest score [11].

a. Fluency

Fluency in thinking refers to students' ability to generate a variety of thoughts or questions in large numbers. As many as 5 students, or about 16%, provided more than one relevant and correct solution to the problem. Students' answers to question number 1, as shown in Image 1, demonstrate their ability to present diverse methods or ideas for solving systems of linear equations in two variables. Fluency is essential for students to express critical ideas in problem-solving. This is supported by research from Rahayu et al. (2018) and Thanheiser et al. (2021), which found that a quick understanding of learning concepts can be achieved by students with creative thinking skills that generate many ideas. [12][13].

b. Flexibility

Flexibility is the ability of students to use various approaches in solving problems. As many as eight students, or 25%, successfully provided more than one different method, with correct calculations, to solve systems of linear equations in two variables. Based on the students' answers to question number 3, as seen in Image 5, they were able to provide various solutions with correct calculations. The ability to think flexibly is very important for exploring different problem solutions, in line with research by Fardah (2012) and Kollosche (2021), which shows that students with good mathematical creative thinking skills demonstrate flexible thinking in providing solutions [14][15].

c. Originality

The ability of originality refers to students' capacity to generate ideas that are original, non-cliché, and rarely used by others. As many as six students, or 19%, were able to solve the system of linear equations in two variables in their own way, and their results were correct. Based on the students' answers to question number 2, as shown in Image 3, they demonstrated the ability to use unique methods in solving the problem. Originality is crucial for combining various approaches in problem-solving, as problems cannot always be solved using conventional methods and sometimes require original solutions [16][17].

d. Elaboration

The ability of elaboration refers to students' capacity to detail the specifics of an object. As many as 7 students, or 22%, were able to provide detailed elaborations in solving problems involving systems of linear equations in two variables. Based on the students' answers to question number 4, as shown in Image 7, they demonstrated the ability to provide detailed specifics in their solutions. Elaboration is crucial for detailing aspects needed to solve problems, where mathematical creative thinking skills with the elaboration indicator are necessary to view problems from various perspectives. [18] [19].

5. Conclusion

Based on the research on students' mathematical creative thinking skills at a junior high school in Yogyakarta on the topic of systems of linear equations, the abilities are still very low, with the average percentage of the flexibility indicator being the highest at 25%, indicating that students are able to think flexibly in solving problems. The elaboration indicator is 22%, the originality indicator is 19%, and the lowest percentage is on the fluency indicator at 16%

To enhance students' mathematical creative thinking skills, teachers should deepen their knowledge and understanding of creative thinking and familiarize students with working on problems that involve creative thinking indicators. Additionally, further research is needed to determine the most effective teaching models for improving students' mathematical creative thinking ability.

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FINANCIAL LITERACY EDUCATION AS A PRODUCTION STRATEGY FOR MSMEs IN KAMPUNG EMAS, SEYEGAN DISTRICT, SLEMAN REGENCY

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Abstrak

The purpose of this activity is to provide education on wise financial management for MSMEs operating in Kampung Emas, Seyegan, Sleman Regency. Furthermore, from an accounting perspective, understanding finance will create a sequential effect on the ability of MSME actors and owners to make more accurate and responsible decisions. Currently, MSMEs in Kampung Emas still require advanced knowledge on how to optimize and streamline their decisions, particularly in financial aspects.

This activity took place from July to September 2024. The training involved 61 participants, consisting of MSME actors and youth from Kampung Emas Seyegan, Sleman. The financial literacy training was conducted over a period of 4 hours, supplemented by 36 hours of mentoring activities (allocated over one week following the training). The overall implementation of the community service can be categorized as successful, as indicated by the results of the final evaluation and the active participation of attendees during the discussion and Q&A sessions. Participants felt that the community service was carried out effectively and that the material provided met their needs in enhancing production effectiveness to support the profitability of MSMEs.

Keywords: Financial Literacy, MSMEs, Community Service

1. Introduction

In the era of globalization and economic complexity, financial literacy is a crucial foundation to ensure individuals possess the skills and insights necessary to manage their finances wisely. There is an increasingly urgent need across various segments of society to improve financial literacy. A lack of understanding of basic financial concepts, such as budgeting, debt management, investment, and retirement planning, can lead to financial instability and difficulties in achieving long-term financial goals (Bancoro, 2023; Loppies, 2023; Braunstein et al., 2002).

Financial literacy encompasses the knowledge, skills, and confidence that influence attitudes and behaviors to improve decision-making quality and financial management in order to achieve community financial well-being. The implementation of financial education aimed at enhancing community financial literacy is essential because, according to a survey conducted by OJK in 2022, the financial literacy index of the Indonesian population is 49.68 percent, an increase from 21.84 percent in 2013, 29.70 percent in 2016, and 38.03 percent in 2019. This financial education activity can provide understanding to the community by covering at least (ojk.go.id).

This reflects a paradigm shift from merely having money to understanding how to manage it intelligently. Financial literacy is not just about reading financial statements or calculating interest rates, but also about the ability to make sound financial decisions based on a deep understanding of long-term implications. MSMEs, as the backbone of the local economy in many countries, play a central role in economic growth and job creation. Unfortunately, MSMEs often face financial literacy challenges that can limit their ability to manage finances effectively. A lack of understanding of basic financial concepts, such as budget planning, cash management, and funding source selection, can pose serious barriers to the development and growth of MSMEs (Edwy et al., 2023; Monteiro et al., 2023; Rohayati et al., 2023).

As the business world becomes increasingly complex, MSMEs must also navigate various financial instruments, such as loans, investments, and financing options that require a thorough understanding. Awareness of financial risks and the ability to manage these risks are key to the

sustainability and resilience of MSMEs amid intense competition. In the era of digitalization and globalization, financial literacy for MSMEs also involves understanding financial technology, e-commerce, and digital platforms. MSMEs that possess good digital understanding and financial literacy can leverage opportunities offered by the digital ecosystem to expand their markets and enhance operational efficiency (Kurnia et al., 2023; Cahyani et al., 2023; Coco et al., 2024).

Therefore, financial literacy for MSMEs reflects an urgent need to empower MSME actors through enhanced financial knowledge and skills. This is not only about increasing individual capacity but also about providing a strong foundation for local economic growth and financial inclusivity. Improving financial literacy for MSMEs will create an environment where MSMEs can make smarter financial decisions, manage risks wisely, and contribute significantly to economic development and the overall welfare of society. Thus, investment in financial literacy for MSMEs not only benefits individuals but also fosters sustainable economic development.

Consequently, the problem formulation for this community service activity is *"Financial Literacy Education as a Production Strategy for MSMEs in Kampung Emas, Seyegan, Sleman Regency."*

2. Method

This community service activity involves providing training to the community on financial literacy for 61 participants consisting of MSME owners and youth in Kampung Emas, Seyegan, Sleman. There are five stages implemented in this community service activity: (1) Cooperation stage, which involves establishing a legal partnership between UNY and the partners. (2) Exploration stage. The team conducts a Focus Group Discussion (FGD) for planning the technical activities as part of the exploration and preparation of materials for the implementation of the community service. (3) Implementation stage, realized through practical activities and financial literacy training for the partners. (4) Evaluation stage of the implementation of community service activities carried out by the implementing team and MSME partners. (5) Reporting stage of activities and preparation of outputs.

3. Implementation

The implementation of this community service began with the planning stage. In this stage, the community service team conducted initial coordination with the Kampung Emas Seyegan, Sleman. Initial coordination was carried out in two meetings. In the first meeting, the service team and the partners coordinated about the material to be delivered to the MSMEs during the service according to the needs of the target group. In the second meeting, the schedule for the implementation of the service was agreed upon, along with coordination regarding the number of participants and the necessary administrative completeness. Based on the discussion, a training plan and instruments to measure participant satisfaction with the training provided by the service team were prepared.

The second stage is the implementation. The training was held on September 21, 2024, and attended by 61 participants consisting of MSME actors and youth from Kampung Emas Seyegan, Sleman. In addition to the workshop, the team also provided mentoring and engaged in intensive communication with MSME actors.



Figure 1. Kegiatan Pelatihan Literasi Keuangan

4. Evaluation

Based on the evaluation of the community service activities conducted, several supporting factors can be identified. These supporting factors include: (1) The presenters are lecturers from the Applied Accounting Study Program, which means they have a solid understanding of accounting, particularly cost accounting, the subject of financial literacy. (2) Participants were very enthusiastic about this training, as they needed it to improve production effectiveness and support the profitability of their MSMEs. (3) Support from the partner location in terms of the facilities and infrastructure provided during the implementation of the community service activities. (4) Financial support from the Vocational Faculty of Yogyakarta State University for the organization of the community service activities, ensuring that the event could run smoothly.

In addition to the supporting factors, there were also several obstacles, including: (1) Limited time for the event, which restricted discussions between the service team and the training participants regarding the material presented. (2) Limited time for initial discussions with partners.

5. Conclusion and Recommendations

The MSME literacy training in Kampung Emas Seyegan, Sleman has been successfully conducted. Participants actively engaged during the Q&A sessions and discussions. They were very enthusiastic about the material presented by the service team, as they felt it was highly important.

The recommendation for future community service activities is to conduct further skills training and mentoring for MSMEs to create a sequence effect on the profitability of MSMEs in Kampung Emas Seyegan, Sleman.

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DEVELOPMENT OF POP-UP BOOK MEDIA BASED ON LOCAL WISDOM OF THE BADUY TRIBE ON FOOD PLANTS DIVERSITY MATERIAL

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Abstract

The Baduy tribe is one of the tribes living in the Kendeng Mountains region, Kanekes Village, Leuwidamar District, Lebak Regency, Banten Province. The Baduy tribe has strong traditional culture and they live side by side with the surrounding nature. One of the local wisdoms of Baduy tribe in utilizing natural resources is *ngahuma* (farming) in a traditional manner, especially in planting food plants. The local wisdom of the Baduy tribe in utilizing food plants to fulfill their living needs can be raised as a learning resource. This research aims to develop pop-up book media based on the local wisdom of the Baduy tribe on the material of food plants diversity and determine the validity of pop-up book media from material aspect and media aspect. This study uses the research and development method with the 4D development model which consists of four stages, they are define, design, develop, and disseminate. Nonetheless, this research is at the third stage of development. The results obtained from this study, on the results of product validation based on material aspect obtained an average score of 3.6 with a very feasible category. The results of product validation based on media aspect obtained an average score of 4 with a very feasible category. Based on this average score, the material aspect and media aspect in the pop-up book media based on the local wisdom of the Baduy tribe have a very feasible category to be tested in biology learning, especially on the material of food plants diversity.

Keywords: pop-up book media; local wisdom of the baduy tribe; concept comprehension; environmental literacy

1. Introduction

The Baduy tribe is one of the tribes that still maintains its traditional culture, in the middle of the advancement of civilization and technology. The Baduy tribe is divided into two, which is Inner Baduy and Outer Baduy. The most basic difference between these two tribes is in carrying out pikukuh (customary rules). Inner Baduy still hold strong to the tradition and carry out customary rules properly, while Outer Baduy still adhere to customary rules but are more open to outside influences [1]. [2] The pikukuh of Baduy community is pondok teu meunang disambung, lojor teu meunang potong (short should not be connected, long should not be cut). The meaning of this pikukuh is that Baduy have an obligation to conserve nature and not go against the laws of nature [3].

The source of life for the Baduy tribe is the forest and the surrounding nature. The dependence of Baduy community's life on nature is reflected in the form of a strong traditional arrangement in managing the resources in their environment. One of the local wisdoms of the Baduy tribe in managing natural resources is *ngahuma* (farming) in a traditional way that is still applied today. *Ngahuma* (farming) for the Baduy community is considered an obligation in their religion, sunda wiwitan. There is an explicit relationship between sunda wiwitan beliefs and the natural environment, one of the important aspects of sunda wiwitan teachings is the obligation to maintain nature and the prohibition to overdo it in managing natural resources, including farming procedures and farming obligations [4].

Based on the data of food plants inventory conducted in Cibeo Village, Inner Baduy in the landscape of cai (water), huma (field), and leuweung lembur (village forest), 43 species from 21 families of food and horticultural plants were found to be utilized as food resources [5]. [6] The main source of food for Baduy indigenous people is huma rice which is managed based on local wisdom and traditional values, without using modern technology. In addition, Baduy community also utilizes various traditional food plants including fruits, vegetables, and tubers. It can be seen that the plants diversity in Baduy tribe is still maintained and utilized as foodstuff, thus showing that Baduy tribe has a contribution in conserving biodiversity. The management and utilization of traditional resources of Baduy community based on

local knowledge, beliefs, and practices have many things that can be contributed to the conservation of biodiversity and the environment [7].

Based on the needs analysis by interviewing the Biology teacher at one of the high schools in Lebak Regency, there are limited learning resources on biodiversity material and the learning process is not optimized. This is because students only use school textbooks. Limited learning resources can affect the lack of information about the preservation and utilization of resources in the environment due to the lack of relevant and accurate sources of information. Learning resources can use the local environment because it provides a lot of information for students to explore the potential and problems that exist in the surrounding environment. Utilization of the environment as a learning resource allows students to directly observe biological objects and phenomena so that the learning process becomes less painful [8].

The local wisdom of the Baduy tribe in utilizing food plants to meet their needs can be raised as a learning resource in the form of pop-up book learning media. [9] The presentation of learning by using local contexts will be better understood by students than using national contexts that are not recognized by students as they usually find in school textbooks. Therefore, a learning resource is needed in the form of pop-up book learning media that raises the local wisdom of the Baduy tribe in managing resources in the environment, especially in food plants.

Learning media as a tool that can facilitate teachers in carrying out the learning process [10]. Pop-up book media is a book that has three- dimensional elements that can move when the page is opened, and provides a more interesting visualization and display to improve students' understanding of learning material [11]. [12] Pop- up book media contains elements of entertainment through illustrations that can be formed, move, and cause embossed effects on the paper pages when opened. Visual illustrations in pop-up book media can be used to clarify learning materials [13], [14].

Based on the explanation above, this research aims to develop pop-up book media based on the local wisdom of the Baduy tribe on food plant diversity material and determine the validity of pop-up book media from material aspect and media aspect.

2. Method

This research is a research and development method with the 4D development model adapted from Thiagarajan et al. (1974) which consists of four stages of development which are define, design, develop, and disseminate [15]. This research was carried out until the develop stage, especially the validation stage carried out by two biology education lecturers, two lecturers of material experts and media experts.

In the define stage, the needs analysis through field observations, biology teacher interviews, learner analysis, curriculum analysis, concept analysis, and formulation of learning objectives. This stage is carried out to determine and define the needs for product development and its specifications. In the design stage, the design of product development drafts, preparation of learning materials, selection of learning models, making research instruments and making research instrument validation sheets. In the develop stage, product development is carried out into a real product and submits validation to material expert validators and media experts. If there are deficiencies or errors, improvements are made according to the suggestions of the validators.

The instrument used for product validation testing is through validation sheets from material aspect and media aspect. After obtaining the product validation results, the validation test data is analyzed based on the validator's assessment and then averaged based on each aspect. [16] The feasibility validation formula can be seen in the formula 1.

$$\bar{X} = \frac{\sum X}{n}$$

Information:

$\bar{X}$	: Average score
$\sum X$	: Number of scores earned
n	: Number of questionnaire items

Furthermore, the average score obtained is converted into a four-point scale. [17] The reference table for converting scores into a scale of four can be seen in Table 1.

Table 1. Score Conversion on a Four-Scale

Values	Intervals	Category
4	X ≥ 3,1	Very Feasible
3	3,1 > x ≥ 2,5	Feasible
2	2,5 > x ≥ 1,9	Less Feasible
1	X < 1,9	Not Feasible

3. Results and Discussion

The development of pop-up book media based on the local wisdom of the Baduy tribe on food plants diversity material was carried out using three stages of the 4D development model consisting of the define, design, and develop stages.

In the define stage, analyzing needs through field observations, biology teacher interviews, learner analysis, curriculum analysis, concept analysis, and formulation of learning objectives were conducted. It is known that pop-up book media based on local wisdom has never been used for learning.

In the design stage, the design of pop-up book media based on the local wisdom of the Baduy tribe, especially on the material of food plants diversity, is conducted. Pop-up book media based on the local wisdom of the Baduy tribe on the material of food plants diversity consists of 32 pages. The process of making pop-up book media starts from making flowcharts, making storyboards, design visualization, and media preparation.

The flowchart making stage is the stage of making concept maps related to food crop diversity material from reference studies. This stage aims to determine the sequence and relationship of the material developed. The storyboarding stage is an initial description of the material to be developed and designs the elements that will be displayed in the pop-up book media. The design visualization stage is carried out by packaging the material that has been developed into a design using the Canva application. In the last stage, the media preparation stage is carried out printing and compiling into a series of pop-up books. The media was printed using 260 gsm inject art paper, with a size of 21 cm x 27 cm, by selecting Anton, Amaranth, and Canva Sans fonts. Tahap pembuatan flowchart merupakan tahapan pembuatan peta konsep terkait materi keanekaragaman tanaman pangan dari pengkajian referensi.

The pop-up book media component can be seen in the picture below. Below is the cover page of the pop-up book media product in Fig. 1.

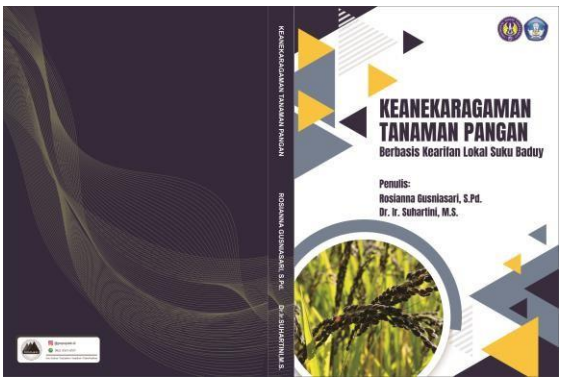


Figure 1. Front and Back Cover

Appearance of the preface and table of contents on Fig. 2.

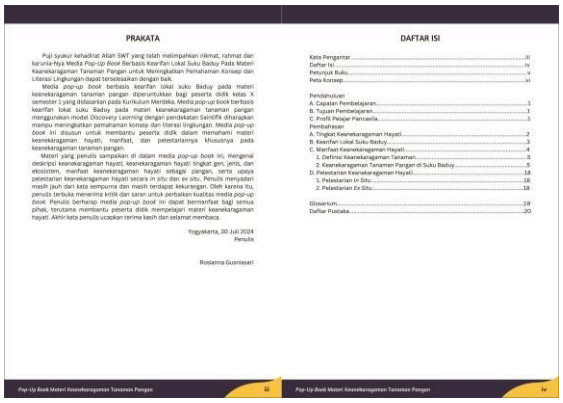


Figure 2. Preface and Table of Contents

Appearance of the book instructions and concept maps in Fig. 3.

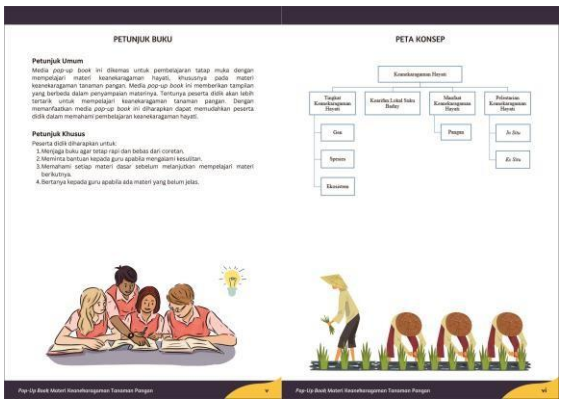


Figure 3. Book Instructions and Concept Maps Pop-up view of rice barn in Fig. 4.



Figure 4. Pop-Up Rice Barn

Appearance of learning outcomes, learning objectives, Pancasila student profile, food plants diversity material can be seen in Fig. 5.

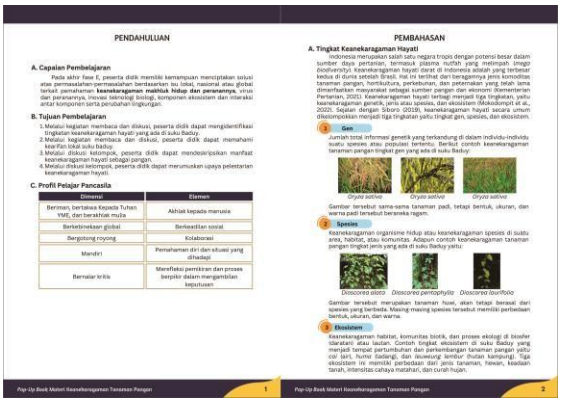


Figure 5. Learning Outcomes, Learning Objectives, Pancasila Student Profile, and Food Plants Diversity Materials

Appearance of the local wisdom of the Baduy tribe can be seen in Fig. 6.



Figure 6. Local Wisdom of the Baduy Tribe Pop-up view of rice plants in Fig. 7.



Figure 7. Pop-Up Rice Plant Pop-up view of food plants in Fig. 8.

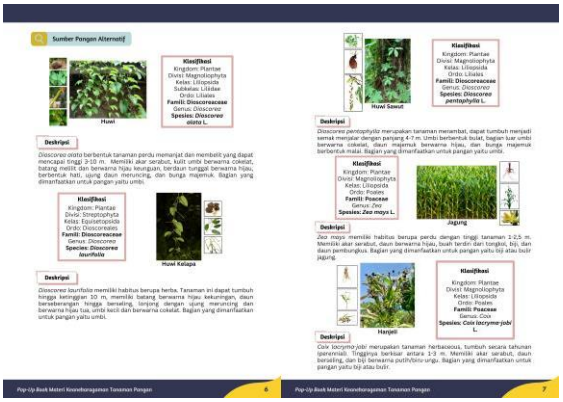


Figure 8. Pop-Up Food Plants

The last is the glossary and bibliography seen in Fig. 9.



Fugure 9. Glossary and Bibliography

In the develop stage, the validation test of pop-up book media products based on the local wisdom of the Baduy tribe was carried out based on material aspect and media aspect by two biology education lecturers. The results of the validation test from the material aspect can be seen in Table 2.

Table 2. Validation Results Based on Material Aspect

No	Aspect	Validation Score	Average Score	Category
1	Content Validity	18	3,6	Very Feasible
2	Material Presentation	13	3,3	Very Feasible
3	Linguistics	16	4	Very Feasible
	Amount	47	10,9	Very Feasible
	Average		3,6	

Below is the result of the validation test from the media aspect can be seen in table 3.

Table 3. Validation Results Based on Media Aspect

No	Aspect	Validation Score	Average Score	Category
1	Consistency	12	4	Very Feasible
2	Pop-Up Book Media Display	32	4	Very Feasible
3	Physical Attractiveness	12	4	Very Feasible
	Amount	56	12	Very Feasible
	Average		4	

Based on the validation results from the material aspect, an average of 3.6 out of a total maximum average value of 4 was obtained. As for the results of validation from the media aspect, an average of 4 out of a total maximum average value of 4 was obtained. Both assessments are in the very feasible category which indicates that the pop-up book media based on the local wisdom of the Baduy tribe on the material of food plants diversity is very feasible to be tested in biology learning, especially on the material of food plants diversity.

The material of food plants diversity was chosen in the development of pop-up book media based on the local wisdom of the Baduy tribe because of its relevance to the development of contemporary science and sustainable development goals (SDGs), especially on food, which is included in SDGs 2, that is zero hunger.

The relevance of food plants diversity to the development of contemporary biology is closely related to the understanding and utilization of food plants in everyday life, which can help in increasing knowledge about food plants diversity and how to manage and develop food plants diversity in a sustainable manner.

SDGs with food plants diversity can help in providing information on environmentally sound food plants development. SDGs Goal 2 is to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture [18]. The problem of hunger in Indonesia has different levels of urgency among regions and provinces. [19] The problem of hunger requires efforts to increase the consumption of a variety of foods that must refer to the principle of balanced nutrition, which can be called food diversity or food diversification.

The selection of food plants diversity material provides an understanding of the importance of food plants diversity in food security and sustainability. Therefore, the material of food plants diversity is packaged in the form of pop-up book media based on the local wisdom of the Baduy tribe. The benefits of learning using pop-up book media are to be able to improve learning outcomes [20], improve memory [21], and improve students' concept mastery [22].

According to some research, pop-up book media is feasible to use for learning. Reference [23] stated that the pop-up book is feasible to use as learning media on biodiversity material for class X SMA. In addition, reference [24] stated that pop-up book media is feasible to use in the learning process.

4. Conclusion

Based on the development that has been conducted, it can be concluded that the pop-up book media based on the local wisdom of the Baduy tribe on food plants diversity material obtained an average value of 3.6 from the material aspect and an average value of 4 from the media aspect. The average value shows that pop-up book media is feasible to use as a learning media on biodiversity material, especially on food plants diversity material.

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POSTMODERNISM IN THE DECONSTRUCTION OF THE APPLICATION OF JOGLO FORMS IN YOGYAKARTA

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Abstract

Deconstruction in architecture Joglo Yogyakarta represents shift and adaptation form traditional in modern context. Research This aiming For analyze How phenomenon deconstruction influence meaning and form building traditional Joglo, as well as How elements architecture the adopted and transformed into modern buildings. This study explore five cases : Graha Sabha Pramana (GSP), Rectorate of Yogyakarta State University (UNY), Dalem Joyokusuman, Tembi Cultural House, and Joglo Traffic Police Post. Each building the reflect phenomenon different deconstructions, starting from glorification(hyperbole) ,parody, stagnation, fluidity, to deviation. Research This use method descriptive qualitative with approach phenomenological. Data obtained through observation fieldwork, interviews, and studies library. The results show that transformation architecture Joglo reflect existence tension between tradition and modernity, where the meaning symbolic traditional joglo experience change significant. Modern buildings do not only maintain element aesthetics traditional but also interpret return forms the in accordance need contemporary. In conclusion, deconstruction architecture Joglo in Yogyakarta shows dynamics changes that reflect flexibility architecture traditional in face context changing social and cultural conditions.

Keywords: Postmodernism, Deconstruction, Joglo, Yogyakarta

1. Introduction

Joglo is one of the architecture traditional Javanese culture which is rich in meaning symbolic, reflects social status, philosophy cosmology, and spirituality. However, in development, modernization has bring change significant in implementation architecture Joglo in Yogyakarta.

Form and meaning traditional Joglo has experience deconstruction, where the elements traditional the dismantled and arranged repeat in context modern. Deconstruction This involving shift value, function, and aesthetics, so produce meaning new in architecture. Phenomenon This interesting For analyzed use understand How architecture traditional Joglo adapted to in modern architecture, which is not only maintain mark its aesthetics but also interpret return the meaning in accordance with needs of the times.

If That associated with art within the scope of the area postmodern discussion, including in matter This architecture, then art is as expression cultural that produces limitation among others: *collage,* parody, and *pastiche* e. *Collage,* is make a work with merge pieces parts from various work Good That started from classic, tradition or modern to become a new work. Parody, is A composition art or literature that plays with and twists style, idea or expression typical taken from figure artist, so that looks becomes absurd. Likewise pastiche is an empty, neutral and normless parody, as speak without language, history without period historical. There is no Again representative reality or a parody that is imitated, because in imitated pastiche is imagination.(Piliang, A. 1998: 306-308).

Deconstruction is emerging approaches in various field like philosophy, literature, architecture, and art, which focuses on the analysis and dismantling of structure meaning, ideas, and forms that are considered stable or traditional. (Jacques Derrida: 1976). Deconstruction highlight How meaning a text or structure no remain, but always open For interpretation, depending on different contexts and perspectives.

Approach This challenge dualism in thinking traditional, such as good and bad or center and edge, with emphasize that concepts the each other related and not can separated. Deconstruction also pays attention to context social, cultural and historical aspects that shape understanding to a work or structure, so that analysis No only focused on visible elements, but also on factors that influence them. interpretation.

The process of reinterpretation the existing elements in deconstruction produce better understanding broad and complex, opening up room For invention meaning new that is not unexpected.

In addition, deconstruction confess that meaning and form always nature liquid and not can ensured, create chance For more exploration in in understand phenomenon.

In architecture, deconstruction functioning as effort For dismantle and redefine elements traditional, allowing interpretation newer one in accordance with modern context, as well as challenge existing limitations in form and function. As known that Derrida's deconstruction model does not capable accommodate development art, so that happen widening theory deconstruction or in a way intertextual called with "Non-Derridean Deconstruction". In the world of architecture, "Non-Derridean Deconstruction" is is consists of from *instability* or No stable, *disorder* or No regular, *impure* or No pure, disharmony or No harmony, fragmentation No unified, *fluid* or melting, *metaphor* or the metaphor in question to mean Language as hyperbole, *distortion* or distortion, *in-context* or own context and *contrast* or opposite so that Can make stability, cohesion and identity form pure disturbed (Mantri & Makainas (2011).

Based on background behind the problem that has been described, research about phenomenon postmodernism in deconstruction building Joglo in Yogyakarta becomes very relevant and interesting for reviewed.

2. Method

Study This use approach descriptive qualitative with method phenomenological. (Creswell, John W: 2013). Object study consists of from five buildings in Yogyakarta: Graha Sabha Pramana, UNY Rectorate, Dalem Joyokusuman, Tembi Cultural House, and Joglo Police Post. Data collection techniques include observation field, interview deep with architects and users buildings, as well as study library For obtain secondary data. Data analysis techniques are carried out with inspect change form and function architecture Joglo, then connected with draft Derrida's deconstruction. Data reduction is carried out For filter information relevant related with deconstruction architecture. Validity of data obtained through triangulation of data from various source.

3. Results and Discussion

Postmodernism in Deconstruction that occurs in every object study show dynamics change architecture Joglo in various method as following.

Graha Sabha Pramana (GSP)

The Graha Sabha Pramana building is example hyperbole or glorification in which form joglo enlarged become monumental. Different with meaning original joglo as spiritual center, this reflect modern glorification of power and prestige institutional.

In the Graha Sabha Pramana Building, a phenomenon postmodernism seen in method architecture traditional, especially style joglo, experiencing shift significant from meaning initially. In the context of this, postmodernism emphasize grandeur and hyperbole. Elements architecture joglo which is usually simple and humble Now changed become a monumental and magnificent structure

Glorification This No only physique but also symbolic because the Graha Sabha Pramana Building is functioning as representation power and prestige modern institutions. This creates impression the distant majestic beyond objective beginning joglo as spiritual and social center community. This postmodern structure challenge tradition with redefine values architecture joglo, making it as symbol domination and modernity.

In addition, the implementation element excessive and monumental designs show attitude skeptical to principles architecture traditional. The Graha Sabha Pramana building is example How postmodern architecture does not only change element traditional but also change meaning, allows interpretation newer one in accordance with context modern social and cultural. This fact show that architecture can explored in various a way that reflects chaos modern society and not Again limited to one meaning or function.

UNY Rectorate

UNY Rectorate Building shows deconstruction in the form of parody, where the elements intercropping reversed- usually widen to below, but here widen to above. This is reflect criticism to stiffness architecture traditional, at the same time give room For interpretation new. Phenomenon

postmodernism This use parody as technique deconstruction. Parody in situation This functioning For change existing conventions; for example, the elements intercropping which is usually widen to lower changed become widen to above. Reversal This is criticism to inflexibility architecture traditional besides A visual game.

Phenomenon postmodernism in the UNY Rectorate Building can seen from method structure building This utilise parody as method deconstruction. In the context of this, parody functioning For reverse existing conventions — for example, the element intercropping which is usually widen to lower changed become widen to above. Reversal This No only just a visual game, but also a criticism to inflexibility architecture traditional.

With reverse elements that have been established in architecture joglo, UNY Rectorate Building invites reflection regarding rigid design norms and inviting public For see architecture in more context dynamic and open. This is in line with principle postmodernism that rejects idea single about truth or beauty, and conversely, celebrating diversity interpretation.

This criticism can considered as satire to values held in architecture traditional, where the forms and functions often considered sacred. With adopt form that is not conventional and giving meaning new to existing elements, the UNY Rectorate Building creates room for exploration creative and innovative.

Therefore that, phenomenon postmodernism in context This show that architecture No only functioning as place physical, but also as a medium for greater social and cultural dialogu. This allows more interpretation free and flexible, at the same time challenge existing limitations in tradition architecture.

Joyokusuman Palace

Joyokusuman Palace reflect stagnation in context postmodernism with interesting way, showing tension between tradition and modernity. Although building This has switch function become room commercial, structure physical and spatial still maintained with very traditional way. Stagnation This create impression conservative, where the building No fully adapt with changes of the times, but more choose For maintain values and forms traditional.

Within the framework postmodernism, stagnation This Can seen as form criticism to modern approach that requires innovation and change constant. Postmodernism often reject absolute ideas and celebrate plurality as well as ambiguity. In case This is the Joyokusuman Palace can seen as symbol from ambivalence to modernity — even though its function has changed, building This Still trapped in norms and forms traditional that is not fully relevant with need contemporary.

Condition This also reflects How values culture and history still held firm, even in context change fast social. Stagnation in Dalem Joyokusuman show that There is uncertainty and challenges in embrace changes, which often make buildings and spaces social caught between two worlds : one that wants preservation traditions, and others that encourage modernization and flexibility.

With Thus, Dalem Joyokusuman functioning as mirror from postmodern dynamics, where identity, values, and forms each other interact in complex way. This highlights the importance of dialogue between tradition and modernity in architecture, as well as challenges faced in try find balance between both of them.Dalem Joyo Kusuman display stagnation, where even though building experience change function become room commercial, spatial traditional No experience change significant, creating impression conservative in face modernization.

Tembi Cultural House

Tembi Cultural House reflects fluidity, where the function spaces traditional like pringgitan and dalem agent disbursed For various modern activities, creating flexibility new without remove element traditional.

Tembi Cultural House reflects draft tight fluidity the relation with approach postmodernism in architecture. In the context of this, fluidity refers to the ability room For adapt and function in a way flexible, creating dynamic interaction between element traditional and modern needs. With melt function spaces traditional like pringgitan and dalem ageng, Tembi Cultural House shows that values and forms architecture No must static or stiff, but can experience transformation in accordance with context changing social and cultural conditions.

From the perspective postmodernism, fluidity This reflect rejection to narrative single or traditional which is often binding architecture on function and meaning certain. On the other hand, Tembi Cultural House creates space that allows Lots interpretation and use. This is show that architecture can own various meanings, depending on the context its use. With Thus, space can functioning No only as place stay, but also as an arena for various activities, start from show art until courses and meetings.

More Far again, Tembi Cultural House reflects Spirit postmodern pluralism, in which the elements traditional No removed, but integrated to in more context area. Elements architecture traditional, such as joglo, no only become decorative, but also functional as connector between the past and the present, creating a dialogue between identity rich culture and diverse modern needs.

With Thus, Tembi Cultural House does not only just building, but also a symbol from ability architecture For adapt and create an inclusive and multifunctional space. This reflects postmodern belief that architecture must capable serve various need public while still respect and defend inheritance existing culture. Existing fluidity in the Tembi Cultural House becomes example real How element traditional can interact and adapt in modern context, creating relevant and meaningful space for public moment This.

Joglo Traffic Police Post

Joglo Traffic Police Post experienced deviation, where the use of joglo roofs at police posts small deviate from meaning the original as social status symbol high, become element decorative without context symbolic traditional.

Joglo Traffic Police Post reflects phenomenon deviation in architecture postmodernism, in which elements traditional adapted For very different context from meaning the original. In case This, the use of a joglo roof which is usually is a symbol of high social and cultural status, today functioning as element decorative on the police post building which is functional and pragmatic.

From the perspective postmodernism, deviation This show How elements architecture can let go from context original and interpreted in ways new. In the context of This is a joglo roof No Again functioning as marker hierarchy or status, but more as attractive visual form attention without meaning in- depth related with power or spirituality. This reflects one of the principle postmodernism, namely rejection to meaning single and acceptance to diversity interpretation.

In addition, the use of The joglo at the police post also reflects tension between tradition and modernity. In one side, element traditional the Still maintain its known form broad, but on the other hand, he lost meaning attached symbol to him. In the context of this, postmodernism invite We For see architecture No only as product culture, but also as an arena in which various meaning and function can collide and interact.

The deviation that occurred at the Joglo Police Post shows that architecture in the postmodern era no Again tied to values rigid traditional. On the other hand, architecture can functioning as a medium that creates experience new for its users, even though with possible ways deviate from convention. This allows architecture For become more inclusive and responsive to need society that continues change, without put aside inheritance existing culture.

With Thus, Joglo Traffic Police Post is not only just building functional, but also a statement about How element traditional can deconstructed and adapted in a modern context, creating room For more interpretation wide and shows dynamics between tradition and innovation in architecture.

4. Conclusion

Deconstruction architecture Joglo in Yogyakarta shows that architecture traditional No nature stiff and static, but rather dynamic and capable adapt with modern context. Use element joglo in various modern buildings reflect flexibility architecture traditional in face change social, economic, and cultural. Although form his physical still can recognized, its meaning and function experience changes that reflect interpretation new. Research This disclose that deconstruction open room for architecture traditional For develop in accordance with needs of the times, even though often happens shift meaning from function the original.

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DEVELOPMENT OF THE SOUND SYSTEM OF THE PADUKUHAN HALL IN DUKUH SERUT KULON PROGO

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Abstract

Sound system in commercial buildings refers to the design and arrangement of sound systems to ensure even, clear, and effective audio distribution throughout the building area. This community service activity aims to: (1) develop sound systems in the hamlet hall of Serut Pengasih Kulonprogo, (2) Provide knowledge to the community regarding the use of sound systems, and (3) provide knowledge to the community regarding sound system maintenance.

The strategy for implementing community service activities is carried out with Need analysis, determining the location, making a sound system, socialization and training on the use and maintenance of commercial building sound systems, and evaluating activities. The location for making the commercial building sound system is the UNY vocational faculty maintenance and repair laboratory, while the location for installing the sound system is the Serut Pengasih Kulonprogo Hamlet Hall. Based on the implementation strategy, it is expected to have a good impact on the community of Dukuh Serut Pengasih Kulonprogo.

The results of community service activities are firstly, a commercial building sound system has been created, both indoor and outdoor, which is installed in the hamlet building of Serut Pengasih Kulonprogo. Second, socialization and training have been carried out regarding the use of commercial building sound systems. And third, socialization and training have been carried out regarding the maintenance of commercial building sound systems. The results of the evaluation of public understanding regarding the use and maintenance of sound system systems are that the average value for understanding the use of sound system systems is 82.5 while for maintenance of sound system systems is 85. This shows that the understanding of the participants in the socialization and training on the use and maintenance of sound system systems at the Serut hamlet hall is in the good category.

Keywords: Sound systems, Building, Commercial

1. Introduction

A sound system is a system of various electrical equipment that is used to amplify sound signals so that they can be heard by many people, usually used as amplifiers and loudspeakers. Beyond its function as an amplifier and loudspeaker, the sound system has an important role in various buildings. Whether in a meeting room, hall, stadium, or place of worship, a sound system helps clarify the delivery of information, increase focus and participation, and create a conducive atmosphere. Within the scope of a building, a sound system is very necessary to expand the range of sound, so that it can be heard clearly throughout the room, including the farthest corners.



Figure 1. Location of Serut Hall Pengasih Kulonprogo

Serut Hamlet Padukuhan Hall in Kulonprogo Regency is the center of activities for the Serut Hamlet community. From community meetings, cultural arts performances, to posyandu. In fact, this hall is often a place for holding development and outreach activities to improve community welfare.

However, over time, the sound system at Padukuhan Serut Hall is starting to show its age. The resulting sound is no longer clear, its range is limited, and it is often distorted. This hampers the smooth running of activities and reduces the comfort of residents, both in village meetings, deliberations, celebrations and performances.



Figure 2. Community Activity Room

Therefore, developing a sound system at Balai Padukuhan Serut is important to ensure the smoothness and benefit of various activities of the Serut Hamlet community. The new system will not only minimize communication and discussion barriers in village meetings, deliberations and training, but also create a comfortable and conducive atmosphere for residents who take part in arts and culture activities, posyandu or counseling. In this way, it is believed that community participation in various activities at the hall will increase, indirectly supporting the progress of Serut Hamlet

2. Method

The activities to be carried out will be explained in detail based on the partner's problem solving methods. The implementation method in this program consists of several steps, namely:

a. Need Analysis

Needs analysis is the initial stage carried out to determine various needs before making a commercial building sound system. This needs analysis is carried out by adjusting to existing problems to find solutions. This needs analysis is carried out in 2 stages, namely field observation and literature study.

b. Determining Location

The location for designing sound systems for commercial buildings is carried out in the Electrical Engineering and Installation Lab of the D4 Electrical Engineering Study Program, Faculty of Vocational Studies, UNY. For the implementation of the sound system and socialization on the use and maintenance of the sound system, it was carried out at the Padukuhan Serut Hall, Pengasih Village, Kec. Compassionate Kulonprogo

c. Making of a sound system

The creation of this sound system requires careful planning to ensure functionality, sound quality, and safety. The creation of the sound system is carried out in several steps, namely:

1) Speaker layout design
2) Selection of sound system components
3) Installation of sound system components

d. Sound System Testing

The purpose of testing the sound system is to ensure that the sound system functions properly and according to plan. The steps for testing the balia padukuhan sound system are as follows:

1) Connectivity Testing

2) Device Function Testing
3) Sound Distribution Testing

e. Socialization and training on the use and maintenance of commercial building sound systems

The socialization and training on the use and maintenance of the sound system at Balai Padukuhan Serut aims to provide knowledge and understanding to the managers of the hall and the community about the use and maintenance of the sound system. The steps of socialization and training are as follows:

1) Preparing a place for socialization and training, namely at the Balai Padukuhan Serut Pengasih, Kulonprogo.
2) Preparing materials for socialization and training and resource persons for electrical experts from community service members.
3) Providing socialization and training to partners on the use of sound systems
4) Providing socialization and training to partners on sound system maintenance
5) Providing sound system facilities to managers

3. Results and Discussion

The results of the development of commercial building sound systems will be explained in detail based on the development method. This sound system development method consists of several steps, namely:

a. Needs Analysis

The needs analysis stage is the initial step in developing a sound system. This stage aims to identify various problems in the field. The following is an explanation of the needs analysis.

1) Field Observation

Field observations were conducted in the Serut Pengasih Kulonprogo Hamlet building by observing the problems currently being experienced by the Serut Hamlet community. Based on the results of the observation, the problem was that the Serut Hamlet Hall building did not yet have indoor or outdoor sound system technology so that community activities were less than optimal. The second problem was that the manager of the Hamlet building did not yet have an understanding related to the use and maintenance of sound systems, so it was feared that the use and maintenance of the sound system would not run well.

2) Literature Study

After knowing the results of the observation, the next step is to conduct a literature study to find out what needs are needed to overcome the problems from the results of the field observations that have been carried out. Literature studies are carried out by reading various references. Based on the results of the literature study, the development of commercial building sound systems needs to be carried out to optimize community activities. Literature studies are also carried out to find out the various needs to develop sound systems in commercial buildings.

b. Determining Location

The location for designing sound systems for commercial buildings is carried out in the Electrical Engineering and Installation Lab of the D4 Electrical Engineering Study Program, Faculty of Vocational Studies, UNY. For the implementation of the sound system and socialization on the use and maintenance of the sound system, it was carried out at the Padukuhan Serut Hall, Pengasih Village, Kec. Compassionate Kulonprogo

c. Making of a Sound System

The process of developing a sound system for commercial buildings in Serut Pengasih Hamlet, Kulonprogo consists of several steps, namely:

1) Speaker Layout Design

The speaker layout design process is carried out according to the characteristics of the room or building that you want to provide sound system. The design that must be done is to calculate or calculate the sound field according to your needs. The results of the sound system planning can be seen in Figure 3.

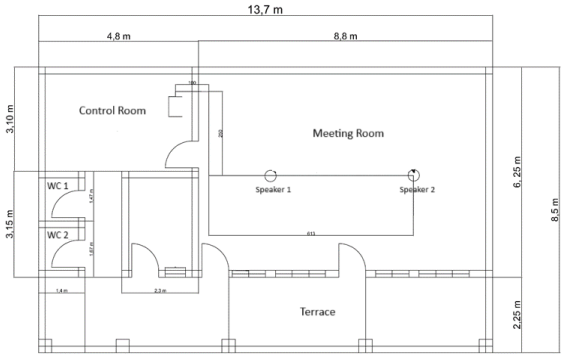


Figure 3. Speaker Layout

2) Selectian of Sound System Component

The next step in creating a sound system is selecting components such as speakers, selecting the type and number of speakers according to the needs of the room. For example, ceiling speakers for larger areas or wall speakers for smaller spaces. Amplifiers, selecting amplifiers that are capable of supporting the number and type of speakers selected, and have enough power to produce clear sound without distortion. Microphones, selecting microphones according to needs, such as handheld microphones, table microphones, or wireless microphones for more flexibility. Audio Controllers, selecting audio control systems that allow flexible volume and sound distribution settings across zones. The results of component selection are shown in table 1.

Table 1. Sound System Components

No.	Name of Components	Spesification
1.	Inside Room Speaker	TOA tipe ZS-658R
2.	Outside Room Speaker	TOA tipe ZH-5025BM CE
3.	Amplifier	Amplifier Bluetooth Stereo Audio Channel 5.1 HomeTheater AV-888BT
4.	Microphone	Toa ZM-26iHS-AS
5.	Cable	NYYHY 2x0,75mm

The list of components in table 1 are the main components in the sound system. While the supporting components of the sound system are conduit pipes, clamps, teedus, crossdus, elbows, sheaths, black tape. These components are used to support the installation of the sound system to be neat and safe.

3) Installation of sound System Component

The next step is the installation of sound system components with speaker installation steps according to the design that has been made, the position is appropriate for optimal sound distribution. Installation of amplifiers and supporting equipment is carried out in the control room or area that has been prepared. The next step is to carefully pull and install cables, according to the designed path. The installation of speakers and cables is shown in figures 4 and 5.



Figure 4. Speaker Installation



Figure 5. cable Installation

In addition to installing speakers and pulling cables, an amplifier was also installed as a sound amplifier in the sound system, which can be seen in Figure 6.



Figure 6. Amplifier Installation

The installation of speakers and cables in connection with a commercial building sound system must be done carefully to ensure even sound distribution and not be disturbed by environmental factors or building aesthetics. Speakers need to be installed in strategic points, such as on ceilings, walls, or outdoor areas, depending on the type of room and coverage needed. In addition, the cables connecting the speakers to the amplifier and control system must be neatly laid, protected from physical interference, and in accordance with electrical safety standards. The placement of cables should not interfere with the interior design of the building, often by installing them in hidden cable channels or behind suspended ceilings. Also, make sure there is good planning to minimize sound leakage and interference from other devices in the vicinity.

a. Sound System Testing

The purpose of testing the sound system is to ensure that the sound system functions properly and according to plan. The steps for testing the sound system of the hamlet hall are as follows:

1) Connectivity Testing

Connectivity testing is done by testing all cable connections to ensure there are no loose or damaged connections. This includes checking speaker cables, microphone cables, and Amplifier cables. And testing all devices that have a stable and adequate power source. Ensuring that there are no problems with the voltage that can cause distortion or device failure. The results of the connectivity test are shown in table 2.

Table 2. Result of The Connectivity Test

No.	Name of Connectivity	Result
1.	Speaker Cable	Normal
2.	Microphone Cable	Normal
3.	Amplifier Cable	Normal

2) Device Function Testing

Device function testing is done by testing the speakers by activating all speakers individually to ensure that each speaker is functioning properly and producing sound without distortion. Amplifier testing by adjusting the volume at various levels to ensure that the amplifier can work properly without overloading or distortion. Microphone testing by ensuring sensitivity and sound quality. Device function testing is shown in table 3.

Table 3. Result of Device Fungtion Test

No.	Name of Component	Result
1.	Speaker 1	Normal
2.	Speaker 1	Normal
3.	Amplifier Volume 10%	Sounds Good
4.	Amplifier Volume 50%	Sounds Good
5.	Amplifier Volume 100%	Sounds Good
6.	Microphone	No noice

3) Sound Distribution Testing

Sound distribution testing is done by subjective evaluation. Sound distribution testing is done subjectively by listening directly to the sound produced by the system from several points in the Balai Padukuhan Serut Kulonprogo room. Listening to sound from several points in the room aims to determine the distribution of sound and can be heard clearly from several points. The Balai Padukuhan Serut room faces north and the position of the sound source is on the east side of the room so that the points in the room that are the test positions are the center, northwest, southwest, southeast, and northeast. Determination of test points is based on the direction of the wind from the position of the room. The results of the sound distribution test are shown in table 4.

Table 4. Result Sound Distribution Test

No.	Position	Result
1.	Center of room	Sounds Clear
2.	Northwest of room	Sounds Clear
3.	Southwest of room	Sounds Clear

No.	Position	Result
4.	Southeast of room	Sounds Clear
5.	Northeast of room	Sounds Clear

b. Socialization and training on the use and maintenance of commercial building sound systems

The process of socialization and training on the use and maintenance of the sound system was carried out within one week, namely from 16 to 20 September 2023. The socialization and training process has the following stages of activity:

1) Socialization and training on the use of sound system

The socialization and training of the use of the sound system was carried out for 3 days, namely from 16 to 18 September 2024. The strategy for implementing the activity was that on the 16th and 17th, socialization was carried out using the classical lecture method with resource person Dr. Hartoyo, M.Pd., MT. then on the third day, the 18th, training was carried out using the demonstration method and direct practice of using the sound system. The purpose of the socialization and training of the use of the sound system is to provide knowledge to the community and hamlet building managers on how to use the sound system correctly and safely. To measure the understanding of the participants, a written test was carried out with 40 multiple choice questions. The results of the written test taken by the participants got an average score of 82.5. based on these results, the understanding of the participants in the socialization and training of the use of the sound system was categorized as good. Photos of the activity can be seen in Figure 7.



Figure 7. Socialization and training on the use of sound system

2) Socialization and training of sound system maintenance

The socialization and training of sound system maintenance was carried out for 2 days, namely from 19 to 20 September 2024. The strategy for implementing the activity was that on the 19th, socialization was carried out using the classical lecture method with Usman Nursusanto, M.Pd. as the resource person, then on the second day, the 20th, training was carried out using the demonstration method and direct practice of sound system maintenance. The purpose of the socialization and training of sound system maintenance is to provide knowledge to the community and hamlet building managers on how to properly and safely maintain a sound system. To measure the participants' understanding, a written test was conducted with 40 multiple-choice questions. The results of the written test taken by the participants obtained an average score of 85. Based on these results, the participants' understanding

of the socialization and training on the use of the sound system was categorized as good. Photos of the activity can be seen in Figure 8.



Figure 8. Socialization and training of sound system maintenance

4. Conclusion

The conclusion of the sound system development activities at the Serut Pengasih Kulonprogo hamlet hall is as follows:

a. The development of a sound system in the Serut Pengasih Kulonprogo hamlet hall has been successfully carried out. The sound system has been tested with the results that all components of the sound system function well and the sound clarity test from various sides of the room is clearly audible.

b. Socialization and training on the use of sound systems have been implemented and provide an understanding of the correct and safe use of sound systems. This is proven by the results of the evaluation of socialization and training activities, the average value of participants is 82.5. The average value is in the good category.

c. Socialization and training of sound system maintenance have been implemented and provide an understanding of proper and safe sound system maintenance. This is proven by the results of the evaluation of socialization and training activities, the average value of participants is 85. The average value is in the good category.

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Training on Developing a Business Plan to Support Business Activities

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Abstract

The aim of the training is to develop a Business Plan as an active entrepreneurship methodology to enhance the analytical perception of Micro, Small, and Medium Enterprises (MSMEs) in Wonokerto, Turi, Sleman, Special Region of Yogyakarta. This training is expected to serve as an evaluation that contributes to the improvement of MSME Business Plans. The training participants consisted of 35 members from the Wonokerto MSMEs Forum. The training was conducted using three methods: lectures, tutorials, and discussions. The implementation of this community service can generally be categorized as successful, based on the evaluation results and the active participation of participants during the discussion and Q&A sessions.

Keywords: Business Plan, MSMEs

1. Introduction

The objective of the training on preparing a business plan to support business success is to meet the primary challenges of entrepreneurship training in the community by applying and systematizing business ideas within the chosen field of knowledge. In entrepreneurship education, the Business Plan is a key tool that consists of several planning items that assist in the development of business ideas. Therefore, facilitating the process of teaching Business Plans can contribute to the development of Micro, Small, and Medium Enterprises (MSMEs).

A Business Plan includes the characteristics of the business, how it operates, its strategies, plans for capturing market share, cost and revenue projections, and financial report outcomes. Preparing a Business Plan requires a comprehensive and systematic view of all components that make up the plan, understanding the function of each part and its interconnections, thereby facilitating the planning process for entrepreneurs. Business Plan is a management tool that can and should be used by every entrepreneur, following a logical and rational flow [1].

The Business Plan describes the company and its business model, providing learning and self-knowledge to the entrepreneur during its preparation. The business plan allows for continuous evaluation of all actions taken by the entrepreneur and what aids them in achieving their desired outcomes. Understanding that the business plan is a tool that enables predictions, anticipations, or mitigates the causes of failure in new businesses [2]. The business plan is a document with strategic studies that demonstrate the feasibility or infeasibility of a project.

It presents the Business Model Canvas, an instrument developed to describe how an organization creates, delivers, and captures value, thereby developing the organization's business model [3]. The Business Model Canvas is a business plan represented by a visual on a single sheet of paper, aimed at creating a visual map of the company that can convey more relevant information in a short amount of time. The business plan is outlined in seven stages in a concise manner, which is visible and can be updated with frequent contributions from the team [4]. This different approach to the Business Plan allows for understanding the development of the planning structure presented in the Circular Business Plan.

In this context, the Circular Business Plan is an instrument developed and implemented in this community service program. The approach is chosen to train Micro, Small, and Medium Enterprises practitioners by teaching business plans to individuals with diverse backgrounds and experiences.

The limited knowledge of entrepreneurship through the creative industry and the lack of guidance from competent parties are other factors influencing the community's lack of desire to establish creative businesses in the face of global competition. The community needs socialization regarding global economic competition, an increase in entrepreneurial spirit, and the creation of creative business plans so that they can build creative enterprises to improve the local economy and prepare themselves to face global competition through the creative economy. This can start with communities in rural areas, as the potential natural resources that serve as materials for the creative industry in villages are usually greater than those in cities.

Wonokerto Village, Turi District, Sleman Regency, is one of the villages with a significant amount of potential natural resources, particularly from the plantation and agricultural sectors. So far, these agricultural products have only been sold as they are, without efforts to enhance their market value. On the other hand, the population in this village is large, but there has not been much, or perhaps even any, movement to broadly encourage the community to improve the village economy by establishing a planned creative industry. Socialization, training, and sufficient guidance are needed for the community to build creative enterprises to enhance the economy, particularly in Wonokerto Village, Turi District, Sleman Regency, through entrepreneurship education and the development of the creative industry.

2. Method

The implementation of this Community Service activity was carried out using lectures, tutorials, and discussions. The systematic approach to this community service activity is as follows:

Step 1 (Lecture Method): Participants were provided with knowledge about the global economy and the role of the community in building Indonesia's economy in the future. They were also motivated to be aware of the importance of entrepreneurship for the economy, so that the entrepreneurial spirit of each participant could increase and they would have the desire to establish and build new businesses.

Step 2 (Tutorial Method): Training participants were given materials on business planning using natural resources, starting with analyzing business opportunities using a business plan.

Step 3 (Discussion Method): Participants were given the opportunity to discuss the issues related to the creation of business plans that they faced, enabling them to develop effective business plans. The Business Plan was written on an A3-sized sheet of paper and then presented. Subsequently, everyone collectively evaluated the discussion results.

3. Results and Discussion

This community service activity involves providing training to the community on business plans using a circular business planning approach in Wonokerto Village, Turi District, Sleman Regency. The target audience consists of 35 participants who are owners of MSMEs. This community service activity was enthusiastically welcomed by village officials and participants alike. The Business Plan training began with an expository approach, inviting participants to plan business ideas from various backgrounds. Understanding the concept of business planning, the goals of the training, and what a Business Plan is are essential in creating a business plan. Participants were given tutorials on filling out the business plan following the steps outlined in [7] below:

Opportunities: What is your business idea? What innovations does this idea incorporate? What is the name of this business idea? How can this idea be sustainable economically, socially, and environmentally?

Company: What are the mission, vision, and values of your business idea? What type of business entity does this idea represent? What are the strengths and weaknesses of your business idea?

Products and Services: What are the characteristics of all the products and services offered?

Consumers: What consumer expectations does this business idea aim to fulfill? Who are the people who will buy your products and services?

Environment: What market opportunities support this idea? What market threats could weaken this idea? Who are the direct and indirect competitors, and what are their characteristics?

Production and Operations: What are the stages of production and service delivery from suppliers to consumers?

Marketing and Sales: What phrases can effectively communicate your business idea? How and where will the products and services be presented? What are the estimated prices and quantities of your products and services?

Team: What positions are needed to implement this idea? What are the roles of each manager in the business idea?

Finance: What is the initial investment amount? Who are the investors? What are the operational costs?

Participants filled out the business plan papers according to their respective business ideas. They engaged in discussions and Q&A during the process of creating the business plans. This session enhanced participants' activity in articulating their business ideas.

Once the plans were created, participants presented their business ideas and received constructive feedback from other participant groups. Individually, participants expressed their perceptions of the training through the results of their business plans. After the training concluded, participants collectively evaluated the business plans they had developed.

Based on the evaluation of the community service activities conducted, several supporting factors can be identified. These supporting factors include: (1) The facilitators are lecturers from the Bachelor of Applied Accounting Study Program, meaning they have a solid understanding of entrepreneurship. (2) Participants were very enthusiastic about this training, as they needed it to prepare their business plans. (3) Support from the partner location regarding the facilities and infrastructure provided during the community service activities.

Conversely, there were two hindering factors: (1) Limited time for the event, which restricted discussions between the community service team and training participants regarding the materials presented, resulting in less detailed exchanges. (2) Limited time for initial discussions with partners.

The Training for Developing Business Plans to Support Business Success in Wonokerto Village, Turi District, Sleman Regency, has been successfully conducted. Participants actively participated during the Q&A and discussion sessions. They showed great enthusiasm for the material presented by the community service team, as they felt the content was very important. Moving forward, there is a need for follow-up activities in the form of entrepreneurship mentoring and monitoring within the MSME forum in Wonokerto Village, Turi District, Sleman Regency.



Figure 1. Lecture method



Figure 2. Discussion



Figure 3. Implementation

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TRAINING FOR THE DEVELOPMENT OF DIGITAL MODULES FOR ELEMENTARY SCHOOL TEACHERS IN BANTUL

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Abstract

The objective of this Community Service (PPM) activity is to provide training to teachers as a solution to the problems they face, specifically the lack of knowledge and skills in using digital technology to support the learning process.

This PPM activity was conducted both online and offline from June 28 to September 1, 2024. The training series included online talk shows, assignments, and training using the LMS platform, as well as direct monitoring at schools. The subjects consisted of 25 participants, who were elementary school teachers in Bantul District. The methods used included lectures, discussions, training & assignments, simulations, and mentoring. The lecture, discussion, and LMS usage methods were employed to deliver material (both theory and practice) and help participants understand the concept of digital module development. The practice/simulation method was used to give participants the opportunity to design digital modules using computer applications to support the digital learning process.

The results of the PPM activities show that (1) the knowledge, insight, and competence of the teachers in designing, developing, and integrating digital modules into their daily teaching have improved; (2) This training activity has been deemed successful in significantly enhancing teachers' competencies in understanding the basics of digital technology, creating engaging digital content, and employing effective teaching strategies using digital modules. Additionally, the training introduced teachers to various applications and software that can be used to create digital modules easily and efficiently.

Keywords: Digital module, training, development, teachers

1. Introduction

Education is the primary foundation in nation-building, and in this digital era, technology has become an integral part of daily life, including education. Entering the Industrial 4.0 era, digital literacy becomes crucial so that individuals are not easily swayed by hoaxes and can use technology wisely. According to CSIS, digital literacy is important for searching, collecting, and organizing valuable information, as well as promoting critical thinking skills. Paul Gilster (1997) defines digital literacy as an individual's ability to use technology, information, and communication effectively and efficiently in various contexts.

There are six benefits of digital literacy: 1) Facilitating the search and understanding of information, 2) Enhancing critical thinking skills, 3) Increasing vocabulary mastery, 4) Improving verbal abilities, 5) Enhancing focus and concentration, and 6) Improving reading, sentence structuring, and writing skills. Digital literacy not only encompasses understanding technology but also the ability to use it effectively and critically, including in education.

Technological advancements have fundamentally changed the educational landscape, influencing students' learning styles. The digital native generation tends to be more comfortable using technology in the learning process (Teo, 2013). They are attracted to teaching materials and learning media that can be accessed through digital devices such as smartphones and tablets.

The role of teachers has also transformed. Teachers are now expected to be learning facilitators and developers of content relevant to the needs of digital native students. The ideal teacher in this era is one who can develop engaging and relevant learning materials with technology and utilize various digital learning resources. However, adapting to these changes is not easy for educators. Research by Radinal (2021) shows that the ability to adapt to technology is a crucial competency for educators in times of disruption. The era of disruption brings significant changes in education, including systems, administration, and technical aspects. Educators must be able to keep up with these developments and adjust their teaching practices to remain relevant and effective.

Digital modules play an important role in this context. Digital textbooks allow for wider accessibility to learning materials and provide flexibility in the learning process, which is no longer

bound by space and time. Digital modules are designed to ensure ease and relevance with learning achievement indicators. Digital-based teaching materials can create innovative learning experiences and motivate students to be more interested in studying the material. Digital teaching materials also have great potential to be integrated with digital devices and internet technology favored by the digital generation. Research by Astawa (2020), Raharjo (2021), and Suleha (2020) supports this. Therefore, training and mentoring in the use of digital textbooks are essential so that educators can meet the changing and evolving demands of learning in this digital era.

2. Literature Review

Digital Modules

Digital modules have become an essential component of modern education, especially in the continuously evolving digital era. The use of digital modules in teaching not only helps in delivering more engaging material but also increases the accessibility and flexibility of learning. In Indonesia, various studies have been conducted to explore the benefits and challenges of using digital modules in education.

According to research conducted by Astawa (2020), digital modules can enhance students' learning motivation. In his study, Astawa found that students are more interested and motivated to learn when using digital modules compared to conventional teaching materials. This is due to the richer interactivity and visualization in digital modules.

Raharjo (2021) also highlights the benefits of digital modules in improving learning effectiveness. In his study, Raharjo found that the use of digital modules can help students better understand the material through features such as videos, animations, and simulations. Additionally, digital modules allow for more personalized and adaptive learning, where students can learn at their own pace and according to their individual learning styles.

Despite having many benefits, the use of digital modules in education in Indonesia also faces several challenges. Suleha (2020) identifies several major obstacles, including limitations in technological infrastructure and digital skills among teachers. Many schools in remote areas still struggle with accessing stable internet and adequate technological devices.

In his book, "Digital Transformation in Education" (2019), Wahyudi emphasizes the importance of training and mentoring for teachers in using digital modules. Wahyudi underscores that the successful implementation of digital modules heavily depends on the readiness and competence of teachers in utilizing technology. Therefore, continuous training and technical support are highly necessary.

Digital modules offer many benefits for education in Indonesia, including increased motivation, learning effectiveness, and student learning outcomes. However, challenges such as limitations in technological infrastructure and digital skills among teachers need to be addressed to maximize the potential of digital modules. Continuous training and mentoring for teachers are key to the successful implementation of digital modules in education.

3. Method

Based on the various points previously mentioned, the implementation of this program is carried out using the following activity methods:

1) Training and Outreach

This method is used to provide participants with an understanding of improving their skills in developing and applying digital modules. The activities begin with a lecture session that provides theoretical foundations on digital modules, followed by interactive discussions and assignments. For the assignments, participants are asked to design a plan for implementing digital modules in classroom teaching. This task aims to enhance participants' ability to assist students in self-directed learning using digital modules. The expected outcome is that participants will have a better understanding of how digital modules can be used to facilitate more effective and independent learning.

2) Simulation and mentoring

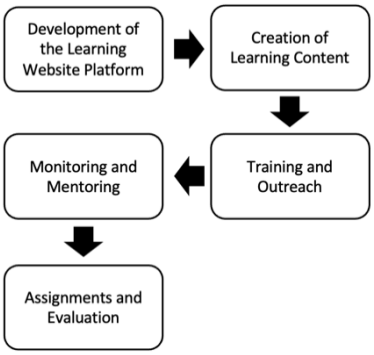
This method is implemented to give teachers the opportunity to practice applying digital modules in teaching and to understand their roles as facilitators. For the implementation, teachers are provided with comprehensive knowledge and understanding of the importance of competencies and skills in using digital modules. This activity includes simulations of digital module application in real learning scenarios. For mentoring, the facilitator team will provide direct guidance during the simulation to ensure that teachers can apply digital modules effectively. The expected outcome is that teachers will have better competencies in using digital modules, which in turn will support students' understanding of the lesson material and improve their academic performance.

3) Assignments

This activity is used to measure the extent of teachers' understanding and mastery in applying the training materials related to the development and use of digital modules. For the implementation, teachers are given tasks to design and conduct self-directed learning activities that support the use of digital modules. This assignment is done individually, where each participant creates a creative digital module that aligns with the designed learning objectives. The expected outcome is that teachers will be able to design and implement digital modules that effectively support students' independent learning. With these activity methods, it is hoped that elementary school teachers will be more prepared and competent in developing and applying digital modules, thereby improving the quality of teaching and supporting students in independent learning.

Here are the stages of digital module training for elementary school teachers in Bantul:

Figure 1. Stages of Digital Module Development Training for Elementary School Teachers



4. Results And Discussion

The digital module development training for elementary school teachers in Bantul goes through several stages. Each stage yields results that align with the desired objectives:

a. Development of the Learning Website Platform.

At this stage, the service team is developing an online learning platform accessible at https://belajar.edutechlab.id/. This website is specifically designed to support teacher training, where teachers are expected to follow and complete a series of meticulously designed activities to enhance their competencies. The platform not only provides activity content but is also designed to be an interactive space for teachers undergoing training. During the development process, the service team prepares various structured and systematic content, including key elements as follows: (a) Learning Videos: Each training material is accompanied by high-quality videos. These videos aim to provide a visual understanding that is easier for participants to grasp, covering key concepts, effective teaching methods, and practical simulations that can be applied in classroom teaching activities. (b) Written Materials: In addition to videos, training materials are also compiled in-depth text form, covering theories, concepts, and best practices in education. These materials are designed for teachers to read in detail at any time and are integrated with relevant references and supporting resources to enrich the participants' insights. (c) Interactive Exercises: Each training module is equipped with exercises designed to test participants' understanding of the material presented. These exercises can be in the form

of multiple-choice questions, short essays, or case studies that participants must complete, with feedback provided automatically or manually by the facilitator. (d) Performance Tasks: To measure how well teachers have applied the concepts learned, performance tasks are also provided. In these activities, teachers are asked to implement the skills or knowledge they have newly acquired in real or simulated situations. This ensures that teachers not only understand the theory but can also apply it in practice.

b. Creation of Learning Content

The development of learning content undergoes several stages designed to ensure the material covers the knowledge required by the training participants. This process begins with examining the characteristics of the training participants and the content being developed. An important step in developing learning content is conducting interviews with teachers to understand the teaching strategies they have been using. The interviews revealed that most teachers do not consistently apply specific teaching strategies in their instruction. Based on the analysis of the interview results and the characteristics of the participating teachers, the service team then compiles the material in several formats. First, videos are created to introduce the topics to be discussed. Following that, the material is presented in the form of presentations to support further understanding and is complemented with feedback on tasks that participants must complete as part of the active learning process.

c. Training and Outreach

The training begins with workshops that address various issues in the education world. These workshops are conducted to strengthen the teachers' understanding of the material presented by the service team. To make the material more relevant to the participants' experiences, discussion and Q&A sessions are provided. Interactive discussions are conducted in a multi-directional manner, where the service team and training participants exchange ideas. Participants are given the opportunity to share experiences, challenges faced, solutions they have tried, and discuss the importance of developing digital modules. The service team guides the discussion and Q&A by posing questions related to the topic being discussed and ensuring that every training participant can actively participate. These interactive discussions provide opportunities for participants to think critically, collaborate, and learn from each other's experiences. At the end of the workshop, participants are given information about the follow-up training activities that will be conducted through the web platform.

d. Monitoring and Mentoring

Monitoring of training participants is conducted periodically throughout the training period via the web platform. This monitoring aims to provide support and assistance to participants experiencing difficulties, whether technical or in understanding the material. To strengthen the mentoring, the service team also visits one of the schools used as a meeting place. This school serves as a venue for training participants to gather, discuss, and receive direct assistance from the service team. During the discussion sessions, most teachers expressed various challenges they faced. Some teachers reported technical difficulties in operating the web platform, such as interface navigation or accessing provided content. On the other hand, some teachers also expressed confusion in understanding the training content, especially on material that requires a deeper understanding of concepts or application in daily teaching. Through these discussions, the service team provided solutions and clarifications and offered direct assistance to overcome the obstacles faced by the participants. These monitoring and mentoring activities are designed to ensure the training process runs smoothly and that participants gain maximum benefit from the presented material.

e. Assignments and Evaluation

In this stage, participants are given assignments to create digital modules according to the subjects they specialize in. To assess the teachers' competencies in creating digital modules, a comprehensive evaluation is conducted. This evaluation includes assessments of several aspects, namely understanding, skills, and attitudes of the teachers. One component of the evaluation is the digital modules created by the teachers. Additionally, evaluations are conducted to measure the overall effectiveness of the training.

The understanding and skills of teachers improved after participating in the training program. This is evident as teachers are able to master applications for creating digital modules. Furthermore, the teachers' skills in this training are also visible from their ability to create creative digital modules that align with the characteristics of their students. These teachers are also able to provide useful feedback and tips to their peers. These achievements indicate significant progress, and the enthusiasm and positive attitude shown by the teachers contribute significantly to their skill improvement in creating digital modules, which will later be applied in their respective classrooms.

5. Conclusion

The digital module development training for teachers in Bantul yielded positive results and is relevant to current educational needs. The structured and participatory training methods have helped teachers enhance their understanding and skills in integrating technology into the learning process. Teachers realize that improving digital skills greatly aids in the efficient preparation of teaching materials. The use of the web facilitates flexible timing for teachers to attend the training, despite challenges related to readiness and limited time to integrate digital modules into a packed curriculum. Many teachers feel pressured by the strict academic curriculum demands, making it difficult to focus on digital module development skills. A more flexible curriculum adjustment is needed so that technology use can be integrated naturally. Additionally, some teachers face difficulties managing diverse classrooms, especially when students have different views on technology use. Therefore, ongoing mentoring and supervision programs are needed to help teachers develop skills and handle dynamic classroom situations. Support from all stakeholders, including school principals, parents, and the local community, is also crucial to integrating digital module development training in schools. Awareness from all parties is necessary to expand the acceptance of this technology beyond the classroom and create a better educational ecosystem.

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THE IMPACT OF A TRAINING PROGRAM ON THE APPLICATION OF LEARNING MODELS TO INCREASE TOLERANCE AND EMPATHY AMONG TEACHERS IN BANTUL

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Abstract

This article discusses the impact of a training program designed to equip teachers in Bantul with the application of learning models that enhance students' tolerance and empathy. The purpose of the training was to provide teachers with the knowledge and skills necessary to integrate tolerance and empathy into the learning process by recognizing the importance of fostering these values in a multicultural society such as Indonesia. Considering the characteristics of the learners, the training is conducted using the web, which is complemented by monitoring web-based training activities with face-to-face rooftop carats. The training results show a significant increase in teachers' understanding of the importance of tolerance and empathy in education. Teachers showed improved ability in implementing tolerance and empathy learning models that promote positive social interactions and emotional knowledge among students. In addition, using the web is more conducive and makes it easier for teachers to manage their learning process and learning needs. However, challenges such as time constraints due to the academic curriculum, multicultural classroom management and lack of institutional support were identified as barriers to full implementation. The study concludes that while the training program effectively improved teachers' abilities and positively influenced classroom dynamics, ongoing support and curriculum adjustments are needed to sustain these improvements. Further efforts to engage schools and communities in supporting tolerance and empathy initiatives will ensure long-term success in building inclusive and harmonious learning environments.

Keywords: teacher training, tolerance, empathy, elementary school teachers.

1. Introduction

In the context of Yogyakarta society, there are symptoms of waning tolerance and egalitarianism (Wahyono, et al. 2022). The attitude of tolerance that was once nurtured by the spirit and principles of Javanese such as *tepa selira, ajur-ajer, lembah-manah,* and *rukun*, all of which led to a situation of harmony or *tata tentrem* conditions, feels increasingly dry. The research results of Setara Institute concluded that Yogyakarta is among the top 10 provinces with the highest number of cases of freedom of religion/belief (KBB) in Indonesia, occupying the 6th position out of 37 cases. This indicates that cases of intolerance in Yogyakarta are real. It was reported that some students do not want to do flag ceremonies or do not want to respect the red and white flag. This intolerance is ironic, considering Yogyakarta declared itself the *city of tolerance*.

The national survey results of the Center for the Study of Islam and Society (PPIM) UIN Syarif Hidayatullah Jakarta (2018) show that intolerant and radical opinions among teachers at various levels, from kindergarten to high school, the level of intolerance and radicalism is quite high. The dissemination of survey results in DIY on 32 Muslim teachers, both school and madrasah teachers from kindergarten/RA, SD / MI, SMP / MTs, and SMA / MA, showed that intolerant opinions amounted to 59.38%. This is almost the same as the national percentage of 57.03%. There are intolerant and radical opinions of teachers at all levels of education nationally, which is quite high. As many as 59.38% of teachers have opinions in favor of the establishment of an Islamic State, although their support varies. There is a spectrum of understanding, for example, when children establish relationships with groups of different beliefs, it is feared that their faith will fade. In line with the results of research by the *Alvara Research Center* (Wahyono et al., 2022), Indonesian students are increasingly intolerant, and teachers play a significant role in fostering intolerance, in addition to the role of clerics and social media.

Educational institutions, which are strategic social institutions, have also become an arena for the practice of intolerance. On the other hand, the city of Yogyakarta, which has a cultural base full of

tolerance values, is increasingly less able to sustain the life of a diverse society. Similarly, the image of Yogyakarta as the *city of tolerance* will only be a slogan and lose legitimacy. Various facts about religious intolerance in Yogyakarta show that intolerance is still a serious problem in the life of a diverse society.

As cited by Yunia (2023), the results of the PISA assessment, the UNICEF survey, and the findings of Noboru et al. and Subroto also show the lack of internalization of the values of *compassion,* tolerance, and empathy of students. In addition to cases of bullying, the lack of values of tolerance, empathy, and a sense of justice can also be seen in various forms of discrimination and intolerance cases that occur in the world of education and society (Afriansyah & Seftiani, 2019; Floranti, 2022). For this reason, every teacher needs to understand how to integrate multicultural education into every subject. Learners must be involved in producing knowledge that contains the values of diversity, tolerance and empathy. Such learning will be able to eliminate various racist prejudices, ethnocentrism, and intolerance through learning together so that they will leave prejudiced ways of thinking. It is well known that the purpose of education is not only limited to the transfer of knowledge and cognitive skills but also includes the development of good morals and ethics, including attitudes of tolerance and empathy. In the context of an increasingly diverse society, tolerance and empathy are increasingly crucial in terms of culture, religion, and socio-economic background (Banks, 2015).

Schools, as formal education institutions, have a great responsibility to instill these values in their students, and teachers play an important role as the main driver in the education process. Bantul, as one of the regencies in the Special Region of Yogyakarta, has a very diverse socio-cultural background. This diversity brings its dynamics to education. The presence of students with various backgrounds requires teachers to be wiser in applying learning methods that not only emphasize academic aspects but also character development, especially in terms of tolerance and empathy. Tolerance is the ability to accept and appreciate differences in terms of culture, religion, and worldview, while empathy is the ability to feel and understand the feelings of others (Noddings, 2013).

The origin of the word tolerance is an absorption word from Latin *tolerance* (endure), which means to leave in peace (not disturb) all people who have different beliefs and practices of life. (Sularto, 2018). Aslan (2018), as cited by Rahmadonna (2022), defines tolerance as a significant part of democratic values. Walzer defines tolerance as the "indifference to difference" of people different from oneself. However, this definition is opposed by many people because indifference can never reach an ideal position in humanity. (Witenberg, 2019). Tolerance aims to maintain security, justice and acceptance of human rights (UNESCO, 1994) Tolerance is not just tolerating or respecting each other because this attitude is only the beginning of the meaning of tolerance. Tolerance is a noble human value that believes that individuals are human beings who have different bodies and feelings, that every human being is unique and has its distinctiveness, and that every difference will provide its color and further beautify the order of life. The highest level of tolerance is not to feel disturbed by the existence of differences but, on the contrary, to feel comfortable, strong, and prosperous with these differences.

The importance of tolerance and empathy in the educational process is increasingly relevant given the challenges of globalization and increasing social mobility in society (McAllister & Irvine, 2000). Broader interactions with individuals from different backgrounds can be a source of conflict if not managed well. Therefore, schools need to be places where learners learn to coexist peacefully and respect each other. Teachers play a key role in creating a supportive environment for learning these values (Banks, 2015). However, the challenges teachers face in developing tolerance and empathy among learners are not simple. Most teachers may not be fully equipped with adequate knowledge and skills to implement effective learning models to build tolerance and empathy (Slavin, 1995). This suggests an urgent need for training specifically focused on implementing learning models that can improve both aspects (Johnson & Johnson, 2009). Training teachers in Bantul on the application of learning models to increase the tolerance and empathy of students is a strategic step to answer this challenge.

This training is designed to provide teachers with a deeper understanding of the concepts of tolerance and empathy and how these values can be instilled through innovative and interactive learning models. As Noddings (2013) explained, caring relationships between teachers and students are essential in creating an inclusive classroom atmosphere and encouraging students to develop empathy. Teachers who can build positive relationships with students can become real models in teaching empathy through daily actions in the classroom (Rimm-Kaufman & Sandilos, 2011). Joyce and Weil (2015) use the term "model" in designing learning. A model is defined as a conceptual framework that is used as a guide in

conducting activities. The learning model is a conceptual framework that describes systematic procedures in organising learning experiences to achieve specific learning objectives and serves as a guide for learning designers and teachers in planning and implementing learning. The learning model must consider five important elements: syntax, social system, reaction principle, support system, learning impact, and accompanying impact. Affective values learning is not technical but a reflexive reflection on themes related to human behavior. Values are studied and integrated between cognitive aspects, feelings, and actions. The object of study is directly related to the practices of living together in society so that character values and other affective elements cannot simply be transferred from teachers to students or adults to children (Budiningsih, 2018).

The training also aims to improve teachers' ability to manage diverse classrooms. One of the main challenges in managing a multicultural classroom is the emergence of stereotypes or prejudices that can trigger conflicts among learners (Banks, 2015). In this training, teachers will be taught specific techniques to identify potential conflicts and how to address them with a constructive approach. Teachers will also be trained to design learning activities that encourage collaboration, discussion and joint problem-solving, all of which play an important role in developing tolerance and empathy (Slavin, 1995). The training will also equip teachers with collaboration-based learning models (Johnson & Johnson, 2009), projects (Slavin, 1995), and problem-based approaches (Crick & Dodge, 1994) that have proven effective in promoting cooperation among students from different backgrounds.

Collaborative learning, for example, invites students to work in groups to achieve a common goal, which requires them to respect different views and learn to work together in a mutually supportive atmosphere (Johnson & Johnson, 2009). Using this approach, teachers can encourage students to develop strong social skills, such as tolerance and empathy, needed in their social lives outside school. In addition, the training is also designed to help teachers understand the complex classroom dynamics where students from different social and cultural backgrounds must learn together. With a deeper understanding of the concepts of empathy and tolerance, and with the skills gained from the training, teachers are expected to create an inclusive and harmonious learning environment where every student feels accepted and valued (Banks, 2015; Noddings, 2013). Therefore, this training is essential to provide teachers with the skills and understanding they need to implement learning models that support the development of tolerance and empathy characters. By involving participation and reflection-based learning methods, the training is expected to help teachers in Bantul to be better prepared to manage a diverse and dynamic classroom. With adequate support, teachers are expected to become agents of change capable of building a generation of tolerant and empathetic students who will create a more harmonious and just society.

2. Method

The training implementation method was adjusted to the needs and characteristics of the training participants, namely private primary school teachers in Bantul Regency. Around 30 teachers attended the training, both *offline* and *online*. The service team came to the training location to provide material and assistance and observe the teachers' tasks and projects. In addition, the team also monitored the trainees to determine the extent to which they could work on the programmed tasks. Monitoring and mentoring could also be done using *Google Classroom or through Zoom*.

The following are some of the training implementation methods that will be carried out by the Team from the Department of Curriculum and Educational Technology FIPP UNY in the Community Service (PkM) program to private elementary school teachers in Bantul Regency on "Training on the application of learning models to increase tolerance and empathy for students, for elementary school teachers, described as follows.

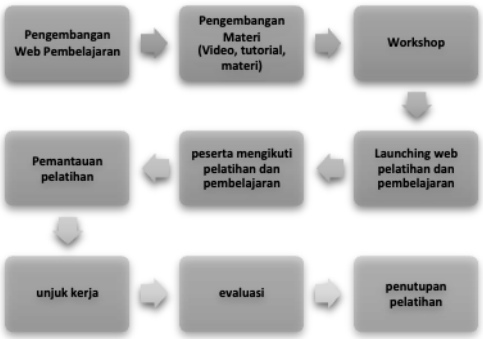


Figure 1. Stages of training on the application of learning models to increase tolerance and empathy of learners for elementary school teachers.

3. Results and Discussion

The training on the application of the learning model to increase tolerance and empathy was conducted for teachers in Bantul, as described in the previous section, in seven steps. Each step showed results as expected.

a. Web learning development

At this stage, the developer developed a learning web with the web address *https://belajar.edutechlab.id/.* This web contains activities that teachers need to do during the training process. In the process of developing this learning web, the team also prepared the content that became the content of the learning web. The content includes videos, materials, exercises, and demonstrations.

b. Material Development

Material development is carried out through several stages. The materials are expected to have the scope to fulfil the trainees' knowledge. The material development process examines the characteristics of the training participants and the training content developed. While developing this material, the service team interviewed teachers regarding the strategies the teachers have been using in learning. The results show that teachers do not specifically use certain learning strategies in learning. Analyzing the results of interviews conducted on learning and teacher characteristics, the material was developed as a thirty-minute video as an introduction to the material, then continued by developing material presented in the form of PowerPoint and tasks that must be done.

c. Workshop

The training began with a workshop related to educational issues, this activity was carried out online and attended by 43 teachers. To deepen the teachers' understanding of the material presented by the Service Team and ensure that the material is per the experience of the training participants, discussion and question-and-answer opportunities are provided. The interactive discussion method was carried out between the service team and the training participants in a multi-directional manner. Participants are encouraged to share their experiences, challenges, and solutions, as well as the importance of learning, to increase tolerance and empathy for students. Participants were invited to share their experiences and views on the best way to increase the tolerance and empathy of learners.

The service team guides the discussion and Q&A by asking questions about the topics and ensuring that all trainees can participate. This interactive discussion allows trainees to think critically, collaborate, and learn from each other. At the end of the workshop, participants were given information about training activities that will be carried out using the web.

d. Workshop

Web launching is done by socializing the web with trainees who have attended the workshop. Participants are given guidelines that can be followed to conduct training using the web that has been developed. In this activity, trainees can work alone or work in groups.

e. Training Monitoring

Monitoring is conducted between training sessions using the web. This monitoring aims to assist trainees who experience difficulties during the training process. In the activity, the service provider went to one of the schools to become a gathering post and discuss the training participants with the service team. In the discussion, most of the teachers shared the difficulties they faced both technically using the web and understanding the material content itself.

f. Performance

Demonstration is an important part of this training. Trainees are asked to create lesson plans with learning models that can train empathy and tolerance in students.

g. Evaluation

An evaluation was conducted to measure the competence (understanding, skills, and attitudes) of teachers in training on the application of learning models to increase the tolerance and empathy of primary school students in Bantul Regency. The evaluation of the training results included an assessment of the lesson plans produced by the teachers and an evaluation to assess the effectiveness of the training that had been carried out. Regarding the results of the lesson plans, teachers generally understand how to implement learning that can train tolerance and empathy. As for the evaluation of training activities, all teachers said they liked this training model, especially with monitoring activities that helped them better understand the material provided.

Based on the results of the training, it is known that there has been an increase in understanding of the concepts of tolerance and empathy. Data obtained prior to the training showed that many teachers considered character education, especially tolerance and empathy, to be part of the school's responsibility but not the focus of the learning process. After going through all stages of the training, teachers began to show a deeper understanding of how tolerance and empathy play an important role in building an inclusive and harmonious learning environment. They are more aware that learning about tolerance and empathy not only focuses on learners' behavior, but also involves teaching processes that support active participation, collaboration, and cross-cultural understanding. This aligns with Vygotsky's (1979) assertion that a tolerant learning environment is important for children's cognitive development. This increased understanding shows that the training has successfully changed teachers' perceptions of the importance of social-emotional values in the learning process.

On the other hand, the training was also observed to have improved teachers' ability to apply tolerance and empathy-based learning models. This is known based on the results of discussions with teachers. After attending this training, those who previously did not specifically apply one model in learning became interested in developing lesson plans that apply cooperative, project and problem-solving learning models that emphasize the development of tolerance and empathy. Teachers understand that interaction is important to build tolerance and empathy in students. One teacher also said she felt more alert in responding to diverse classroom dynamics. Through this training, teachers understood that learning tolerance and empathy can go hand in hand with achieving academic goals.

After the training, in the monitoring activities, teachers also shared that they started implementing the learning models they had learned in their classrooms. One of the most widely used models is collaboration-based learning, where learners are organized in small groups to complete tasks. Discussions with teachers reveal that using this model significantly increases positive interactions between learners. They communicate more, listen to each other, and respect the opinions of their friends who may have different views. Teachers also revealed an increase in empathy among learners. For example, in some classes that implement a project-based learning model that focuses on social issues, learners not only learn about academic topics but also learn to understand the problems faced by others in society.

4. Conclusion

The training on the learning model's application to increase tolerance and empathy for teachers in Bantul produced positive results and is relevant to current educational needs. Through structured, participatory, and practice-based training methods, teachers have improved their understanding and ability to integrate the values of tolerance and empathy into the learning process in the classroom.

Through this training, teachers understand that students need not only cognitive abilities to develop but also social skills to be used when they later join social life.

The results of the lesson plans showed that teachers have a sufficient understanding of how to implement learning models based on tolerance and empathy in their classrooms. Using the web also allows teachers to be more flexible in managing time to attend the training provided. However, in the implementation of learning, teachers need to consider several things, including the readiness of teachers to implement the lesson plans they have prepared. This is compounded by the limited time to integrate tolerance and empathy-based learning methods into an already crowded curriculum. Many teachers feel pressured by the demands of a rigorous academic curriculum, making it challenging to provide space for learning that focuses more on character development. To overcome this problem, a more flexible curriculum needs to be adjusted, where learning social values such as tolerance and empathy can be integrated naturally into existing subjects. This requires collaboration between schools, education offices, and policymakers to design a curriculum more supportive of character development.

In addition, there are still some teachers who struggle to manage diversity in the classroom, especially in situations where learners have sharply differing views on religious values, culture, or customs. Teachers need ongoing guidance to deal with changing classroom situations. An ongoing mentoring and supervision program is therefore needed to help teachers further develop their skills and deepen their understanding of how to handle complex multicultural situations in the classroom.

The results also show that full support from all stakeholders, including school principals, parents, and the local community, is essential to ensure that tolerance and empathy programs are well integrated in schools. All parties in the school and community need to be aware of this to help expand the acceptance and implementation of these values beyond the classroom, thus creating a more inclusive and supportive education ecosystem.

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DEVELOPMENT OF LEARNING MODELS TO INCREASE STUDENT TOLERANCE AND EMPATHY THROUGH LECTURES

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Abstract

This research aims to test the effectiveness of the learning model that has been declared valid/feasible and practical to increase tolerance and empathy of students through lectures at UNY, as well as to socialize and disseminate the developed model.

The type of research is an experimental Posttest Equivalent Groups design with research subjects UNY students. The instruments used are observation sheets to see the course of lectures using the developed learning model, tests, and questionnaires to measure learning outcomes, tolerance, and empathy of students. The data analysis technique uses an independent t-test, which is used on data tested for normality and homogeneity. This test was conducted to determine the differences in learning outcomes, tolerance, and empathy of students between the experimental class and the control class so that the effectiveness of the learning model developed could be known.

The research results on learning outcomes show t-count 3.382 and t-table two-tail 1.983 with alpha = 0.05, then t-count> t-table. That is, there is a significant difference in the average student learning outcomes in the experimental and control classes. In the aspect of tolerance, it was found that the t-count was 4.335 and the t-table was 1.959 with alpha = 0.05, then t-count> t-table. That is, there is a significant difference in the average value of student tolerance in the experimental and control classes. Regarding empathy, it was found that the t-count was 3.804, and the t-table was 1.989 with alpha = 0.05, so t-count> t-table. This means that there is a significant difference in the average value of student empathy in the experimental class and control class after applying the tolerance and empathy learning model. In the experimental class, students are willing and able to appreciate and learn and work with other students who are different. Students recognize other students as individuals, want to be open and act fairly, express their opinions well, and respect other friends by preparing rewards for friends who wish to be actively involved in learning. Students are more enthusiastic in lectures and always look forward to every meeting to see new surprises prepared by the presentation group.

Keywords: Learning Model, tolerance, empathy, UNY students

1. Introduction

Various facts about religious intolerance practice in Yogyakarta show that intolerance is still a serious problem in the life of a diverse society. In addition to bullying cases, the lack of values of tolerance, empathy, and a sense of justice can also be seen in various forms of discrimination and intolerance cases that occur in the world of education and society. This shows that there is still a lack of internalization of the values of compassion, tolerance, and empathy for others. For this reason, every teacher needs to understand how to integrate multicultural education into every subject. Learners need to be involved in the process of producing knowledge that contains the values of diversity, tolerance, and empathy. Such learning will be able to eliminate various racist prejudices, ethnocentrism, and intolerance through learning together so that they will leave prejudiced ways of thinking (Wahyono, S.B. et.al., 2022).

UNY, as an LPTK that produces teaching and education personnel, has the responsibility to produce professionals in their fields. Prospective teacher students must be able to prepare themselves to respond to the conditions and demands above and have a critical awareness of the various values of equality, tolerance, empathy, care, democracy, and various forms of structural injustice. Prospective

teacher students need to be conditioned through various learning models in lectures to increase tolerance and empathy for other students and the community.

Research in 2022 has conducted a need assessment of the importance of learning to increase the tolerance and empathy of teaching staff and students. Research in 2023 has produced a prototype of a valid/feasible, and practical learning model to increase the tolerance and empathy of students through lectures at UNY. Research in 2024 wants to test the effectiveness of the learning model that has been declared valid/feasible and practical to increase student tolerance and empathy through lectures, as well as disseminate the model. The formulation of this research problem is how the effectiveness of the learning model was developed to increase student tolerance and empathy through lectures at UNY.

Characteristics of Learners

Learners are beings who are free to shape themselves, beings who are dignified and able to control themselves, and beings whose characteristics are unique, so they are not empowered, but empowerment is preferred. The different characteristics of each learner can be seen from various aspects such as intelligence, needs, learning readiness, learning motivation, learning style, culture, initial teaching provision, social development, and so on (Budiningsih, 2017). For this reason, in developing their potential, an atmosphere is needed to develop and learn that can facilitate the development of their respective potential. Everyone needs to be recognized according to their dignity, respect for the abilities and characteristics of each learner, no coercion, mutual acceptance, and not repressive and racist.

Learners need freedom of opinion and to choose learning activities according to their interests, non-discrimination, and fairness. A learning atmosphere that respects other people's ideas and is willing and able to live together in differences is needed. Learners are encouraged to be active in their development and make responsible decisions. It is important to practice such a democratic atmosphere through learning sessions at school. Democratization of learning is characterized by diversity of behavior, so differences need to be respected. The sociocultural context of learners is also different, so understanding these differences needs to be taught to all learners through learning settings so that learners become inclusive human beings (Budiningsih, 2017). Appropriate learning strategies are needed to improve attitudes of solidarity, tolerance, empathy, caring and other moral aspects.

Tolerance

Referring to its origin, tolerance is an absorption word from Latin tolerance (endure), which means to let in peace (not disturb) all people who have different beliefs and life practices (Sularto, 2018). Aslan (2018), as cited by Rahmadonna (2022), defines tolerance as a major part of democratic values. Walzer defines tolerance as "indifference to differences" of people different from oneself. Tolerance aims to maintain security, justice, and acceptance of human rights (UNESCO, 1994), not just allowing or respecting each other because this kind of attitude is only the beginning of the meaning of tolerance. Tolerance is a noble human value that believes that individuals are human beings who have different bodies and feelings, that every human being is unique and has its characteristics, and that every difference will provide its color and further beautify the order of life. The highest tolerance level is not to feel disturbed by differences but to feel comfortable, solid, and rich with these differences. In Javanese culture, including Yogyakarta, tolerance is closer to the attitude of tepa selira and ngewongke uwong. This attitude has become a principle of life and a characteristic of people's daily lives (Astri, 2020). Lickona (2016) outlines the relationship between morality and religion, where there are important things related to religious tolerance.

This research views tolerance as someone willing and able to appreciate and live peacefully with different people, recognize others as individuals, be able to cooperate and be open with others, and act fairly. Such tolerance values can be developed through learning activities by applying the right learning strategy or model.

Empathy

Empathy is different from sympathy, where empathy relates to how other people feel about me, both my problems and my environment (Budiningsih, 2017). Carl Rogers, a humanistic psychologist, first used the term empathy. In his theory, researchers widely use warmth, compassion, respect, unconditional positive regard, genuineness, and understanding. These terms are used to communicate an understanding of the feelings, thoughts, and motives of others. Empathy implies that a person tries to understand another person's situation as the other person understands it and conveys that understanding to him or her (Hansen, et al., 1992). Empathy means getting inside someone and seeing

the situation from that person's side as if he or she is that person. According to Dahlan, a person is said to have empathy if he can live the other person's emotional state can see the external situation according to the person's reference pattern and communicate his appreciation that he understands the person's feelings, behavior and experiences personally (Pangaribuan, 1998). Empathy is accurate if the individual's understanding of the other person's situation is correct because it matches the empathized person's appreciation.

The three stages of empathizing (Gazda et al., (1991) are: 1) listening carefully to what the other person is saying, how they feel, and what is happening to them. 2) compose appropriate words to describe the person's feelings and situation. 3) using these words to recognize others and try to understand their feelings and situations. Empathic responses will affect the person given empathy (Budiningsih; 2011). The person feels listened to, cared for, their problems understood and valued. Meaningful responses will lead to meaningful interactions. According to Goleman (1996), this is the basic art of democracy.

Empathy can be measured using an empathy scale to see each individual dimension so that one's weaknesses or strengths can be known for action. Gazda, et al. (1991) distinguish four levels of response in the empathy scale, followed by an explanation of why each response is rated at that level.

Level I: Response is irrelevant or hurtful, not directed at the speaker's feelings. If the content of the conversation is communicated accurately, the level of response will be raised.

Level II: The response has little to what the speaker says or feels. If the content of the conversation is communicated accurately, it can increase the level of response; conversely, if it is inaccurate, it can decrease the response.

Level III: The response indicates that the respondent understands the speaker's feelings. The content is less important, but when the content is discussed, it should be observed. If the content is inaccurate, the response level may drop.

Level IV: The response can increase the speaker's awareness and can identify his/her underlying feelings. The content is used to deepen meaning. If the content is inaccurate, the response level may be lowered.

Keywords: Level 1 = irrelevant; hurtful; Level 2 = subtractive; Level 3 = surface feelings reflected; and Level 4 = underlying feelings; additive.

Learning Model

Joyce and Weil (2015) use the term "model" in designing learning. A model is defined as a conceptual framework that is used as a guide in conducting activities. The learning model is a conceptual framework that describes systematic procedures in organizing learning experiences to achieve specific learning objectives and serves as a guide for learning designers and teachers in planning and implementing learning.

Five important elements must be considered in the learning model: syntax, social system, reaction principle, support system, and learning and accompanying impact. Affective values learning is not technical but a reflexive reflection on themes related to human behavior. Values are studied and integrated between cognitive aspects, feelings, and actions. The object of study is directly related to the practices of living together in society so that character values and other affective aspects cannot simply be transferred from teachers to students or adults to children (Budiningsih, 2017).

Learning is conditioned by a learning climate that respects and upholds equal rights and rules that ensure every learner without discrimination has access to the same guaranteed services and is treated accordingly. Efforts are directed towards achieving social justice and solidarity for the weakest members of the school community. In other words, the educational institution has an inclusive constitutional and regulatory framework that is not based on the views of any group but is acceptable to all members of any group as members of the institution so that they can prosper without fear of threat to their identity and distinctiveness.

The role of the teacher as a facilitator helps learners consider various humanitarian conflicts and see inconsistencies and discrepancies in ways of thinking in overcoming humanitarian problems. Teachers have an attitude of self-knowledge and wisdom, starting from their limitations, taking a reasonable attitude, being open, and seeing various possibilities. Positive attitude towards students, not hindered by the pettiness of primordialism, tribe, nation, religion, ethnicity, skin color, and others.

He/she is against pettiness, bigotry, violence, and absolute judgments and does not quickly condemn learners' views. Instead, they are open, tolerant, respectful of learners' beliefs even if they disagree with them, and able to see the positive behind differences. Such learning will be created if the school facilitates humanitarian actions for all its citizens (Budiningsih, 2011). This research focuses on learning models to increase tolerance and empathy.

Learning Model to increase tolerance and empathy.

The learning model to increase tolerance and empathy is based on the philosophies and theories of humanism (Goble, F. G. 1993), constructivism (Perkins, D.N., 1991), and sociocultural (Moll, L. C., ed. 1994). The principles of the developed learning model: 1) raise themes that are interesting and meaningful to learners. The problems or themes raised are real and related to real-life needs, so they are motivated to learn about them, 2) give confidence to learners both individually and in groups based on a shared belief that they are able and willing to overcome the chosen problem or theme. Learners jointly choose how to learn the learning resources used and are responsible for the results of their learning; (3) the teacher accepts each learner as they are according to their abilities and uniqueness, respects their nature and needs, provides opportunities to learn, grow and develop, (4) providing guidance and empathy to learners by understanding and feeling what they are experiencing, is an aid for students to remain enthusiastic in overcoming learning difficulties, (5) providing various learning resources that can be used to solve the problems being studied, (6) the teacher's job is to provide a conducive learning environment and atmosphere so that students can learn together.

Whatever efforts are made, the programs developed must have a positive impact on improving the quality of learning (Directorate General of Higher Education, 2011). The syntax or learning procedure to increase tolerance and empathy includes the following steps: 1) Orientation, namely communicating and agreeing between lecturers and students about the outline of learning tasks, including objectives, materials, learning activities and forms of learning and assessment. 2) Group work and exploration: students, individually and in groups, look for and read sources, try, listen, witness, live, conduct interviews, look for other learning resources, and/or go to the community, use the internet or others related to the agreed learning contract. 3) Interpretation: from the results of exploration, students together conduct discussions by analyzing, discussing, formulating concepts, and presenting the results of their understanding in front of the class face-to-face or online to be responded to by other students and lecturers. 4) Re-creation: students together and individually create something from the results of their understanding in the form of a series of drawings, stories, dramas, novels, papers, poems, works of art, articles, caricatures, recipes, or anything else according to the learning objectives that have been determined in the field of study. These will all be displayed and demonstrated. 5) Reflection: students individually and collectively reflect on what they have learned from their learning experience. What are the advantages and disadvantages of doing such learning activities? Students then think about the next learning activities that should be done. Which learning activities need to be maintained, improved, or replaced? 6) Evaluation: learning evaluation is carried out during the process and at the end of learning. During the learning process, evaluation is carried out by observing students' attitudes, tolerance, empathy, thinking ability, interest, motivation to learn, perseverance, discipline, and ability to work together. Evaluation of learning outcomes uses concept understanding tests (because of exploration & interpretation), as well as creative products produced by students both individually and in groups. Group grades are a combination of individual grades. 7). Awards: the group score is the combined value of the individual scores that will be awarded according to the rank obtained compared to the scores of other groups. In this way, each group member will compete to help other members to get a good individual score.

2. Method

This type of research is experimental (Posttest Equivalent Groups Design). The experimental and control classes were randomly selected, consisting of 2 experimental and two control classes in the Development and Characteristics of Learners course and Comparative Education course. The experimental design is as follows:

Table 5. Experimental research type (Posttest Equivalent Groups design)

R	X1	O2
R	-	O2

Description:
R: Randomization
X1: Treatment

The research was conducted at Yogyakarta State University (UNY). The research subjects were UNY students who were randomly selected, both for the experimental and control classes. Learning outcome test instruments, questionnaires and observation sheets on tolerance and empathy were applied to all experimental and control class students. The total respondents were 214 students consisting of 109 experimental and 105 control class students. Data analysis using an independent t-test was used on data that had been tested for normality and homogeneity using IBM SPSS version 26 to ensure the accuracy of the results. In addition to the data analyzed Quantitatively, the observations of the Implementation of the learning model and interview data were analyzed qualitatively by drawing the results, starting from looking at specific conclusions to be directed into general conclusions. This means making specific theoretical formulations as a basis for general conclusions.

In addition to data analyzed quantitatively, the results of observations of the implementation of the learning model and interview data were analyzed qualitatively by drawing the results, starting from looking at specific conclusions to be directed into general conclusions. This means making specific theoretical formulations as a basis for general conclusions.

3. Results and Discussion

The results of statistical calculations on the three variables, namely learning outcomes, tolerance, and empathy, can be concluded that there are significant differences in the average value of learning outcomes, tolerance, and empathy of experimental and control class students after applying a learning model to increase tolerance and empathy in lectures, as follows :

a. The learning outcomes aspect shows t-count 3.382 and t-table two-tail 1.983 with alpha = 0.05, then t-count> t-table. That is, there is a significant difference in the average student learning outcomes.

b. experimental class and control class. The average learning outcomes of experimental class students (A-) were better than those of control class students (B+) after applying the learning model to increase tolerance and empathy. In terms of the mean value of tolerance and empathy, experimental class students are better than control class students after applying the learning model to increase tolerance and empathy.

c. In the aspect of tolerance, it was found that the t-count was 4.335 and the t-table was 1.959 with alpha = 0.05, so t count> t table. This means a significant difference in the average value of student tolerance in the experimental and control classes. Experimental class students' average tolerance score is in the high category, while control class students' average tolerance score is in the low category.

d. In the empathy aspect, it was found that the t-count was 3.804, and the t-table was 1.989 with alpha = 0.05, so the t-count> t-table. This means that there is a significant difference in the average value of student empathy in the experimental class and control class after applying the tolerance and empathy learning model. Students in the experimental class's average value of empathy is in the medium category, while students in the control class's average value of empathy is in the low category.

e. In the experimental class, students are willing and able to appreciate and learn and work with other students who are different. Students recognize other students as individuals, want to be open and act fairly, express their opinions well, and respect other friends by preparing rewards for friends who wish to be actively involved in learning. Students are more enthusiastic in lectures and always look forward to each meeting to see new surprises prepared by the presentation group.

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SCIENTIFIC WRITING TRAINING FOR HIGH SCHOOL TEACHERS IN IKIP VETERAN III TAMBAKROMO GUNUNGKIDUL

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Abstract

This study examines the effectiveness of scientific writing training activities attended by 42 teachers from various schools, including IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. The training was conducted in four meetings followed by online mentoring for six months. The strategies applied include introducing ideas, learning sentence structure, and constructing sentences with good cohesion and coherence. The evaluation of activities was carried out in three steps, consisting of (1) evaluation of teacher participation, (2) preparation of scientific writing drafts according to the field of study, and (3) preparation of scientific papers in accordance with journal objectives. The results showed a significant increase in teachers' understanding and writing skills from the first to the fourth meeting, with the percentage of success reaching 80% at the last meeting. The results indicates a significant increase in teachers' understanding and writing skills from the first to the fourth meeting, with the percentage of success reaching 80% at the last meeting. The results of scientific writing training illustrate that teachers have been able to understand the basics of writing scientific articles, determine themes and titles based on the issues raised, formulate problems, write introductions and methodologies, compile results, discussions, and formulate conclusions. Although there were challenges in writing, this training proved effective in improving teachers' professional competence. This training is expected to contribute to supporting teachers in producing quality scientific papers and strengthening their position as professional educators.

Keywords: training, writing scientific papers, professional competence, teachers

1. Introduction

Writing scientific papers is an important skill that every teacher should have to put their ideas and research results into writing. However, this activity has never been done systematically in schools, so many teachers consider it essential to receive the required training [1], [2]. This information was obtained from students who had done a community service program (KKN) in the village and was also conveyed by teachers during the reunion of the Faculty of Language and Cultural Arts (FBSB), where they wanted a resource person from Yogyakarta State University (UNY) to provide training in scientific writing.

According to these problems, Community Engagement Team (PkM) for Professorial Assignments (Penugasan Guru Besar) team propose solutions, including 1) problem solution by providing training and guidance to partner schools on how to compose a proper and correct sentence in accordance with Indonesian principles, 2) solution to the problem of preparing scientific papers by providing training and guidance to affiliated school on how to prepare drafts of scientific papers from the results of research that has been carried out in the previous year, and 3) solution to the problem of writing ideas and ideas into a writing by providing training and guidance to affiliated school on how to properly and correctly use reference tools so that they can implement these tools. Reference tools are also part of the application of Science and Technology (IPTEKS). With reference tools teachers can quickly find bona fide and correct reference sources that can be referred to in their writing. Teachers do not necessarily have to read heavy book works. However, teachers need to search for reading sources through these reference tools, especially those sourced from international journals.

Based on the problems and solutions described, a Community Service activity was proposed at IKIP Veteran III Tambakromo High School, Gunungkidul, and was attended by teachers from various subjects. The 2024 PkM was attended by teachers not only at IKIP Veteran III Tambakromo High School, but also at Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. Teachers who follow are also not restricted to teachers who teach German, but teachers who teach various subjects. This training aims to provide scientific writing skills, so that teachers are expected to produce quality writing that is ready to be submitted to accredited national journals or reputable international journals. Thus, it is expected that this training can have a positive impact on teachers who have not previously received training on scientific writing.

The method of this training of scientific writing, thus teachers must have previous research results so that teachers can write ideas and ideas from the research results. The training was held twice offline and continued with online assistance. The time spent organizing the activity was 6 months as it takes a long time to develop a scientific paper. Thus the teachers have the opportunity to write ideas and ideas into writing. The strategy for achieving success was carried out through training in writing basic ideas and ideas into writing. Then the training continued to organize a good and proper sentence structure. This is followed by training to construct sentences that have cohesion and coherence correctly.

Progress in writing scientific papers is largely determined by the results that can be achieved properly in daily activities. Teachers who succeed in pouring their ideas and ideas into writing that has excellent quality can be produced by their success in the transfer of knowledge [3]–[5]. Academic achievement does not only rely on the transfer of knowledge, but also the transfer of value that is needed by teachers. This is closely related to character education which relies heavily on the success of the learning process and the transfer of value [6]. The success of character education can be a great asset in improving the image of good education in the country. The number of juvenile delinquency, wild races, and brawls between students is a blurry portrait in the world of education. With the application of a learning model that integrates all existing components can minimize the juvenile delinquency. Schools that are strict in supervising and protecting their students can at least reduce the negative excesses that arise. The role of parents is certainly no less important to help educate their children towards a better education. The project method provides space for teachers and students, and between students to build more intimate communication. With good intimacy, it facilitates effective value transfer.

This PkM engagement was carefully prepared by the team. In accordance with the agenda agreed by the affiliated schools, including SMA IKIP Veteran III Tambakromo Gunungkidul so that the material provided is in line with the needs of the teachers. Training is provided by lecturers who are competent in the field of writing scientific papers to teachers. This PkM engagement's affiliated school also provided some important information that was useful for developing an activity plan from start to finish.

This PkM engagement is a form of implementation of Three Pillars of Higher Education of Yogyakarta State University in empowering the community in the educational field. Therefore, training activities for teachers are required. This activity is included in the category of lecturers who carry out off-campus programs, which is in accordance with the IKU (Key Performance Indicators) demands launched by the Ministry of Education and Culture and Research so that lecturers and students are able to play an important role both in the industry and society. In addition, this program supports lecturers' work in providing guidance, mentoring, and services to the community in schools. This PkM program is in line with the Yogyakarta State University Strategic Plan 2025.

Thus, this program can be a mutually beneficial cooperation for both sides. UNY was able to assign lecturers to the community to help the school's needs. The school is helped by the continuous training, not only carried out once or twice, but regularly and systematically for one semester. In addition, lecturers' off campus programs also involve students, thus providing real experience of the school situation, and students are expected to prepare themselves before entering the world of work.

2. Literature Review

Scientific papers contain an exposure to a problem or phenomenon scientifically carried out by researchers. Through scientific papers, a phenomenon can be presented logically and systematically to the reader. Scientific papers are generally written to find answers about something and to prove the truth about something contained in the object of writing. Thus, scientific writing often raises certain themes, problems, and actual phenomena [7], [8].

Writing scientific papers requires a proper structure and the usage of formal language to express and organize logical arguments [9]. The arguments in scientific papers are coherent and supported by reliable data. This is necessary to produce writing that can be accounted for [10]. Writing scientific papers also requires critical skills in analysis, synthesis, and processing information. Compiling scientific writing thus requires gradual steps and must be ensured according to the rules of scientific writing [11]. In general, experts formulate scientific writing consists of several stages and needs repeated practice, starting from formulating topics, writing methodologies, to discussing results [12]. In addition, discussion and feedback are necessary in writing scientific papers to optimize scientific writing and and encourage authors to revise drafts of scientific papers substantially before submitting them for review in the targeted journal [13], [14].

A professional teacher must have competencies that support education and instructional tasks. One important aspect of this competency is the ability to write and publish scientific papers, which plays a role in developing teacher professionalism. Therefore, writing scientific papers is one form of innovation that can improve professionalism in the teaching profession [15]–[17]. Scientific papers are sequentially organized starting from the background, methodology, results, discussion, and conclusion [18], [19].

Findings from several previous studies indicate that the comprehension and ability of teachers in writing scientific papers is not considered optimal [1], [2], [20]. This capability is not optimal due to factors such as lack of motivation, opportunity or time to write, difficulty finding data, lack of diligence in utilizing technology, lack of references, group activities in the field of scientific work are still lacking and the reach of agencies that support to facilitate is still lacking [21]. In addition, factors such as the lack of facilities to conduct research in schools, limited reference sources, and the absence of a special allocation of funds for research affect the not optimal understanding and ability of teachers in writing scientific papers [16].

There are various ways to help improve teachers' competence in writing scientific papers. One of the ways is through scientific writing training. Scientific writing training is effective in increasing teachers' understanding and ability to produce good scientific work [17], [22], [23]. The success of a training certainly cannot stand alone, but must be maximized by the role of the organizing work unit and the activeness of each participant in the training. The potential of teachers to develop themselves in conducting research and producing scientific work needs to be facilitated and given assistance [22].

Project-based learning is one of the innovative learning models characterized by student-centered and can be chosen and used by teachers as an alternative to provide new colors in learning that generally tends to be conventional [24]. The focus of project-based learning aims to enable learners to develop their knowledge and skills through a structured inquiry process and produce a product. This is different from traditional learning which generally only provides memorized theories. Through project-based learning, learners acquire meaningful and long-term knowledge and skills [25]. Correspondingly, there are five distinctive features of project-based learning, 1) PBL projects as the main underlying framework for learning activities, 2) focusing on meaningful problems that encourage students to engage deeply in learning, 3) PBL engages students in constructive inquiry, allowing them to explore and construct knowledge through hands-on experience and investigation, 4) these projects are student-run to a significant degree, encouraging learners to have control over the learning process, and 5) PBL is realistically designed to address real-world challenges [26]. With these principles, PBL in several studies has been proven to increase the effectiveness of learning in terms of student activeness and participation, to improve critical thinking skills [27]–[30].

3. Method

The Scientific Writing Training Program was attended by 42 teachers from various schools including IKIP Veteran III Tambakromo High School as a partner school, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. Scientific writing training was carried out twice offline followed by online assistance. The total implementation time is 6 months to provide enough time in writing scientific papers. The training strategy applied is writing training with ideas and ideas, learning good and correct sentence structures, and composing sentences that have cohesion and coherence. The implementation design of this scientific writing training program is shown in Table 1.

Table 1. Program Implementation Plan

Meeting	Topics of Focus	Method
1st	Basic understanding of scientific article writing.	Presentation with Discussion and Question and Answer (Q&A) Session
2nd	Determining theme, problem formulation, and writing introduction and methodology.	
3rd	Preparation of results, discussion, and conclusions.	
4th	Presentation of teachers as participants. Giving good feedback on articles made by participants.	

The evaluation design of this scientific writing training program is carried out in three steps, namely; (1) evaluation of teacher participation in participating in offline training on scientific writing, (2) preparing scientific writing drafts in accordance with the subjects taught by each teacher, so that teachers focus and can better master their fields, and (3) designing and writing good and correct scientific papers in accordance with the target journal objectives. This program was carried out by a team of 6 members, consisting of 3 lecturers and 3 students from the PkM team. The data in this study were obtained from observations and projects.

4. Results and Discussion

The scientific writing training was conducted in four meetings, each of which had a different topic of focus to improve teachers' writing skills. The results of each training implementation for each meeting are shown in Table 2.

Table 2. Results of Scientific Writing Training

Meeting	Topics of Focus	% Level of Teacher Understanding
1st	Basic understanding of writing scientific articles through Powerpoint presentations.	25% of teachers are able to understand how to write articles well.
2nd	Discussion of title selection, problem formulation, and writing of introduction and methodology.	50% of teachers have been able to carry out writing according to the established criteria.
3rd	Discussion of the preparation of results, discussion and conclusions part of an article.	60% of teachers have succeeded in meeting the expected target criteria.
4th	Presentation by the teacher as a participant and providing feedback on articles written by participants.	80% of teachers successfully achieved completion in writing scientific articles.

Based on the implementation of training activities, the results were obtained as in Table 1. In the first meeting, the training focused on the basic understanding of writing scientific articles through Powerpoint presentations. In the first meeting, it was concluded that only 25% of teachers were able to understand how to write articles well. Meeting 2 discussed the selection of the title, formulation of objectives, and writing the introduction and methodology. In meeting 2, it can be concluded that 50% of teachers have been able to carry out writing according to the established criteria. In meeting 3, participants were taught how to compile the results, discussions, and conclusions. As a result, 60% of teachers managed to meet the expected criteria targets. At the 4th meeting as the last meeting, teachers had the opportunity to make presentations and receive feedback on the articles they had written. At the 4th meeting, it can be concluded that 80% of teachers managed to achieve completion in writing scientific articles.

The results indicated that before the training on scientific writing was held for 42 teacher participants, teachers' understanding and ability to write scientific papers were considered to be not optimal. Gradual improvement in understanding of article writing started to develop at each training meeting. By meeting 4, 80% of the teachers were able to write and present their articles. This finding

is in line with previous studies that have revealed the problem of not optimizing the ability of teachers to write good scientific papers [1], [2]. This finding also supports previous research findings on the effectiveness of training in helping improve article writing skills [17], [23].

Findings from the training showed significant improvement in teachers' ability to write scientific papers, with 80% of teacher participants achieving a better ability to construct logical and coherent arguments by the fourth meeting. This finding is relevant to the guidelines [9], which emphasize the importance of understanding good structure and logical argumentation in scientific writing. However, this improvement is not only caused by the understanding of the structure and principles of scientific writing, but also supported by the active role of the PkM team and teacher as participants in the training. This is in line with the opinion of [22] which suggests that training must be supported by the active role of the organizing work unit and the participation of attendees. The potential of teachers to develop themselves through research and writing scientific papers needs to be facilitated and assisted optimally. When compared to the findings of [12], this training has emphasized gradual stages in the development of scientific writing skills, which proves that a systematic approach in teaching scientific writing can have positive results. However, the improvements recorded from meeting 1 to meeting 4 are restricted to basic skills such as paragraph coherence, and the ability to organize scientific work according to the right stages and sequence, while more complex aspects such as critical analysis, literature synthesis, and finding reference sources still need to be expanded. In this training, to support and facilitate teacher participants in finding reference sources, teacher were also introduced to reference tools. In meeting 4, teacher had the opportunity to present their scientific work for further feedback. Providing feedback in writing scientific papers has an urgency that is in line with the opinion of [13] to optimize scientific writing and encourage participants to substantially improve scientific papers before submitting them for review in the targeted journal.

The scientific writing training program attended by teachers from IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School is a concrete example of this effort. This training was carried out by a team of 6 members, three lecturers and three students from the PkM team. The lecturers involved are experts in scientific writing and have served as Editor in Chief in reputable international journals indexed by Scopus Q2. This mentoring by experienced professionals is essential to help teachers produce good quality scientific papers. The implementation of this training is thus also relevant to the challenges faced by teachers, such as lack of skills in utilizing technology, lack of references, and lack of group activities in the field of scientific writing, as well as the reach of supporting institutions [21]. In this training, the utilization of technology in the form for reference tools is introduced to teachers to facilitate the process of writing scientific papers. The training materials were designed with a presentation approach equipped with relevant materials, making it easier to convey information to participants. This can be seen in Figure 1, which shows the interaction and involvement of participants during the training session.

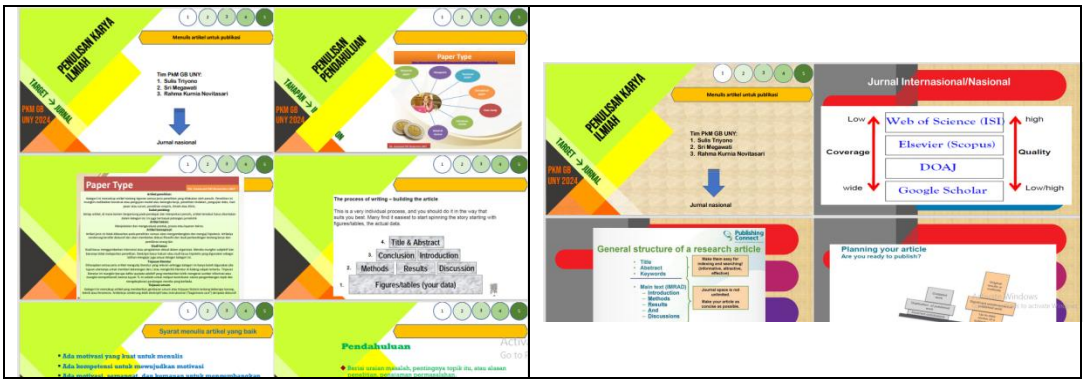


Figure 1. Training Materials for Writing Scientific Papers and Using Reference Tools

Based on the data from the training on scientific writing attended by 42 teachers, there was a significant increase in their understanding of scientific article writing from each meeting, from meeting 1 to meeting 4. This increase is a reflection of the theoretical framework of project-based learning that emphasizes a student-centered approach. In this study, the teacher are the center of focus of the learning. For example, in the first meeting, where teachers were introduced to the basic understanding of

scientific article writing, it was found that only 25% of the participants showed a good comprehension. This reflects the initial challenges faced by teachers who are writing scientific articles for the first time. Nevertheless, with structured guidance, the teachers are expected to be able to investigate more deeply about scientific writing, in line with experts who explain that project-based learning provides opportunities for learners to explore knowledge through a process of inquiry [24]. In addition, as with the results from the second meeting, when the focus shifted to selecting the title, formulating the objectives, and writing the introduction and methodology, there was an increase to 50% of teachers who could carry out the writing according to the good criteria. This shows that the project-based approach can strengthen students' understanding of the material being taught. Experts [25] have underlined that project-based learning focuses on developing meaningful knowledge and skills, not just memorized theory, but practical. At the third meeting, progress was seen with 60% of the teachers able to fulfill the criteria in preparing the results, discussion and conclusion of the article. The findings show that project-based learning provides not only theoretical knowledge but also practical skills that can be applied. This means that the implementation of this training is in line with the third feature of PBL, where teachers engage in constructive inquiry, allowing them to explore and build knowledge through direct experience and collaboration with fellow participants [26]. At the fourth meeting, 80% of teachers finally managed to achieve comprehension in writing scientific articles. This is in line with previous research findings that have indicated the effectiveness of project-based learning in supporting the success of the learning process [27]–[30]. Thus, this training provides a space for teachers to put theory into practice.

Although there was a significant improvement in participants' understanding and writing skills from the first to the fourth meeting, there were some difficulties experienced by teachers. Most teachers were writing scientific articles for the first time, so they needed time to adapt to the correct format and writing techniques. In addition, there were also teachers who showed high enthusiasm and motivation to learn even though they had never written an article before. One participant even had previous experience in writing scientific articles, which gave inspiration to her colleagues.

This PkM program aims to provide training and guidance to teachers in partner schools, especially in writing scientific papers. This is necessary since one of the advantages of teacher competence is that they are able to implement their professional knowledge into quality scientific writings. In addition, by training in writing scientific papers, it is expected that teachers can be trained to write scientific papers properly. The benefit of this PkM program is that it helps teachers improve their writing quality and writing competence, especially in the aspects of critical thinking, creativity, and innovation through intensive training and mentoring by the PkM team.

5. Conclusion

The scientific writing training conducted for 42 teachers from various schools indicated its effectiveness in improving their understanding and skills in scientific writing. Through four meetings that focused on various aspects of scientific writing, there was a significant increase in the ability of participants, as measured by the evaluation results which showed that 80% of teachers managed to achieve mastery in writing scientific articles at the last meeting. The results of scientific writing training attended by teacher participants from IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School illustrate that teachers have been able to understand the basics of writing scientific articles, determine themes and titles based on the issues raised, formulate problems, write introductions and methodologies, compile results, discussions, and formulate conclusions.

The application of a project-based learning approach provides a strong framework, allowing participants to actively engage in inquiry and writing practice. By focusing on the student-centered aspect, teachers are encouraged to gain knowledge and skills through hands-on experience, allowing them to put theory into practice more effectively. Although there were some challenges faced, especially for first-time teachers, the enthusiasm and motivation of the participants showed a high desire to learn and develop. Therefore, this activity not only improves teachers' professional competence, but also contributes to academic development in the educational environment. This training activity is expected to contribute to supporting teachers in producing quality scientific papers, as well as strengthening their position as professional educators.

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THE ROLE OF CHILDREN'S STORYBOOKS FOR TEACHING TOLERANCE IN ELEMENTARY SCHOOLS

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Abstract

Tolerance education is a key aspect of children's character development. Therefore, understanding tolerance and diversity needs to be introduced from an early age. Tolerance education is easier to grasp when taught to children in elementary school. This study aims to examine how children's storybooks can teach tolerance values to elementary school students. The research uses a qualitative approach with a case study method, involving 26 fourth-grade students from an elementary school in Yogyakarta. Observation, interviews, and questionnaires were selected as data collection techniques. The children's storybooks used in this study focus on themes of diversity and mutual respect. The results of the study show that using children's storybooks effectively improves students' understanding of the concept of tolerance. After reading the books with themes of tolerance and diversity, students were able to explain tolerance values and showed improvements in positive social interactions, such as cooperation and respecting differences. The role of the teacher as a facilitator in guiding discussions also greatly influenced students' understanding and application of tolerance values. The findings also indicate that children's storybooks are an effective educational tool for teaching tolerance values in elementary schools. The use of narratives and illustrations relevant to students' everyday lives helps them understand and internalize these values. However, due to the limited availability of children's storybooks that fully explore students' needs for understanding tolerance, this study recommends the development of children's storybooks that focus on tolerance and are adapted to the character and diverse conditions surrounding children.

Keywords: tolerance, children's storybooks, social interaction, elementary school

1. Introduction

Tolerance is a fundamental element in shaping the character of students, especially at the primary school level. This is further emphasized by the demands of the 21st century, where students must be equipped with the ability to conceptualize a peaceful society. A peaceful society is one where mutual understanding, the key to managing diversity dynamics, thrives (Sudirman, 2019). Thus, primary school education provides children with the opportunity to learn and carry forward what they acquire for future life (Mangunwijaya, 1986). At this stage, instilling moral and social values becomes essential, serving as a foundation for their actions. However, many still do not fully grasp the concept of tolerance, often treating it as a mere word without genuine meaning or practical application.

The word tolerance comes from the Latin "tolerare", which means to endure. It implies allowing others to live peacefully without interference, despite having different beliefs and lifestyles (Sularto, 2018). From a simpler perspective, tolerance is seen as a core democratic value (Aslan, 2018). American philosopher Michael Walzer, however, defined tolerance as indifference to difference, which has sparked debate. Critics argue that achieving an ideal human state cannot be based on mere indifference (Witenberg, 2019).

Each individual or group may interpret tolerance differently, making it a term with no clear-cut definition or boundaries. UNESCO attempted to bridge these varying interpretations by stating that tolerance practices aim to promote security, justice, and the recognition of human rights (UNESCO, 1994). This sentiment is echoed by the Global Council of Tolerance and Peace (GCTP), which asserts that true humanity can only be realized through the practice of tolerance (GCTP, 2017).

In modern society, tolerance, alongside respect for others and openness, forms one of the essential foundations every individual must possess (Al Majali & Al Khaldi, 2020). Given that children are in a crucial phase of cognitive and social development, instilling tolerance values should be approached through methods that align with their capabilities. One effective way to introduce these values is through children's storybooks with tolerance-related content. These books not only enhance literacy but

also serve as a medium to impart moral and social lessons, fostering inclusivity and respect for differences. Multicultural education, which teaches values such as tolerance, empathy, and mutual respect, helps students recognize and appreciate diversity (Banks, 2015). This is particularly important in diverse countries like Indonesia, where differences in ethnicity, religion, and culture abound. Primary schools provide an ideal environment for this learning process, as children are still forming their self-concept and understanding of the social world around them (Piaget, 1964).

Vygotsky emphasized that learning occurs through social interaction, and schools are the most suitable environment for interacting with peers from diverse backgrounds (Vygotsky, 1978). This highlights the significance of teaching tolerance at the primary level, as it lays the foundation for the development of social attitudes in the future. Tolerance in education extends beyond respecting cultural or religious differences; it encompasses the ability to listen to and understand different viewpoints, empathize with others, and resolve conflicts peacefully. According to UNESCO's research, teaching tolerance at an early age can prevent the development of discriminatory attitudes and prejudice later in life (UNESCO, 2016). This education is vital for creating a more inclusive and harmonious society. In the context of Indonesia, teaching tolerance values in primary schools has become part of the character education curriculum initiated by the government to strengthen the national identity, one that values diversity.

Children essentially need concrete media that offer direct examples of how to behave and act with tolerance. Children's storybooks are considered one of the effective media for teaching tolerance. These books excel at conveying moral messages because their stories can inspire, motivate, and provide concrete examples of positive attitudes such as tolerance. Children's storybooks teach social values through characters and situations that are easily understood by children. Additionally, they offer narratives that help develop a child's understanding of the world around them (Nodelman & Reimer, 2003). In other words, children's storybooks can deliver messages of tolerance that are aligned with the characteristics and developmental needs of children. These books are often packaged in an engaging and easy-to-understand way, illustrating everyday situations that can be related to the real-world experiences of children. Illustrations in children's storybooks also play a crucial role in reinforcing children's understanding of the messages being conveyed. The combination of text and images provides a deeper learning experience for children. Attractive illustrations and simple stories allow children to not only grasp tolerance cognitively but also emotionally, through engagement with the characters and narratives presented (Kress & van Leeuwen, 2006).

Children's storybooks are believed to have a significant influence on children's social attitudes and development. This is supported by several studies, including research conducted by Lynch-Brown and Tomlinson, which found that children who are regularly read stories tend to have a better understanding of social values, including tolerance (Lynch-Brown & Tomlinson, 2005). Storybooks that depict positive interactions between characters from different backgrounds can help children understand the importance of respecting and accepting differences. This finding aligns with Paley's research, which revealed that children can learn to identify the feelings of others and understand the importance of justice and equality through the stories they read or hear (Paley, 1992). Additionally, it has been found that narrative is one of the primary ways children learn to understand the world and their place in it (Dewey, 1938). This indirectly explains how children learn to deal with differences positively and inclusively by reading stories that depict various social situations.

In the context of elementary education, teachers can utilize children's storybooks to guide students in discussions about the values contained within the stories and how they can apply these values in their daily lives. Teachers can also organize group discussions or role-playing activities involving characters from the stories they have read. This is believed to not only help children understand the concept of tolerance but also provide opportunities for them to practice communication skills and collaborate with their peers. Interactive and experience-based learning is highly effective in helping children internalize moral and social values (Dewey, 1938).

This study aims to examine the role of children's storybooks in teaching tolerance in elementary schools and how these storybooks can support children's social development in a multicultural educational environment. Given the importance of tolerance in building a harmonious society, this research has significant relevance for educators, parents, and curriculum developers. The results of this study are expected to offer insights for teachers, parents, and child development specialists in selecting storybooks wisely for character education, particularly regarding tolerance.

2. Method

This study is qualitative research utilizing a case study approach. It was conducted in an elementary school in Yogyakarta, which has a diverse student population in terms of ethnicity, religion, and culture. A qualitative approach was chosen to gain an in-depth understanding of the phenomenon of tolerance learning through children's storybooks in the social context of an elementary school.

The subjects of this research were 26 fourth-grade students from a private elementary school in Yogyakarta, selected purposively due to the class's diversity. The research was conducted over four weeks, with tolerance education integrated into classroom reading activities using children's storybooks. The research process was divided into four steps:

a. **Step 1**: Initial Observation. Researchers observed classroom interactions to understand social behavior among students prior to the introduction of children's storybooks. The focus was on how students interacted with peers from different backgrounds and how they resolved conflicts.

b. **Step 2**: Learning Intervention. In this step, the teacher introduced children's storybooks containing tolerance messages. Each week, one storybook was read aloud, followed by a guided discussion about the message of tolerance conveyed. The researchers noted students' responses to the stories and discussions.

c. **Step 3**: Interviews and Questionnaires. After each session, interviews with the teacher were conducted to gather insights on how students responded to the stories and whether they showed behavioral changes related to tolerance. Students were also given simple questionnaires to measure their understanding of the concept of tolerance and its application in the classroom.

d. **Step 4**: Post-Intervention Observation. After the intervention period, researchers observed again to see if there were changes in the students' social interactions, particularly in how they treated peers from different backgrounds. Observed behaviors included cooperation, respect for others' opinions, and conflict resolution.

The data collected were reduced, and key findings were qualitatively analyzed to draw comprehensive conclusions. The data analysis included data processing and preparation, reading through all data, organizing data, analyzing, formulating a thesis, and drawing conclusions.

3. Results and Discussion

This research focused on answering how children's storybooks can help teach tolerance in elementary schools. The storybooks used featured themes of diversity and difference. Data was collected through observation, interviews with students and teachers, and analysis of student responses to the children's storybooks used in the lessons.

The findings show that students responded positively to the storybooks. When asked to recount the books they had read, students were eager to share, and their peers were equally interested, as evidenced by the many questions asked during storytelling. Students actively participated in discussions about diversity and the moral values presented in the storybooks. This demonstrated that students understood both the stories they read and those shared by their peers. Furthermore, after the storybook reading and discussion sessions, students showed a better understanding of tolerance. They expressed a clearer sense of what to do when encountering differences or interacting with peers from different backgrounds. One student shared:

"I enjoy reading storybooks; it's fun! Now I know we don't need to fight if we're different from our friends".

This sentiment was reinforced by the results of a questionnaire, where the majority of students could explain and provide concrete examples of tolerance in everyday life, such as respecting differing opinions, helping friends from diverse backgrounds, and not imposing their will on others. Some students even mentioned helping peers with special needs in the classroom. Meanwhile, post-intervention observations showed that after several learning sessions using children's storybooks containing tolerance messages, interactions between students became more positive. Students became more open to discussing with peers from different groups and were better at resolving minor conflicts. They also began to socialize more with all students. Although some students still tended to form groups based on similar characteristics, this behavior diminished. Observations revealed that students often

gathered in larger groups and played together during recess. Likewise, when asked to form groups for classroom activities, students were more accepting of being grouped with any classmate.

In the learning process, the role of the teacher is crucial. Interviews with the teacher revealed that they need to understand their role in facilitating tolerance education through the use of children's storybooks. During the lessons, the teacher should be actively involved in discussions and provide real-life examples from the stories to help students grasp the core messages. This includes explaining how the characters in the stories exemplify tolerance when encountering differences. Unfortunately, the use of illustrated storybooks for teaching tolerance often faces challenges due to the lack of books that not only convey messages of tolerance but are also tailored to the characteristics of children and their social-cultural environments. This is an important factor that must be considered to ensure the storybooks used are relevant to the children's conditions and can provide them with a more concrete experience.

The findings of this research show that children's storybooks play a significant role in teaching tolerance in elementary schools. Tolerance is not just a word, but must be conveyed through examples, attitudes, and actions. The illustrations in children's books can provide students with more tangible experiences, making tolerance easier to understand. The research results also indicate that storybooks successfully capture students' interest and serve as effective tools for teaching the concept of tolerance. This supports the notion that children's books not only have a literacy function but also serve as tools for conveying moral and social messages (Nodelman & Reimer, 2003). The use of interesting characters and storylines helps children comprehend situations they may not have experienced directly but are relevant to their social experiences at school. This is also reinforced by the idea that multimodality—the combination of text and illustrations—gives children more opportunities to learn visually and verbally. The emotional engagement of students in learning is supported by the use of storybooks (Kress & van Leeuwen, 2006). In this context, using children's storybooks to convey messages of tolerance is highly relevant because the social values conveyed are easier for students to understand and internalize.

One of the key findings of this research is the improvement in students' understanding of the concept of tolerance after attending reading sessions and discussions on children's storybooks. This improvement was evident in the opinions they shared during discussions and in how they responded to their peers' comments. This aligns with Vygotsky's theory that learning occurs through social interaction and that children learn through adult guidance and peer interaction (Aguilera-Jiménez & Prados Gallardo, 2020; Moll, 1993; Veer, 2007; Vygotsky, 1978). The discussions that occur during lessons allow children to indirectly learn from their peers. After reading the storybooks, the teacher creates space for discussion and dialogue, enabling students to not only understand the message of the story but also relate it to their social experiences. This supports Paley's findings that narratives in children's books can encourage children to reflect on their behavior toward others (Paley, 1992). In this way, children's books can serve as reflective tools, allowing students to understand the importance of respecting others and not imposing their will on them. If properly guided by the teacher, this reflective process can strengthen students' understanding of the importance of tolerance in everyday life.

Additionally, the research findings highlight the vital role of teachers in facilitating tolerance education through children's storybooks. Teachers need to have social and emotional competencies to manage the classroom effectively, as these competencies are key in creating a classroom environment that supports the teaching of social values such as tolerance (Jennings & Greenberg, 2009). The teacher's ability to guide discussions and provide concrete examples from the stories is crucial in helping students understand and apply these values in their social interactions at school. Rosenblatt argues that students' understanding of texts is not only influenced by the texts themselves but also by the interaction between the reader and the text in a social context. Teachers can play a significant role in helping students interpret the stories they read through guided discussions, which in turn helps students apply tolerance values in their daily lives (Rosenblatt, 1978).

The observed increase in positive interactions among students after learning with children's storybooks shows that these books can directly impact social dynamics in the classroom. Another perspective suggests that narratives are one of the primary ways children understand the world and their relationships with others (Bruner, 1986). By reading stories that portray cooperation and mutual respect, children can learn how to interact positively with their peers, even when differences are present. This research also aligns with findings from UNESCO, which show that teaching tolerance at an early age can prevent the development of discriminatory attitudes and prejudices later in life (UNESCO, 2016). By providing students with narrative experiences that emphasize inclusive values, children's storybooks can be an effective tool for shaping positive social attitudes, including tolerance toward differences.

Based on the discussion, it is evident that children's storybooks play an important role in teaching tolerance in elementary schools. Through age-appropriate narratives and illustrations, along with support from teachers who can facilitate meaningful discussions, children's books can help students develop a deeper understanding of the importance of tolerance and respect for differences. This research reaffirms the importance of storybooks as educational tools that not only support literacy but also shape children's social character.

4. Conclusion

This study has explored how children's storybooks can play a role in teaching tolerance in elementary schools. Based on observations, teacher interviews, and analysis of student responses, it can be concluded that children's storybooks are an effective medium for conveying moral and social messages, including the values of tolerance. Through age-appropriate narratives and illustrations, storybooks engage students and facilitate their understanding of the importance of appreciating differences. Students' improved understanding of tolerance is evident after reading and discussing the storybooks. They are more capable of recognizing and respecting differences in a social context, such as differences in opinions, cultural backgrounds, and ethnicity.

Teaching tolerance requires the active involvement of teachers as learning facilitators. Teachers who actively guide discussions and provide real-life examples from the stories help students internalize tolerance values and apply them in their social interactions. Instilling character values is also essential to be integrated into the learning process. Through children's stories, students learn how to interact with others, as modeled by the characters in the stories they read. This contributes to increased positive social interaction. This shows that narratives in children's storybooks not only aid in concept understanding but also impact student behavior in the classroom. Overall, children's storybooks are effective tools for teaching tolerance in elementary schools, with strong support from teachers to guide students in understanding and applying these values in their daily lives.

Based on the findings and discussions, it is essential to carefully select appropriate storybooks. Teachers must ensure that the books used in the learning process contain relevant content and include values of tolerance, diversity, and inclusiveness. Schools are also encouraged to collaborate with publishers or literacy experts to select suitable books for students. Therefore, further research is needed to develop children's storybooks that can teach tolerance and diversity, with stories and narratives tailored to the characteristics, learning needs, and social environments in which children grow and develop.

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SELF-ASSESSMENT AS A TOOL FOR ENHANCING ACADEMIC CULTURE: INSIGHTS FROM THE FASHION EDUCATION STUDY PROGRAM

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Abstract

The quality of learning in higher education significantly impacts the achievement of educational goals, with academic culture serving as a fundamental pillar in this regard. This study investigates the implementation of self-assessment as a participatory approach to enhancing academic culture within the Program Studi Pendidikan Tata Busana. The research addresses existing challenges in academic culture, such as plagiarism and a lack of optimal use of scientific resources, while emphasizing the role of feedback in fostering an effective academic environment. Employing a descriptive quantitative methodology, data was collected from 149 students using structured questionnaires assessing academic culture, self-reflection, self-regulation, and self-efficacy. Results reveal that The implementation of Academic Culture Self-Assessment is carried out through a series of stages, including criteria determination, feedback seeking, self-reflection, self-assessment judgment, and calibration. The academic culture criteria externally determined by lecturers of the Fashion Education Study Program through a Focus Group Discussion (FGD). The results show that 59% of students demonstrate a good level of academic thinking, 58% exhibit good academic behavior, and 60% display good academic ethics. Feedback is provided individually based on the results of the academic culture self-assessment. A total of 70% of students stated that they understood the feedback given by the lecturers. The results of students' self-reflection show that 45% have a good level of self-reflection, while 14% show poor or inadequate self-reflection. A total of 60% of students demonstrated good self-regulation skills. This shows that more than half of the students possess strong abilities to manage and monitor their own learning progress. A total of 60% of students reported having a good level of confidence in facing academic challenges. This research underscores the effectiveness of self-assessment in strengthening academic culture, fostering self-awareness, and aligning with the "Merdeka Belajar" framework that promotes student autonomy and competence development.

Keywords: academic culture, self-assessment, self-reflection, self-efficacy

1. Introduction

The quality of learning in higher education directly affects the extent to which educational goals can be achieved. Academic culture, as the main foundation for ensuring the quality of education[1], plays a crucial role in shaping a conducive and innovative learning environment. In the context of the Program Studi Pendidikan Tata Busana, academic culture plays a significant role in developing students' creativity, innovation, and independence. However, challenges related to academic culture that do not meet expected standards are still frequently encountered. Academic phenomena such as plagiarism and cheating remain the biggest challenges in higher education [2]; [3]. Additionally, dependence on technology and the lack of optimal use of scientific information sources hinder the learning process [4]; [5].

So far, the evaluation of academic culture has only focused on the level of students' academic culture. However, feedback plays an important role in developing academic culture in higher education settings [6]. Hence, there is a need for a more dynamic and participatory method of evaluating academic culture, which allows students to independently assess their progress and performance within the context of academic culture. Self-assessment becomes an effective solution because this method not only encourages self-reflection but also enhances students' awareness of their strengths and weaknesses in maintaining academic culture standards. Several studies have proven that through self-assessment, individuals can reflect on what they have done, thereby increasing self-awareness of their strengths and weaknesses in the learning context [7]. Self-assessment also plays a role in enhancing students' self-efficacy [8]; [9]; [10]; [11]. Through self-assessment, students can become more confident in their

ability to face academic challenges, including completing practical tasks in the field of fashion design. This confidence is crucial in the process of developing professional competence, especially within the "Merdeka Belajar" framework, where students are expected to be more proactive and creative in developing their potential.

The self-assessment process involves three main steps: determining assessment criteria, seeking self-directed feedback, and engaging in self-reflection [12]. Yan & Brown's [12] study indicates that feedback and reflection are essential elements of self-assessment. Without feedback, reflection is vulnerable to personal biases, such as the overconfidence effect. As a result, the calibration process is undervalued, leading to inaccurate self-assessments. Through academic culture self-assessment, students will independently recognize the weaknesses and strengths of their academic culture. This awareness and self-improvement will lead to an overall strengthening of academic culture.

This study aims to implement academic culture self-assessment within the Program Studi Pendidikan Tata Busana. Through the implementation of self-assessment, this study seeks to strengthen academic culture while providing a more participatory and reflective approach, supporting the "Merdeka Belajar" principles that emphasize student autonomy and responsibility in the learning process, as well as enhancing individual competence development and flexibility in education.

2. Method

This research uses a descriptive study with a quantitative approach to describe the phenomenon of self-assessment implementation in the context of academic culture. The research population consists of all students in the Program Studi Pendidikan Tata Busana, totaling 240 students. The sample size was determined based on the Isaac & Michael table with a 1% margin of error, resulting in a confidence level of 99%. A sample of 149 students was selected using proportional stratified random sampling, which included students from the 1st, 3rd, and 5th semesters.

Data collection was conducted by distributing questionnaires to students. The instruments used in this study were the academic culture self-assessment sheet, the self-reflection questionnaire, the self-regulation questionnaire, and the self-efficacy questionnaire. The academic culture self-assessment sheet used four answer options: 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree). The self-assessment sheet consists of 18 statements covering academic thinking, academic ethics, and academic behavior. The self-reflection questionnaire was used to assess students' level of self-reflection after undergoing the self-assessment process and receiving feedback. The self-reflection questionnaire consists of 12 statements with four answer options: 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree). The self-regulation questionnaire was used to assess how students regulate themselves after the self-assessment process. The self-regulation questionnaire consists of 12 statements with four answer options: 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree). The self-efficacy questionnaire was used to assess students' confidence in regulating themselves after the self-assessment process. The self-efficacy questionnaire consists of 12 statements with four answer options: 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree).

Validity testing was conducted using convergent validity and discriminant validity tests. Convergent validity measures the extent to which a group of items in the self-assessment instrument can collectively measure the same concept. Convergent validity is evaluated by calculating the Average Variance Extracted (AVE) value for the academic culture, self-reflection, self-regulation, and self-efficacy variables. The AVE value is considered adequate if it is greater than 0.5, indicating that the group of items can effectively measure the variable. The analysis results show that the AVE value for the academic culture variable is 0.675, for self-reflection 0.987, for self-regulation 0.678, and for self-efficacy 0.889.

Next is discriminant validity, which ensures that each item accurately measures its respective variable. An item meets discriminant validity if the outer loading value of the variable it measures is greater than the outer loading values of variables it does not measure. Based on cross-loading analysis, each item measuring a variable has the highest correlation with the variable it measures, compared to its correlation with other variables. This means that all items can be correctly used to measure the research variables.

The final step is to test the internal reliability of the questionnaire instruments. Internal reliability is tested by calculating the Cronbach's alpha coefficient. A group of items has good internal reliability

if its Cronbach's alpha value exceeds 0.6. The Cronbach's alpha value for the academic culture variable is 0.76.

Data collection was carried out by gathering responses through self-assessment instruments in the form of questionnaires provided via Google Forms. The questionnaire used a 1-4 scale (Strongly Agree, Agree, Disagree, and Strongly Disagree). The data generated from this research is quantitative and will be analyzed using descriptive statistical techniques. The scores obtained will have their mean, median, and mode calculated. The mean value is used to determine the average score of the variables in this study. The data is then categorized into four categories: Very Good, Good, Fair, and Poor.

3. Results and Discussion

This section describes the findings based on the implementation of self-assessment for academic culture among students in the Fashion Education Study Program. The research results are presented using the theoretical framework of self-assessment, which includes three key components: Determining Criteria, self-directed feedback seeking, and self-reflection [12]. These three components are evaluated using a self-assessment questionnaire regarding academic culture, self-reflection, self-regulation, and self-efficacy.

Determining Performance Criteria

In the first phase, students were asked to assess the academic culture based on pre-defined criteria that include academic thinking, academic ethics, and academic behavior. In this case, the self-assessment criteria were determined externally by the faculty of the Fashion Education Study Program through a Focus Group Discussion process.

Although the self-assessment criteria were determined externally by the study program, this does not diminish the value of the self-assessment process. According to theories presented by Yan on [13] external control over the establishment of criteria can pose challenges, especially in professional development. However, in the context of this research, the use of external criteria allows students to understand and internalize the academic standards relevant to their field, thereby still holding significant value in preparing them to enter the professional community.

Based on the analysis of the questionnaire, the majority of students (59%) exhibited a good level of academic thinking, as shown in Table 1. This result indicates a strong ability in academic thinking within their learning.

Table 1. Students' Academic Thinking

Category	Frequency	Percentage
Very Good	45	33%
Good	80	59%
Not Good	23	17%
Poor	1	1%

For academic behavior (including attendance, punctuality, and respect for peers and lecturers), the results are shown in Table 2. This data reflects that 58% of students exhibit academic behavior that aligns with the existing academic culture.

Table 2. Students' Academic Behavior

Category	Frequency	Percentage
Very Good	30	20%
Good	88	58%
Not Good	31	20%
Poor	0	0%

For academic ethics (honesty in academic work, avoiding plagiarism), the results are shown in Table 3. The distribution in Table 3 indicates that the majority of students (60%) demonstrate good academic ethics, with no students lacking academic ethics.

Table 3. Students' Academic Ethics

Category	Frequency	Percentage
Very Good	60	40%
Good	89	60%
Not Good	0	0%
Poor	0	0%

Although the self-assessment criteria are determined externally, this does not diminish the value of the self-assessment process itself. Yan et al. [13] note that external control over criterion setting can present challenges, especially in professional development. However, in the context of this research, the use of external criteria allows students to understand and internalize academic culture relevant to their field, thereby retaining significant value in preparing them to enter the professional community. Research by Balloo et al. [14] shows that clarity in established assessment criteria can enhance students' understanding of academic expectations, which is crucial for their engagement in the learning process.

Self-Directed Feedback Seeking

After the criteria were determined and the self-assessment results were obtained, the next step was seeking feedback. In this implementation, students did not actively seek feedback from lecturers or peers. Instead, feedback was directly provided to the students based on the questionnaire they completed. The feedback was given to highlight their strengths and weaknesses in applying the values of academic culture.

The feedback received by students was delivered individually, focusing on improving weaker aspects and strengthening areas that were already good. Based on interview data with several students after receiving the feedback, the majority of students felt that the feedback was clear and helpful in identifying areas for improvement. A total of 70% of students stated that they understood the feedback given, while 30% required further clarification regarding improvement suggestions.

The feedback-seeking process is crucial because constructive feedback can help students understand their position in meeting the established criteria. Data indicates that 70% of students feel that the feedback provided is clear and helpful. This aligns with research by Ahea et al. [15], which states that unclear or ambiguous feedback can decrease student motivation. This highlights the need for lecturers to pay attention to how feedback is delivered to ensure it is more easily understood.

Self-Reflection

The next stage is self-reflection. After receiving feedback, students are expected to reevaluate their academic performance. This process involves self-reflection to understand what they need to improve in their studies. Based on the self-reflection questionnaire results from 149 students in the Fashion Education Study Program, the descriptive statistical analysis of self-reflection showed a mean of 31.5 with a standard deviation of 8.0. The data was then grouped into four categories. The frequency distribution results of the self-reflection of Fashion Education Study Program students can be seen in Table 4.

Table 4. Students' Self-Reflection

Category	Frequency	Percentage
Very Good	61	41%
Good	68	45%
Not Good	10	7%
Poor	10	7%

The reflection process aims to help students become aware of their strengths and weaknesses. According to Mertens et al. [16], effective reflection can enhance self-awareness, which is key to personal and academic development.

The analysis results show that the average self-reflection score for students is 31.5, with 45% of students falling into the good category. However, the phenomenon of overconfidence arises, as some students feel confident despite reflection results indicating otherwise. Research by Ehrlinger et al. [17] shows that overconfidence often occurs when individuals lack sufficient knowledge to accurately assess

their abilities. This underscores the need for clear guidance for students in the self-reflection process so that they can evaluate themselves more objectively.

Self-Assessment Judgement

After self-reflection, students evaluate their abilities and develop improvement actions. In this process, self-regulation plays an important role. Students set strategies to address their weaknesses. Based on the self-regulation questionnaire results from 149 students in the Fashion Education Study Program, the descriptive statistical analysis of self-regulation showed a mean of 28.33 with a standard deviation of 7.18. The data was then grouped into four categories. A total of 60% of students demonstrated good self-regulation abilities, indicating they are able to set strategies to achieve their academic goals. The frequency distribution results of the self-regulation of Fashion Education Study Program students can be seen in Table 5.

Table 5. Students' Self-Efficacy

Category	Frequency	Percentage
Very Enough	57	38%
Enough	89	60%
Not Enough	0	0%
Insufficient	3	2%

After the self-reflection process, students are expected to assess their abilities and plan corrective actions. This process highlights the importance of self-regulation in learning. Guven and Babayıgıt [18] explain that students with strong self-regulation skills tend to be more successful in their studies.

The research findings indicate that the average self-regulation score among students is 28.33, with 60% of students demonstrating good self-regulation skills. These findings align with research by García-Pérez et al. [19], which states that effective self-regulation contributes to better academic achievement. Therefore, it is essential to support students in developing their self-regulation skills, such as through training in effective learning strategies.

Calibration

The final stage is calibration, where students adjust their self-reflection and evaluation after receiving feedback from lecturers. At this stage, students re-examine their reflections and strategies to ensure consistency between their self-perception and actual performance. This calibration influences their self-efficacy, which reflects their confidence in completing academic tasks. Based on the self-efficacy questionnaire results from 149 students in the Fashion Education Study Program, the descriptive statistical analysis of self-efficacy showed a mean of 25.3 with a standard deviation of 6.78. The data was then grouped into four categories. The frequency distribution results of the self-efficacy of Fashion Education Study Program students can be seen in Table 6.

Table 6. Students' Self-Regulation

Category	Frequency	Percentage
Very Enough	32	21%
Enough	89	60%
Not Enough	25	17%
Insufficient	3	2%

Calibration is the stage where students adjust their self-assessments based on the feedback received. This is crucial to ensure that students have an accurate understanding of their abilities. Lin et al. [20]indicate that self-efficacy plays a role in determining the extent of effort that students will exert in facing academic challenges.

The research findings show that the average self-efficacy score among students is 25.3, with 60% of students feeling confident in facing academic challenges. These findings suggest that high self-efficacy can encourage students to take more risks in their learning. Research by Shaked and Altarac [21] supports the notion that strong self-efficacy contributes to better academic performance.

4. Conclusion

Based on the research findings, it can be concluded that the implementation Academic Culture Self-Assessment is carried out through a series of stages, including criteria determination, feedback seeking, self-reflection, self-assessment judgment, and calibration. Each stage plays an important role in supporting the development of students' competencies, especially in terms of enhancing self-awareness, self-regulation, and confidence. The academic culture criteria, which include academic thinking, academic behavior, and academic ethics, were externally determined by lecturers of the Fashion Education Study Program through a Focus Group Discussion (FGD). The results show that 59% of students demonstrate a good level of academic thinking, 58% exhibit good academic behavior, and 60% display good academic ethics. This indicates that the majority of students are able to understand and meet the academic culture standards set by the study program. Feedback is provided individually based on the results of the academic culture self-assessment. A total of 70% of students stated that they understood the feedback given by the lecturers. The results of students' self-reflection show that 45% have a good level of self-reflection, while 14% show poor or inadequate self-reflection. A total of 60% of students demonstrated good self-regulation skills. This shows that more than half of the students possess strong abilities to manage and monitor their own learning progress. A total of 60% of students reported having a good level of confidence in facing academic challenges. This reflects that the majority of students feel confident in their ability to overcome challenges and achieve academic goals.

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TRAINING AND CERTIFICATION IN CAD 3D USING FUSION 360 WITH INTRODUCTION TO 3D PRINTING FOR VOCATIONAL HIGH SCHOOL MACHINING TEACHERS IN DIY

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The community service project titled Training and Certification in CAD 3D Using Fusion 360 with Introduction to 3D Printing for Vocational High School Machining Teachers in DIY aims to enhance teachers' competencies in the fields of CAD 3D and 3D printing technology. This training includes mastering the Fusion 360 software, creating 3D parts, assembly, technical drawing, and preparing models for 3D printing. The training program consists of several sessions, followed by a competency certification exam. Results from the training demonstrate a significant improvement in participants' understanding and skills, as evidenced by the comparison of pretest and posttest scores. The average scores of participants increased from 27% to 68.5% in 3D part creation, from 30.03% to 62.8% in drawing, and from 23.3% to 64.3% in assembly creation. In the 3D printing training, scores improved from 8.5% to 64%.In conclusion, this training successfully significantly improved the technical competencies of the participants, although further optimization is needed in creating more complex parts. The CAD 3D certification conducted at the end of the training provides professional recognition to participants, acknowledged by the industry, thereby giving them a competitive advantage in the workforce.

Keywords: CAD Training, Fusion 360, 3D Printing

1. Introduction

The Musyawarah Guru Mata Pelajaran (MGMP) Teknik Mesin in Yogyakarta City serves as a collaborative platform for vocational school (SMK) mechanical engineering teachers. This organization plays a crucial role in improving the quality of mechanical engineering education through various activities such as discussions, training, and workshops aimed at enhancing teachers' competencies in both teaching and mastering the latest technologies and teaching methods (Muhammad & Erihadiana, 2021). Additionally, MGMP Teknik Mesin Yogyakarta City functions as a forum for teachers to share experiences and knowledge, as well as a means to align the educational curriculum with the needs of both local and national industries. With the support and active participation of its members, this MGMP is expected to become a driving force in improving the quality of mechanical engineering education in Yogyakarta City, ultimately producing graduates who are competent and ready to compete in the workforce.

The rapid advancement of manufacturing and design technology demands that the educational sector, particularly at the vocational high school (SMK) level, continuously adapt and enhance the quality of its instruction (Shi et al., 2024). In this context, mastering Computer-Aided Design (CAD) 3D and 3D printing technology has become highly relevant, especially for teachers in the machining field (Verner & Merksamer, 2015). CAD 3D is widely used in modern manufacturing industries to digitally design and visualize products before they are produced (Shi et al., 2024). Meanwhile, 3D printing, also known as additive manufacturing, enables the creation of physical objects from digital models with a high degree of precision (Huang et al., 2024)..

In the Special Region of Yogyakarta (DIY), there is an urgent need to improve the competencies of vocational high school (SMK) machining teachers in CAD 3D and 3D printing technologies. This need is driven by the increasingly complex demands of local and global industries, as well as the necessity for SMK graduates to be job-ready with skills aligned with industry requirements. Through training and certification in CAD 3D using Fusion 360 software, along with the introduction of 3D printing technology, it is hoped that teachers can update their knowledge and skills in line with the latest technological developments.

Fusion 360 is a 3D CAD software that excels in integrating various design, simulation, and manufacturing features into a single platform (Feeman et al., 2018). Mastery of this software will equip teachers with the ability to teach product design more effectively and efficiently to students. Meanwhile, introducing 3D printing technology to vocational high school (SMK) machining teachers will not only enhance their ability to design and produce prototypes but also provide them with a deeper understanding of the rapidly evolving digital manufacturing processes.

Through this training and certification, it is expected that vocational high school (SMK) machining teachers in Yogyakarta can become change agents capable of transforming their school curricula and teaching methods. This will better equip SMK graduates to face the challenges of a dynamic, high-tech workforce.

2. Method

This community service initiative began with a planning phase, which included designing a training program to be delivered through blended learning—a combination of online and in-person sessions. The initial phase was followed by the preparation of training materials, equipment, and resources necessary to support the implementation of the training. The four-day training was conducted as follows: On the first day, the online session focused on introducing and installing Fusion 360 software, providing participants with the essential foundational knowledge. The second day featured a pretest to assess participants' initial competencies, followed by training on 3D part creation and technical drawing using Fusion 360. On the third day, participants learned about assembly part creation and were introduced to 3D printing technology, including hands-on practice. The training concluded on the fourth day with a CAD 3D competency certification, aimed at evaluating and validating participants' ability to apply the knowledge and skills gained during the training.

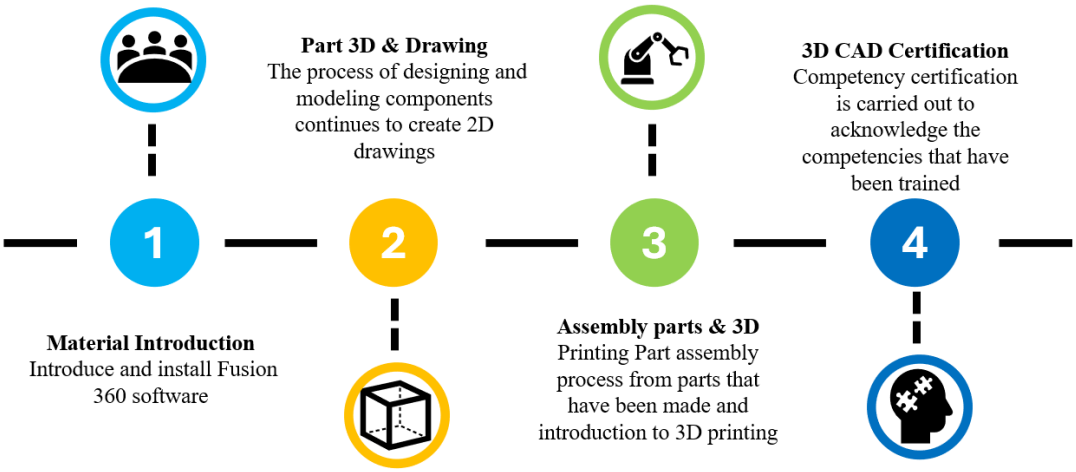


Figure 1. 3D CAD competency training flow

3. Results and Discussion

The implementation of CAD 3D training and certification using Fusion 360 for vocational high school (SMK) machining teachers in Yogyakarta faced several key challenges. These included the limited experience of teachers with modern CAD software and the availability and access to adequate hardware. Developing an effective curriculum without disrupting existing lesson plans, ensuring teachers' readiness to adopt new technologies, and collaborating with recognized certification bodies were also significant concerns. Additionally, effective funding strategies, ongoing training programs, continuous support, and comprehensive evaluation mechanisms to assess improvements in teacher competencies were necessary. To support the program's success, a collaborative platform is essential to facilitate the sharing of experiences and solutions among teachers.

Coordination and preparation with MGMP Mechanical Engineering Teachers for the Yogyakarta Region

The coordination and preparation activities for the CAD 3D training and certification program using Fusion 360 for vocational high school (SMK) teachers in the Special Region of Yogyakarta (DIY) were conducted comprehensively and systematically to ensure optimal implementation of all aspects of the program. This process began with intensive coordination meetings involving various stakeholders, including school representatives, the Mechanical Engineering Subject Teacher Consultation (MGMP), relevant educational institutions, and industry partners. During these meetings, the schedule of activities, training curriculum, and selection of competent instructors with experience in using Fusion 360 and 3D printing were discussed and agreed upon.

In addition, the identification of hardware and resource needs was a primary focus. The organizing team collaborated with schools and technology providers to ensure that the Fusion 360 software was installed and functioning properly on all computers designated for the training. The procurement and preparation of 3D printers were also prioritized, with particular attention to the appropriate technical specifications and the availability of sufficient printing materials (filaments).

The preparation of training materials included the development of systematic learning modules that covered basic concepts and practical applications in creating CAD 3D designs and implementing 3D printing. These modules were designed not only to meet the needs of teachers in mastering new technologies but also to ensure effective knowledge transfer to students in the classroom.

The organizing team also meticulously arranged logistics, including the setup of adequate training spaces for both online and in-person sessions. To support the implementation of blended learning, technical testing of hardware, software, and stable internet connectivity was conducted. This included conducting online training simulations to identify and address potential technical obstacles that might arise during implementation.

Furthermore, standard operating procedures (SOPs) were prepared for all stages of the program, including guidelines for equipment usage, training regulations, and health protocols for in-person sessions. All these measures were taken to ensure that the training proceeded smoothly, efficiently, and in alignment with the established goals regarding the enhancement of teachers' competencies and the application of CAD 3D technology and 3D printing in vocational high school settings.

a. Introduction and Installation of Fusion 360



Figure 2. Fusion 360 app installation process

The training activities commenced with an online session on the first day, focusing on the fundamental introduction to using the Fusion 360 software. Participants were provided with guidance on how to download, install, and set up the software on their computers. The instructor explained the main features of Fusion 360 and its benefits in CAD 3D design. Additionally, this session included an orientation to the user interface and an explanation of the basic tools that would be utilized throughout the training.

b. 3D Part Creation and Drawing

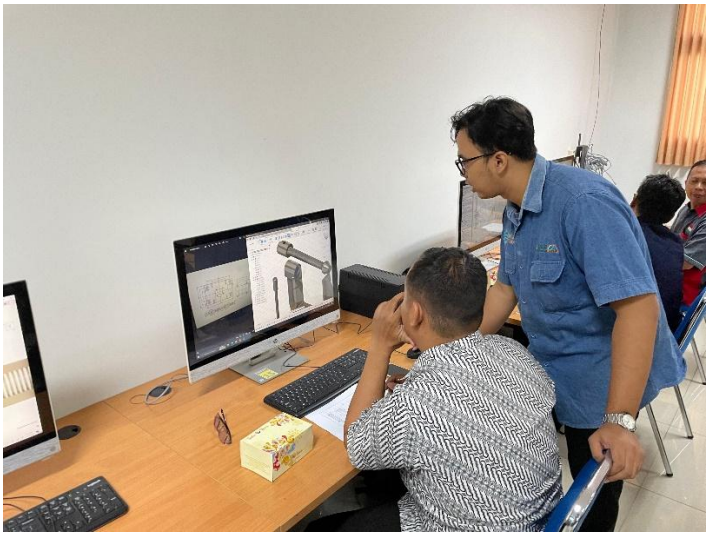


Figure 3. Part 3D drawing and 2D drawing training

On the second day, the training continued with the administration of a pretest aimed at assessing the participants' initial understanding of CAD 3D concepts and their proficiency in using Fusion 360. Following the pretest, participants began studying the core material, which focused on creating 3D parts. The instructor guided the participants step by step in designing simple components, starting from basic shape modeling to producing technical drawings that adhere to industry standards. This session aimed to enhance the participants' abilities to create accurate and professional CAD designs.

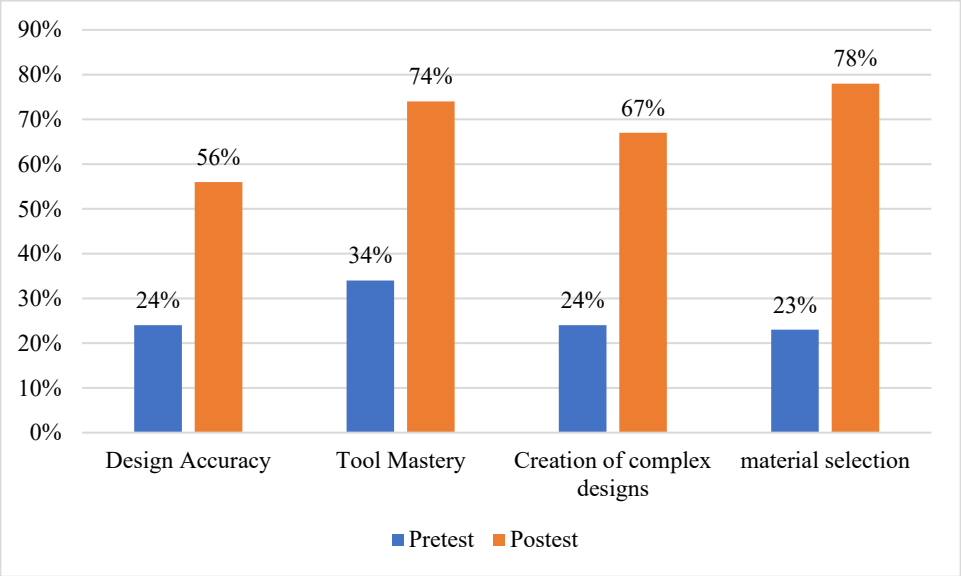


Figure 3. Pretest and Posttest 3D Part Making Design Training

The results indicate a significant improvement in the pretest and posttest scores obtained through direct testing in using the CAD software. The overall average for the pretest was 27%, while the posttest average rose to 68.5%. This demonstrates that the training focused on part creation design effectively enhances participants' understanding of how to work tactically through correct and standardized design practices. While the optimization of the design training for part creation has been successful, there is a need to emphasize the creation of complex parts, as the training primarily covered basic skills without addressing the complexities involved in part design. It is essential for vocational school teachers to follow up on this aspect so that students become more skilled in using CAD 3D modeling.

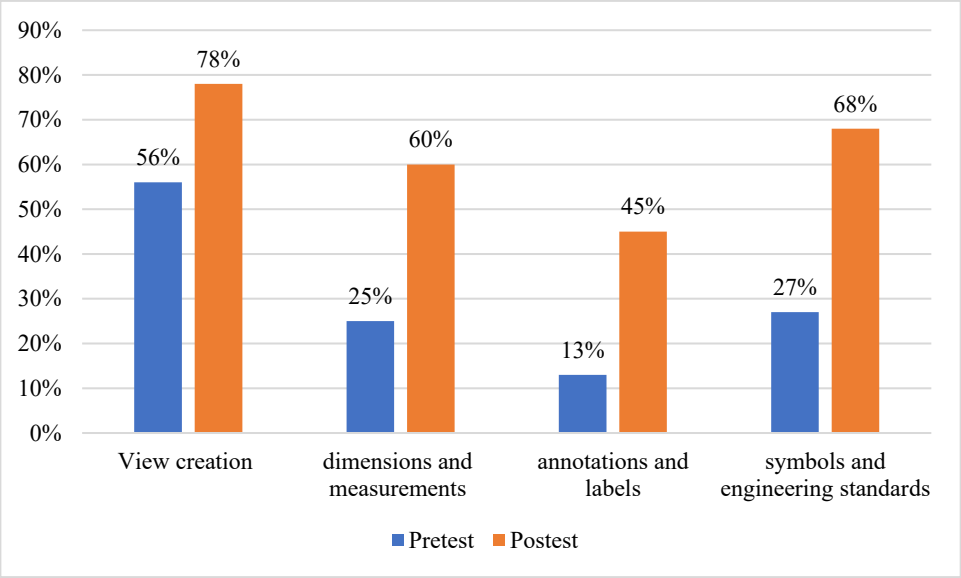


Figure 4. Pretest and Posttest Drawing Design Training

The results indicate a significant improvement in the pretest and posttest scores obtained from theoretical questions. The overall average for the pretest was 30.03%, while the posttest average increased to 62.8%. This demonstrates that the CAD 3D training has effectively enhanced participants' understanding of creating drawings with various views, dimensioning, annotations, symbols, and technical standards. The optimization of this CAD 3D training needs to be expanded to encompass all aspects relevant to vocational school students, preparing them to face industry challenges that demand the ability to create and modify designs efficiently and accurately. By mastering CAD 3D drawing, students will gain a competitive edge in an increasingly digital and technology-driven job market. If this approach is consistently implemented and supported by relevant stakeholders, it will lead to significantly improved competencies.

c. Assembly Part Manufacturing and 3D Printing



Figure 5. 3D Printing Training

On the third day, the training shifted focus to creating assembly parts, where participants were taught how to assemble multiple 3D parts into a cohesive and functional unit. The instructor demonstrated how to establish relationships between components and ensure that the assembly functions mechanically. Following this, participants were introduced to the 3D printing process, covering everything from preparing the CAD model for printing to adjusting the printer settings. They also had the opportunity to conduct print simulations, allowing them to understand the challenges that may arise during the 3D printing process. This hands-on experience aimed to enhance their skills and confidence in both assembly design and 3D printing.

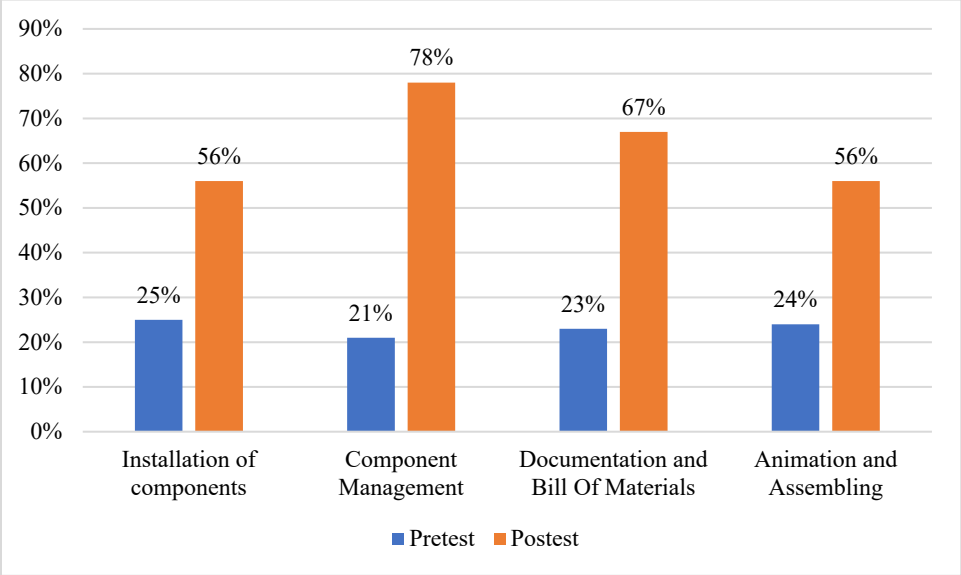


Figure 6. Pretest and Posttest Assembly Training

The results indicate a significant improvement in scores for both theoretical and practical assessments when comparing pretest and posttest results. Overall, the average pretest score was 23.3%, while the posttest score rose to 64.3%. This notable difference before and after participating in the assembly part training demonstrates the effectiveness of the training activities related to component installation, component management, documentation, Bill of Materials, as well as animation and assembly practices.

Additionally, the support from the facilities provided helped solidify the skills gained, contributing to the enhancement of participants' competencies. This comprehensive training approach not only improved knowledge but also equipped participants with practical skills essential for their professional development.

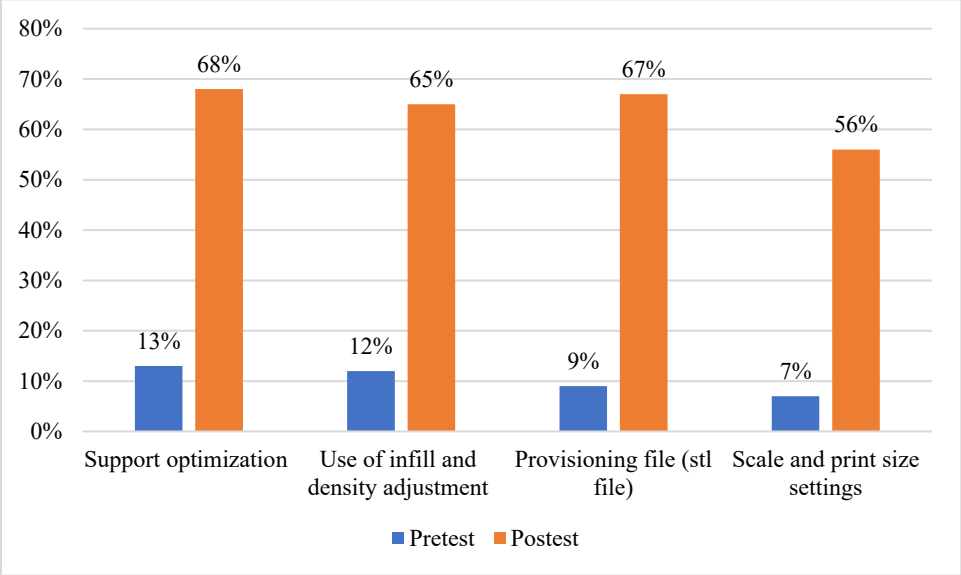


Figure 6. Pretest and Posttest 3D Printing Training

The results indicate a significant improvement between the pretest and posttest scores obtained through theoretical assessments. The average pretest score was recorded at 8.5%, while the posttest score increased to 64%. This demonstrates that the 3D Printing training has effectively enhanced participants' understanding of creating objects with various shapes, dimensions, as well as knowledge about materials and production processes. Therefore, the optimization of this 3D Printing training needs to be expanded to cover all aspects intended for vocational high school (SMK) students, ensuring they are better prepared to face industrial challenges that demand skills in creating and producing objects with high efficiency and accuracy. Mastery of 3D Printing will provide students with a competitive advantage in an increasingly technology-driven job market. Consistency in this training, along with support from relevant stakeholders, can significantly contribute to improving students' competencies.

d. 3D CAD Competency Certification



Figure 8. 3D CAD Competency Certification

The fourth day marked the culmination of the entire training program, where participants faced a significant challenge: the CAD 3D competency certification exam. This exam is not merely a test; it is a comprehensive evaluation designed to assess the extent to which participants have understood and can apply the skills they learned during the training. The exam covers several crucial aspects of CAD 3D design using Fusion 360, including part creation, assembly, drawing, and preparation of models for 3D printing.

The certification process began with assessing participants' ability to create 3D parts, where they needed to demonstrate a deep understanding of design geometry, use of modeling tools, and application of correct engineering principles. Following this, participants were tested on assembly creation, which involved combining multiple parts into a functioning unit. They were required to understand and apply the relationships between components and ensure that the assembly operated according to design objectives.

Additionally, participants were evaluated on their ability to produce accurate drawings, which serve as technical representations of 3D designs. These drawings needed to meet industry standards regarding dimensions, tolerances, and other essential details. The exam also included an assessment of participants' readiness to prepare CAD models for 3D printing, encompassing understanding printer settings, materials used, and model optimization for high-quality prints.

Throughout the exam process, participants were encouraged to demonstrate creativity, precision, and problem-solving skills that might arise during design creation. The results of this exam would determine whether participants were eligible to receive the CAD 3D competency certification. This certification is not just a formal acknowledgment; it serves as validation of the participants' professional capabilities in using Fusion 360 for CAD 3D design, recognized by the industry and providing them with an advantage in the job market. Upon successfully completing the exam and meeting the established criteria, participants would receive a certificate as evidence of their mastery of the skills necessary to use Fusion 360 effectively in a professional setting.

4. Conclusion

The implementation of CAD 3D training and certification using Fusion 360 for vocational high school (SMK) machining teachers in DIY has demonstrated significant results in enhancing

participants' competencies. From pretest to posttest, there was a remarkable increase in the average scores of participants in each session. Specifically, scores improved from 27% to 68.5% in 3D part creation, from 30.03% to 62.8% in drawing, and from 23.3% to 64.3% in assembly. In the 3D printing segment, scores rose from 8.5% to 64%. These results indicate that the training successfully enhanced participants' understanding and technical skills, although there is still a need for optimization in creating more complex parts. The CAD 3D certification at the end of the training comprehensively assessed participants' abilities in creating 3D parts, assembly, drawing, and preparation for 3D printing, providing a professional recognition that is acknowledged by the industry.

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THE IMPACT OF MOTIVATION AND TRAINING INTEREST ON THE RESULTS OF BULLION STIT TECHNIQUE EMBROIDERY AT THE COMMUNITY LEARNING ACTIVITY CENTER

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Abstract

The lack of skills that can improve competence, productivity, and performance that can enhance the welfare of learners is a major problem faced by PKBM Cendikia Mandiri. The purpose of this research is to understand how learners' motivation and interest can affect the outcome of bullion stitch embroidery. Through this research at PKBM Temanggung, we are expected to know the factors that influence the level of success in producing embroidery with bullion stitch techniques. The data collection method used was a questionnaire and documentation. Data analysis was obtained using PLS-SEM. This study concludes that the bullion stitch technique embroidery training begins with socialization, training, mentoring, and evaluation activities, as well as program sustainability. Based on the data obtained and analyzed, motivation has a significant positive effect on embroidery results, as well as interest which both have a significant positive effect on embroidery results.

Keywords: Embroidery training, bullion embroidery, PKBM Cendikia Mandiri

1. Introduction

Cendikia Mandiri Learning Activity Center (PKBM) Independent is an institution of non-formal education that focuses on education, especially for children who have dropped out of school. PKBM Cendikia Mandiri has a vision For increasing the quality of life of school dropouts through education, skills, and entrepreneurship. PKBM Cendikia Mandiri currently has 247 students, with a range of ages 7-40 years.

Problems faced by PKBM Cendikia Mandiri Currently there is a lack of skills that can increase competence, productivity, and performance that can increase welfare participant education. Problems the can known after he did initial observations to PKBM Cendikia Mandiri. Based on the problem, then needs to be analyzed in a way to design training to be able to in a way effectively and efficiently finish problems and also face future challenges [1]. By analyzing deep needs, PKBM Cendikia Mandiri can design appropriate and effective training programs To increase the skills participants educate. Training designed in an way appropriate can give a positive contribution to quality source Power humans in the environment surrounding area the more increase.

According to Aprilia & Nawangsari training focuses on excellence, knowledge [2], skills, and attitudes. Training is a process that has the objective of increasing knowledge, skills, and perspectives of participant training [3]. The success of an organization in reach objective can supported by the existence of training skills and good work [4]. Based on the definition, can concluded that training is an activity carried out in a way systematic and organized to increase the abilities, skills, and attitudes of participants who are trained. The purpose of the training is to reach effective and efficient work. Training Bullion embroidery done at PKBM Cendikia Mandiri focuses on improvement advantages, so that can help students increase competence participants educate according to their abilities.

The capacity of somebody individual to operate various tasks in a work is also called ability [5]. Ability is expertise or excellence from individuals who have knowledge, skills, and attitudes in finishing problems [4]. Training embroidery can help participants increase the skills they have in field craft hands, like bullion embroidery. Through improvement skills in field bullion embroidery, participants' training can expand work opportunities and improve the sustainability economy in the community. In addition, because of interest and motivation training, participants training can also become agents of active changes in reaching objective development sustainable at the level locally and globally. Thus, this training can contribute to the achievement of *Sustainable Development Goals* (SDGs), especially

the target of increasing skills and jobs decent (SDGs 8). Through training embroidery, students can also increase interest and motivation to learn, which is a factor important in achieving SDGs related to education quality (SDGs 4). Therefore, training embroidery can be one effort To support the development agenda sustainable.

Need required training determined after do analysis needs of participants educate PKBM Cendikia Mandiri. Training and development will help individuals reach strength its potential [2]. Meanwhile, according to Nadler and Wiggs, training is the process of focusing thought related to the skills, knowledge, and attitudes required To complete a task or job [6].

Understanding components that influence the desires and interests of participants educated in training technique bullion skewer helps determine the need for training. With the existence of This understanding is expected by PKBM Temanggung can give more effective and efficient training for participants educated. In addition, it is expected that the findings of This research will give a contribution to the development of technique stab the bullion at PKBM Temanggung to make it even more in demand and successful in produce work quality embroidery.

Decorating is an activity to beautify objects to make them more interesting and can increase mark sales. One of the forms of activity decorate the fabric is embroidering. Embroidery technique is the technique of decorating a medium that is worked on manually, activities are better known as embroidering [7]. Embroidery is a decoration that [8]. In Indonesia, the art of embroidery has been well-developed. Embroidery is an art decoration made on media with thread and needle sewing. As time progressed, the embroidery was not limited to thread cloth, You can also use beads, feathers birds, pearls, pieces of metal, and up to sequins [9]. Types of embroidery techniques used in training at PKBM Cendikia Mandiri is a type of bullion embroidery.

Bullion embroidery is one of the techniques of embroidery that has been developed in Indonesia [10]. Apart from its beautiful shape, the embroidery technique bullion stabs into unique Because own texture Embossed embroidery. This embroidery is just that can be handmade, and cannot use machines so that No one can be produced in a way mass, thing causes product embroidery to become exclusive and have mark high sales. Embroidery technique bullion skewers are not yet popular among society, so they potentially become the favorite products community with power competition that still exists low. Implementation bullion embroidery can applied as decoration on clothes, headscarves, and so on.

The role of motivation and interest are very important in the implementation of the training embroidery technique bullion piercing at PKBM Temanggung, motivation participant are educated in their roles To reach optimal results. Participants will be more enthusiastic and persistent in learning technique embroidery If they have high motivation. Desire experience To live and enjoy life is called motivation. Attitude faced in situation Work can form motivation. The energy that drives the self in a way directed and focused To reach an objective certain known as motivation. A positive positive mental attitude can help increase the desire to reach the level of best performance.

Maslow's Hierarchy of Needs Theory is one of the theories of motivation famously states that motivation is formed from various needs [11], namely :

a. Need physiological

   One of the most basic needs is the need physiological, namely To maintain life. Physiological among them are the need to eat, drink, rest, water, air, place shelter, and clothing. According to Maslow's theory of needs physiological must be fulfilled before the need other.

b. The need for security

   The need for security is needed man For feel protected and free from threats physique and also psychological. This is the second stage that exists in the hierarchy of Maslow's needs, after need physiological fulfilled. Security physical, stability finance, certainty law, and security emotional are several aspects of the need for security.

c. Need love Darling

   Need love Darling is an indicator third from Maslow's Theory, needs love Darling required man To feel loved, accepted, and have bond strong social with other people. Every person needs to be appreciated, accepted, and loved by others.

d. Need award

Need award is need man For feel appreciated, recognized, and have price self. Needs awards covering awards that come from self-esteem, and appreciation that comes from from others (recognition). Appreciation from self-esteem includes belief in self, achievement, and independence. Meanwhile, recognition, status, and reputation can become forms of awards from other people.

e. Need actualization self

According to Maslow's theory, the actualization of self is the thing that is at the top in Maslow's Theory. Needs actualization self will appear If other existing needs below it has fulfilled properly. The self-actualization self can cover development potential, creativity, search for meaning, authenticity, acceptance self, and improvement self. Someone who can reach actualization self usually feels satisfied with life, has deep awareness will themselves, and can contribute in a way significant to society. They tend to chase the goals they consider important and focus on growth personal, creativity, and spiritual fulfillment.

Abraham Maslow (1943) and Frederick Herzberg (1964) are a psychologist and experts in theory, both agreed to confess the importance of development in Motivate People. Peak from hierarchy needs Maslow's human is price self and actualization self. Meanwhile, Herzberg identified factors motivation, namely 1) responsibility responsibility, 2) progress, 3) achievement, 4) recognition, and 5) the work itself.

Apart from motivation, strong interest will also be encouraged in addition to participant training For Keep going develop skills in training embroider. Interest that arises in oneself somebody formed Because of experience that has happened to himself. Interest in himself somebody influenced by several factors that generally arise Because of the condition of social economy in the environment of the person's life. Furthermore, interest is influenced by things as follows:

a. Physical factors

Interest in self somebody determined by conditions physical, for example moment an individual is faced with work, then his physical condition must be good because work heavy involves Lots of challenges. Therefore, the factors physique is one of the factors important For support activity individual.

b. Psychological factors

Interest is influenced by factors the psychic including motives, attention, and feelings. Motives are encouragements to do something that appears in the individual. Meanwhile, interest in somebody can arise consequence existence of attention If one experiences involvement. While feeling happy is a conditioned soul caused by good events that happen to the person concerned, this the will cause interest If reinforced by attitude positive.

c. Environmental factors

Environmental factors influence interest Because the surrounding environment individual plays a role in forming perceptions, experiences, and decisions taken by a person. Family, school, and community are several factors environment that influence interest.

Several training-related embroidery has been done before, such as training ribbon embroidery, embroidery thread, and embroidery sequins. However, this type of embroidery technique bullion stick is seldom found as material training Because own level higher difficulty. The bullion embroidery is still there seldom applied to various types of marketed clothing. Training in this kind of thing is necessarily done Because gives insight and skills to participants ' training. In addition, embroidery tactics bullion stick still arguably seldom found own good potential for marketed Because own beautiful and unique shape with manufacturer few competitors. Therefore, this research has the objective of knowing How the interest and motivation participants are educated can influence results from embroidery technique bullion stab. Through This research in PKBM Temanggung, it is hoped that known factors influence the level of success in producing embroidery with the technique of bullion stab.

2. Method

The method used in this community service is the PKM Participatory Action Research (PAR) approach. This community service method was chosen because the learning objectives are to solve problems and meet the practical needs of the community, increase knowledge, and involve the process of social change [12].

The data collected in this activity were training motivation, training interest, and bullion stitch embroidery results. Data collection techniques were carried out using questionnaires and documentation. Data collection was carried out on June 1-2, 2024 at the Cendikia Mandiri PKBM located in Manding Village, Temanggung District, Temanggung Regency. The data source came from PKBM Cendikia Mandiri students who participated in the training from beginning to end, totaling 35 participants. The Structural Equation Modeling (SEM) technique was used to analyze the data. This analysis technique allows for a deeper understanding of the factors that influence the results of the training. The results of the data analysis were then analyzed descriptively.

3. Results and Discussion

The bullion embroidery training activity was carried out well and smoothly on June 1-2, 2024, attended by ±33 training participants from the Cendikia Mandiri Independent Learning Activity Center (PKBM). The training participants showed high enthusiasm during the activity. They managed to follow each stage of the training well and were able to produce quite good bullion embroidery works. In addition, the active participation of participants also contributed to the success of the implementation of this training activity.

a. Implementation of Activities

Based on the activities that have been carried out, it can be seen that the flow of bullion embroidery training is as follows:

1) Socialization

This activity was carried out on the first day as an initial step to introduce training participants to the objectives, benefits, and implementation plans of the empowerment program for PKBM Cendikia Mandiri students. In addition, socialization also aims to explain the positive impacts that participants get from participating in this training program so that training participants can better understand the importance of the training and be more motivated to follow each stage properly.



Figure 1. Socialization Training

(Source: Personal Documentation)



Figure 2. Socialization Training

(Source: Personal Documentation)

2) Training

After the socialization activity ended, training activities were also carried out on the first day. The instructor provided materials with the help of power points related to the basic understanding, types of bullion embroidery-making techniques, to examples of their application to the media. After the delivery of the material with power points, a video tutorial on making bullion embroidery was also played to make it easier for training participants to understand how to make the embroidery, so that they could practice it more easily. When the material was delivered, training participants listened carefully and asked questions if they encountered difficulties.



Figure 3. Provision of Materials

(Source: Personal Documentation)

After the delivery of the material, the training participants with a total of ±33 then formed small groups, with each small group member consisting of 5-6 people. Each group that has been formed will be accompanied by one instructor, the aim is to make it easier to monitor when practicing making bullion embroidery. Each small group is free to choose a place in the PKBM Cendikia Mandiri area that is comfortable for practicing embroidery with the bullion stitch technique, with the hope that the training participants remain comfortable during the training session.



Figure 4. Practice Making Bullion Stitch Embroidery Technique

(Source: Personal Documentation)

Participation participant training Enough active. This is known from sufficient reciprocal interaction between participants training with an instructor. Although there are several constraints Because participant Didik is not used to making embroidery, part big constraints can handled well thanks to the motivation and interest participant's high training.



Figure 5. Results of Bullion Stitch Technique Embroidery

(Source: Personal Documentation)

Figure 4 is an example of the results of bullion stitch embroidery done by the training participants. Overall, the training participants were able to make bullion stitch embroidery independently. However, some training participants still had difficulty in making the embroidery. The results of bullion stitch embroidery from each -training participant are assessed to determine the extent to which students can apply the insights and skills that have been taught and to determine the achievement of the objectives of the training activities.

3) Mentoring & evaluation

Mentoring and evaluation of training participants are carried out to ensure that they can implement the skills they have learned well. In addition, the synergy between instructors, participants, and other related parties will also continue to be improved so that this training program can continue to develop most beneficially for all parties involved. With continuous efforts and strong commitment, it is hoped that bullion embroidery training at PKBM Cendikia Mandiri can become one of the innovative programs that can have a significant positive impact on the surrounding community.

4) Sustainability of the program

Bullion embroidery training is expected to continue to be improved and developed so that it can provide greater benefits to training participants in the future. In addition, the implementation plan for the next training also needs to be prepared to ensure the continuity and sustainability of this training program. With the support and collaboration of all related parties, It is hoped that bullion embroidery training at PKBM Cendikia Mandiri can continue to provide positive contributions to improving the skills and knowledge of the surrounding community.



Figure 6. Group photo with Participant Training

(Source: Personal Documentation)

b. **Training Participant Profile**

The bullion embroidery training activity was attended by a total of 35 training participants, consisting of 20 male participants (57.1%) and 15 female participants (42.9%). The following is the gender data of the bullion embroidery training participants at PKBM Insan Cendikia Temanggung.

Table 1. Training Participant Profile

No.	Gender	Number of Respondents	Percentage
1.	Man	20	57.1%
2.	Woman	15	42.9%
	Total	35	100%

Based on Table 1, it is known that bullion embroidery training participants are dominated by male participants. This is interesting because usually skills training is closer to women. However, in this training, male participants were able to follow well from the beginning to the end of the training session.

The following is also data on the age range of bullion embroidery training participants at PKBM Cendikia Mandiri.

Table 2. Training Participants' Age Data

No.	Age	Number of Respondents	Percentage
1.	< 10 years	2	5.7 %
2.	10–20 years	11	31.4 %
3.	20-30 years	15	42.9 %
4.	> 30 years	7	20%
	Total	35	100%

c. **Data Analysis Results**

Evaluation of Measurement Model (*Outer Model*)

Motivation and interest data were obtained from the questionnaire instrument, then bullion embroidery result value data was also obtained through expert assessment. The three data were processed using the *Partial Least Square - Structural Equation Model* (PLS-SEM) method with SmartPLS 4 *software to* determine the effect of motivation and interest in training on the results of bullion stitch embroidery techniques at PKBM Cendikia Mandiri Temanggung. Measurement is used to determine how closely the indicators and latent variables are related to each other. *Convergent validity*, construct reliability, and *discriminant validity* are three tests used to examine *the outer model.*

1) Convergent Validity

The convergent validity test can be seen from its *loading factor*, if *the loading factor* > 0.7 then the indicators of each variable have good *convergent validity. The following are the loading factor values of* each indicator:

Table 4. Loading Factor Data

Indicators in Variables	Loading Factor
Motivation	
KAD	0.751
KF	0.828
KK	0.729
KP	0.800
KS	0.703
Interest	
F	0.753
FL	0.805
FP	0.870
Embroidery Results	
H1	0.979
H2	0.976

(Source: Data processed 2024)

Based on Table 4, all indicators have a *loading factor value* > 0.7, which shows that the indicators of each variable have good *convergent validity.*

2) Construct Reliability

The Average Variance Extracted (AVE) and *Cronbach's alpha* values of each variable in the model can be used as a benchmark for the value of construct reliability. *Cronbach's alpha* is used to test the reliability of the model used. Later, *Cronbach's alpha value* is used to determine the accuracy, consistency, and precision of the instrument used to measure the construct. If the value of *Cronbach's alpha* for the latent variable is >0.7, then the variable is said to be reliable [13]. The recommended *Average Variance Extracted (AVE)* value [13] is an AVE value of more than 0.5. All latent constructs have good reliability values, as shown by the research results shown in Table 5. This is indicated by *the Cronbach's Alpha value* for each latent construct >0.7 and the *Average Variance Extracted* (AVE) value >0.5.

Table 5. Cronbach's Alpha and *Average Variance Extracted* (AVE) values

Variables	Cronbach's alpha	AVE
Embroidery results	0.953	0.955
Interest	0.743	0.657
Motivation	0.820	0.583

(Source: Data processed 2024)

3) Discriminant Validity

If the correlation value between the indicator and its construct is greater than the correlation value between the indicator and other constructs, then the model has good discriminant validity [13]. Another way to test *discriminant validity* according to [13] is to compare the root value of *the Average Variance Extracted* (√AVE) with the correlation value between latent variables. If the √AVE value > correlation value, then it can be said that the model has met the *discriminant validity requirements*. The √AVE value in this research model is greater than the correlation value between variables. The comparison of these values is shown in Table 6.

Table 6. Correlation Values Between Latent Variables and √AVE Values

Variables	Embroidery Results	Interest	Motivation
Embroidery Results	0.977		
Interest	0.842	0.811	
Motivation	0.876	0.664	0.763

Note: the bold numbers are the √AVE values, while the others are the correlation values.

(Source: Data processed 2024)

Based on Table 6, the model has met the *discriminant validity requirements* because the √AVE value is greater than the correlation value.

Figure 7 shows the final research model along with the indicator *loading factor values*.

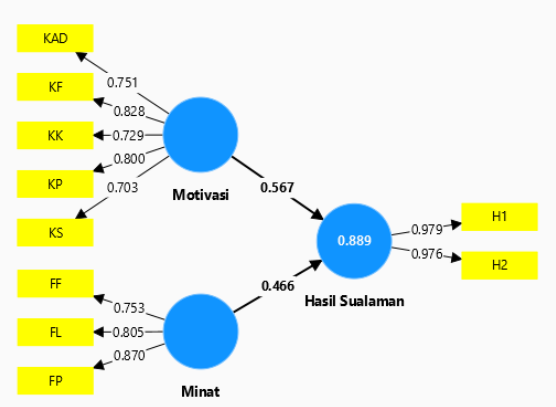


Figure 7. Final SEM-PLS Model

(Source: Data processed 2024)

d. **Structural Model Evaluation (Inner Model)**

The next step in conducting SEM-PLS analysis is to conduct a structural model evaluation (*inner model evaluation*). *Bootstrapping* is used in analyzing research data to obtain the values needed in the structural model evaluation. These values are the *R-square value* of the dependent variable, the path coefficient value, and the t-statistic value.

1) Model goodness-fit test by R-square

R-square value can be used to measure the substantive influence of a particular independent variable. The changing *R-square value* can also indicate the degree of variability of the dependent variable that can be explained by the indicator variables in the model.

R-square and adjusted R-square values

Variables	*R-square*	*R-square adjusted*
Embroidery Results	0.889	0.882

(Source: Data processed 2024)

Through the data presented in Table 7, it can be interpreted that as much as 88.9% of the embroidery results can be explained in Figure 7 Final results of SEM-PLS in the study Source: Data processed (2024) model, while 11.1% is explained by other factors outside the model. [13] stated that the structural model is said to be good, moderate, or weak respectively when the *R-square value* on the dependent variable is 0.67, 0.33, and 0.19. According to this statement, it can be seen that the structural model in this study is good.

e. **Path Coefficient Significance Test**

The final result of the SEM-PLS analysis is the significance of the path coefficient. Through *bootstrapping,* the path coefficient value in the model used in the study can be known. If the t-statistic value is greater than the t-table value (significance level 5% = 1.96), then the influence shown on the path coefficient

is said to be significant. The path coefficient and t-statistic values in this study are presented in Table 8.

Table 8. *Path coefficient, T statistic, and P value*

Relationship path	*Path coefficient*	T statistics	P value
Interest -> Embroidery Results	0.466	6,845	0.000

Motivation -> Embroidery Results	0.567	8,621	0.000

(Source: Data processed 2024)

Both variables have a positive and significant influence on embroidery results. As for external factors, there are no variables that have a significant influence on embroidery results either directly or indirectly.

f. **The Influence of Motivation and Interest on Embroidery Results**

Based on the data that has been processed using PLS-SEM, motivation has a significant positive effect on embroidery results. The T-statistic value for the motivation variable on the path coefficient to embroidery results is 8.621. This value is greater than the T-table with a significance level of 5%, which is 1.96. Based on the analysis, it was found that motivation contributed 56.7% to the embroidery results of PKBM Cendikia Mandiri participants.

In addition, based on the data that has been processed using PLS-SEM, interest has a significant positive effect on embroidery results. The T-statistic value for the motivation variable on the path coefficient to embroidery results is 6.845. This value is greater than the T-table with a significance level of 5%, which is 1.96. Based on the analysis, it was also found that interest contributed 46.6% to the embroidery results of PKBM Cendikia Mandiri participants.

4. Conclusion

Based on the results and discussion, the conclusion of this study is that bullion stitch embroidery training begins with socialization activities, training, mentoring and evaluation, and program sustainability. Based on the training, data on the influence of motivation and interest on embroidery results were obtained by processing using SEM PLS, the results of the data processing stated that motivation had a significant positive effect on embroidery results, as well as interest which both had a significant positive effect on embroidery results.

Acknowledgment

The success of the bullion stitch embroidery training is certainly inseparable from the support of various parties. On this occasion, we would like to thank Yogyakarta State University for supporting the realization of the training. Then, we also express our gratitude to PKBM Cendikia Mandiri for their support and assistance in providing comfortable facilities for the implementation of bullion embroidery training.

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Development of a Writing Literacy Culture for Teachers Through Scientific Article Writing Training

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Abstract

The purpose of the community service (PKM) is to enhance the quality of teachers' professionalism, teachers' writing competence, and the culture of scientific literacy in educational institutions through the writing of scientific articles. This training is expected to increase teachers' motivation to write good and high-quality scientific articles. The methods for implementing the training activities include planning, training, and mentoring in article writing. This training was attended by 41 teachers from SMP N 2 Banyudono. They actively asked various questions related to writing scientific articles and expressed the challenges they faced in the writing process. Participants were given the opportunity to apply the information and knowledge related to writing scientific articles that they had acquired from the training session.

Keywords: writing, scientific articles, community service, junior high school.

1. Introduction

The national education system positions teachers as the main pillar in the learning process [1]. The quality and competence of accompanying teachers are the main factors in the success of education. In addition to classroom learning, research conducted by teachers plays an important role in improving the quality of teaching and learning in schools. As professional educators, teachers are responsible for educating, teaching, guiding, directing, training, assessing, and evaluating students at the levels of early childhood education, primary education, and secondary education [2]. To enhance teachers' professionalism, it is important for them to participate in scientific publications, whether through research or educational ideas in the field of formal education. A scientific paper is a work that contains and examines a specific issue using scientific principles. According to [3], the scientific principles referred to mean that a scientific paper uses scientific methods to discuss problems, presents studies with standard language and scientific writing formats, and adheres to principles of objectivity, logic, empiricism, systematicity, clarity, and consistency.

Scientific papers must be written by teachers for self-development and should be published as a form of contribution to improving the quality of the learning process in schools and the development of the education field in general. This is also necessary to obtain credit points according to the Regulation of the Minister for State Apparatus Empowerment and Bureaucratic Reform No. 16 of 2009 regarding Functional Positions of Teachers and Their Credit Points, which includes scientific publications. Furthermore, the Directorate General of Higher Education, Ministry of Education and Culture (2014) initiated the organization of International Scientific Article Writing Training for productive researchers. This is one of the efforts made to address existing issues by providing training on writing scientific articles for both accredited national journals and reputable international journals. It is hoped that these activities will stimulate and encourage productive researchers, particularly within the academic community, to publish their research results in reputable international scientific journals. According to [4], the SCImago ranking site (www.scimagojr.com), which ranks scientific publications from 239 countries, Indonesia ranks 61st. In fact, Indonesia's publication ranking is significantly lower compared to other ASEAN countries (Malaysia, Singapore, and Thailand). Based on this fact, concrete steps are needed to accelerate the increase in scientific article publications, starting with quality research and writing that has the potential to be published in reputable national and international journals.

Given the low level of publication in Indonesia, it is necessary to emphasize again to teachers and faculty researchers the need to expedite their scientific writings. Therefore, the government has established promotion regulations that require teachers to have scientific publications as an important

and mandatory condition. Thus, scientific papers must be written by teachers for self-development and should be published to contribute to improving the quality of the learning process in schools and the overall development of education, as well as to obtain credit points according to the Regulation of the Minister for State Apparatus Empowerment and Bureaucratic Reform No. 16 of 2009 regarding Functional Positions of Teachers and Their Credit Points.

Teachers' scientific articles can be written based on their experiences in line with their duties and functions as educators, and can be published in the form of research reports or scientific reports/ideas ([4], [5]). However, the productivity of academic writing publications in Indonesia is still low [6]. Therefore, concrete steps are needed to improve the publication of high-quality scientific articles that have the potential to be published in leading national and international journals. This is important considering the low level of publication in Indonesia. Thus, teacher researchers need to be encouraged to enhance their productivity in producing scientific works, especially in the form of scientific articles. In addition, every teacher possesses skills in language aspects, particularly in speaking, as they communicate with students every day. However, writing ability is also very important for a teacher in analyzing root problems and articulating ideas to solve those problems. Therefore, training in scientific article writing is necessary, both in the form of research reports and article writing for scientific journals [7]. Thus, teachers' writing skills can be improved alongside the fulfillment of promotion requirements.

Moreover, the enthusiasm and competencies of teachers in composing scientific articles are expected to be transmitted to students. Students' ability to write scientific articles from an early age will have a positive impact when they become college students. Scientific article writing training is essential for teachers in schools. Through this training, teachers can be guided to understand the essence and process of writing scientific works and their publication. The training can also assist teachers in correctly citing references [8]. Additionally, scientific writing training is very effective in enhancing teachers' understanding of the types of scientific works [9]. The culture of scientific literacy is also an important aspect of education. In this context, scientific literacy involves the ability to use scientific knowledge, ask questions, and draw conclusions based on facts and data. Educational institutions play a crucial role in developing critical thinking skills related to scientific literacy [10]. The school literacy movement, which also includes scientific literacy, has been mandated in the Ministerial Regulation No. 23 of 2015. However, the culture of literacy, including scientific literacy, remains low in educational institutions and has not yet become a habit among students. Therefore, educational institutions need to enhance the competencies of writing scientific works as examples and facilitators in the development of a literacy culture [11].

Through training activities on writing scientific articles for teachers, it is hoped that the quality of teachers' professionalism, writing competence, and the culture of scientific literacy in educational institutions can be improved. The training is also expected to enhance teachers' motivation to write good and high-quality scientific articles. In order to increase understanding and awareness of the benefits of writing scientific articles, as well as the importance of scientific literacy, it is essential to conduct scientific article writing training for teachers at SMP Negeri 2 Banyudono, Boyolali. The goal of this community service activity is to provide a good understanding of methods for writing quality scientific articles and to boost teachers' motivation in writing scientific articles. This training is expected to be a positive starting point in developing teachers' writing competencies and fostering a culture of literacy in educational institutions.

2. Method

The implementation of this community service is carried out in three stages, as follows:

a. **Planning**:

The planning activities are conducted through coordination between the Service Team and SMP N 2 Banyudono regarding the teachers' needs for improving their performance and professionalism. Subsequently, the Service Team and the school coordinate the schedule and participants for the training.

b. **Training**

The training activities which consist of: **Presentation of Material by the Service Team**, The Service Team presents material related to articles and how to write articles for the teachers. One of the topics covered is the teachers' understanding of the types of scientific

works. **Discussion and Q&A**, Participants engage in discussions about the research topics they will develop and the training material.

c. **Assistance in Writing Scientific Articles.**

The Service Team provides guidance to participants in writing scientific articles.

3. Results and Discussion

Based on the situational analysis derived from the initial survey at SMP N 2 Banyudono, it was found that the teachers at the school still experience difficulties in writing scientific articles. From the discussions, the teachers expressed a desire for training that would provide a more foundational and accessible approach to article writing. It was agreed upon in the discussions to hold training and mentoring sessions focused on survey research.

This community service activity aims to assist educators at SMP N 2 Banyudono in addressing their challenges, specifically their difficulties in writing scientific articles. The training event was conducted on May 30, 2024, at SMP N 2 Banyudono and was attended by 41 teachers and staff members.

Two approaches were used in the implementation of this community service, namely training and mentoring. In the first activity, which was the training, the teachers received instruction on how to effectively write scientific articles. During the training session, it was evident that the participants, consisting of 41 teachers and staff, were very enthusiastic about the training. They actively asked various questions related to writing scientific articles and expressed the challenges they faced in the writing process.

There was a dynamic two-way dialogue during the training. The teachers were very engaged, considering the training to be highly important and beneficial, as it provided them with the latest information on writing scientific works. Additionally, the training helped refresh their knowledge about aspects related to the writing of scientific articles.

The series of community service activities not only included the training on writing scientific articles. The next activity in this community service initiative was mentoring. During this activity, the training participants were given the opportunity to apply the information and knowledge related to writing scientific articles that they had acquired from the training session. The participants received guidance in writing their scientific articles.



Figure 1. Implementation

Acknowledgement

We would like to express our gratitude to the Directorate of Research and Community Service of Yogyakarta State University for their financial support for the Community Service activities. We also extend our thanks to SMP Negeri 2 Banyudono for being our partner in this initiative.

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THE ROLE OF INTERNATIONAL INTERNSHIPS IN THE DEVELOPMENT OF TECHNICAL SKILLS AND SOFT SKILLS OF INTERNSHIP PROGRAM STUDENTS IN JAPAN: AN EVALUATIVE STUDY

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Abstrac

This study evaluates the role of international internships in Japan in the development of students' technical skills and soft skills. The methodology employed was an evaluative survey, gathering data from students who participated in the internship program. The results indicate a significant positive impact on knowledge enhancement, technical skills (hard skills), and soft skills. Participant satisfaction levels were very high, with the majority of respondents finding the program relevant to their fields of study and reporting satisfactory skill improvements. The program provided new knowledge that was more relevant compared to traditional coursework. Notable improvements were also observed in soft skills, particularly work ethic, responsibility, teamwork, and discipline. Specifically, 43.8% of respondents reported excellent improvements in technical skills, while 56.3% rated their skills as good. Mastery of technology and tools saw improvements, with 50% of participants rating their experience as very good. The ability to apply theory to practice showed substantial development, with 56% of respondents indicating excellent capability. In terms of soft skills, 50% of participants rated their discipline and teamwork as excellent, with 68.8% feeling that the program was very effective in enhancing their work ethic and responsibility. Although there were minor challenges regarding alignment with the academic curriculum and adaptation to Japan's work standards, overall, the internship program was effective in preparing students to meet the demands of the global workforce by developing relevant knowledge and skills.

Keywords: Internship, Technical Skills, Soft Skills, Hard Skills

1. Introduction

The development of globalization and the Industrial Revolution 4.0 has significantly transformed the workforce. Technological advancements such as automation, artificial intelligence, and the Internet of Things (IoT) have created new challenges for workers worldwide (Attaran et al., 2024). Companies no longer require employees solely with technical skills in specific fields but also seek workers who can quickly adapt to technological changes and the constantly evolving dynamics of the industry. The digitalization and transformation of industries have shifted work practices, where cross-country and cross-cultural collaboration has become increasingly common. In this context, cross-cultural communication has become a crucial skill, enabling workers to function effectively in diverse global teams (Chae et al., 2023).

In addition to technical abilities, soft skills such as teamwork, adaptability, and problem-solving in multicultural situations are essential for professional success (García-Pérez et al., 2021). In the global work environment, university graduates are not only challenged with technical tasks but must also be able to communicate and collaborate with colleagues from different cultural, linguistic, and national backgrounds. Thus, intercultural competence and the ability to quickly adapt to dynamic work environments become highly valuable assets (Setti et al., 2022). Graduates who possess both technical skills and soft skills will more easily adapt to international standards and global demands, giving them a competitive edge in the international job market (Ellis et al., 2014).

Today's job market requires a balance between specific technical skills and supporting soft skills. On one hand, companies need individuals with strong technical expertise relevant to their field of work, such as proficiency in using specialized software, understanding industrial processes, or having in-depth knowledge of cutting-edge technologies (Truran, 1998). However, technical expertise alone is not enough. To achieve optimal productivity, companies also expect employees to have strong soft skills,

such as critical thinking, teamwork, and effective conflict management (Mao et al., 2024). These soft skills enable employees to collaborate efficiently with colleagues from various departments and backgrounds, helping them adapt quickly to changes or challenges that arise.

Working abroad offers valuable opportunities for students to hone their interpersonal skills, particularly in the context of cross-cultural communication (Nilsson & Ripmeester, 2016). Being in an international work environment, such as Japan, requires students not only to master the local language but also to understand and adapt to different non-verbal communication nuances. In Japan, communication often occurs in a more subtle and indirect manner, where maintaining honor and politeness in every interaction is highly valued (Pizziconi, 2003). Students must learn how to respond appropriately, read situations carefully, and adjust their tone of speech according to the existing social hierarchy. This strengthens students' ability to navigate cultural differences and build harmonious relationships in international work environments.

Working in multicultural teams enriches students with cross-cultural collaboration experiences, where the perspectives, values, and work habits of each team member may vary greatly (Petrovskaya & Shaposhnikov, 2020). Students are not only required to understand these differences but also to bridge cultural gaps that may arise in communication and collaboration (Collado, 2012). This creates a more positive and productive work dynamic and teaches students how to resolve conflicts that may arise due to cultural or work-style differences (Collado, 2012). These interpersonal and cross-cultural communication skills become crucial in the increasingly integrated global workforce, where cross-country interactions are commonplace.

Internship programs in Japan typically involve strong cooperation between the universities in the students' home countries and Japanese companies. This collaboration creates a strategic bridge between academia and industry, where students can directly learn from leading industries in Japan. This synergy between universities and industries provides students with real-world work experience, which is difficult to acquire solely within academic environments. Through these internship programs, students not only have the opportunity to participate in projects involving cutting-edge technology but are also exposed to real industry challenges, such as technical problem-solving and product innovation.

In addition to technical aspects, this collaboration offers students significant opportunities to expand their professional networks at the international level. Japanese companies involved in these internship programs are often multinational corporations with extensive networks in various countries. Students can take advantage of this opportunity to build connections with professionals from diverse disciplines and backgrounds, which can be highly beneficial for their future careers. These internship programs also often pave the way for students to embark on international careers, with some Japanese companies offering employment or collaboration opportunities after the internship ends. Thus, the program not only supports the development of technical skills and soft skills but also provides students with a valuable entry into the international professional world, which is crucial for their future career success.

Research on the Role of International Internships in Developing Students' Technical Skills and Soft Skills is crucial, considering the increasing competitiveness of the global job market in the era of globalization and the Industrial Revolution 4.0. Today, companies worldwide are not only looking for graduates with strong technical skills but also students who possess soft skills, such as communication, teamwork in multicultural settings, and the ability to adapt quickly to various situations. International internship programs, particularly in developed countries like Japan, provide direct exposure to world-class industrial practices, focusing not only on technical aspects but also shaping students to be more flexible, independent, and innovative in facing global challenges. Furthermore, with the close collaboration between universities and Japanese companies, students gain real-world experience that cannot be fully provided through classroom learning alone. This research will contribute significantly to evaluating the extent to which international internship programs can enhance students' professional readiness and how cross-cultural experiences impact the holistic development of students' competencies in the workforce.

2. Methods

This research employs a quantitative approach with an evaluative study method. The purpose of this approach is to objectively measure the impact of the international internship program in Japan on the development of students' technical skills and soft skills. By using a quantitative approach, the

research findings can be statistically analyzed, producing measurable and structured results regarding the program's influence.

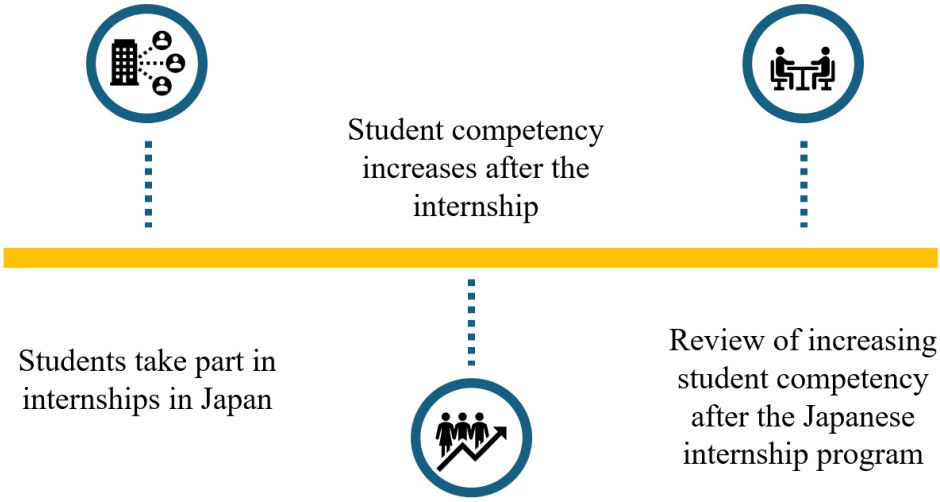


Figure 1. Research Flow

The research design used is an evaluative survey, where data will be collected through a questionnaire containing closed-ended questions using a Likert scale. This questionnaire is designed to evaluate changes in students' technical skills and soft skills before and after participating in the internship program in Japan. With this design, the research can measure students' satisfaction with the program, the relevance of the knowledge gained, and the changes in skills throughout the internship.



Figure 2. Competency Assessment

The population in this study consists of engineering students from universities in Indonesia who have completed an internship program in Japan. The sample was selected using purposive sampling with specific criteria, such as students who have completed a minimum six-month internship and students majoring in mechanical engineering. The sample size for this study is 16 participants, which is deemed representative for the research objectives.

For data collection, a structured questionnaire will be the primary instrument. This questionnaire is designed to measure several key indicators, including: level of knowledge (satisfaction, relevance, and novelty of knowledge), development of professional technical skills (covering technology, applications, and technical procedures), and soft skills related to communication and teamwork. Each item in the questionnaire will be measured using a 5-point Likert scale, where respondents are asked to indicate their level of agreement with the statements provided.

Data will be collected online via a questionnaire distributed to students who have participated in the internship program in Japan. The questionnaire will be disseminated through platforms such as

Google Forms, email, or alumni networks that have participated in the program. Once the data is collected, quantitative analysis will be conducted using descriptive statistics to describe students' perceptions regarding the development of their skills during the internship.

The research procedure begins with data collection by distributing the questionnaire to respondents who meet the criteria. After data is gathered, it will be processed using statistical software such as SPSS or Microsoft Excel. The processed data will then be analyzed using descriptive and inferential statistical methods to evaluate the outcomes of the internship program. Finally, the research findings will be compiled into a report that will serve as recommendations regarding the effectiveness of the international internship program in developing students' technical skills and soft skills.

3. Results and Discussion

Knowledge

International internship programs, particularly in Japan, play a crucial role in enhancing students' knowledge by providing direct access to innovative professional work environments. Students not only have the opportunity to learn about the latest technologies and practices used in the industry but also deepen their understanding of the theories they have studied in their coursework. This experience enriches students' knowledge through practical application and updates their insights with fresher and more relevant technological developments compared to what is taught in the classroom. This aspect of knowledge forms a foundational pillar in preparing students to face the challenges of the global workforce.

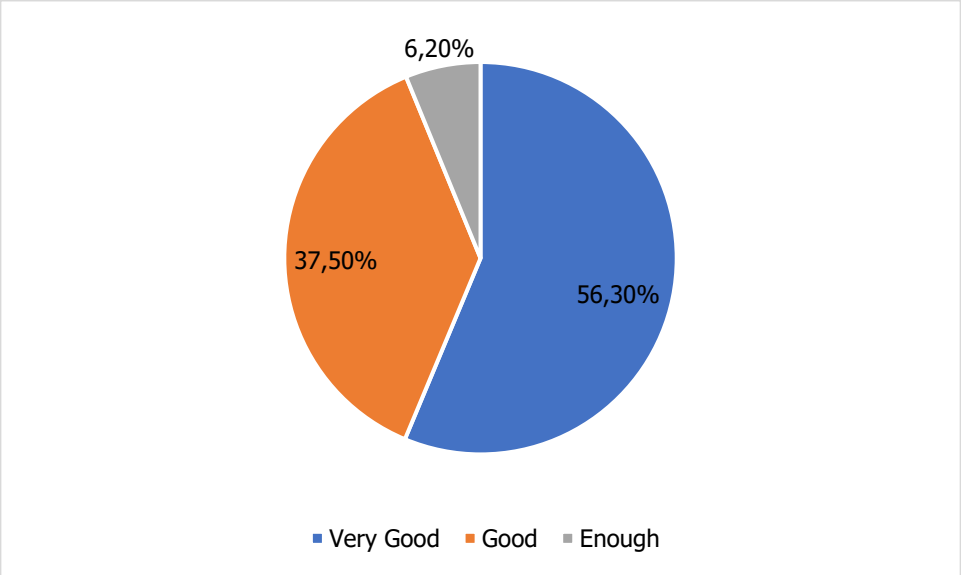


Figure 2. Competency Assessment

The level of understanding of component structure and function after the internship program in Japan is notably improved, with 56.30% of respondents reporting a very strong grasp of the material and 37.50% indicating a solid understanding. This shows that the majority of participants significantly benefited from the program, particularly in terms of gaining in-depth knowledge about how components are structured and function in real-world applications. However, 6.20% of respondents noted that their understanding remained only adequate. Overall, these findings confirm that the internship program in Japan provided valuable insights and enhanced participants' technical understanding of component structure and function.

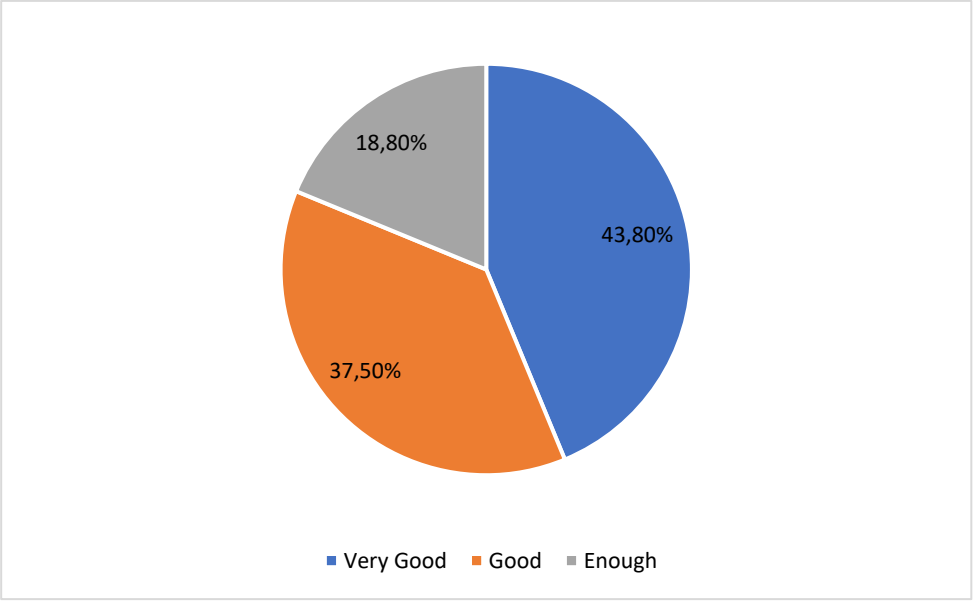


Figure 3. Level of knowledge of work procedures

The relevance of the internship experience in terms of work procedures for students in Japan also showed positive results, with 43.8% of respondents rating their experience as very good and 37.5% rating it as good. This reflects that most students felt the program provided valuable exposure to professional work procedures aligned with their field of study and essential for entering the workforce. However, 18.8% of respondents indicated that the relevance of the work procedures they encountered during the internship was only moderate, suggesting that a small portion of students felt there could be better alignment between the tasks performed and their formal education. This highlights an opportunity to further optimize the integration of work procedures within the internship program and the academic curriculum, ensuring that all students can fully benefit from their internship experience.

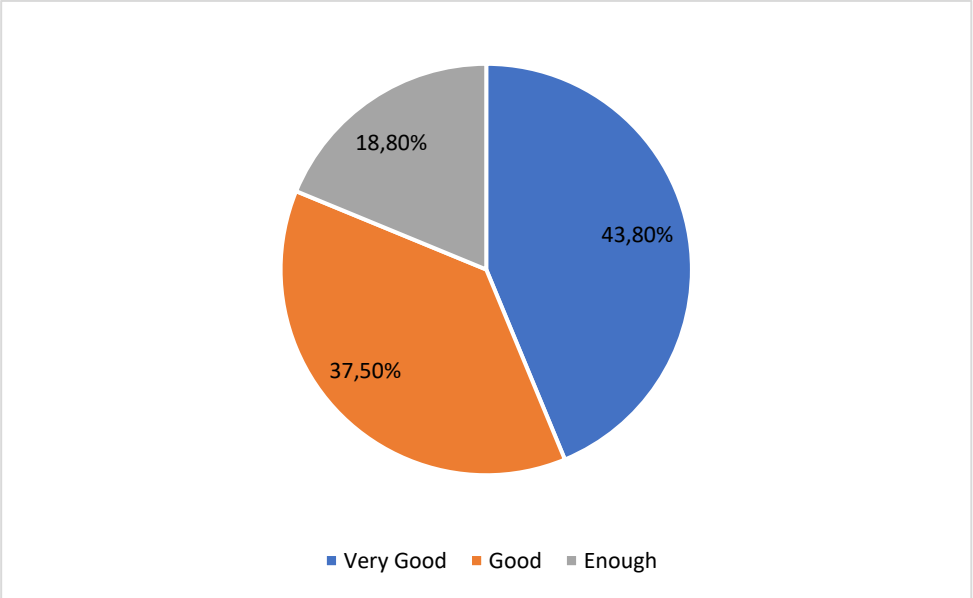


Figure 4. Level of knowledge of tool use

The effectiveness of tool use knowledge gained by students during the internship in Japan was also rated very positively, with 62.5% of respondents rating it as very good and 37.5% rating it as good. This suggests that the majority of students felt that the skills they acquired in using tools during the internship were more advanced and relevant than what they had previously learned in their coursework. The hands-on experience in Japan's high-tech and innovative industrial environment allowed students to apply their theoretical knowledge and gain practical insights into tool operation, which not only

enhanced their technical skills but also broadened their perspectives on industry best practices. However, this improvement in tool use also highlights the need for better integration between academic curricula and practical experiences, so that students can be better prepared to meet the demands of the professional world.

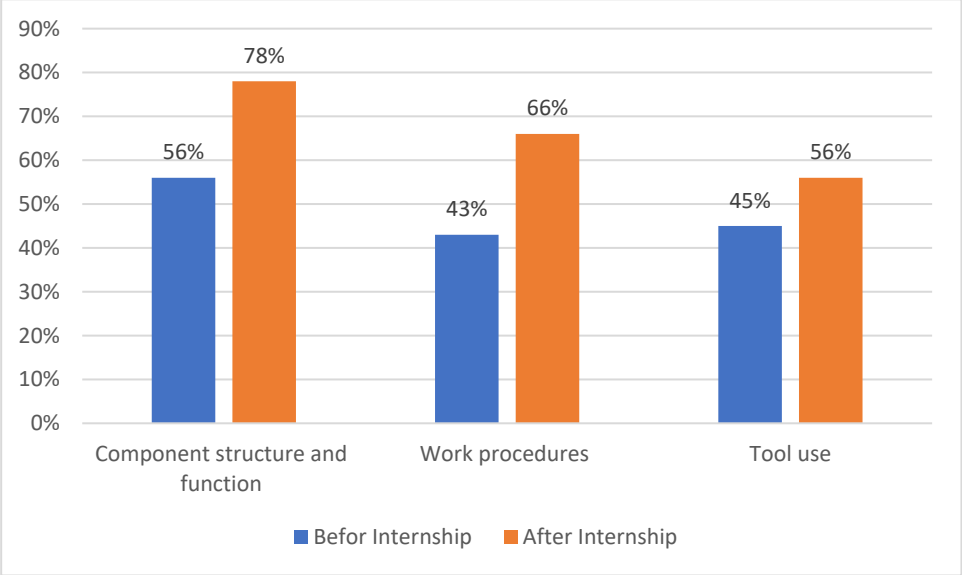


Figure 5. Graph of student knowledge improvement

The Figure illustrates the improvement in knowledge among participants of the internship program in Japan across three key aspects: understanding of component structure and function, work procedures, and tool usage. Before the internship, the understanding of component structure and function was at 56%, which increased to 78% after the internship, reflecting a significant improvement of 22%. Knowledge of work procedures also showed a notable increase, rising from 43% to 66%, with a gain of 23%. In contrast, the increase in tool usage was more modest, moving from 45% to 56%, indicating an improvement of 11%. Overall, the internship experience in Japan has proven to have a positive impact on enhancing participants' technical knowledge, particularly in the areas of component structure and work procedures, although the improvement in tool usage still requires further attention.

a. Soft skills

The international internship program in Japan not only enhances students' technical skills but also plays a crucial role in developing professional attitudes. Students involved in this program are exposed to Japan's disciplined work culture, strong work ethics, and a deep sense of responsibility—key characteristics of the Japanese work environment. They learn to collaborate effectively within multicultural teams, remain committed to their tasks, and embrace professional values such as integrity and discipline. These aspects help prepare students to meet the demands of professionalism in an increasingly competitive global workforce.

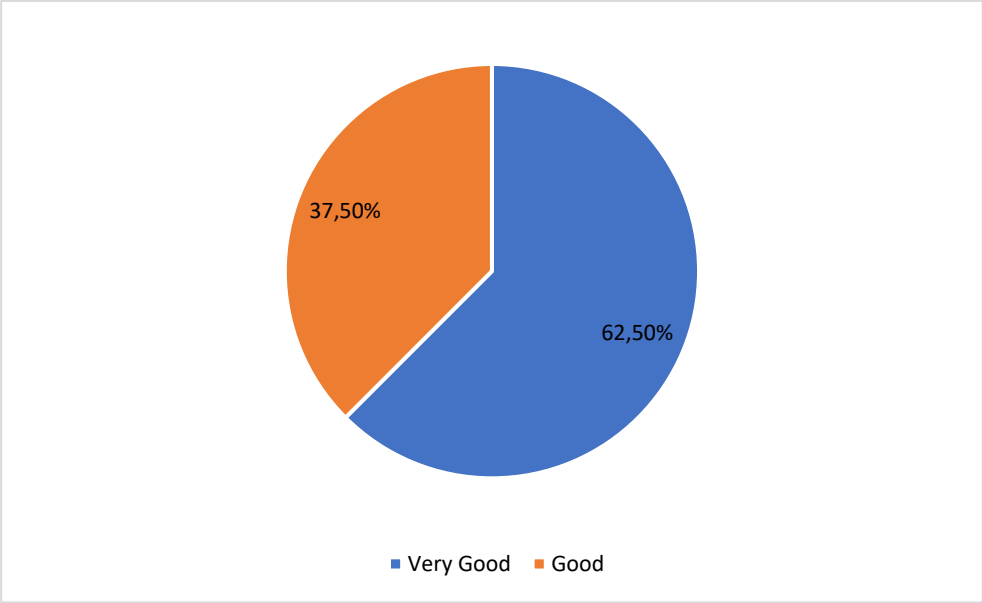


Figure 6. Level of soft skills, ethics and responsibility

Based on the data above, 68.8% of respondents felt that the internship program in Japan was very effective in enhancing students' soft skills, particularly in terms of work ethic and responsibility. This indicates that the majority of internship participants successfully internalized important workplace values, such as discipline, integrity, and commitment to their tasks. Meanwhile, 37.5% of respondents reported that although their soft skills improved, there may still be some areas for further development. Overall, this data reflects that the internship experience in Japan significantly helped participants develop better work ethics and responsibility, which are crucial for their future professional success.

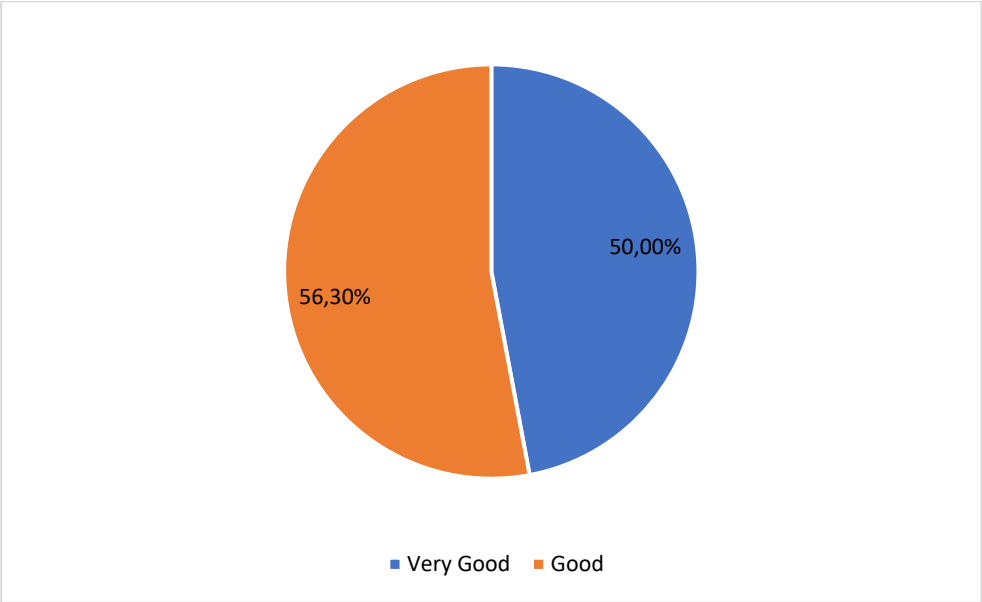


Figure 7. Soft skills level of teamwork

According to the data, 50% of respondents believed that the internship program in Japan was very effective in improving students' soft skills in teamwork, while 56.3% rated this improvement as good. This suggests that most participants experienced a significant increase in their ability to collaborate, particularly in a multicultural work environment. This experience likely strengthened the students' ability to adapt and contribute effectively in teams, by practicing good communication skills, respecting cultural differences, and actively participating in achieving common goals.

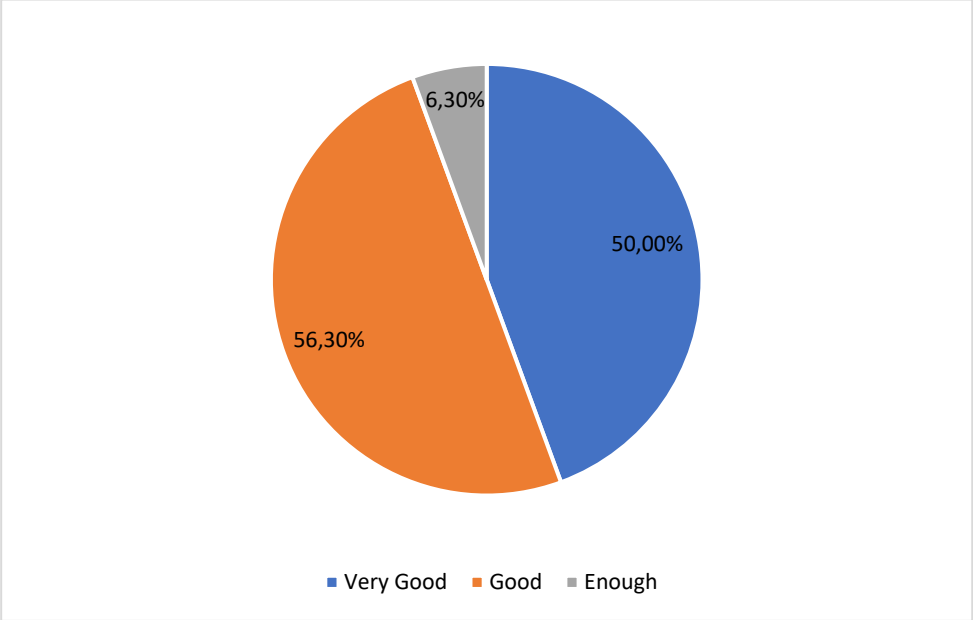


Figure 8. Discipline soft skills level

The data also shows that 50% of respondents felt that the soft skills in discipline gained during the internship in Japan were excellent, while 56.3% rated them as good. This indicates that most students experienced a significant improvement in discipline, a hallmark of the Japanese work culture. The high level of discipline in Japanese workplaces, such as punctuality and commitment to tasks, was reflected in the students' internship experiences. However, 6.3% felt that their discipline had not developed adequately, possibly due to challenges in adjusting to the very high standards of the Japanese work environment.

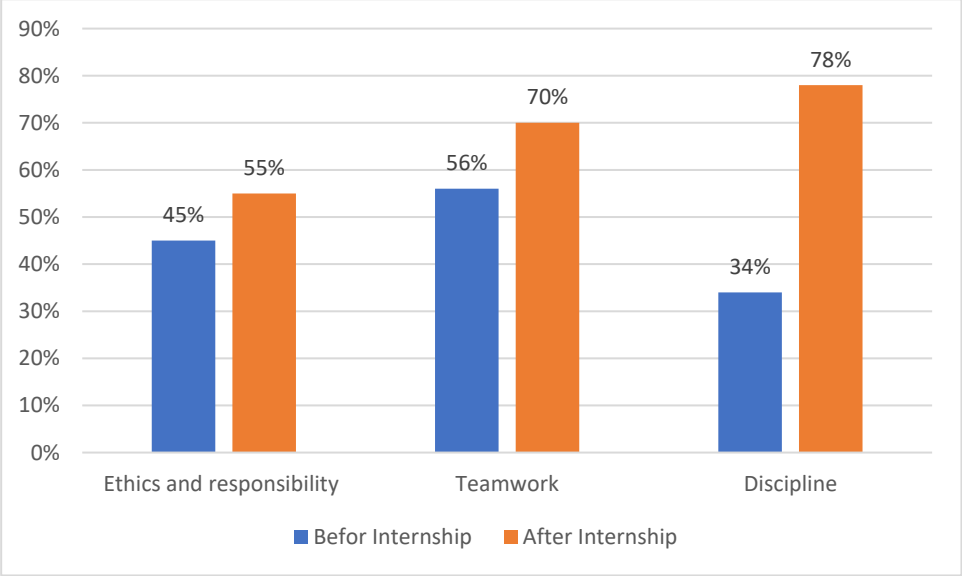


Figure 9. Graph of improvement of students' soft skills

The table above illustrates the improvement in participants' abilities in the areas of ethics and responsibility, teamwork, and discipline. Prior to the internship, understanding of ethics and responsibility was at a level of 45%, which increased to 55% after the internship, indicating a positive although relatively small improvement. A more significant increase was observed in teamwork skills, which rose from 56% to 70%, reflecting a gain of 14%. However, the most remarkable change was seen in discipline, which surged from 34% to 78%, demonstrating a very positive shift and highlighting the

substantial impact of the internship experience. Overall, the internship program not only succeeded in enhancing technical skills but also strengthened participants' values in ethics, teamwork, and discipline.

b. Hard skills

International internships play a crucial role in the development of students' technical skills, especially in rapidly growing industrial sectors. Through internships in Japan, students can deepen their understanding of advanced technologies, the operation of tools, and efficient, high-standard work procedures. Technical skills such as design, analysis, problem-solving, and the application of theory to practice become increasingly relevant in preparing students to face the challenges of the workforce. This hands-on experience equips them with the practical abilities needed to meet the demands of global industries, making them more prepared and competent.

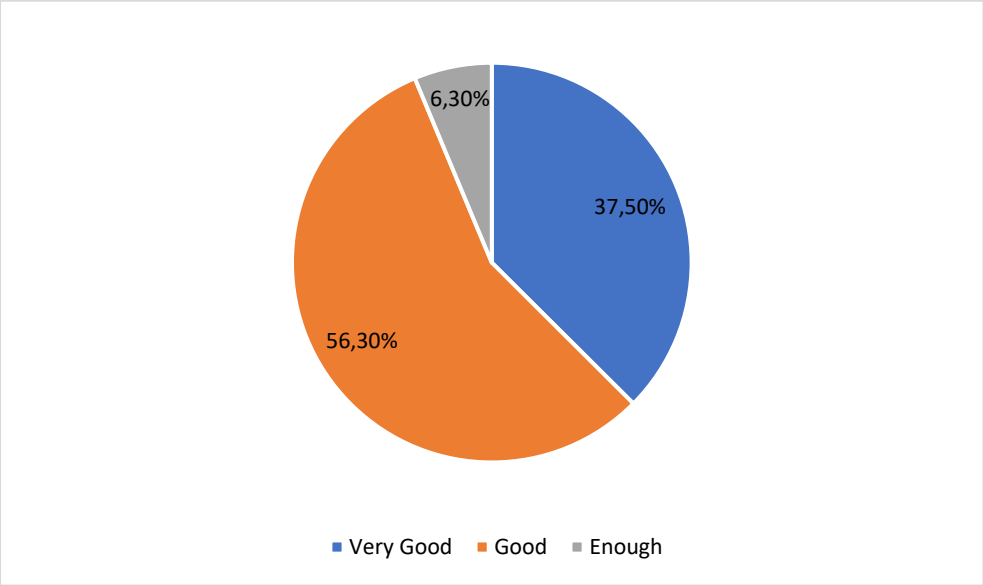


Figure 10. Hard skills level of specific technical skills

Based on the data above, the level of hard skills or specific technical skills acquired after the internship in Japan shows highly positive results. A total of 43.8% of respondents felt that the technical skills they gained were at an excellent level, reflecting that nearly half of the participants experienced significant improvement in mastering skills relevant to their field of study. The majority of respondents, 56.3%, rated their technical skills as good, indicating that most participants felt they benefited positively from the internship, even though not all reached a very high level of expertise. Only 6.3% of respondents rated their skills as adequate, suggesting some challenges or limitations in developing technical skills among a small portion of participants.

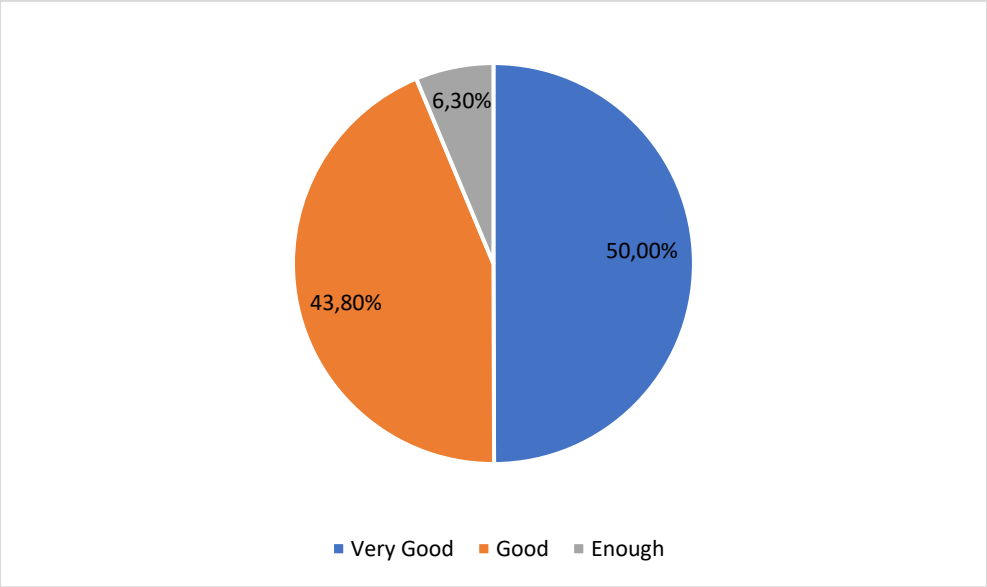


Figure 11. Level of technology and tools

The data also indicates that the level of hard skills related to technology and tool mastery after the internship in Japan was quite high. A total of 50% of respondents felt that their mastery of technology and tools used during the internship was excellent, reflecting that half of the participants experienced a significant increase in technical skills related to the use of industrial technology. Another 43.8% of participants rated their abilities as good, indicating that most participants gained substantial benefits from the experience, although there is still room for improvement. Only 6.3% considered their mastery of technology and tools as adequate, which could be attributed to challenges in adaptation or limited time to fully grasp more complex technologies.

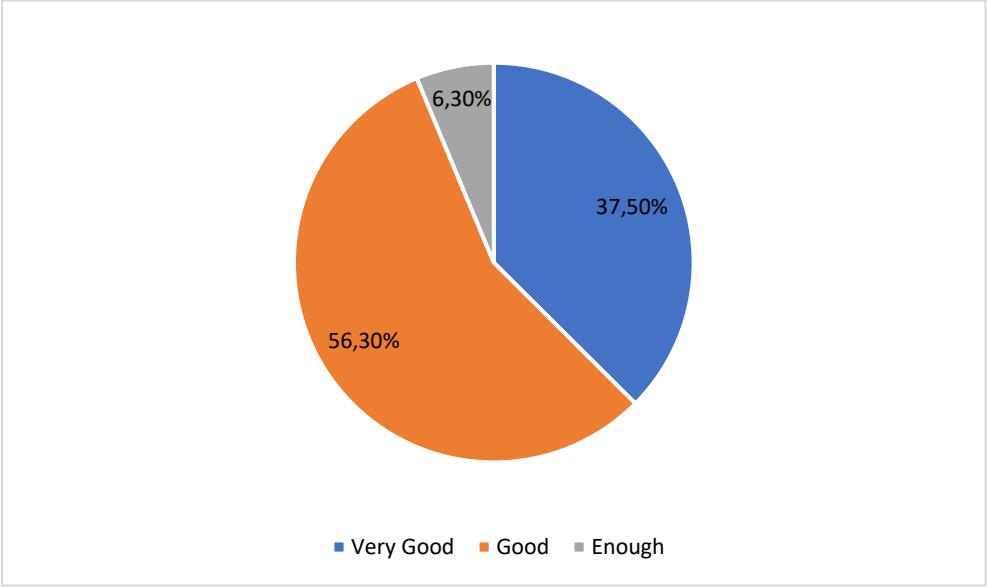


Figure 13. The degree of application of theory to practice

Furthermore, the level of hard skills related to applying theory to practice after the internship in Japan showed very positive results. A total of 56% of respondents rated their ability to apply theoretical knowledge learned in the classroom to practical work as excellent. This indicates that more than half of the participants successfully utilized their theoretical knowledge in real work situations, which is one of the main goals of the internship program. Another 37.5% rated their ability as good, showing that most participants experienced a significant improvement in connecting theory to practice. Meanwhile, only 6.3% rated their ability as adequate, possibly due to differences between the theory learned in university and the practical situations encountered in the workplace.

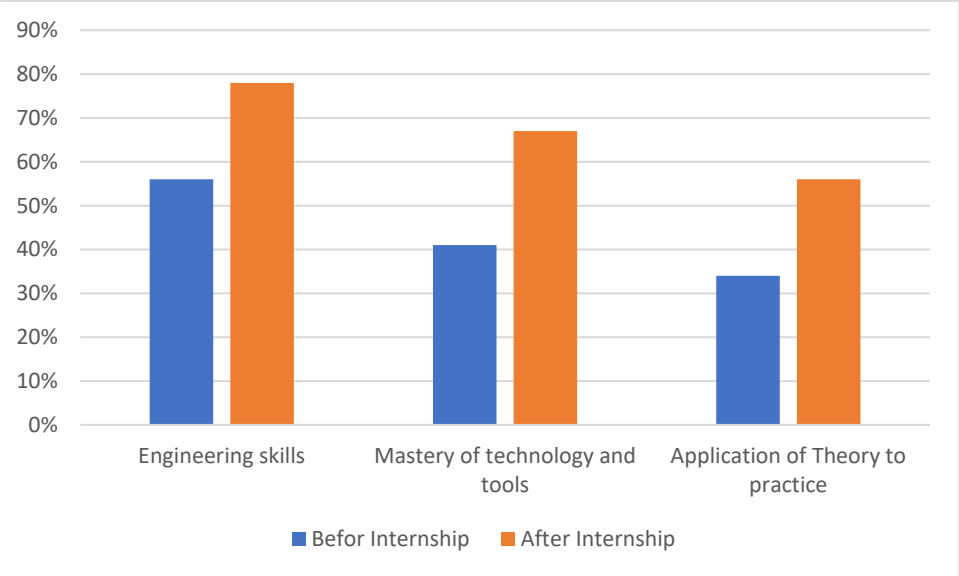


Figure 14. Graph of improvement of Student Hard Skills

4. Conclusion

Berdasarkan hasil penelitian, program magang di Jepang terbukti memberikan dampak positif yang signifikan terhadap pengembangan pengetahuan, sikap profesional, dan keterampilan teknis (hard skills) mahasiswa. Tingkat kepuasan peserta sangat tinggi, dengan mayoritas merasa puas dan sangat puas dengan pengalaman magang mahasiswa. Program ini relevan dengan bidang studi mahasiswa dan memberikan pengetahuan baru yang lebih segar dibandingkan dengan perkuliahan. Selain itu, magang ini berhasil meningkatkan soft skillspeserta, terutama dalam hal etika kerja, tanggung jawab, kerja sama tim, dan disiplin. Pengembangan hard skills, seperti keterampilan teknis spesifik, penguasaan teknologi, serta penerapan teori ke praktik, juga mengalami peningkatan yang signifikan. Namun, masih ada beberapa tantangan kecil yang perlu diperhatikan, seperti relevansi program dengan kurikulum akademik dan adaptasi peserta terhadap standar kerja di Jepang. Secara keseluruhan, program magang ini sangat efektif dalam mempersiapkan mahasiswa untuk dunia kerja global, baik dari segi pengetahuan maupun keterampilan.

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DIGITAL DIDACTICAL DESIGN: SCRATCH-ASSISTED LEARNING OF PROBABILITY MATERIALS IN JUNIOR HIGH SCHOOL

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Abstract

The purpose of this research is to explore students' learning obstacles in learning junior high school probability materials as well as to describe the role of Scratch programming application in the Learning Trajectory of learning junior high school probability materials. The research method used is Didactical Design Research which consists of several main research stages, namely, (1) Didactical situation analysis (exploring learning obstacles and developing HLT); (2) Metapedactical analysis (HLT implementation); and (3) Retrospective analysis, to analyze the learning trajectory process owned by students. The research was conducted on grade VIII students in one of the private junior high schools in Yogyakarta. The research subjects for the learning obstacle exploration were students who had learned the material of probability, namely 27 students of grade IX. While the research subjects for the implementation of didactical design were 31 students of grade VIII. All research subjects came from one of the private junior high schools in Yogyakarta. The results of the study found the existence of student learning obstacles in the material of probability which are divided into 3 types namely ontogenic obstacles, epistemological obstacles, and didactical obstacles. The researcher developed HLT and mathematical task with Scratch for the learning of probability material. The results showed that the use of Scratch programming application can help students understand the concept of probability. Leaning trajectory generated in accordance with the results of restrospective analysis showed several stages of learning, namely, (1) Situational; (2) Referential; (3) General; and (4) Formal.

Keywords: digital didactic, probability, learning obstacle, learning trajectory, scratch.

1. Introduction

Probability is a mathematical concept related to uncertainty [1] [2]. This concept is not only important in math subjects, but also in everyday life [3] The concept of probability is often used to make the right choice, predict something, or minimize failure [4]. Understanding the concept of probability itself provides various benefits for students. Knowledge of uncertainty or probability can empower students to make wise decisions when facing various situations [5]. A good understanding of probability also helps one to understand the risks and possible benefits of an action and also ensures fairness in everyday life [6]. Given the importance of probability, many countries place probability as part of the mathematics school curriculum including in Indonesia [7], [8].

In Indonesia, probability material begins to be taught at the junior high school level. The expected learning outcomes related to the concept of probability at the junior high school level are that students can understand probability material and the relative frequency of one event applied to a simple experiment. However, in reality, teaching probability material is not easy[9], [10]. This is supported by several studies which found that learning mathematics, especially probability, still has many problems[8], [11], [12], [13]. These problems arise due to several reasons. One of the causes is the limited activities with real contexts in mathematics learning that can help construct students' knowledge related to probability materials [14], [15], [16]. This is not in accordance with the characteristics of probability material where probability material is material that is often encountered in everyday life [5] and should be taught using experiments in learning [7], [17].

To help students understand the concept of probability and minimize student learning barriers, there are several studies related to learning probability materials that have been conducted. [18] has developed a learning trajectory using the context of a picture clapping game to help reduce students' learning barriers in probability material. In addition, [19] has also designed HLT using a snakes and ladders game video which is expected to help students understand probability material.

Unlike the previous studies, this research will use the help of a simple programming application, Scratch, to help students understand the concept of probability. Scratch is a simple programming

application that is easy for students to use to create stories, games, and even math calculators. The Scratch programming application was chosen because integrating programming in athematics learning can improve students' motivation, learning outcomes, and problem-solving skills[20]. [21] also suggests that programming can be a bridge between formal mathematics and the real world, for example in learning probability students can conduct unlimited repeated experiments using programming applications. In addition, the use of Scratch in learning mathematics has been proven to help students improve their understanding of the mathematical concepts learned[22], [23], [24].

Based on the explanation above, the main objective in this study is to produce a digital didactical design based on students' learning obstacles in grade VIII probability material assisted by Scratch. The research questions in this study are:

1. What are the learning obstacles experienced by students in learning probability material in class VIII?

2. What is the role of Scratch programming application in learning junior high school probability material?

2. Method

Researh design

This research is a qualitative research, using Didactical Design Research (DDR) research design, where this research aims to obtain a didactical design that can overcome learning obstacles in learning probability material in class VIII. Didactical design research has a foundation in two paradigms, namely the interpretive paradigm and the critical paradigm[25]. The interpretative paradigm contains a study of reality phenomena related to the impact of didactic design on a person's way of thinking. The critical paradigm has the main objective of implementing changes to the existing didactical design[25]. The new didactical design will be developed as a step in improving the learning stages so that it can minimize the learning obstacles faced by students, especially in the material of probability in class VIII.

Research Procedure

The research procedure consists of three stages, namely didactical situation analysis, metapedactic analysis, and retrospective analysis. The didactical situation analysis stage begins with the process of extracting information on learning obstacles (prospective analysis). This data mining was conducted to find the students' learning obstacles on probability material from the perceptions of students and teachers, which later became a reference for developing a hypothetical learning trajectory (HLT). After that, the researcher developed HLT based on the learning obstacles found and learning tools in the form of mathematical tasks containing mathematical activities on probability materials with the help of Scratch programming application.

After the HLT had been prepared, the researcher conducted the implementation process of the HLT and learning tools that had been prepared. The implementation was carried out in 4 meetings, with the researcher herself as a teacher in the classroom. After the learning process was completed, the researcher used restrospective analysis with a phenomenological approach to describe the learning trajectory that occurred during the implementation process.

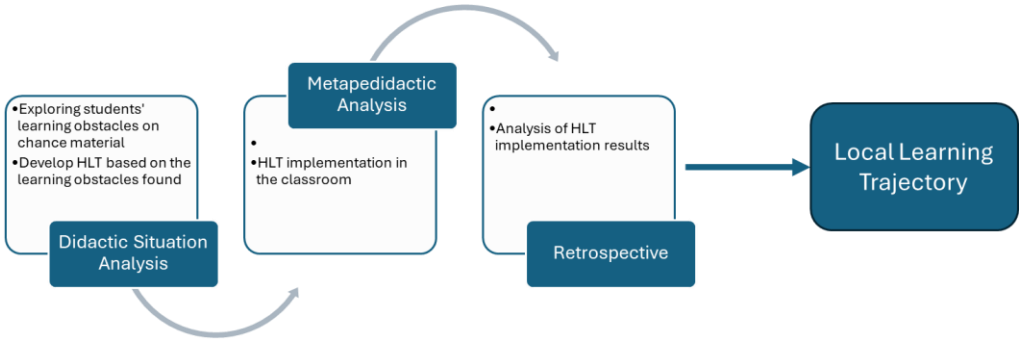


Figure 1. Research Procedure

Research Subject

The research subjects in this study were divided into two groups, namely the exploration of learning obstacles and the implementation of didactical designs that have been designed. The research subjects in the excavation of learning obstacles are students who have learned the material of probability, namely 27 students of class IX. While the research subjects for the implementation of didactical design were 31 students of grade VIII. All research subjects came from one of the private junior high schools in Yogyakarta.

Data Collection Instrument

a. Didactic situation analysis

The didactic situation analysis stage begins with the process of extracting information about learning obstacles (prospective analysis). To explore data related to learning obstacles, researchers used 3 instruments, namely: (1) in-depth interview guidelines to teachers and students, (2) learning observation sheets, and (3) counting skill test questions. The data collection process was conducted sequentially. First of all, the researcher conducted an interview with the teacher. The interview process was conducted face-to-face to obtain more accurate information from the research subject. The main focus in this interview is information about what learning barriers students have, especially in the material of probability. After the interview process was completed, the researcher conducted classroom observations to confirm the results of the interviews that had been conducted previously. Researchers used 2 observers in the classroom where each focused on teacher and student activities during the learning process. Finally, the researcher gave test questions to students followed by in-depth interviews with students to see the learning obstacles experienced by students on the material of probability. After the researcher obtained information related to student learning barriers, then the researcher compiled a hypothetical learning trajectory (HLT) and mathematical activities (mathematical tasks). The preparation of HLT and mathematical activities refers to the learning barriers that have been found.

b. Metapedidactic analysis

In this stage, the researcher implemented the mathematical didactical design along with the HLT that had been made in learning probability in class VIII. The instruments used in this stage were HLT and mathematical tasks that had been prepared based on the learning obstacles found.

c. Retrospective analysis

For restrospective analysis, researchers used video recording instruments and observation sheets to record the learning process that occurred in the classroom. The observation process was carried out during the learning of probability material. This analysis was conducted to develop a revised didactical design after implementation.

Data

To maintain data validity, researchers used data triangulation methods, namely collecting video recordings of research activities and student worksheets[26]. The data collected in the form of photos and video recordings of activities, student worksheets, and important notes from researchers and teachers. The combination of all these data collection results was used to check the validity of the researcher's interpretation. The mathematical didactical design and HLT that had been designed also supported the validity of the research, because the didactical design and HLT that were prepared became guidelines in conducting research and references in answering research questions.

3. Results and Discussion

Learning obstacle analysis

The first stage in designing a didactical design for learning junior high school probability materials with Scratch is to analyze learning barriers. These barriers are the result of analysis through teacher interviews, learning observations, and tests on probability material given to students followed by

interviews with students. Learning barriers experienced by students can be identified in 3 types of barriers presented in Table 1.

Table 1. Identification of Learning Obstacle Findings for Junior High Probability Materials

No	Types of Obstacle	Findings
1	*Ontogenic Obstacle*	Probability material is material that is considered difficult by students
		Lack of student interest in mathematics
		Limited understanding of the concept of sample space causes obstacles to the concept of theoretical odds
		Prior knowledge related to theoretical probability is strongly embedded, causing obstacles to the concept of expected frequency
2	*Epistemological Obstacle*	Students' limited understanding and mastery of probability material
		The context used in probability material is less varied
3	*Didactical Obstacle*	Lack of appropriate learning strategies used by teachers in teaching probability material
		Limited teaching materials and media used by teachers in teaching probability material

The results of the learning obstacle analysis were used as the basis for developing the hypothetical learning trajectory and mathematical task. The following is the Hypothetical Learning Trajectory(HLT) and mathematical task that was developed based on the learning obstacle analysis found.

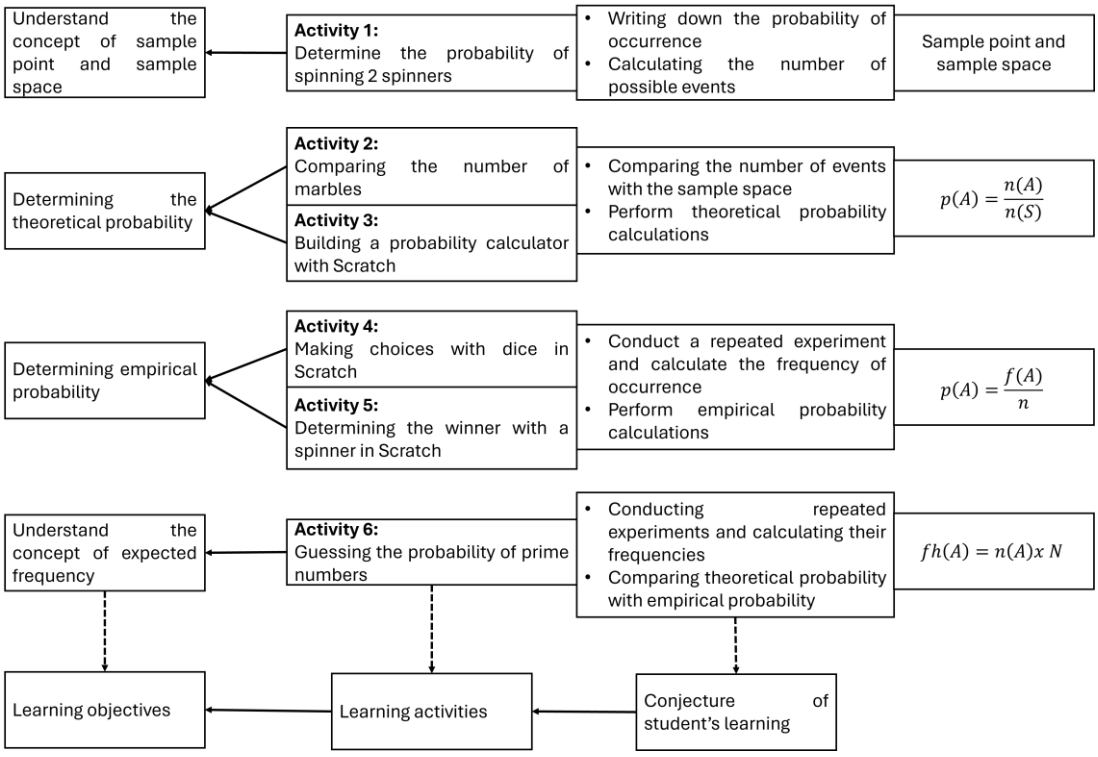


Figure 2. HLT for Junior High Probability Learning

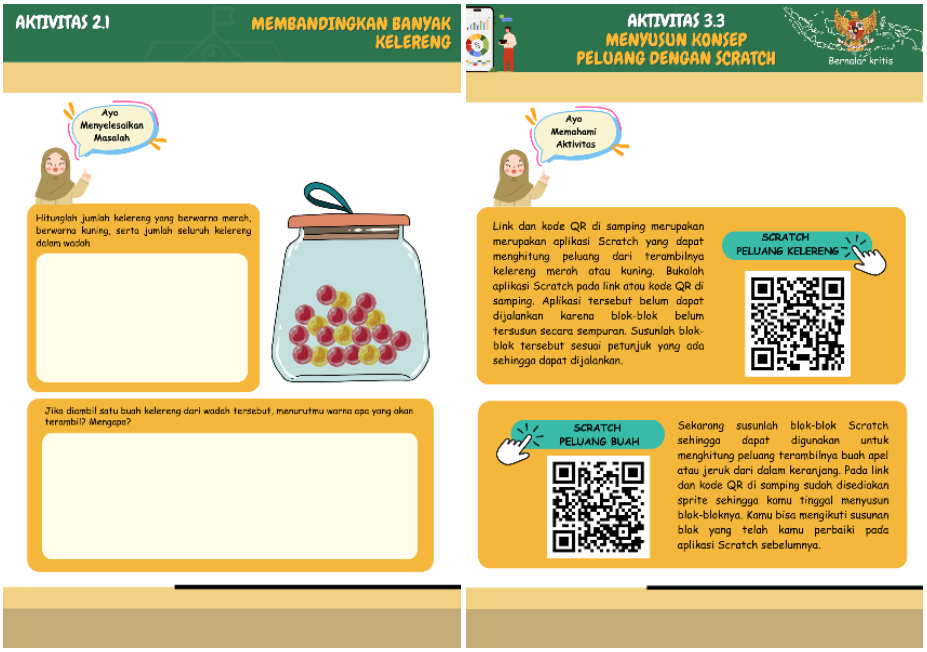


Figure 3. Mathematical Task for Probability Learning

To reduce the learning obstacles found, the activities in the HLT designed use 3 different contexts namely spinners, marbles, and dice as well as the Scratch programming application to help students find the concept of probability. The learning will be conducted in 4 meetings, where each meeting will study a different subject. The HLT and mathematical tasks that have been developed were then implemented on 31 students of class VIII in one of the private junior high schools in Yogyakarta.

Meeting 1: Sample point and sample space

In the first meeting, the context used was spinners, where students were asked to write down the possibilities that occur if there are two spinners that are rotated simultaneously. The purpose of this activity is for students to understand the concepts of sample point and sample space. Figure 4 shows an example of a student's answer in determining the probability of spinning two spinners.

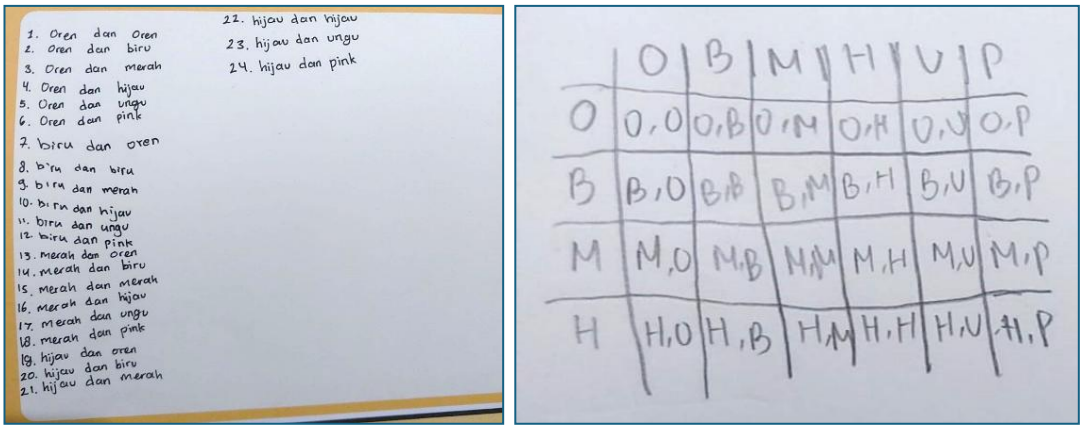


Figure 4. Example of student answers on 2 spinner

Figure 4 shows the results of students' answers when asked to write down all the possibilities that occur when there are two spinners rotated together. From the figure, it can be seen that there are 2 ways used by students to write down the possibilities of spinner rotation, namely by listing and table method. The list method is the informal method used by most students. Students will write down one by one the color pairs that might appear. The method used by students is in the referential level [27].

From Figure 4, it can also be seen that there are students who use the table method to write down the possibility of spinning the spinner. The table method is a more effective and efficient way because it reduces the risk of losing writing members of the sample space. The table method is at the general level, where this method is a potential tool to guide students towards formal mathematics [7].

However, both listing and table methods are inefficient if the sample space is large. Therefore, it is necessary to have a vertical mathematization process to determine the number of members of the sample space, for example by counting techniques. In this spinner context, students are given a picture of 3 spinners and asked to determine the number of possibilities if the three spinners are rotated. The rotation of the three spinners makes students have to leave the way of listing and tables in determining the number of members of the sample space. The results of student work can be seen in Figure 5.

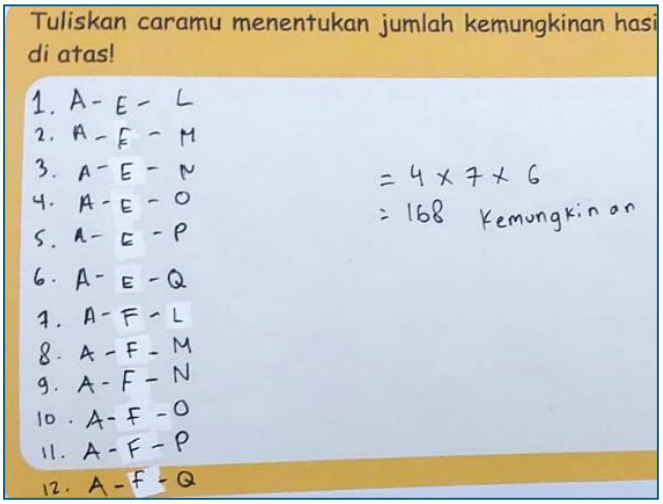


Figure 5. Example of students' answers to the 3 spinners

From Figure 4 on the left, it can be seen that at first the student tried to use the method of registering as in the previous problem. However, students find it difficult because there are too many possibilities that occur. Furthermore, by connecting the number of colors in each spinner with the number of possibilities that occurred in the previous problem, students found a way to determine the number of members of the sample space from spinning 3 spinners without having to register or make a table. Spinner 1 has 4 colors, spinner 2 has 6 colors, and spinner 3 has 7 colors which are then written in the following formula

Banyak anggota ruang sampel = 4x6x7=128

From these activities, it can be seen that although at first students used informal methods in determining the number of members of the sample space, these methods can help students find formal mathematical ways to calculate the number of members of the sample space. This is in line with [28] which found that informal ways used by students can be gradually developed into formal mathematics.

Meeting 2: Theoretical Probability

In the second meeting, students were given a problem using the context of marbles. The purpose of the activity at this second meeting is that students can calculate theoretical probbility. In addition to providing visualization on the mathematical task, the teacher also provides props in the form of marbles that match the problem presented, which is also a situational stage given to students.

In this activity, at first students were asked to guess the marbles that were taken. Most students guessed the red marbles that would be taken because the red marbles had a larger number. In guessing these marbles, students still used non-formal ways according to the results of their respective thoughts. To further direct students to formal mathematics, students are asked to determine the probabilitys of taking marbles of each color. The results of student work can be seen in Figure 6.

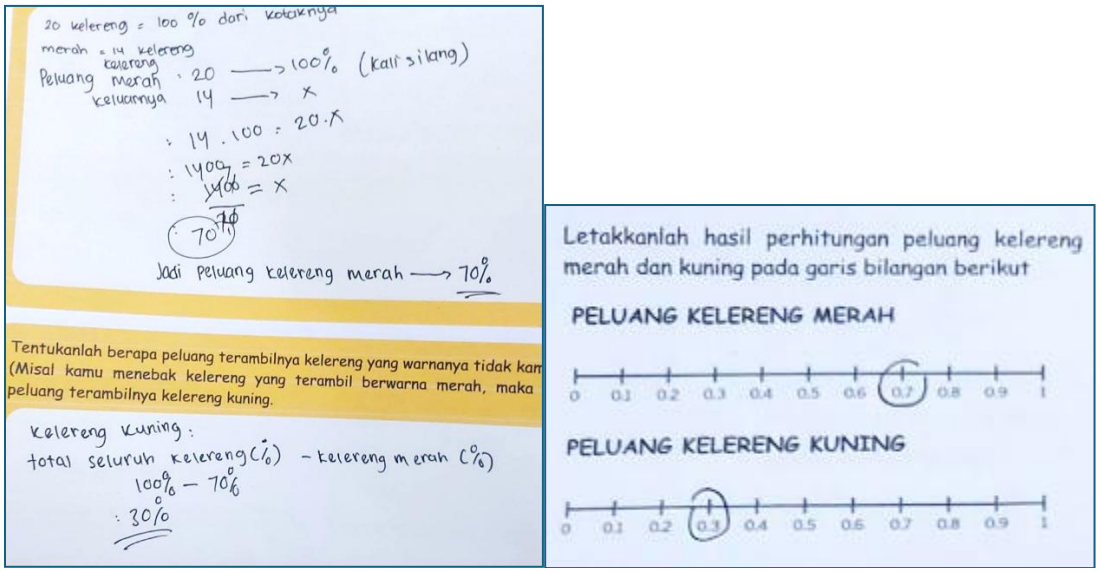


Figure 6. Students' answers in determining the probability of a marble being picked up

From Figure 6, it can be seen that to determine the probability of taking the marbles, despite not knowing the formula for calculating the theoretical probability, students use formal mathematics by utilizing the knowledge they have learned, namely the concept of percentage. Meanwhile, in determining the probability of taking the yellow marbles, students do not use the same method as determining the taking of the red marbles, but use the formula

Peluang kelereng kuning=total seluruh kelereng (%) – total kelereng merah (%)

= 100% - 70%

=30%

Conceptually, the formula used by students is a formula for calculating the probability of complement, namely by subtracting the overall probability with the probability of the known event. Based on the results of interviews with students, the way students get to determine the probabilitys of taking red and yellow marbles is because students see the visualization of marbles provided by the teacher so that it is easier to do the calculations. The use of visualization and real context can make it easier for students to understand a mathematical concept where the use of real context and visualization can improve student understanding and minimize student learning barriers[29], [30], [31].

The next activity in meeting two is that students are asked to compile programming blocks in Scratch which contain formulas for calculating theoretical probability. Students construct the blocks in two stages. First, a file is provided that contains blocks that have been arranged but not perfect, students are asked to complete the blocks so that programming can run. Second, students are asked to compile programming like the first file but with a different context. The following are the results of the students' Scratch blocks.

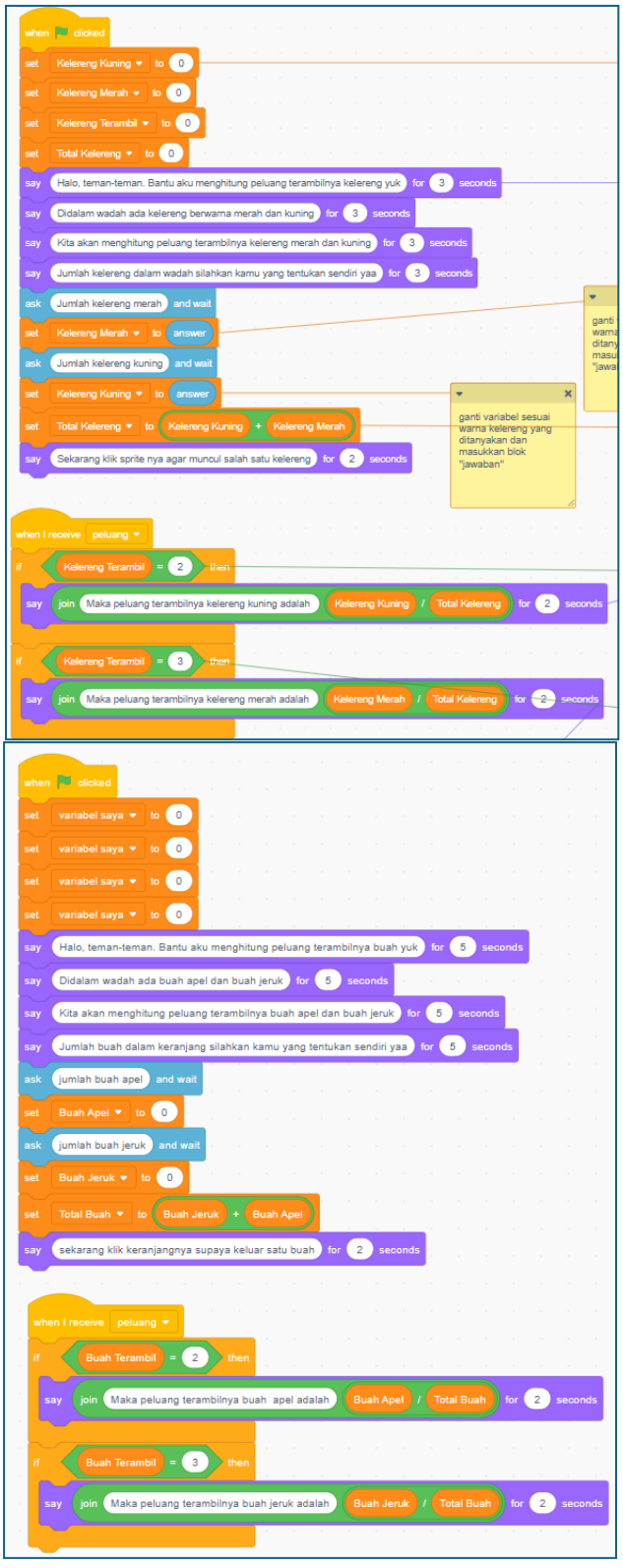


Figure 7. Results of student Scratch arrays

From the results of students' block arrangement in Figure 7, it can be seen that students can arrange programming blocks by applying the theoretical probability formula well. This shows that by arranging programming, students can better understand and apply the concept of probability they have learned. This is in line with the research of [23] which shows that students who implement the concept of probability in designing Scratch programming can improve their understanding of the concepts used.

Meeting 3: Empirical Probability

In the third meeting, there were 2 activities that students did. The first activity is to determine the choice with dice, where students will roll the dice using the Scratch application and determine the choice based on the results of rolling the dice. The second activity is to determine the winner with a spinner, where students will spin the spinner using the Scratch application and determine the winner based on the results of spinning the spinner. The purpose of these two activities is to provide experience to students to find the concept of empirical probability. The following is an example of the results of spinning the spinner on Scratch and the results of student answers.

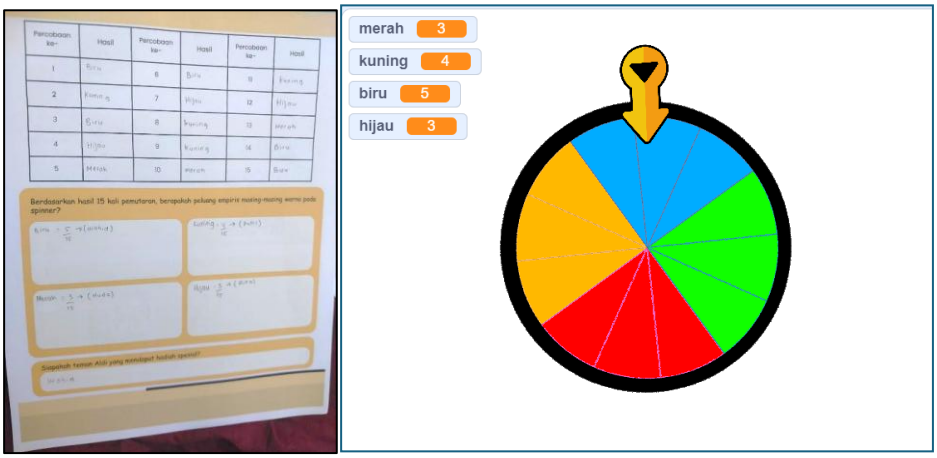


Figure 8. Spinner results and student answers

From Figure 8, it can be seen that after students conduct an experiment with Scratch, students determine the empirical probability by comparing the number of times the color appears with the number of trials conducted. Conceptually, these students have understood that to calculate the empirical odds is to compare the number of events with the number of trials.

To further strengthen the concept that empirical probability are probability based on experimental results, after getting their respective answers, students were asked to compare their answers with their friends' answers. From the results of the comparison, students found that the answers obtained by each student would vary depending on the results of the experiment. This emphasizes to students that empirical probability will depend on the results of the experiments carried out.

From the results of the implementation of the third meeting, it can be concluded that experiments using the Scratch application conducted by students can help students to better understand the concept of odds, especially empirical odds. This is in line with the results of research by[24] which shows that students better understand mathematical material after conducting experiments with Scratch. This is because the use of programming applications can be a bridge between formal mathematics and the real world[21].

Meeting 4: Expected Frequency

The activity at this meeting begins with students being asked to guess how many times a prime number appears on several throws of the dice. Furthermore, students are asked to prove the results of their guesses by rolling the dice using the Scratch application 5, 20, 50, and 100 times and writing down the results.

Based on the results of the roll, students are asked to compare the theoretical probability of the appearance of prime dice numbers with the empirical probability based on the results of their experiment. The purpose of this activity is to introduce students to the concept of expected frequency, where there is a relationship between the theoretical probability and the number of trials conducted. The following are the results of students' answers to the meeting 4 activity.

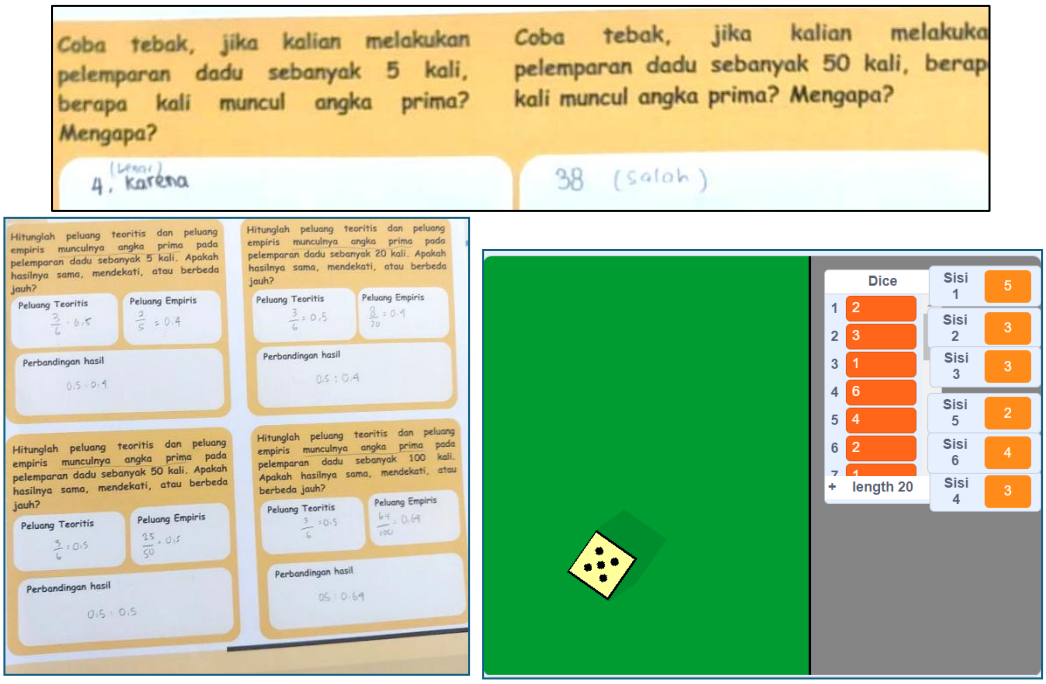


Figure 9. Students' answers to the meeting 4 activity

From the students' answers in Figure 9, it can be seen that the students initially guessed that the prime number would appear 4 times in 5 trials and 38 times in 50 trials. This guess is not based on any reason. This shows that students answer in a non-formal way according to what students think.

Furthermore, students were asked to throw the dice using the Scratch application 5, 20, 50 and 100 times. The use of this Scratch application for dice throwing makes it easier for students to conduct repeated experiments, in line with [21] opinion that experiments using programming applications are more effective and have an unlimited number compared to manual experiments. The results of rolling the dice are written in the table provided.

Based on the results, students are asked to calculate the theoretical probability and empirical probability of prime numbers appearing and compare them. This is so that students can find the relationship between the theoretical probability and the experiment conducted. From Figure 8, it can be seen that the theoretical probability of prime numbers appearing in each experiment is always the same, which is ½ or 0.5. Meanwhile, the empirical probability value is different. But even though it is different, from the comparison results it can be seen that the value tends to be close or even the same as the theoretical probability value.

From the results of this comparison, students understand that there is a relationship between the theoretical odds and empirical odds so that it is easier for students to understand the concept of expected frequency. This can be seen in Figure 10, where when students are asked to guess the appearance of prime numbers in 1000 trials, students answer using formal math steps. This is in line with the opinion of [32] which states that students find it easier to understand new concepts if students can relate them to concepts they have previously learned.

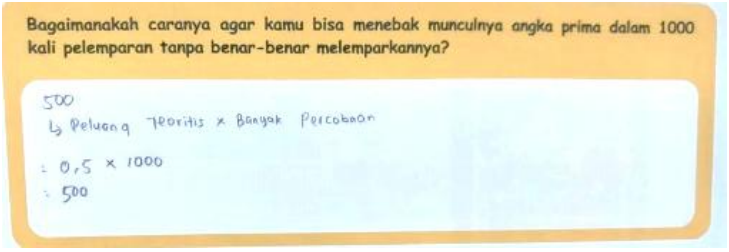


Figure 10. Students' guessed results after learning the concept of expected frequency

Learning Trajectory for Scratch-assisted Probability Materials

Referring to the implementation results that have been presented, the description of students' learning trajectory can be described in several stages, namely the situational stage, referential stage, general stage, and formal stage. Students' learning trajectory in Scratch-assisted probability learning from the situational to the formal stage can be seen in Figure 11.

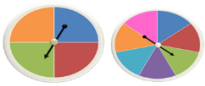
Probability Concept in Junior High School				
Formal	Multiplication Rule	$p(A) = \frac{n(A)}{n(S)}$	$p(A) = \frac{n(A)}{n(S)}$	$fh(A) = p(A)xN$
General	Determining many members of a sample space using tables and tree diagrams	Comparing the number of marbles and putting the results on a number line	Determining the largest number of events	Understanding the relationship between theoretical and empirical probability
Referential	Determining many members of a sample space by listing	Guessing the retrieval of marbles	Writing down the results of spinning a spinner and rolling a die with Scratch	Writing down the results of repeatedly rolling a die with Scratch
Situasional			Problems related to making choices based on the results of spinning the spinner	Guessing the occurrence of prime numbers in repeated trials

Figure 11. Learning Trajectory of Scratch-assisted probability learning

Based on Figure 11, the learning trajectory of Scratch-assisted probability material learning consists of 4 stages, namely (1) Situational Stage. At this stage students understand the various problems presented in the mathematical task; (2) Referential Stage. At this stage students solve problems using non-formal methods such as listing to determine the number of members of the sample space or using mathematical aids to find concepts; (3) Practical Stage. At this stage students do LEGO building activities for learning multiplication and sticker activities for learning division; (4) General Stage. At this stage students use mathematical notations to complete the task; and finally (5) Formal Stage where students find formal mathematical concepts in junior high school probability material.

4. Conclusion

Based on the results of the research that has been conducted, it is found that there are learning obstacles experienced by students in the probability materials. The results also found that learning using Scratch application can help students understand the concept of probability to reduce the learning barriers that occur in students. Scratch application is used as a tool in conducting experiments to find the concept of . Scratch application is also used by students to develop programming to implement the concept of probability that they have learned.

Based on the conclusions obtained, some suggestions that researchers give, namely: (1) Scratch-assisted learning trajectory research helps students to understand the concept of probability in junior high school so that similar research can be done to help students understand other mathematical concepts; and (2) lesson planning that considers the expected student responses is highly recommended to be done by teachers so that the expected learning objectives can be achieved more optimally.

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UTILIZATION OF MULTIMODAL TEXTS IN SUPPORTING MULTIPLE INTELLIGENCES IN PRIMARY SCHOOLS

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Abstract

This research aims to analyze how multimodal texts can support the development of multiple intelligences owned by each student. This research uses a qualitative approach with content analysis method to explore the elements of written, visual, audio, and audiovisual texts used in learning. The results show that the use of multimodal text elements significantly supports multiple intelligences. Through the integration of multimodal texts, the learning process becomes more varied and interactive, so students can engage according to their potential and preferences. Students who are predisposed to a particular intelligence can utilize the appropriate elements to understand the material more effectively. The multimodal text approach provides more flexible and inclusive access to learning, allowing each individual to optimally develop their potential.

Keywords: multimodal text, multiple intelligences, elementary school

1. Introduction

Curriculum changes bring significant changes in efforts to improve the quality of education, because the curriculum must always be adjusted to the development of science, technology (IPTEK), and the diverse needs of students. Indonesia is currently implementing the Merdeka Curriculum, which provides more flexibility to teachers and students [1]. This curriculum is designed to reduce the pressure of a rigid system and focus more on developing individual competencies and potential. The aim is to create an inclusive and contextualized learning environment, allowing students to learn according to their interests, abilities and needs [2];[3]. With an emphasis on active and meaningful learning experiences, this curriculum is expected to encourage students to think critically, creatively and independently in facing global challenges.

One important component of the Merdeka Curriculum is differentiated learning, which allows teachers to adapt learning methods and materials to the needs and abilities of individual students. Through these strategies, such as grouping by level of understanding or assigning tasks tailored to the dominant intelligence, students are expected to be more active and motivated [4]. This approach not only supports students with different ways and speeds of learning, but also develops their social and emotional skills, creating an inclusive learning environment for all [5].

Differentiated learning also accommodates multiple intelligences, as proposed by Howard Gardner. Each student has unique strengths and ways of learning, so teachers need to design activities that match students' dominant intelligences [6]. This creates more personalized and relevant learning, which in turn increases students' motivation and potential development. In Indonesian language learning, this approach is very relevant, because each student has a different way of understanding and using language, so it is important for teachers to create an environment that supports their development [7].

Multimodal texts, which combine text, images, audio, video and graphics, are very effective in conveying information in a more engaging way [8]. The use of multimodal texts can create a richer learning experience and allow students to understand the material in a way that suits their preferences. This approach also supports multiple intelligences, as students with diverse strengths can be more actively involved in learning, as well as improve their cognitive and creative skills [9].

The importance of multimodal texts in supporting multiple intelligences is significant in modern education [10]. By presenting information through various modes, multimodal texts can meet the needs of students with different learning styles, stimulate emotional engagement, and increase their motivation to learn [11]. In a learning environment that supports multiple intelligences, multimodal texts not only aid the delivery of material, but also encourage creativity, critical thinking and collaboration, which are essential to prepare students for future challenges.

This research aims to describe the utilization of multimodal text in supporting students' multiple intelligences. The multimodal text content contained in the Indonesian language learning e-module will be studied to find out its relationship in supporting multiple intelligences.

2. Method

This research uses a qualitative approach with the content analysis method to understand, analyze, and interpret the content of communication in the multimodal text of the e-module for grade V Indonesian language learning [12];[13]. The main objective is to describe how the multimodal text supports students' multiple intelligences.

The study material of this research is multimodal text in e-modules, and the instrument used is documentation to study related literature [14]. The data analysis technique involved systematic coding to identify themes and patterns in the documentation. The analysis aims to explain the relationship between text elements, such as images, video and audio, and the development of students' multiple intelligences, and show how multimodal text can create a more diverse learning experience and support student motivation and engagement.

3. Results and Discussion

Multimodal Text

In learning, multimodal text that combines written text, images, video and audio plays an important role in supporting the development of students' multiple intelligences [15];[16];[17]. The documentation aims to examine the contribution of each multimodal text element in the fifth grade Indonesian e-module to the development of students' multiple intelligences. Through this analysis, we can understand how students' interactions with multimodal texts support multiple intelligences, as well as create richer and more diverse learning experiences.

Table 1. Multimodal Text

Multimodal Text	Frequency	Percentage
Written Text	24	47%
Audio Visual Text	14	28,4%
Visual Text	8	15,6%
Audio Text	5	9%
Total	51	100%

Table 1 above shows the results of the analysis of Indonesian learning e-modules related to the use of multimodal text, with a total of 51 content elements. Of these, 24 elements (47%) are written texts, which dominate the module and provide in-depth information and explanations of the learning material. 14 elements (27%) are audio-visual texts, including videos and multimedia presentations, which create an interactive learning experience. 8 elements (16%) consist of visual texts, such as images and graphics, which help students understand concepts in a concrete and engaging way. Meanwhile, 5 elements (10%) are audio texts, which include voice recordings or narration, providing auditory comprehension support..

Multimodal Texts that Support Multiple Intelligences

After identifying the multimodal texts in the learning e-module, the activities related to the multimodal texts and how these activities can support the multiple intelligences of each student will be described next [18];[19]. These activities are designed to utilize various elements of text, such as written text, audio visual, visual, and audio, thus allowing students to engage in learning actively and creatively in Table 2.

Table 2. Learning Activities that Support Multiple Intelligences

Text Type	Learning Activities	Multiple Intelligences
Write Text		
Legend	Reading the Legend of “Sangkuriang” Listening to a Friend's Reading	Verbal Linguistic Kinesthetic

Text Type	Learning Activities	Multiple Intelligences
	Role Play Group Dynamics	Interpersonal
Fairy Tale	Reading the fairy tale "Cinderella" Word Guess Individually	Verbal Linguistics Logical-Mathematical Intrapersonal
Fables	Reading the Fable "The Tortoise and the Hare" Listening to a Friend's Reading Creating a Fable Story Individually	Verbal Linguistics Logical-Mathematical Intrapersonal
Short Story	Reading the Short Story "Nails and Fences" Listening to a Friend's Reading Role Play Making Comics from Short Stories Group Dynamics	Verbal Linguistic Kinesthetic Interpersonal
Novel	Reading the Novel "Harry Potter" Individually	Verbal Linguistic Intrapersonal
Myths	Reading the Myth of "Lake Toba" Listening to a Friend's Reading Quick Quiz on Myths Individually	Verbal Linguistic Intrapersonal
Procedure Text	Reading the text of the procedure "Shutting down the computer" Make a Video Tutorial Individually	Verbal Linguistics Logical-Mathematical Intrapersonal
Audio Visual Text		
News	Watch "Natural Disasters" News Listening to the News Analyzing the News Individually	Verbal Linguistics Musical Logical-Mathematical Intrapersonal
Legend	Watching the Legend of "Malin Kundang" Listening to the Legend Analyzing the Legend Quick Quiz on Malin Kundang Individually	Verbal Linguistics Musical Logical-Mathematical Intrapersonal
Fables	Watching the Fable of the Wicked Frog Listening to the Fable Analyzing the Fable Role Play Individually	Verbal Linguistics Musical Logical-Mathematical Intrapersonal
Visual Text		
Picture of a Serial Story	Analyzing Serial Pictures Create a fable story from serial pictures Reciting the Story Listening to the Story Individually	Logical-Mathematics Linguistic Intrapersonal
Poster	Analyzing Posters Creating a Poster Individually	Logical-Mathematical Intrapersonal
Audio Text		
Short Story Reading	Listening to Short Stories Analyzing Short Story Reciting the Analysis Result Quick Quiz on Short Story Individually	Musical Logical-Mathematical Linguistic Verbal Intrapersonal

Based on Table 2 above, an explanation of the relationship between multimodal texts and their support for multiple intelligences will be outlined as follows.

Written Text

The legend of "Sangkuriang" is very relevant for primary school students because it contains cultural and moral values, and can develop critical and creative thinking skills. Through this legend, students learn the value of loyalty and the consequences of actions. Research by Rowe in 2024 [20] showed that fairy tales can improve literacy culture and promote gender equality among learners. Activities in learning legends include reading legends and listening to friends' readings, which support verbal linguistic intelligence. In addition, role play and group dynamics can enhance kinesthetic and interpersonal intelligence. These activities not only support the development of language and communication skills, but also enhance cooperation in groups, providing a holistic and rewarding learning experience for students.

Short stories contain various important values, such as moral and social values, which are very suitable for elementary school children. According to research by Noviyanti in 2020 [21] stories can be an effective medium for teaching life values. Through reading short stories, students can recognize these values, while listening to friends read helps them understand other people's perspectives. Role-playing activities allow students to experience the characters and situations in the story, stimulating their kinesthetic intelligence. In addition, group dynamics encourage discussion about the values in the story, enhancing interpersonal intelligence. These activities also support other multiple intelligences, such as linguistic-verbal and musical, making short stories an entertainment tool as well as a rich learning medium. Recent research shows that the use of stories in education can enhance children's character development and social skills [22].

Fable texts contain moral and social values that are very suitable for the characteristics of learners, which shows that fables are effective in teaching positive values to children [23];[24]. Through the activities of reading fables, listening to friends' readings, and creating individual fable stories, students can develop multiple intelligences, including verbal-linguistic, which improves speaking ability and expands vocabulary; musical, through musical elements or rhythm when telling stories; logical-mathematical, by analyzing and solving problems in the story; and intrapersonal, through individual reflection to understand themselves and the values in the story. This combination of activities not only enriches students' learning experience but also supports the development of their social skills and character [25].

Novels contain moral, social, and cultural values that are important for students' character building. Reading novels can enrich students' understanding of various life values [26];[27]. Through individual reading activities, students can develop multiple intelligences, such as verbal linguistic, which improves language and communication skills, and intrapersonal, which helps students reflect on their own experiences and emotions. This activity not only deepens students' understanding of the novel's content but also supports the development of their social and emotional skills.

Myths contain values that can provide an overview of culture and local wisdom, become a medium to teach life values and strengthen cultural identity [28];[29]. Through reading the myth of "Lake Toba," listening to friends' readings, and reading individually, students can improve multiple intelligences, including verbal linguistic, which enriches language and communication skills; musical, if accompanied by musical elements in storytelling; and intrapersonal, which encourages students to reflect on their personal experiences and emotions. This activity not only deepens students' understanding of the myth but also supports the development of their social and emotional skills [30].

Procedure texts provide students with an understanding of the systematic steps in completing a task. Procedure texts are effective in helping students understand and apply practical concepts in everyday life [31]. Through the activities of reading the procedure text "Turning Off the Computer," listening to a friend's reading, and creating individual procedure texts, students can support multiple intelligences, including verbal-linguistic, which improves language and communication skills; musical, if accompanied by rhythmic elements in delivery; and logical-mathematical, which involves analytical thinking and logical organization of steps. This activity not only improves students' understanding of the procedure text but also strengthens their problem-solving skills.

Audiovisual Text

Through the news presented, students can foster critical thinking skills and creativity. The activities of watching news about "Natural Disasters," listening to the news, and analyzing the news individually can improve their verbal linguistic, musical, logical-mathematical, and intrapersonal abilities. Media literacy and news analysis can enrich students' understanding of information and help them develop critical thinking skills [32]. Reading and analyzing news can also improve students' social and emotional abilities [33].

Watching legends can provide students with a deeper understanding of cultural and moral values. Through watching the legend of "Malin Kundang," listening to the story, and analyzing the legend individually, students can support the development of verbal linguistic, musical, logical-mathematical, and intrapersonal skills. This activity not only improves language and communication skills, but also helps students understand different perspectives, enhance creativity, and explore the values contained in the story [34].

Fables presented in the form of films provide opportunities for students to develop critical thinking skills and understand the moral values contained in the story [35].Through the activities of watching the fable "The Useless Frog," listening to the story, and analyzing the fable individually, students can support verbal linguistic, musical, and logical-mathematical intelligence. This activity not only improves language and communication skills, but also enriches students' understanding of morals and ethics, and stimulates their creativity.Intrapersonal.

Visual Text

Through serialized pictures, children will think critically and exercise creativity [36];[37]. Through the activities of analyzing serial pictures, creating fable stories from serial pictures, reading stories, and listening to stories individually, students can support multiple intelligences such as logical-mathematical, linguistic, musical, and intrapersonal [38]. These activities not only improve critical thinking and creativity, but also help children develop communication skills and understand story structures better.

Posters can assist individuals in visually understanding information and improve their memory and engagement with the material [39]. Through analyzing posters and creating individual posters, students can support logical-mathematical and intrapersonal intelligence. This activity not only improves analytical skills and creativity, but also helps students organize information systematically and understand concepts better.

Audio Text

Short stories presented in audio form can provide focus for students to listen [40]. Through listening to short stories, analyzing short stories, and reading out the results of the analysis individually, students can support multiple intelligences such as musical, logical-mathematical, verbal-linguistic, and intrapersonal. This activity not only improves listening skills and story comprehension, but also stimulates students' creativity and personal reflection on the values in the story.

Through the learning activities contained in multimodal texts, learning can support the multiple intelligences possessed by each individual. Multimodal texts, which combine elements of written text, visuals, audio and video, provide a variety of stimuli that stimulate students' multiple intelligences. Each student, with his or her diversity of intelligences, can find a suitable way of learning through this multimodal. As a reference in the learning process, this approach allows students to be more actively involved, facilitates deeper understanding, and encourages the exploration of each student's unique potential, thus creating an inclusive learning environment that supports the diversity of intelligences that exist.

4. Conclusion

This research shows that multimodal texts in Indonesian language learning e-modules play an important role in supporting the development of multiple intelligences possessed by each individual. By integrating various media elements such as text, images, audio and video, students can engage in a holistic and engaging learning experience. Multimodal text not only increases students' engagement in learning but also allows them to use their various abilities optimally. Apart from improving academic understanding, these diverse activities also aid the development of social skills and creativity. The use of multimodal elements makes learning more dynamic, increases students' motivation for active

learning, and supports the development of the various intelligences possessed by each student. With this approach, students can more easily explore their own ideas, develop independence in learning, and understand strategies that suit their own learning styles. Overall, the integration of multimodal texts in education supports inclusive and quality learning at the primary school level.

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Development of Static Fluid E-book based on Problem Based Learning integrated Science, Technology, and Society to Improve Critical Thinking Skills of High School Students

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Abstract

This study aims to develop a Physics e-book based on Problem-Based Learning (PBL) with a Science, Technology, and Society (STS) approach to static fluid material to improve student's critical thinking and scientific communication skills. The development uses the ADDIE model (Analyze, Design, Develop, Implement, Evaluate). The analysis stage shows students' low critical thinking skills due to conventional learning methods. At the design stage, an e-book is compiled with relevant problem-based scenarios. The e-book is validated at the development stage and is considered very feasible, with an average score of 98.95%. Implementation is carried out in an experimental class using e-books and a control class using conventional methods. The results of the N-Gain test show a significant increase in critical thinking skills in experimental class 1 (0.80, high category) and experimental class 2 (0.75, high category) compared to the control class (0.53, medium category). These results indicate that PBL-STS-based e-books effectively improve students' critical thinking skills. In conclusion, this e-book can be an effective learning medium for teaching static fluids.

Keywords: E-book, Problem-Based Learning, Science Technology and Society, Static Fluid, Critical Thinking, ADDIE

1. Introduction

Physics learning in senior high schools (SMA) plays an important role in shaping students' understanding of natural phenomena and scientific principles. However, many students have difficulty [1] understanding abstract and complex physics concepts [2]. One of the challenges that often arises in learning physics is students' limitations in connecting theory with real phenomena they face daily [3]. This causes low student interest in learning [4] and a lack of in-depth understanding of physics concepts [5], including the concept of static fluids.

Static fluid is one of the important materials in physics that studies the properties and behavior of fluids at rest. This concept involves pressure, buoyancy, and Pascal's law [6]. Although relevant to many everyday life applications, such as in the design of ships, airplanes, and building construction, many students have difficulty understanding this concept [7]. Obstacles in understanding static fluid material are often caused by the lack of application of real contexts and the limitations of learning methods that only focus on theory without involving contextual problem-solving [8].

Critical thinking skills are important skills that must be developed in the modern era [9], but in reality, many high school students, including those studying physics, show low critical thinking skills [10] [11]. In physics learning, especially in a static fluid material, students are often unable to analyze problems in depth [12], make logical inferences [13], and apply concepts to solve real problems [5]. This shows the need for a more effective learning approach to improve students' critical thinking skills in the context of physics learning.

Critical thinking is the ability to analyze, evaluate, and make decisions based on logical and rational reasoning [14]. Studies on critical thinking skills show that developing these skills is very important for students to understand learning materials in depth [15]. This ability can also help students develop problem-solving [16] and decision-making skills needed in their daily lives and in their future careers [17].

The Problem-Based Learning (PBL) approach is a learning method that has been proven effective in improving students' critical thinking skills [18] [19]. PBL encourages students to learn by solving problems that are authentic and relevant to their lives [20] so that students can be more actively involved in the learning process [21]. Several previous studies have shown that PBL can improve critical thinking

skills [21] [16], collaboration [22] [23], and students' scientific communication [24] [25], especially in science learning, including physics.

In addition, the Science, Technology, and Society (STS) approach can also increase the relevance of physics learning to real life [26]. The STS approach emphasizes the importance of linking learning materials to social, technological, and environmental issues around students [27]. Previous studies have shown that applying STS in physics learning can increase students' learning motivation and make learning more meaningful and contextual [28].

Integrating PBL with STS in physics learning can have a greater impact on improving students' critical thinking skills. By combining these two approaches, students are not only required to solve problems collaboratively. However, they are also invited to understand the relevance of physics in a broader social and technological context.

Along with the development of technology, digital media such as e-books are increasingly being applied to learning. E-books offer flexibility and wider access to learning materials [29] and can accommodate various types of interactive content that support PBL and STS-based learning. E-books in physics learning, especially in static fluid material, are expected to help students understand concepts more deeply and improve their critical thinking skills.

Based on this background, this study aims to develop an e-book based on PBL-STS on static fluid material to improve the critical thinking skills of high school students. This study is expected to contribute to efforts to improve the quality of physics learning in high schools and develop critical thinking skills that students greatly need in the current era of globalization.

2. Method

This research uses a development method with the ADDIE model (Analyze, Design, Develop, Implementation, and Evaluation) from [30]. The ADDIE development procedure is described in Figure 1.

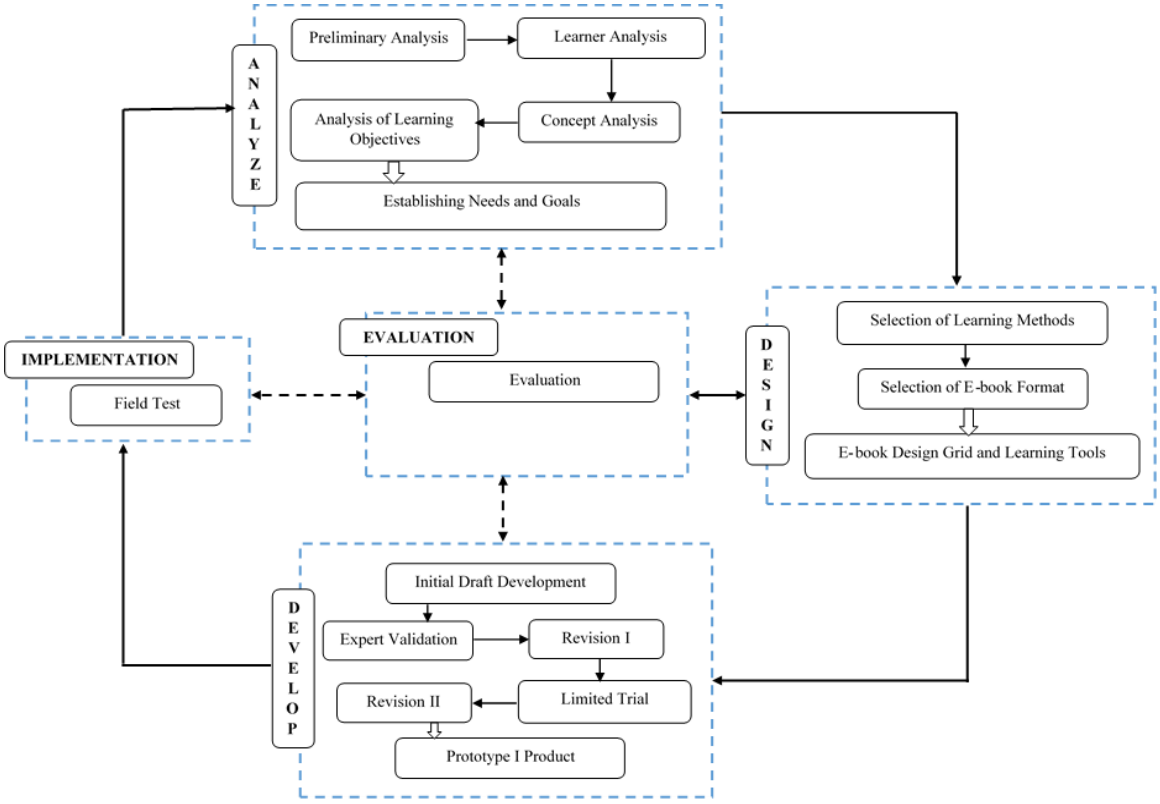


Figure 1. Research Procedures

This study used purposive sampling by intentionally selecting samples from high school students studying static fluid material in grade XI. The selection of samples was based on the consideration that these students already have relevant basic abilities in physics and are predicted to be able to follow the PBL and STS-based learning process. The sample used in this study consisted of three classes, namely an experimental class and a control class.

The data collection technique in this study used a critical thinking ability test compiled based on critical thinking indicators. This test was given to students before and after the implementation of the e-book to determine the improvement in their critical thinking skills. The critical thinking ability test includes analyzing, evaluating, drawing conclusions, and linking concepts to real problems. The descriptive test instrument used included indicators of critical thinking skills that Harts has validated, so it is suitable for measuring students' critical thinking skills.

Expert test data analysis is conducted to assess whether a developed teaching material is suitable for learning. The data analysis technique used for validation is Aiken's V Index.

The feasibility analysis of the PBL-STS-based static fluid e-book was carried out using the following stages: The following equation.

$$\bar{X} = \frac{\sum_i^n x}{n} \quad (1)$$

$$X_i = \frac{skor\ maksimum\ ideal + skor\ minimum\ ideal}{2} \quad (2)$$

$$SB_i = \frac{skor\ maksimum\ ideal - skor\ minimum\ ideal}{6} \quad (3)$$

The values obtained are then converted into the following criteria.

Table 1. Four Scale Assessment Criteria

No.	Respondent Score	Category
1.	$X \geq \bar{X}_1 + 1{,}0\ SB_i$	Very Eligible
2.	$\bar{X}_1 < X < \bar{X}_1 + 1{,}0\ SB_i$	Eligible
3.	$\bar{X}_1 - 1{,}0\ SB_i < X \leq \bar{X}_1$	Not Eligible
4.	$X \leq \bar{X}_1 - 1{,}0\ SB_i$	Very Not Eligible

The increase in product usage was analyzed using inferential analysis to determine the impact of using static fluid e-books based on a comparison of students' pretest and posttest scores. Before conducting the N-Gain test, a prerequisite test for normality and homogeneity was first conducted. The following is the N-Gain equation.

$$N - Gain = \frac{Skor\ posttest - skor\ pretest}{Skor\ ideal - skor\ pretest} \quad (4)$$

The obtained N-Gain values are then interpreted using the criteria in Table 2.

Table 2. N-Gain Criteria

No.	N-Gain Value	Criteria
1.	0.00 < g < 0.30	Low
2.	0.30 < g < 0.70	medium
3.	0.70 < g < 1.00	High

3. Results and Discussion

This study uses the ADDIE (Analyze, Design, Develop, Implement, Evaluate) development model to develop an e-book on static fluid material based on Problem-Based Learning (PBL) with a Science, Technology, and Society (STS) approach. The results of this study are explained based on the ADDIE stages.

a. Analyze

In the analysis stage, students' and teachers' needs related to static fluid learning were identified. Based on observations and interviews, it was found that students' critical thinking skills in understanding the concept of static fluids were still low. This is due to the learning approach, which tends to be conventional, with less emphasis on contextual problem-solving and minimal integration of technology in the learning process.

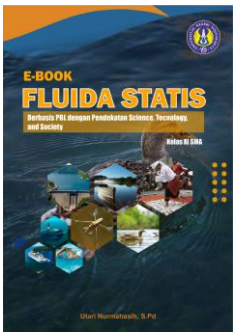
This needs analysis is the basis for developing PBL-STS-based e-books, with the aim of providing a more active and contextual learning experience and improving students' critical thinking skills. Critical thinking ability indicators are adjusted to critical thinking standards, which include analysis, evaluation, interpretation, and conclusion.

b. Design

The design stage involves the preparation of the structure and content of the e-book, which is designed according to the PBL model and the STS approach. This e-book contains problem scenarios relevant to everyday life and social and technological issues related to static fluids. The components contained in the e-book grid are the e-book construct, the relationship to static fluid material, the problem-based learning model, and the science, technology, and society approach. The e-book construct consists of a cover, main menu, instructions for use, foreword, competencies, material descriptions, evaluations, glossaries, references, and developer information. The next step is to prepare the contents of the e-book to be created. In this study, development begins by collecting the required components, such as static fluid material, images, and videos as supporting materials to be displayed in the e-book. This e-book is designed so that students can actively explore problems, analyze data, and find solutions independently, supporting critical thinking development.

c. Develop

In the development stage, the e-book was developed with various interactive features such as problem-based questions, interactive simulations, and learning videos. This e-book was developed using the Canva application, which can be accessed via computers and smartphones. For the e-book to display videos, the Heyzine Flip application was used to edit the e-book by adding videos. The output from Heyzine Flip is a .html link used to access the e-book. The following are some parts of the Physics e-book based on problem-based learning with a science, technology, and society approach that have been developed.



a) *Cover E-Book*



b) Presentation of the Concept of Society



c) Science Concept Presentation



d) Presentation of Technology Concept

Figure 1. E-book Section

Material and media experts validated the e-book's content and appearance to ensure that they were in accordance with learning needs. The results of expert assessments of the content aspects are presented in Table 3.

Table 3. Results of E-book Content Assessment

No	Aspect	Assessment Results	Category
1.	Cover	100	Very Eligible
2.	Main course	100	Very Eligible
3.	Instructions for use	100	Very Eligible
4.	Foreword	93,75	Very Eligible
5.	Competence	100	Very Eligible
6.	Description of the material	90	Very Eligible
7.	Evaluation	100	Very Eligible
8.	Glossary	100	Very Eligible
9.	Reference	100	Very Eligible
10.	Information page	100	Very Eligible
11.	Language	100	Very Eligible
12.	Software engineering	100	Very Eligible
	Average	98,95	Very Eligible

The validation results show that this e-book is very suitable for use, with several minor improvements related to the appearance and arrangement of the material.

After validation, a limited trial was conducted in selected schools to determine students' initial responses to this e-book.

Table 4. Readability Analysis Results

No.	Readability Aspect	Assessment Value	Category
1.	Presentation of material	78,44	Very Eligible
2.	Design	81,25	Very Eligible
3.	Media operations	76,42	Very Eligible
Average		78,70	Very Eligible

Based on limited trials, students responded positively to the ease of use of e-books and active involvement in problem-solving.

d. Implementation

The experimental class then implemented PBL-STS-based e-books, while the control class used conventional learning methods without e-books. Both groups underwent pre- and posttests to measure their critical thinking skills before and after learning.

Table 5. Results of the Pretest-Posttest of Students' Critical Thinking and Scientific Communication

No.	Test	Class	Average	Std. Deviation
1.	*Pretest*	Experiment 1	38,83	9,42
		Experiment 2	32,92	9,05
		Control	40,83	11,53
2.	*Posttest*	Experiment 1	83,75	8,43
		Experiment 2	70	8,09
		Control	66,93	10,89

The pretest results showed that the control class obtained the highest critical thinking ability, followed by experimental class 2 and experimental class 1. After being given treatment, critical thinking ability increased. This is seen from the posttest scores of the three experimental classes: 1, followed by experimental class 2, and the control class.

e. Evaluation

The implementation results were evaluated using several statistical tests to determine the effectiveness of PBL-STS-based e-books.

Normality and Homogeneity Test

Before the statistical test, a prerequisite test was conducted as a normality and homogeneity test. The normality test was conducted to determine whether the sample from the population was normally distributed. The results of the normality test of the pretest and posttest data of students in the Shapiro-Wilk analysis results are presented in Table 6.

Table 6. Normality Test Results

No.	Test	Class	*Shapiro-Wilk*		
			Statistic	df	Sig.
	Pretest	Experiment 1	0,957	30	0,253
		Experiment 2	0,952	30	0,194
		Control	0,942	30	0,101
	Posttest	Experiment 1	0,947	30	0,143
		Experiment 2	0,935	30	0,069
		Control	0,963	30	0,376

Table 7. Homogeneity Test Results

Class	*Levene Statistic*	df1	df2	Sig.
Pretest	0,315	2	87	0,731
Posttest	0,321	2	87	0,706

The results of the Kolmogorov-Smirnov test show that the data is normally distributed, while the Levene test shows that the data variance from both groups is homogeneous, so further statistical tests can be carried out.

N-Gain Test

The N-Gain test measures the improvement of students' critical thinking skills.

Table 8. Results of Pretest-Posttest of Critical Thinking Skills

No.	Component	Experimental Class 1		Experimental Class 2		Control Class	
		Pretest	*Posttest*	*Pretest*	*Posttest*	*Pretest*	*Posttest*
1.	Number of Students	30	30	30	30	30	30
2.	Average Value	34,83%	87,17%	34,83%	84%	33,17%	68,33%
3.	The highest score	50	100	50	95	45	75
4.	Lowest Value	20	70	20	70	20	50
5.	N-Gain Score	0,80		0,75		0,53	
6.	Category	High		High		Medium	

The N-gain score results show that experimental class 1 and experimental class 2 get higher gain scores of 0.80 and 0.75 with a high category. In contrast, the control class gets a lower N-gain score of 0.53 with a medium category. Thus, the critical thinking skills of students in the experimental class using PBL-based Physics e-books with the STS approach are higher than those in experimental class 2 and the control class; this shows that PBL-STS-based e-books are effective in significantly improving students' critical thinking skills compared to conventional learning methods.

4. Conclusion

Using the ADDIE development model, this study successfully developed an e-book based on Problem-Based Learning (PBL) with a Science, Technology, and Society (STS) approach to static fluid material. Based on expert validation and readability tests, this e-book is considered very suitable for learning, with an average assessment score of 98.95%.

Implementing e-books in the experimental class showed that students who used PBL-STS-based e-books experienced a significant increase in critical thinking skills. The results of the N-Gain test showed that experimental class 1 obtained an N-Gain score of 0.80 (high category), and experimental class 2 obtained an N-Gain score of 0.75 (high category). In contrast, the control class only obtained an N-Gain score of 0.53 (moderate category). The increase in critical thinking skills in both experimental classes was much higher than in the control class, which shows that using PBL-STS-based e-books is more effective than conventional learning methods in improving students' critical thinking skills.

Thus, this e-book can be an effective tool in overcoming the limitations of conventional learning methods, providing a more contextual and interactive learning experience, and supporting the development of students' critical thinking skills.

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WORKSHOP ON INNOVATIVE AND CUTTING-EDGE TEACHING MODELS FOR INDONESIAN LANGUAGE TEACHERS AT THE JUNIOR HIGH SCHOOL LEVEL IN PANGANDARAN REGENCY

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Abstract

The workshop titled "Innovative and Cutting-Edge Teaching Models for Indonesian Language Teachers at the Junior High School Level in Pangandaran Regency" was organized with the aim of enhancing the pedagogical competencies of teachers in applying adaptive teaching models that meet students' learning needs. The workshop was attended by 30 Indonesian language teachers from various junior high schools in Pangandaran Regency. Participants were given intensive training through a combination of offline and online sessions consisting of four stages. In the first stage, participants were provided with theoretical material on the concepts and characteristics of innovative and cutting-edge teaching models. In the next stage, participants were guided in developing teaching modules based on the models they had learned.

The main outcome of the workshop was the development of teaching modules based on innovative and cutting-edge teaching models, such as project-based and problem-based learning. These modules were tailored to the teaching context of each school. Evaluation results indicated that participants were able to develop teaching modules aligned with innovative learning principles. Additionally, a survey conducted after the event showed that 52.9% of participants agreed, and 47.1% strongly agreed that the training provided significant benefits.

Challenges during the workshop included limited time for discussions and less optimal guidance during the module development process. However, participants maintained a high level of enthusiasm in understanding and implementing the innovative and cutting-edge teaching models presented during the training. Participants also actively engaged in every stage of the activity, from material presentation to discussions and module creation. The success of the workshop is evident from the enthusiasm and active participation of the attendees, reflected in the constructive discussions and the developed teaching modules.

Keywords: Teaching Models, Innovative, Cutting-Edge

1. Introduction

Education is an essential aspect of a country's development, as it enables the optimal development of human resources. One of the key components in the education process is the role of the teacher. Teachers are not only responsible for delivering subject matter, but they must also create an innovative learning environment that inspires students. In this regard, teachers play a central role in the teaching and learning process in the classroom [1]. Therefore, teachers are required to have good academic management skills, which can help improve students' success in learning. Educational management includes the ability to plan, implement, and evaluate the learning process effectively. Teachers who can manage the classroom well, design a relevant curriculum, and develop teaching strategies that meet students' needs will positively contribute to students' academic achievements and personal development. A teacher's ability to provide excellent academic services not only influences learning success but also contributes to a better future for students [2], [3].

Furthermore, teachers need the ability to integrate learning activities with contemporary phenomena and developments. In today's digital era, knowledge is accessible from a wide range of sources. Therefore, teachers must present learning material in ways that are relevant and engaging for students. This requires a deep understanding of trends and societal changes, as well as the ability to

connect learning material with real-world contexts. Teachers must also be able to use information and communication technology (ICT) effectively to support learning based on current phenomena. In this way, students will not only gain a better understanding of the material but also develop the critical and analytical thinking skills needed to face the challenges of the modern world. Integrating learning with contemporary phenomena will help students connect learning material to their daily lives, strengthen their motivation to learn, and prepare them to be contributing individuals in a continually evolving society.

Teachers have a significant influence on students' success in learning [4]. However, one of the challenges is that many teachers lack adequate classroom management skills. Many still rely on conventional teaching models as their primary reference in conducting learning activities. These conventional models tend to be traditional and are not responsive to the diverse learning needs of students in today's modern era. Teachers who adhere to conventional teaching methods may treat the whole class uniformly, without taking into account the individuality of students.

Over-reliance on conventional teaching models can hinder teachers' creativity in designing more innovative and relevant learning strategies. Traditional models limit the scope for teachers to experiment with new, more engaging approaches that better meet the needs of modern students. As a result, learning can become monotonous and uninspiring, diminishing students' interest in learning and motivation to seek further knowledge. Moreover, the dominance of conventional teaching models can restrict teachers' creativity and their ability to identify and address students' learning difficulties effectively. Teachers' creativity is crucial for equipping students with the skills needed to face an unpredictable future (Shin & Jang, 2017). With limited approaches, teachers may struggle to offer a variety of learning methods tailored to individual students' needs. This inability to solve problems can lead to students with learning difficulties not receiving the support they need, which, in turn, can affect overall academic achievement. Therefore, it is important for teachers to continually develop their ability to design and implement innovative and up-to-date teaching models.

By understanding diverse learning models, teachers can introduce variety into the learning process, allowing students to learn through approaches that suit their learning styles. For example, by using cooperative learning approaches, students can work together in groups to complete tasks or projects, improving their social and collaboration skills. Additionally, by applying problem-based learning methods, teachers can encourage students' critical thinking and problem-solving abilities while making learning more relevant to real-world situations. This will help maintain students' interest and motivation in the learning process, ensuring that each student receives the support needed to reach their full academic potential.

The workshop on innovative and modern teaching models for Indonesian language teachers at junior high schools in Pangandaran is considered a strategic step to enhance teachers' competencies in providing educational services. Through this workshop, teachers can gain new insights, enrich their teaching methods, and apply more creative and responsive approaches to meet students' needs in Indonesian language learning. This will create a more dynamic, interactive learning environment that provides meaningful learning experiences for students.

Joyce, Weil, & Calhoun [5] explain that a learning model is a conceptual framework that outlines structured procedures for organizing learning experiences to achieve the predetermined learning objectives. This model serves as a guide for instructional designers and teachers in planning and conducting teaching and learning activities. By using a learning model, educators can systematically organize students' learning experiences, ensuring that learning objectives are met effectively and efficiently.

Suhana [6] states that a learning model is a series of teaching and learning processes from start to finish, involving both teachers and students in designing specific lessons using particular learning materials, as well as the interaction between teachers, students, and the learning materials. Typically, a learning model consists of various stages of the learning process that need to be followed. The learning model is closely related to students' learning styles and teachers' teaching styles.

Based on these definitions, it can be concluded that a learning model is a conceptual framework used to organize the teaching and learning process with the aim of achieving set learning outcomes. This model provides guidance for instructional designers and teachers in planning and implementing educational activities. By using a learning model, educators can systematically structure students' learning experiences, ensuring that learning objectives are achieved effectively and efficiently.

Furthermore, the learning model involves a series of teaching and learning processes that incorporate interactions between teachers, students, and learning materials, while adapting to students' learning styles and teachers' teaching methods.

A learning model has a syntax, which refers to a specific sequence of steps that outlines the overall flow of the learning process and is accompanied by a set of learning activities [7]. The syntax includes a comprehensive flow sequence, often involving various stages such as material presentation, teacher-student interaction, and the implementation of various learning activities. By following this syntax, teachers can design structured and effective learning experiences for students, ensuring that each stage in the learning process is well-integrated and leads to the desired learning outcomes.

The selection of innovative and up-to-date learning models is essential for the success of the educational process. Innovative and modern learning models offer teaching approaches that are aligned with current developments and are effective in capturing students' attention. Additionally, these models can enhance students' learning experiences. By implementing innovative learning models, teachers can adapt to changing student needs and leverage modern technology to maximize learning outcomes. Moreover, innovative learning models encourage creativity and innovation among teachers and students, fostering a dynamic and engaging learning environment. Overall, the selection and implementation of innovative and up-to-date learning models play a crucial role in ensuring the success and effectiveness of the educational process.

2. Method

Based on discussions and coordination with middle school administrators in Pangandaran Regency, this workshop will be held from May to August 2024 through both in-person and online formats, with the following activities:

a. Lecture

In this session, the speaker will introduce the concepts and fundamental principles of innovative and modern teaching models in Indonesian language instruction. Additionally, the session will discuss the importance of applying these up-to-date teaching models in the context of Indonesian language education.

b. Demonstration

During the demonstration on innovative and modern teaching models in Indonesian language instruction, participants will be presented with activities that illustrate the practical application of these concepts. For instance, participants will be shown examples of how project-based learning can be implemented, including the planning, execution, and evaluation processes of student projects. In this session, participants will also attempt to design lesson plans that apply these innovative and modern teaching models.

c. Discussion

In the discussion session, participants will engage actively with the speaker and fellow participants to discuss various concepts, ideas, and experiences related to Indonesian language teaching. The discussions will take place in different formats, such as small group discussions, Q&A sessions, and open forums. The main goal of this discussion is to deepen participants' understanding of the innovative and modern teaching models explored during the workshop. Through these discussions, participants are expected to enrich their knowledge and stimulate critical thinking among teachers in designing and conducting more engaging and effective Indonesian language lessons.

d. Evaluation

Evaluation will be conducted to assess participants' understanding and reception of the materials presented. Additionally, this activity aims to gauge the overall effectiveness of the workshop. Various evaluation methods will be used, including questionnaires, Q&A sessions, and reflective discussions. Participants will be asked to provide feedback on the usefulness of the content, the clarity of the delivery, and their overall impressions of the workshop experience. The results of this evaluation will provide valuable input for the PkM team to adjust the materials and delivery methods to better meet the participants' needs and expectations.

3. Results and Discussion

The community service activity (PkM) "Workshop on Innovative and Modern Teaching Models for Indonesian Language Teachers in Junior High Schools in Pangandaran Regency" was carried out in four structured stages with the goal of enhancing teachers' competencies in applying innovative and modern teaching models. This workshop was attended by 30 junior high school Indonesian language teachers from Pangandaran Regency. The workshop was conducted both in-person and online, providing a comprehensive approach to training. Through in-person sessions, participants were able to engage directly in discussions and hands-on activities that enriched their understanding and application of the material. Meanwhile, the online sessions offered flexibility in participation, allowing teachers to follow the training and contribute to discussions at their convenience. The stages of the workshop are described below.

First Stage

The first stage of the workshop took place on June 7, 2024, and was conducted in-person at SMP Negeri 1 Pangandaran. This stage was led by Dr. Esti Swatika Sari, S.Pd., M.Hum., and Beniati Lestyarini, S.Pd., M.Pd. During the first stage, participants were introduced to the concepts and exploration of innovative and modern teaching models. The material included explanations of the definition of teaching models, the importance of innovation in teaching to enhance student engagement and understanding, and effective ways to implement these models in the classroom. Additionally, participants were invited to explore innovative teaching processes through the screening of teaching videos. They were encouraged to discuss the innovations presented in the teaching processes. With this knowledge, the teachers were expected to be able to select and apply innovative and modern teaching models suited to their respective school environments. The results from the first stage of the workshop are as follows: a. 30% of the teachers already possessed knowledge of innovative and modern teaching models. b. Teachers required further guidance to implement innovative and modern teaching models in classroom instruction. c. Teachers formed heterogeneous groups to discuss and develop innovative and modern teaching strategies. d. Additional sessions were deemed necessary to deepen teachers' understanding of how to implement innovative and modern teaching models.

Second Stage

The second stage of the workshop was conducted online on June 29, 2024. This session was facilitated by Dr. Dra. Sudiati, M.Hum., and Titis Kusumaningrum Witdaryadi Putri, M.Pd. The focus of this stage was on the steps of learning, aimed at providing participants with a clear and structured understanding of how to implement Problem-Based Learning (PBL) and Project-Based Learning (PjBL) into their teaching modules. Participants were also given the opportunity to ask questions about any unclear concepts and to share their experiences regarding the teaching modules they had previously developed. This allowed them to broaden their knowledge of innovative and modern teaching model applications. During the second session, the instructors began by explaining the key stages of PBL, which include: a. Orienting students to the problem; b. Organizing students for research; c. Supporting independent and group investigations; d. Developing and presenting the results; and e. Analyzing and evaluating the problem-solving process. Each stage was explained in detail, from facilitating students in identifying and formulating relevant problems to the process of analyzing and evaluating outcomes. Next, the instructors elaborated on the steps of PjBL, which consist of: a. Defining the essential question; b. Designing the project; c. Scheduling; d. Monitoring project progress; e. Assessing outcomes; and f. Evaluating the experience. In this phase, participants were guided on how to select relevant and challenging projects for students, as well as how to manage and monitor project progress throughout the learning process. The final stage included the evaluation of completed projects, involving assessments of both the project outcomes and students' presentations.

Third Stage

The third stage of the workshop was conducted online on July 13, 2024. This session focused on monitoring the development of teaching modules based on innovative and contemporary teaching models. Participants were given the opportunity to present the modules they had designed using the selected teaching models. After each presentation, the workshop facilitators provided constructive feedback to ensure that the teaching materials aligned with the principles of innovative and modern pedagogy discussed earlier. This stage of the workshop not only facilitated the evaluation and refinement of the teaching modules but also strengthened participants' understanding of how to effectively implement these teaching models in the classroom.

Fourth Stage

The fourth stage of the workshop was held online on July 27, 2024, and focused on reflection and evaluation of the workshop's overall execution. During this session, participants and facilitators engaged in in-depth discussions about the successes achieved, challenges encountered, and areas needing improvement. The goal of this reflection was to provide constructive feedback and ensure that the innovative and contemporary teaching models learned could be applied effectively in the classroom. Participants were encouraged to share their experiences regarding the application of the learned models, identify obstacles encountered during implementation, and receive feedback from the facilitators and fellow participants. These discussions not only deepened participants' understanding and skills but also fostered collaboration and collective learning. The evaluation stage also served as a foundation for planning future programs aimed at further enhancing teachers' ability to develop and implement creative teaching strategies that meet students' needs.

4. Discussion

Based on the comprehensive evaluation and reflection on the implementation of the community service project (PkM) titled "Workshop on Innovative and Contemporary Teaching Models for Junior High School Indonesian Language Teachers in Pangandaran Regency," it can be concluded that the activity was successfully carried out. The success of the workshop can be assessed through several indicators, both in terms of process and outcomes.

Firstly, in terms of participation, the number of participants remained consistent from the first to the fourth stages, with 30 participants attending throughout. This consistency reflects the participants' strong commitment to following each phase of the workshop. Moreover, during the workshop sessions, the teachers displayed high enthusiasm and actively engaged in all discussions, indicating that the material presented was relevant and capable of capturing their interest.

Secondly, in terms of outcomes, participants successfully developed teaching modules based on the implementation of the innovative and contemporary teaching models they had learned. The development of these teaching modules is a key achievement, as it demonstrates that participants not only understood the concepts but were also able to apply them in lesson planning. These modules are expected to be used by the participants in their teaching, potentially contributing positively to the quality of classroom learning. Furthermore, the positive impact of this training was tangibly felt by the participants, who reported improvements in their pedagogical skills, particularly in designing lessons that encourage students to be more active, critical, creative, and collaborative. The training also helped participants overcome various challenges they had previously encountered in classroom teaching.

The evaluation results of the "Workshop on Innovative and Contemporary Teaching Models for Junior High School Indonesian Language Teachers in Pangandaran Regency" are reflected in Diagram 1, which shows that 58.3% of participants strongly agreed and 41.7% agreed that the training was beneficial. This percentage highlights that the training had a positive impact on participants' professional development as teachers. This data reinforces the conclusion that the workshop successfully achieved its goals and made a meaningful contribution to improving the quality of education in schools.

The community service activity (PkM) titled "Workshop on Innovative and Advanced Teaching Models for Junior High School Indonesian Language Teachers in Pangandaran Regency" was generally carried out smoothly. All workshop sessions, both in-person and online, were executed according to the planned schedule. The online sessions allowed for flexibility in participation, although some participants reported technical issues, such as unstable internet connections. Despite these challenges, participants' enthusiasm and engagement remained high throughout the online workshops.

The main output of this workshop was the development of teaching modules by the participants, based on innovative and advanced teaching models, such as Project-Based Learning (PjBL) and Problem-Based Learning (PBL). A total of 20 participants successfully submitted their completed teaching modules. The creation of these modules demonstrated a deep understanding of the material provided and the ability to apply these concepts to lesson planning. Additionally, positive feedback from participants indicated that the training was not only relevant but also had a significant impact on improving their teaching competencies. This was further supported by post-workshop surveys showing that the majority of participants found the training beneficial.

Supporting Factors

Several positive aspects contributed to the smooth execution of the community service (PkM) activity, as outlined below:

a. **Commitment and Enthusiasm of Participants**

The teachers who participated in this workshop exhibited a high level of commitment, as evidenced by their consistent attendance at each training session. The participants' enthusiasm and active involvement in discussions reflected their strong desire to enhance their professional competencies. This active participation was a key factor in the overall success of the workshop.

b. **Harmonious Collaboration**

Effective collaboration between the community service team and the participants was a crucial factor in the success of the workshop. The team managed to create a conducive atmosphere for the workshop, enabling participants to feel comfortable sharing their experiences, asking questions, and receiving feedback. This harmonious relationship significantly improved communication and collaboration, ensuring that the workshop proceeded smoothly.

Challenges

The implementation of this community service (PkM) activity went well, with no significant challenges encountered. One minor obstacle identified was the delay in participants submitting their assigned tasks. This delay was attributed to participants' busy work schedules, which made it difficult for some to complete their tasks on time. However, this issue did not affect the overall quality of the workshop. The community service team managed to overcome this challenge by motivating participants to remain committed to completing their tasks. One effective strategy was sending regular reminders through a WhatsApp group, gently reminding participants about the task submission deadlines. This approach proved effective in helping participants complete their assignments on time. By using this responsive approach, the existing challenges were minimized effectively.

5. Conclusion

The Community Service Project (PkM) "Workshop on Innovative and Contemporary Teaching Models for Junior High School Indonesian Language Teachers in Pangandaran Regency" was successfully carried out and achieved its intended objectives. The workshop made a significant contribution to enhancing the pedagogical competence of participants, particularly in understanding and applying innovative teaching models such as Project-Based Learning (PjBL) and Problem-Based Learning (PBL).

The success of the workshop is evident from the enthusiasm and active participation of the teachers throughout the workshop, as reflected in the constructive discussions and the development of teaching modules. Most participants successfully designed and submitted teaching modules based on the teaching models they had studied, demonstrating a deep understanding and skill in crafting innovative and contemporary lessons that cater to students' needs.

Acknowledgement

The organizing team extends its deepest gratitude to all parties who contributed to the successful implementation of this workshop. In particular, we would like to thank the Pangandaran Regency Department of Education and the Indonesian Language Teacher Association for Junior High Schools in Pangandaran Regency for their active participation. We hope that the outcomes of this workshop will bring tangible benefits to classroom learning and support the overall improvement of education quality in Pangandaran Regency. Lastly, we hope that this initiative marks the beginning of positive changes in the field of education and can continue to be developed in the future.

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CHATGPT UTILIZATION TRAINING FOR SMAS IT AL HIKMAH KARANGGEDE BOYOLALI TEACHERS IN MAKING TEACHING MATERIALS

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Abstract

In today's digital era, the utilization of artificial intelligence in education has become very relevant to improve the quality of learning. SMAS IT AL Hikmah Karanggede, Boyolali, identified the need for innovation in the process of creating teaching materials. Therefore, we conducted a special training for MGMP teachers with a focus on utilizing ChatGPT, an advanced generative language model, to assist in the creation of more interactive and adaptive teaching materials.

The training aims to equip teachers with the ability to integrate ChatGPT in lesson planning, creation of teaching materials, and learning assessment. Through a series of workshops, teachers will learn basic to advanced techniques in operating ChatGPT, as well as strategies for integrating it into the existing curriculum.

It is expected that with this training entitled "Utilization of ChatGPT Technology in Making Teaching Materials: Training for MGMP Teachers at SMAS IT AL Hikmah Karanggede, Boyolali", teachers at SMAS IT AL Hikmah Karanggede, Boyolali can utilize ChatGPT to create teaching materials that are not only informative and relevant, but also interesting and motivate students to learn more actively and creatively. In addition, the utilization of this AI is also expected to provide inspiration for other learning innovations in the future.

Keywords: Training, ChatGPT, Education, AI, Teacher.

1. Introduction

The increasingly strong impact of globalization has resulted in the emergence of various moral decadence that has the potential to disrupt the mental and spiritual growth of children. This situation requires us to secure the younger generation from the negative influences that are increasingly dominating both in terms of akhlaq and intellectual aspects. Considering that children are important assets of the Ummah in the future, the responsibility to protect and nurture them with strong values becomes even more urgent. SMAS IT AL Hikmah Karanggede, Boyolali, as a formal educational institution with a strong Islamic foundation, has positioned Education at SMAS IT AL Hikmah Karanggede, Boyolali emphasizes the integration of faith, knowledge, and charity which is implemented in every aspect of student life. The five basic principles upheld in education at SMAS IT Al Hikmah, namely SAAMBER (Sholat, Al Quran, Adab, Mandiri, Berprestasi), become a strong foundation in shaping the character of students who are not only proficient in knowledge, but also strong in spirituality and ethics. As an Islamic Boarding School, SMAS IT AL Hikmah Karanggede, Boyolali combines the national curriculum with the Integrated Islamic School (IIS) curriculum, as well as deep Islamic values. This educational concept creates an environment conducive to the all-round development of students' potential, which is applied not only in school learning but also in daily life.

One of the main obstacles faced by SMAS IT AL Hikmah Karanggede, Boyolali is limited access to technology and infrastructure. Some classrooms are still not equipped with sufficient information technology facilities, hindering the implementation of innovative learning methods. This limitation not only reduces teaching effectiveness but also limits students' ability to engage in technology-based learning. Although SMAS IT AL Hikmah Karanggede, Boyolali is categorized as an Integrated Islamic School, there is still a gap in teachers' skills regarding the use of technology in developing teaching materials. The integration of artificial intelligence tools such as ChatGPT in the preparation of teaching materials is still not optimal. Teachers need to be equipped with adequate training to produce teaching materials that are not only informative but also interesting and relevant to the times.

The dynamic development of the curriculum that needs to be adapted to the needs of the industry and the development of science and technology is another important issue. Teachers' readiness to design teaching materials that are dynamic and adaptive to change is key to ensuring that students get a relevant and quality education. The program will allocate resources to improve information technology facilities in classrooms in need. With better infrastructure, teachers will have more opportunities to implement innovative and interactive learning methods, which in turn will improve the quality of students' learning experience. Intensive training will be held to strengthen teachers' ability to utilize ChatGPT in the preparation of teaching materials. With enhanced capabilities, teachers can more effectively integrate this artificial intelligence technology into the curriculum, resulting in more dynamic and engaging materials for students.

Addressing these key issues, it is expected that the PkM program will make a significant positive contribution not only to SMAS IT AL Hikmah Karanggede, Boyolali, but also to teachers' professional development and students' learning experience. It is hoped that with this training, teachers will become more proficient and confident in using technology in learning, so that they can be more effective in educating and motivating students. This will help SMAS IT Al Hikmah in its mission to develop a generation that is not only smart and competent, but also one that has strong moral and spiritual values.

2. Method

a. Theoretical Foundation

1) Teacher Skills Competency

Article 28 of the National Education Standards (SNP) explains that educators must have qualifications and competencies as learning agents, be physically and mentally healthy, and could realize national education goals. The competence of a teacher's expertise is the main thing that must be possessed, because it is the main support for the learning process at school. Without competence, educators will not have bargaining value, if educators are committed, love their profession, and want to provide the best service for their students, educators must be competent (Agus, 2012: 25). According to the Decree of the Minister of Education of the Republic of Indonesia.045/U.2002, competency elements consist of several aspects shown in the following figure1.

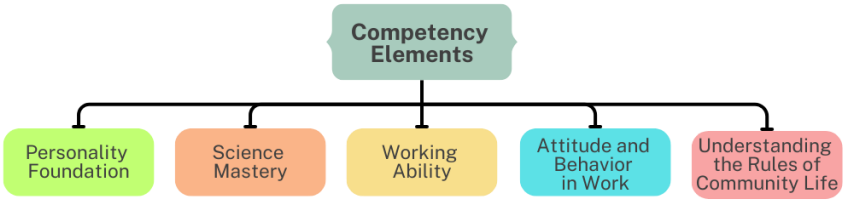


Figure 1. Competency Element Diagram

The foundation of personality, attitudes and behavior are some important points in the competency element for a teacher in the learning process because this will be directly felt by students and is one of the keys to determining the success of the learning process in the classroom. In addition to the foundation of personality, attitudes, and behavior, the main need for a teacher's competence needed in determining the success of the learning process is mastery of expertise in their field. A teacher must have competence in mastering qualified knowledge to be able to guide students in the learning process towards targeted goals. Competence can be obtained through education, training, and self-study by utilizing learning resources (Jejen, 2012: 27)

2) Artificial Intelligence

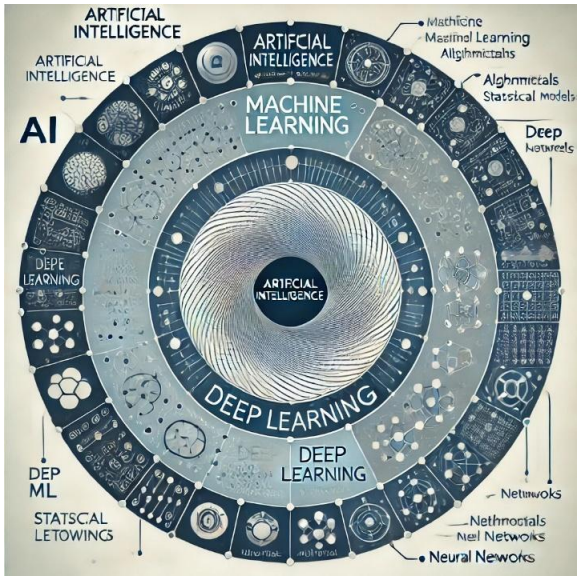


Figure 2. Illustration of Artificial Intelligence Diagram

According to Russell & Norvig (2010) in the book "Artificial Intelligence: A Modern Approach", AI is aimed at creating machines that can function automatically and with human-like intelligence.

AI was first recognized as an academic discipline in 1956 during the Dartmouth conference, organized by John McCarthy and colleagues, where they formulated the goal of creating machines that could "think". AI encompasses several sub-fields that include (Poole et al., 1998) such as Machine Learning (ML), Deep Learning, Natural Language Processing (NLP), and Robotics. The application of AI in used to perform tasks that usually require human intervention. Artificial Intelligence (AI) has also become one of the transformational technologies in education, providing significant opportunities to improve the learning and teaching process.

3) ChatGPT

ChatGPT, an advanced generative language model developed by OpenAI, has attracted widespread attention in various sectors, including education, customer service, and even in creative contexts. The model is part of the GPT (Generative Pre-trained Transformer) family of models, which has gone through several iterations of improvement since its initial launch. According to Jeremy Howard and Sylvain Gugger in their book "Deep Learning for Coders with fastai and PyTorch," GPT-3, the basis of ChatGPT, represents a significant advance in language modeling due to its size and complexity. It is capable of performing a wide range of language tasks without the need for task-specific training, demonstrating unprecedented flexibility in language modeling. This paper will explore the evolution of ChatGPT, its applications, potential, as well as the challenges associated with its use. The potential of ChatGPT lies in its ability to reduce workload and increase efficiency through the automation of text-based tasks. It also promises to increase information accessibility, providing the possibility to democratize knowledge and assist users from different language and educational backgrounds. Furthermore, as an educational tool, ChatGPT can tailor explanations and learning materials according to individual needs, enabling more personalized and adaptive education.

4) Teaching Materials

David Perkins, a professor at Harvard Graduate School of Education, emphasizes the importance of teaching materials that are contextual and relevant to students' real lives. In his book "Making Learning Whole," Perkins argues that teaching materials should allow students to apply what they learn in real situations and solve authentic problems, so that learning becomes more meaningful and memorable. Marc Prensky, famously known as "digital natives," emphasizes the importance of integrating technology in teaching materials to interest and engage students who have grown up in the digital age. In various works, including "Teaching Digital Natives," Prensky suggests that the use of digital tools and interactive media can make learning more relevant and interesting for today's students. Effective teaching materials, according to experts, should be contextualized, align with inclusive education standards, utilize technology, and support collaborative and project-based learning. A deep understanding of these principles and their application in curriculum design can help improve the quality of learning and prepare students for the challenges ahead.

b. **Problem-Solving Framework**

To overcome these problems, various training/workshop activities for teachers can be carried out with the following solutions.

1) Increased insight into the development of AI technology.
2) Provide an understanding of ChatGPT through training.
3) Provide an understanding of the development of teaching materials in accordance with the curriculum using ChatGPT.

c. **Target Audience**

The targeted targets in this PKM program are teachers of SMAS IT Al Hikmah Karanggede, Boyolali. The teachers consist of a group of teachers who teach subjects related to all subjects under the auspices of the educational institution SMAS IT Al Hikmah Karanggede, Boyolali.

d. **Activity Method**

The activity method chosen for the implementation of this PKM program is through training activities on the use of ChatGPT. To clarify the problems that arise, a question and answer method or dialogue will be carried out, and finally an activity evaluation will be carried out. The activity procedures taken to implement this PKM program are as follows:

1) Contacting the Head of SMAS IT Al Hikmah Karanggede, Boyolali to discuss the material to be delivered in the training program.
2) Organizing training with material: Utilization of ChatGPT for Teachers of SMAS IT Al Hikmah Karanggede, Boyolali in Making Teaching Materials.

e. **Evaluation Design**

The assessment of the success of the training program is conducted as material for program evaluation. The success of the program is seen from the achievement of the following parameters.

1) 20 participants or 80% of the invited participants attended the training.
2) The implementation of all ChatGPT Utilization Training activities.
3) 75% of participants who attended the training were able to utilize ChatGPT.
4) Statement of satisfaction from the training participants, and the Institute.

f. **Work Plan and Schedule**

The mechanism to overcome problems and achieve the expected goals requires appropriate activity methods. The methods of this activity include those described in the begin below.

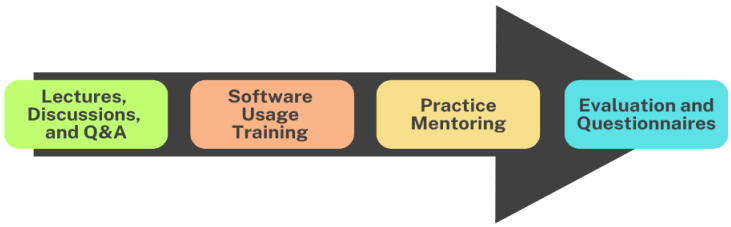


Figure 3. PKM Activity Method Diagram

1) Lecture, Discussion and Q&A

Lecture, discussion, and question and answer methods were used when providing training materials. The material presented was related to the concept of utilizing AI tools in education. Training participants can discuss with each other with the service team to further deepen the material presented.

2) Software Usage Training

The training provided is related to how to operate applications that support the development of learning media. The training starts from the introduction of tools, account registration, operation, to the process of overcoming problems in software or applications that are exemplified.

3) Practice Assistance

Continuous mentoring is carried out by the service team with the intention that participants can implement the theory and results of training practices in solving real problems.

4) Evaluation

The evaluation design is used as a direction for the service team to measure the success of the activity. The evaluation design is prepared from the preparation stage to the end of the activity. Each activity must have clear indicators of success and benchmarks. The evaluation design before, during, and after the implementation of Off-Campus Lecturer Activities is shown in Table 1.

Table 1. Evaluation design before, during, and after implementation

No	Activity	Outcome Indicator	Procedure	Measure Point
1.	Pre-Proposal	Drafted Proposal	Upload Proposal	Uploaded Proposal
2.	Proposal Seminar	Drafted Proposal Seminar Script	Attending the Proposal Seminar	The Proposal Has Been Seminars
3.	Preparation for DLK Implement-ation	Developed training materials	Setting up resources	Papers for each material have been Ready
4.	DLK Implementation	DLK is well done	Applytraining and mentoring methods	Draft research proposal by teacher
5.	DLK result seminar	Drafted results seminar paper	Attend the result seminar	PPM results have been disseminated
6.	DLK Reporting	DLK report compiled	Upload report to the system	DLK report uploaded in the system
7.	DLK Outputs	Designed product content as Digital Marketing Implementation	Identifying business opportunities	Product ad content ready for publishing

3. Results and Discussion

a. Results of Activity Implementation

This PPM PKM activity is in the form of training on the use of ChatGPT which was carried out for two consecutive days from Wednesday, July 17, 2024 to Thursday, July 18, 2024. The training target is teachers who are members of the Yayasan SMP IT Al Hikmah Surakarta group, which is 25 participants. The speakers consisted of five service teams who presented material on the use of ChatGPT. Training activities were carried out offline in the Yayayan school area of SMP IT Al Hikmah Surakarta. Details of the training activities carried out over two days are shown in the following figure.

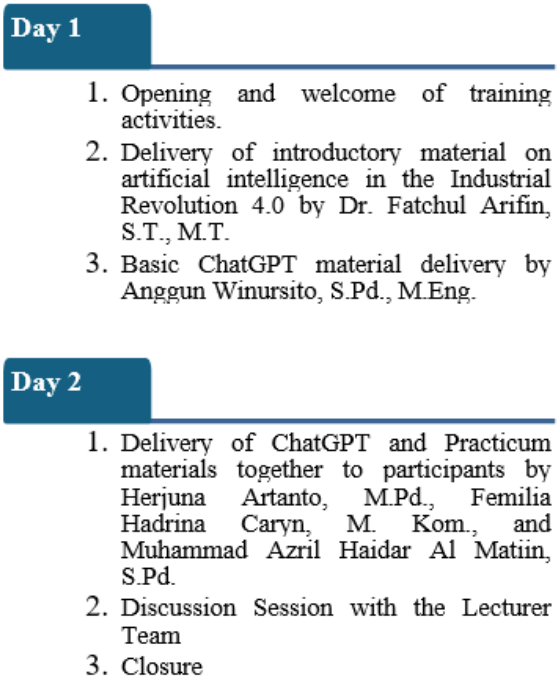


Figure 4. Details of Training Activities

The opening of the activity on the first day began with remarks from representatives of the PPM PKM team and the SMP IT Al Hikmah Surakarta Foundation. After that, the delivery of material 1 about introduction to artificial intelligence by Mr. Dr. Fatchul Arifin, M.T. and continued with introductory material about ChatGPT in Education by Anggun Winursito, S.Pd., M.Eng. On the second day, a brief presentation of practicum material and guided by several team members, namely Herjuna Artanto, M.Pd., Femilia Hadrina Caryn, M.Kom, and Muhammad Azril Haidar Al Matiin, S.Pd. This practicum activity is the culmination of ChatGPT training for curriculum development and teaching module development.

Training participants are directed to practice using ChatGPT directly with direction from the speaker, this is done so that participants understand directly about the material presented, which in fact most of the training material is the practice of compiling teaching modules. During the activity, the interaction between participants and presenters was always carried out through question and answer sessions and discussions. In addition, participants were directed to fill out a questionnaire as evaluation material regarding the training on the use of ChatGPT that had been carried out.

b. Discussion and Evaluation of Activities

The success of the implementation of the ChatGPT Technology Utilization activities can be analyzed from several factors, including the number of training participants, the percentage of attendance of participants, the increase in competence of training participants, and the level of participant satisfaction with the training program implemented.

1) Training Participants

The total number of participants who attended the ChatGPT Technology Utilization training was 25 people. While the presentation of participant attendance in participating in activities for 2 days was 80%. A total of 15 participants attended the training activities in full, while there were 10 people who did not attend the training for 1 day. From the average attendance of participants, it can be concluded that the training participants were enthusiastic about participating in the training activities.

2) Training Evaluation

The progress of the results of this training is measured by conducting an evaluation which is assessed directly by the participants with several question instruments. Details of the evaluation results of the ChatGPT Technology Utilization training at SMAS IT Al Hikmah are as follows.



Figure 5. Percentage of Participants' Responses to the Speaker's Mastery of the Material

Figure 5 shows the results of the trainee survey regarding the process of the basic Python programming training activities that have been carried out. According to the participants, the ChatGPT Technology Utilization training program at SMAS IT Al Hikmah that has been carried out, responding to the mastery of the material by the resource person is very good with a score of 93.3%. For other assessments, namely assessing the mastery of the material from the resource person well, amounting to 6.7%.



Figure 6. Percentage of Participants' Responses to the Proportion of Training Time

Figure 6 shows the results of the trainee survey regarding the process of the basic Python programming training activities that have been carried out. According to the participants, the ChatGPT Technology Utilization training program at SMAS IT Al Hikmah that has been carried out, responded to the proportion of training time very well, with a value of 73.3%. For other assessments, the proportion of training time was good, with a score of 26.7%.



Figure 7. Percentage of Participants' Responses to the way the speakers were delivered

Figure 7 shows the results of the trainee survey regarding the process of the basic Python programming training activities that have been carried out. According to the participants, the ChatGPT Technology Utilization training program at SMAS IT Al Hikmah that has been carried out, gave a response to the way the resource person delivered the training very well, with a score

of 93.3%. For other assessments, namely the way the training resource person delivered the training well, amounting to 6.7%.

The lowest point was reached in the proportion of training time. According to some feedback provided by the training participants, the two-day training period was still insufficient and considered too short. Additionally, the selection of training time coinciding with school activities caused some participants to lose focus during the training. However, in general, the participants were able to follow the training smoothly and directly felt the benefits of the program. The results of the survey on the usefulness of the training are as follows.

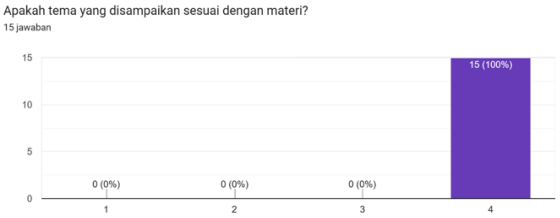


Figure 8. Survey of Participants' Opinions on the Training Theme

Figure 8 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the theme was deemed appropriate with a 100% percentage.



Figure 9. Survey of participants' opinions on the impact of broadening teachers' knowledge

Figure 9 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training had a positive impact on broadening teachers' knowledge with a percentage of 93.3%, which signifies an excellent outcome.

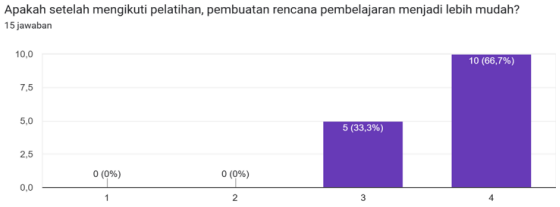


Figure 10. Survey of participants' opinions on lesson planning

Figure 10 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training had an impact on making lesson planning easier after the training, with 66.7% of respondents rating it as excellent, and the remaining 33.3% rating it as good.



Figure 11. Survey of participants' opinions on creating student progress reports

Figure 11 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training had an impact on making the creation of student progress reports easier, with 86.7% of respondents rating it as excellent, and the remaining 13.3% rating it as good.

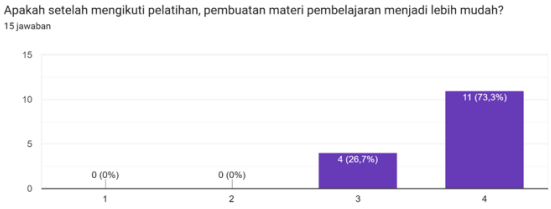


Figure 12. Survey of participants' opinions on creating learning materials

Figure 12 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training had an impact on making the creation of learning materials easier, with 73.3% of respondents rating it as excellent, and the remaining 26.7% rating it as good.



Figure 13. Survey of participants' opinions on creating exam questions

Figure 13 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training had an impact on making the creation of exam questions easier, with 80% of respondents rating it as excellent, 13.3% rating it as good, and the remaining 6.7% rating it as fair.



Figure 14. Survey of participants' opinions on using ChatGPT to assist with answering student questions

Figure 14 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training made it easier to assist with answering student questions, with 93.3% of respondents rating it as excellent and the remaining 6.7% rating it as fair.



Figure 15. Survey of participants' opinions on providing feedback to students

Figure 15 shows the survey results of participants from the ChatGPT Technology Utilization training at the SMAS IT Al Hikmah, indicating that the training made it easier to provide feedback to students, with 86.7% of respondents rating it as excellent and the remaining 13.3% rating it as good.

c. Supporting Factors and Inhibiting Factors of Activities

Based on the analysis of the implementation of the ChatGPT Technology Utilization Training Program at the SMAS IT Al Hikmah through direct observation and the use of survey tools, several supporting and inhibiting factors of the activities were identified as follows.

3) Supporting Factors of Activities

a) The presence of interest/need between both parties. The service team has the obligation to carry out community service, which aligns with the team's expertise in using and utilizing ChatGPT. Meanwhile, the teachers at SMAS IT Al Hikmah also require a program to enhance competence and curriculum

b) Support from the Chairman of the Educational Institution of SMAS IT Al Hikmah, which oversees the teachers of SMAS IT Al Hikmah.

c) The enthusiasm of the training participants, evidenced by the training quota being quickly filled in a short time during registration.

d) Support from Universitas Negeri Yogyakarta in providing funds for the needs of the training program implementation process.

e) Rapid technological development makes the development of curricula and teaching modules an important aspect for teachers to master, especially at SMAS IT Al Hikmah Karanggede, Boyolali .

4) Inhibiting Factors of Activities

a) The training timing coincides with the busy schedule of school activities, which is felt by some participants, thus hindering their ability to participate fully in the training program.

b) Differences in basic knowledge about the use of ChatGPT among participants, and some have difficulties using PC devices. Therefore, during the 2-day training program, some participants complained that the training time was too short to fully understand the use and benefits of ChatGPT.

4. Conclusion

The enthusiasm of the participants in the ChatGPT Technology Utilization Training Program was evident, as demonstrated by an 80% attendance rate over the two-day event. A total of 15 participants attended the full duration of the training, while 10 were absent for one day. The success of the training program can be analyzed through several factors, including participant attendance percentage, competency improvement of the participants, and their satisfaction level with the implemented training program.

The progress in participants' competency was measured by comparing the results of evaluations and surveys conducted post-training. The outcomes achieved an average score in the "very good" range, indicating that the ChatGPT Technology Utilization Training Program has successfully enhanced participants' understanding of using and leveraging ChatGPT to develop competencies and teaching modules.

The training program provided significant advantages to educators, enhancing their teaching methodologies and content development through advanced technological tools. Firstly, the program significantly expanded the teachers' understanding of ChatGPT, illustrating its practical uses and potential benefits in educational settings. This broadened perspective helps educators integrate AI tools into their teaching processes more effectively.

Furthermore, the training clarified the creation and implementation of curriculum-aligned teaching materials, plans, and modules. This ensures that educational content is not only relevant but also tailored to meet the specific competencies and learning goals of students. Participants also benefited from specialized sessions on crafting assessment questions, thereby improving their ability to evaluate student understanding and performance accurately.

Lastly, the program offered a comprehensive overview of ChatGPT's implementation in the classroom, demonstrating its practical applications. This helped educators visualize how AI can be

leveraged to enhance student engagement and learning outcomes, ultimately making teaching more dynamic and impactful.

Acknowledgment

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EARLY CHILDHOOD CHARACTER DEVELOPMENT IN INDONESIAN COASTAL KINDERGARTENS

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Abstract

A number of studies conducted by researchers from various countries have explored early childhood character. However, the results of the research have not focused on the character of early childhood in coastal kindergartens. This study seeks to fill the gap by conducting research to describe the character traits that develop in early childhood in coastal kindergartens. Data sources came from 10 kindergartens in the coastal areas of Buton Islands, Southeast Sulawesi Province, Indonesia. Using a research sample of 191 students in the 2024-2025 school year with a composition of 94 boys and 97 girls. The main research instrument was a closed questionnaire using a Likert scale with four choices that met the criteria of validity and reliability. The collected data were analyzed using descriptive statistical techniques. The results showed that early childhood character development is very diverse in various kindergartens and shows very positive development in spiritual and social aspects. In addition, many kindergartens have successfully developed positive character in early childhood, so that they can support the achievement of the golden generation 2045. The findings of this research can be utilized by the education office, principals, kindergarten teachers, and stakeholders in making character education implementation policies, so that character values derived from local wisdom of coastal culture are maintained and well preserved.

Keywords: character, early childhood, coastal areas, character education

1. Introduction

Character is closely related to morals that integrate cognitive, emotional, and behavioral dimensions. character changes based on social interactions and experiences, thus influencing moral decision-making [1]. Furthermore, character can manifest in various forms, such as moral character, which specifically relates to an individual's inclination towards ethical behavior [2]. Character is not an isolated trait but is influenced by various social contexts and relationships [3], [4]. Character is not just an abstract concept, but a dynamic system that integrates moral cognition, emotional capacity, and self-regulation [1]. Lickona identified three core components of character: moral knowledge, moral feelings, and moral action [5].

The importance of instilling character values from an early age, which can significantly affect children's development and interaction in their community [6]. Early childhood is known as the “golden period” for character education to be carried out effectively [7]. Character education should be systematically integrated into the early childhood curriculum [8]. Early childhood is a crucial phase in character building, where positive traits can be nurtured through consistent educational practices [9].

Some research results related to early childhood character education, including research conducted by [6] found that character education should include dimensions related to self, society, and the environment. In South Korea, character education in kindergarten to promote the value of empathy and respect [10]. Research has shown that children who participate in character education show improved emotional regulation and social interactions, which are critical for forming positive relationships with peers and adults [11], [12]. Research suggests that character education should begin at an early age, ideally in preschool settings, not only fostering self-confidence and positive attitudes, but also preparing children for formal schooling and lifelong learning [13].

Based on the description above, research on early childhood character has been conducted by many researchers from various countries, but no one has focused on early childhood character in coastal areas. Based on the existing gaps, this study seeks to fill the existing gaps by conducting research to describe the character that develops in early childhood in coastal kindergartens. Character education in coastal areas is a multifaceted issue that integrates local cultural values, environmental awareness, and

socioeconomic conditions. The unique challenges faced by coastal communities require special educational strategies that not only provide knowledge but also foster moral and ethical development among early childhood. One important aspect of character education in coastal areas is the integration of local wisdom. Embedding socio-cultural values into the educational framework can significantly improve character education [14].

Character development is an integral part of the education process [15]. Character education is a fundamental aspect of the educational process that aims to foster positive traits and behaviors in early childhood. Character education should be rooted in multicultural and local wisdom, which enables a more relevant and effective approach to education [6]. These culturally relevant practices help children relate to their environment and understand the importance of community values, which are integral to their social development [16]. The linkages between home, school and community environments create a comprehensive framework for character education, ensuring that children receive consistent messages about moral behavior [17]. Thus this study aims to accurately and comprehensively describe early childhood character development in kindergartens in coastal areas of Indonesia.

2. Method

This study uses a quantitative research design and involves descriptive quantitative to describe early childhood character in coastal kindergarten. The purpose of this study is to describe the development of early childhood character in kindergartens in coastal areas of Buton Islands, Southeast Sulawesi Province, Indonesia.

In this study, a cross-sectional approach was used to collect data, as it can increase the representation of the data collected, thus increasing the validity of the findings (Kesmodel, 2018). Data sources came from 10 kindergartens in the coastal area of Buton Islands, namely Anugrah Kindergarten, Bandar Batauga, Cahaya Bagea, Darmawanita Boneatiro, Karunia, Negeri 1 Laompo, Negeri 12 Buton, Negeri Lakudo, RA Asy Syukuria, and Sangia Gola. Using a research sample of 191 students in the 2024-2025 school year with a composition of 94 boys and 97 girls. From the data obtained, it can be seen that the proportion of boys and girls in each kindergarten varies. For example, in Anugrah Kindergarten, the ratio between boys and girls is 40% and 60%, while in Lakudo State Kindergarten, the composition of boys reaches 65% and girls 35%. These variations suggest that parents' interest in enrolling their children in a particular kindergarten may be influenced by various factors, such as the reputation of the institution, the programs offered, and the social environment around the kindergarten. Further analysis of this sample shows that overall, there is a balanced trend between the number of boys and girls in all kindergartens studied. The proportion of boys was around 49.2%, while girls were 50.8%. This reflects a relatively even distribution, although some kindergartens show significant imbalances in the number of children by gender. For example, kindergartens Sangia Gola has a higher proportion of girls (65%), while kindergartens Negeri Lakudo shows a higher proportion of boys (65%). These balances and imbalances highlight the social dynamics that may influence children's enrollment in early childhood education institutions. This study shows that there is variation in the gender composition of children in different kindergartens, with a relatively balanced total number of boys and girls. The imbalance in some kindergartens may indicate different enrollment preferences or policies, which may be influenced by various social and cultural factors.

The data collection period lasted for a month and involved face-to-face surveys conducted in each selected school. This approach was chosen to ensure that the questionnaires were administered correctly, achieve higher response rates, and minimize measurement error. The main research instrument was a closed-ended questionnaire using a Likert scale with four options of Never, Never, Sometimes, and Always. The questionnaire has 50 statement items that measure the four dimensions of character values, namely the dimensions of relationship with God (12 items), relationship with self (12 items), relationship with others (13 items), and relationship with the environment (13 items). This instrument was developed by Harun et al., (2020) which measures these four dimensions and obtained a CR value > (0.89) and VE value > (0.67) so that the reliability of the measurement instrument is very good.

The data collected was analyzed using descriptive statistical techniques that allow researchers to describe the development of early childhood character in coastal kindergartens, so as to provide accurate information on the achievements of early childhood character.

3. Results and Discussion

Based on the results of data analysis, information on early childhood character development in coastal kindergartens (TK) is obtained as follows:

3.1. TK Anugrah

The results of the measurement of student character values at Anugrah Kindergarten show very positive development in various important aspects. Of the 50 statements evaluated, students showed a high level of belief in God's power (92.5%) and a daily prayer routine (92.5%). In addition, they have strong empathy, as reflected in 91.25% of students helping without expecting anything in return and 93.75% helping without favoritism. The courtesy aspect is also very striking, with 98.75% of students speaking with good speech and 97.5% avoiding hurtful behavior towards others. Although there are some indicators that require more attention, such as awareness of delivering school fees (56.25%) and entrusted letters (68.75%), overall, these positive attitudes indicate a character that has begun to be cultivated among students. On the other hand, the habit of personal responsibility was also seen to be good, with high percentages in independent activities such as waking up (92.5%) and bathing (96.25%). However, some aspects related to tolerance of cultural and religious differences still need to be improved. This suggests an opportunity to develop a deeper understanding of diversity in the school environment. Overall, despite some challenges, these results reflect a strong foundation for students' character development, which is crucial for their future social and moral growth. Thus, students' character scores at Anugrah Kindergarten show significant achievements in the aspects of spirituality, empathy and responsibility. Although there are some areas for improvement, especially in terms of tolerance and respect for diversity, these results confirm the importance of continuing inclusive and sustainable character education. With an emphasis on these values, it is hoped that students will not only grow into good individuals, but also into members of society who value differences and build harmonious relationships.

3.2. TK Bandar Batauga

The results of measuring the character values of children at Bandar Batauga Kindergarten show a fairly good level of character development in most aspects. The majority of students showed a high belief in God's power, with 95% admitting to praying every day. While there were some high values, such as honesty (91.25%) and respecting the gifts of friends (81.25%), some values showed a need for further development, such as understanding diversity, where the percentage of respect for different ethnicities and groups still needed to be increased. In addition, children's independent skills in daily activities, such as eating and bathing by themselves, were also quite varied, showing potential for improvement. The highest scores were recorded for discipline in doing schoolwork (97.5%) and listening to the teacher (98.75%). In conclusion, although there are many positive aspects in students' character values, special attention needs to be given to strengthening respect for diversity as well as independence in daily activities, in order for children's character to develop more holistically.

3.3. TK Cahaya Bagea

The results of measuring children's character values at Bagea Kindergarten show diverse achievements in various aspects. In general, students have a high belief in God's power (100%) and show discipline in managing money and delivering messages from parents (100%). However, other spiritual aspects, such as prayer and worship, still need to be improved. Children's independence in daily activities, such as eating, bathing and dressing, is also seen to be good, with percentages above (80%). However, appreciation of diversity, both in terms of ethnicity and religion, still needs to be improved to establish togetherness with friends from different backgrounds), indicating the need to improve understanding and tolerance. On the other hand, social values such as being polite, not hurting others and establishing friendships showed quite good results, with percentages above 70%. In conclusion, although children at Bagea Kindergarten show positive character traits in many aspects, special attention needs to be given to improving understanding and appreciation of diversity and developing deeper spiritual attitudes so that children's character can develop better.

3.4. TK Darma Wanita Boneatiro

The results of measuring children's character values at Darma Wanita Boneatiro Kindergarten show varied achievements in various aspects of character. Most students have a fairly good belief in God's power (77.5%) and show high commitment in daily worship practices, with (85%) claiming to worship as God's command. Children's independence in daily activities, such as bathing and eating by

themselves, is also quite high, with scores above (80%). However, there are some areas that need more attention, such as respect for diversity needs to be improved. Students also showed good results in communicating politely (80%) and speaking honestly (73.75%), but scores for listening to friends and respecting friends' gifts need to be improved. Thus, although positive character traits were identified in many aspects, it is important to strengthen understanding and appreciation of diversity and improve social interactions so that children's character development can take place thoroughly and harmoniously.

3.5. TK Karunia

The results of measuring children's character values at Karunia Kindergarten show positive development in many aspects. The majority of students demonstrate a strong belief in God's power (90%) and show a high commitment to daily worship practices, with 81.25% reporting praying daily. Good social attitudes are also evident, with many students helping friends selflessly (85%) and speaking honestly (90%). Children's independence in daily activities is also good, especially in doing tasks given by parents (88.75%) and delivering messages from school (92.5%). However, some aspects show room for improvement, such as the value of appreciating the diversity of ethnic groups and the introduction to various regional arts and languages. In addition, although interfaith togetherness showed a fair rate, there are still opportunities to improve these interactions. Thus, although Karunia Kindergarten students show strong and positive character traits, it is important to continue developing respect for diversity and social interactions so that children's character can develop thoroughly and inclusively.

3.6. TK Negeri 1 Laompo

The results of measuring students' character values at State Kindergarten 1 Laompo show very positive achievements in various aspects. Most students show a strong belief in God's power (96.87%) and perform daily worship well, such as praying every day (95.31%) and worshiping according to God's commands (93.75%). Children's independence in daily activities is also good, with (82.81%) claiming to be able to wake up by themselves and (82.81%) being able to use water wisely. In addition, social attitudes such as helping friends selflessly (93.75%) and speaking well (95.31%) are also well reflected. However, there are some areas that require more attention, such as appreciation of diversity, and respect for various ethnicities and groups. Although students showed a good sense of unity with peers (71.88%), there is still room to improve interfaith interactions. Thus, although children at TK Negeri 1 Laompo show strong and positive character traits, it is important to continue to develop respect for diversity and improve social interactions so that children's character can develop as a whole.

3.7. TK Negeri 12 Buton

The results of measuring students' character values at TK Negeri 12 Buton showed some strengths and challenges that need to be addressed. The majority of students have a strong belief in God's power (93.75%) and show commitment to praying daily (90%). However, the value of performing worship as God's commandment and worshiping on time needs to be improved. On the other hand, students showed good independence in some aspects, such as bathing by themselves (95%) and eating by themselves (88.75%). However, the ability to help friends selflessly and communicate well still needs to be improved. Appreciation of diversity and respect for various ethnicities and groups needs to be improved. Although many students do not pick on friends (88.75%) and remain friendly despite mistakes (77.5%), there is still room to strengthen social interactions and care for others. Thus, although the students of TK Negeri 12 Buton demonstrated positive character traits in many aspects, a focus on improving social values and diversity as well as consistency in worship practices will be essential for more holistic character development.

3.8. TK Negeri Lakudo

The results of measuring students' character values at Lakudo State Kindergarten show very impressive achievements in the aspects of trust and social attitudes. Most students have a strong belief in God's power (98.75%) and regularly pray (98.75%), and have a high level of tolerance and concern for others, with (100%) students helping friends without favoritism and not choosing friends. In terms of communication, they also showed good skills with (100%) speaking with good speech and listening attentively (97.5%). However, there are some areas that require attention, such as low participation in ta'ziya activities and that show the need for improvement in appreciating cultural diversity. Overall, although there are some aspects that need improvement, Lakudo State Kindergarten succeeded in building a strong foundation of character, emphasizing spiritual, social and moral values in its children.

In conclusion, by strengthening the elements of respect for diversity and collaboration in social activities, the school can further develop the holistic and cultured character of its students.

3.9. TK/RA Asy-Syukuria

The measurement of students' character values at Asy-Syukuria Kindergarten showed positive achievements in various aspects of character. Most students have a strong belief in God's power (90%) and pray regularly (95%), reflecting a good spiritual foundation. They also show high social concern, such as selflessly helping friends (88.75%) and speaking kindly (83.75%). These students are also able to listen well to both parents (97.5%) and teachers (95%), showing respect for authority and effective communication. However, there are some areas that require attention, such as the low participation in ta'ziya activities and the introduction to different types of regional languages, indicating the need for improvement in terms of tolerance and respect for diversity. Overall, despite some challenges, Asy-Syukuria Kindergarten has successfully created an environment that supports holistic character development in its children. By raising awareness about the importance of cultural and social diversity, the school can further build solid and sustainable character values in students.

3.10. TK Sangia Gola.

The results of measuring students' character values at Sangia Gola Kindergarten show that children have a fairly good foundation in several important aspects, although there is still room for improvement. The average belief in God's power was recorded at (81.25%), and many students performed daily worship (71.25%). Good manners and speaking well also recorded high numbers, at (88.75%) and (86.25%) respectively. In terms of helping friends selflessly, only (68.75%) students showed this attitude, indicating the need to strengthen social values among them. Students showed independence in many ways, such as taking their own bath (88.75%) and doing tasks given by parents (81.25%). However, there are some aspects that need to be improved, such as respect for ethnic and group diversity, and participation in social activities such as ta'ziya. Thus, although Sangia Gola Kindergarten has been successful in building many positive characters, further efforts are needed to increase awareness of diversity and social collaboration among students, in order to create a more inclusive and harmonious environment.

Research has shown that early childhood character development is diverse and positive. In addition, many kindergartens in coastal areas have successfully developed positive character in early childhood with various types of approaches in character education. For example, instilling character values through the learning process. As in Bandar Batauga Kindergarten, teachers instill character values to children through delivery accompanied by outdoor games. Asy-Syukuria Kindergarten/RA teachers instill character values to children through delivery accompanied by providing examples of learning media that characterize coastal areas. Various character values are instilled in children through the learning process.



(Source: Research documentation, 2024)
Figure 1. Learning process at Bandar Batauga Kindergarten and RA Asy-Syukuria

Character value education has a good impact on the development of early childhood character in coastal areas. For example, characters related to God, self, others, and the environment. This finding is in line with some previous research results, namely [10] stated that all educational institutions should include elements of moral education, such as empathy and respect, in their teaching. Similarly, [18] found that teaching approaches can be used in kindergarten to instill values such as honesty and generosity, which are crucial for character development.

The cultural context of coastal areas also plays an important role in character education. The incorporation of local cultural wisdom into learning activities can accelerate the development of early childhood character values in coastal kindergartens. For example, local wisdom about ritual ceremonies performed by fishermen before going to sea (*Pikahondoanu hawu*), prohibition of utilization or fishing of small fish (*Pamali*), and ceremonies held once a year by coastal communities (*Pidoanokuri*), marine protection areas (*Ombo*). This condition is in line with the statement of [19], that the importance of recognizing and internalizing local cultural values to develop character in early childhood education. This statement is emphasized by [20] that the use of local arts and traditions as a means to strengthen character values. Thus character education in kindergarten is multifaceted, involving a variety of strategies that include positive psychology, physical activity, cultural integration and teacher-led initiatives. The collaborative efforts of educators, parents and communities are essential in nurturing children's moral and ethical development, ensuring they grow into individuals of good character.

4. Conclusion

The coastal communities of Buton Islands have maritime cultural values that have been passed down from generation to generation. Maritime culture which is used as a philosophy of life contains many good character values and has been accepted and applies to the coastal communities of Buton Islands, so that it becomes a developing and cultured character strength. This research found that the results of measuring students' character values in various kindergartens (TK) showed very positive developments in spiritual and social aspects. In Anugrah Kindergarten, most students showed a high belief in God's power (92.5%) and helped friends selflessly (91.25%), reflecting strong empathy. While there are challenges in appreciating diversity, these efforts show a good foundation of character. Bandar Batauga Kindergarten also showed good results, with 95% of students praying daily; however, attention is needed to improve understanding of diversity. At TK Cahaya Bagea, although trust is high (100%), improvement is needed in spiritual practices. TK Darma Wanita Boneatiro shows good daily worship commitment (85%) and has great potential in social aspects. TK Karunia and TK Negeri 1 Laompo showed significant progress in discipline and independence. At TK Negeri 12 Buton, belief in God's power is good (93.75%), although social interaction still needs to be improved. Lakudo State Kindergarten succeeded in building strong character, but participation in activities that value diversity needs to be strengthened. Although many kindergartens have successfully developed positive character traits in students, significant improvements in respect for diversity and social interactions are essential. Continued education should focus on the values of tolerance and mutual understanding to form individuals who are not only morally good, but also able to contribute to a harmonious and diverse society. This will create a golden generation that appreciates differences and is able to build positive relationships within the wider social environment.

The findings of this study are very useful theoretically and practically. Theoretically, it has provided information on early childhood character development in coastal kindergartens. Practically, it can be utilized by the education office, principals, and kindergarten teachers in making character education implementation policies, so that character values derived from local wisdom of maritime culture are maintained and well preserved. Users or researchers who want to continue this research should expand the research locus.

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LINGUISTIC ANALYSIS AND WRITING FRAMEWORK OF BEST PRACTICES BY SLEMAN JUNIOR AND ISLAMIC SCHOOL TEACHERS USING STAR METHOD

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Abstract

This study aims to analyze the linguistic aspects and writing structure of best practice articles from nine training outcomes for teachers and principals using the STAR (Situation, Task, Action, and Reflection) approach. The analysis results show that the articles were written with varied themes, including four articles on the theme of accompanying students, three articles on school leadership, one on teaching innovation, and one on self-development. Overall, the articles employ a narrative, dialogic writing style that is reader-friendly and easy to understand. The article framework consistently applies the STAR method (situation, task, action, and reflection), resulting in a flowing, chronological, and reflective storyline. This structure and framework effectively serve as a medium for teachers and principals to reflect on their experiences facing various educational challenges. However, several areas need improvement, such as standardized spelling and writing conventions, more effective sentence construction, and sharper reflective statements.

Keywords: *best practices, teachers, principals, reflection, STAR method*

1. Introduction

Best practice articles are essential for teachers and principals (Wahyudi et al., 2022; Prasetyo, B. H., & Nugroho, Y., 2020). Best practice articles can provide information for parents and guardians about how teachers and principals work to educate students. These writings can also inspire prospective teachers and the wider community to handle crucial learning situations (Dewi & Titisari, 2022). Teachers' and principals' ability to understand various learning models, innovations, and approaches to dealing with students can be effectively conveyed through these best practice articles. Implicitly, the outcomes of these writings can also benefit school marketing, showcasing the quality of teachers and principals in educating students (Weinreich, 2021; Zhang, Qu, & Bao, 2022).

To address this objective, the Community Service Team (PPM) from the Department of Indonesian Language and Literature Education at Universitas Negeri Yogyakarta conducted a best practice writing workshop for teachers and principals from junior high schools (SMP) and Islamic junior high schools (MTS) in Sleman Regency. The training was held from May to September 2024. During these four months, the teachers and principals received intensive materials and mentorship on writing. The writing technique used in the best practice articles followed the STAR method (Situation, Task, Action, and Result) and a process-based approach to writing stages (Byham, 2009; Tompkins, 2010).

This paper aims to identify and analyze the linguistic aspects and writing structure of the outcomes from the conducted training. Specifically, this paper will highlight the themes, linguistic structures, and strategies used by teachers and principals in conveying their experiences through writing. Similar research has been conducted extensively. Studies focusing on the linguistic analysis of best practice reports using the STAR method for junior high school teachers have been carried out by Hartanto, D., & Mulyani, S. (2020), Kurniasih, R. (2020), and Nugroho, Y. (2020). Meanwhile, research focusing on the writing skills of the STAR method among principals includes works by Nugroho, Y. (2020), Rahmawati, I. (2019), and Rahayu, N. (2021). Additionally, studies on best practice writing skills for teachers have been conducted by Lestari, M. A. (2020), Prasetyo, B. H., & Widjajanti, W. (2019), and Sutrisno, A. (2018).

2. Method

The object of study in this writing consists of nine articles from training, written by teachers and principals, with titles such as "Perubahan yang Berawal Dari Diri" by Rr. Amani Sri Marhaeni Ernawati, "Bisa Karena Terpaksa" by Didik Saifurrakhman, "Rasa Minder dan Terkucilkan yang Dirasakan Salah Satu Siswi di SMP Negeri 3 Godean" by Catur Haryadi, "Dari Kardus ke Pertunjukan Cantik" by Nurhidayati, "Kesempatan Kedua Sang Calon Tentara" by Umi Mubarokhah, "Mak Cess" and "Sangkur Kewibawaan" by Yuliyanto, "Nazril yang Butuh Perhatian" by Rismanto, and "Jatilan Nayoko Pramudya Spetusa Kebangganku" by Tri Worosetyaningsih.

These nine writings were selected because they reflect the application of the STAR method and uniquely capture the experiences of facing challenges in the school environment. The theory used to explain these writings includes linguistic analysis and the STAR method. The linguistic analysis focuses on aspects of structure, function, and meaning. In the context of best practice writing, linguistic analysis is aimed at identifying how the authors strategize in crafting effective learning experiences (Hartanto, D., & Mulyani, S., 2020; Kurniasih, R., 2021; Lestari, M. A., 2022).

Meanwhile, the STAR method is a narrative framework used to describe the situation, task, action, and reflection (Kurniasih, R., 2022; Lestari, M. A., 2021). Specifically, these components can be elaborated on as follows: The Situation aspect describes the context or background of an event. In the articles by teachers and principals, this aspect may include discussions on the classroom background, student profiles, or challenges faced. The Task aspect explains the duties and obstacles encountered, such as challenges in teaching, difficulties in implementing new learning strategies, or effective classroom management. The Action aspect presents the steps the teachers and principals took to complete the task, including teaching methods, communication approaches, and interventions used. Lastly, the Result and Reflection aspect outlines the outcomes of the actions taken by the teachers and principals in overcoming the challenges. This result can then be converted into a form of reflection that serves as an example for readers (Rahayu, N., 2021; Nugroho, Y., 2020; Wibowo, R. E., 2019; Zhang and Bao, X., 2022).

This study is a qualitative research focusing on text analysis. Therefore, the research emphasizes the description and interpretation of the meaning behind the language used and the application of the STAR writing technique. The analysis covers both narrative and discourse aspects. Narrative analysis identifies language usage patterns and themes within the written articles. In contrast, discourse analysis examines how meaning is constructed, particularly how the writers—teachers and principals—depict the situation, task, action, and result in their writings. The narrative analysis technique explains the use of diction, language style, and sentence structure. Meanwhile, the discourse analysis technique assesses how the STAR method is applied to construct meaning.

3. Results and Discussion

a. Results

Based on the analysis of the nine best practice articles, it was found that the article themes varied. The most common theme was guiding or mentoring students, with four articles covering this topic. These articles tell stories of the approaches taken by teachers and principals in supporting students. Patience, creativity, and kindness emerged as effective strategies in promoting student development. One example, titled "Kesempatan Kedua Sang Calon Tentara", tells the story of a teacher's patience in understanding and giving a second chance to a student who had violated the rules. With this patience, the students were able to reflect and improve themselves.

Meanwhile, the theme of school leadership also emerged as a significant topic, with three articles exploring this theme. These articles delve into the role of teachers and principals in creating a supportive learning environment. In the article "Perubahan yang Berawal Dari Diri", a participative leadership style is narrated, which successfully increased reading interest through engaging programs such as Literacy Thursdays, Performance Day, and Inspirational Fridays. These programs encouraged students to enjoy visiting the library. In another article, "bisa karena terpaksa", a principal successfully initiated a program to reduce waste and create a clean and comfortable school environment. These themes highlight that an adaptive and visionary leadership character is crucial and relevant to the evolving demands of education.

The themes of teaching innovation and teacher self-development are each represented by one article. The article on teaching innovation, titled "Jatilan Nayoko Pramudya Spetusa Kebangganku" discusses the role of the teacher in creating a cultural school program to channel students' interests and talents. Meanwhile, the article focusing on strengthening the integrity and trustworthiness of teachers is found in "Mak Ces." This article centres on the principal's reflection strategy to encourage teachers to be honest and recognize those who demonstrate such traits. Although fewer articles are written on these themes, they both offer valuable insights into the ongoing need for innovation in teaching and the commitment of teachers to professional development.

Table 1. Variety of Themes in Best Practice Writings by Teachers and Principals

Theme Variation	Number of Articles	Percentage
1. Experience of accompanying students	4	44,4%
2. School leadership	3	33,3 %
3. Teaching innovation	1	11%
4. Teacher self-development	1	11%

The themes mentioned above demonstrate that teachers and principals possess broad skills and experiences in dealing with school situations. They also play a significant role in creating a conducive learning environment for students' progress. However, there are recurring issues in the writing process. Based on the identification process, several recurring problems were found related to the focus of the writing. One of the main issues is the lack of focus on a single problem. Some articles attempt to address too many aspects at a time, making it difficult for readers to grasp the core issue being conveyed.

Some articles provide explanations of message organization that are not sufficiently complex or detailed. They often present brief summaries without elaborating on the steps or relevant details regarding the actions taken by teachers and principals in response to the challenges they faced. As a result, the explanations of how the ideas behind their actions worked are not fully detailed.

Another issue that emerged is the repetition of ideas and the lack of illustrations and concrete examples. Some articles repeatedly mention the same ideas without offering variations or introducing new relevant developments. This makes the writing feel monotonous and less dynamic, reducing its appeal and effectiveness in delivering the message to readers. Additionally, the lack of practical illustrations or real-life examples of situations experienced in the field makes it easier for readers to connect theory with practice. Readers need a clear depiction of how the ideas presented can be applied in everyday teaching contexts.

Meanwhile, several recurring mechanical language issues include 1) Incorrect use of punctuation, such as commas, periods, exclamation marks, question marks, and semicolons, misused or not by Indonesian language rules. 2) Inaccurate spelling, particularly the misuse of prefixes and suffixes, such as "di", often being incorrectly used for prefixes or prepositions. 3) Improper use of capital letters, such as using them for common nouns or failing to capitalize the first word of a sentence or proper nouns. 4) Ambiguous sentence structure, making it difficult to understand due to improper arrangement of subjects, predicates, and objects or the inappropriate use of conjunctions. 5) Incorrect use of formal language, such as writing terms or phrases that do not conform to the General Guidelines for Indonesian Spelling (EYD) or mixing formal and informal language. 6) The presence of overly long sentences makes it easier for readers to grasp the main ideas.

There were also issues found with the reflective writing, which tended to be shallow and overly general. Many articles describe the experiences and methods descriptively applied by teachers and principals without delving deeper into the reflective aspects, such as critical analysis of the learning process or outcomes. Teachers often needed to thoroughly explore why certain methods succeeded or failed and had yet to connect these reflections to educational theories or other relevant practices.

Table 2. Problems in Best Practice Writings by Teachers and Principals

Problems in Best Practice Writings by Teachers and Principals	Description
1. Writing Ideas	a. Lack of focus on a single issue
	b. Ideas are too general
	c. Lack of supporting data
	d. Explanations are not complex enough
2. Message Organization	a. Explanations are too general or not detailed
	b. Repetition of ideas
	c. Lack of illustrations and examples
3. Language Mechanics	a. Inconsistent use of punctuation
	b. Incorrect spelling
	c. Incorrect use of capital letters
	d. Sentences are too long
4. Depth of Reflection	a. Reflections are shallow and overly general

b. Discussion

This discussion section will provide a detailed explanation of the linguistic analysis and narrative framework analysis of the writings based on the STAR method as a way to construct meaning. The linguistic analysis will elaborate on narrative structure, diction selection, and sentence forms. The article "Sangkur Kewibawaan" is selected as a sample from the nine articles studied in this linguistic analysis.

c. Linguistic Analysis

The article "Sangkur Kewibawaan" employs a narrative style using a first-person perspective, "I." The storyteller can be assumed to be the author, which makes the content reflect a personal experience. This perspective gives the story a sense of intimacy and emotional depth. The author also utilizes imperative sentences to emphasize their thoughts and attitudes. This is particularly evident at the end of the article, where the author hopes their former student, Budi, becomes a better version of himself.

Semoga sudah semakin sejuk dan sangkur tersebut hanya untuk menambah kewibawaan sebagai komandan dan tidak akan pernah digunakan untuk melukai orang lain.

The article employs a flowing writing style. The sentences vary in structure, avoiding monotony. There are short, direct sentences conveying straightforward messages and longer, more complex sentences with layered meanings. The longer sentences seem to consist of multiple pieces of information at once. Here is an example of such a sentence.

Siang yang cukup terik ketika duduk santai di beranda rumah aku dikejutkan dengan kedatangan seorang laki-laki berbadan tegap menyapa dengan sopan "Assalamu'alaikum."

The excerpt above illustrates that the sentence employs a complex structure of multiple ideas and messages simultaneously. Within this single sentence is a description of the scorching midday heat *(siang yang cukup terik)*, the activity of sitting leisurely *(ketika duduk santai)*, and the interaction interrupted by the sudden arrival of a man (*dikejutkan dengan kedatangan seorang laki-laki)*. In contrast, short sentences are typically used to emphasize specific points, as seen in the following sentence: *"Bapak lupa ya saya murid bapak yang lulus tahun 2003."* This declarative sentence is an example of a short sentence that narrates the protagonist's inability to recall their former student immediately. The presence of both complex and direct sentences highlights the writer's skill in developing ideas effectively.

In addition, the writing does not only rely on narrative descriptions but also incorporates interactive dialogue. The dialogue used in the text is natural and realistic, reflecting everyday interactions between a teacher and a former student. Moreover, the dialogue effectively introduces elements of tension that pique the reader's curiosity. This is demonstrated in the following excerpt*: "Bapak mohon maaf saya menanyakan dan mau mengambil sangkur yang dulu bapak sita dari saya waktu sekolah*." This sentence portrays an unusual request from the student. It also creates an awkward feeling for the protagonist, adding to the tension of the conversation. This sentence evokes curiosity and suspense in the story, encouraging readers to continue reading and wonder about the outcome.

Overall, the linguistic aspects, including sentence structure, diction, and dialogue, effectively present the story of the confiscated bayonet incident. The main theme of this writing is maturity and character transformation. The author conveys the message that past mistakes should serve as lessons for the future. Additionally, the story narrates the theme of the teacher-student relationship, which is nurturing, close, and formal—not only within the classroom but also in everyday life.

d. STAR-Based Narrative Framework as a Meaning Builder

This writing creatively employs the best practice framework based on the STAR method. The Situation aspect is narrated effectively, with a midday setting on the house veranda, featuring the characters of "I" (the teacher) and Budi (the former student). This aspect appears at the story's beginning and is an effective entry point for the writer to start the narrative. The situation also introduces tension, sparking the reader's curiosity, as Budi unexpectedly visits the protagonist's house while they are sitting on the veranda. Questions arise about Budi's purpose and how the protagonist, as a teacher, will respond. This creates a puzzle, drawing readers in and encouraging them to follow the storyline.

The Task aspect in this story is introduced after the setting has been established. It challenges how the teacher should respond to the former student's request to return the bayonet that was confiscated 18 years ago. This challenge carries a moral element, as the bayonet holds sentimental value for Budi, being his father, a retired soldier. On the other hand, the protagonist, as the teacher, must also prioritize safety since the original reason for confiscating the bayonet was to prevent Budi from getting involved in a fight. This challenge creates an emotional inner conflict between the teacher and Budi, adding depth to the story.

The Action aspect is conveyed after the challenge is narrated. The protagonist (the teacher) is shown finding a solution through several steps. First, they recall the location of the confiscated bayonet and provide straightforward information to Budi. Second, they offer money as compensation for the lost bayonet, attempting to meet Budi's request without compromising safety. Third, they manage the situation patiently and avoid confrontation despite feeling pressured.

The Reflection stage is demonstrated by the protagonist's contemplation of the event. The sentence, *"Masih termenung di beranda rumah kenapa aku memiliki murid seperti itu..."* directly shows introspection and deep reflection. Several forms of reflection are presented, such as the teacher realizing that they must continue to show care and concern for current and former students, whether in school or out, as children or adults. This care manifests as a commitment to continue educating. The author also reflects on their hope that Budi will become a better person, not harsh or aggressive, and will take responsibility in his role as a security guard.

Based on the explanation above, it is evident that the narrative framework of the STAR method was applied effectively, consistently, and chronologically in this writing. Readers can seamlessly follow the story with curiosity and emotional engagement. The writer successfully provided thoughtful reflections on the teaching profession, highlighting the ongoing responsibility of educators in shaping their students not only within the school environment but also beyond, and not only during childhood but into adulthood. Teachers play an exceptionally important role and bear great responsibility in education development.

4. Conclusion

Based on the analysis of the best practice writings produced by teachers and principals, the following conclusions can be drawn: a). The best practice writings by teachers and principals successfully narrate their experiences chronologically, describing the challenges faced, actions taken, and reflections on the results obtained. b). The language used in the writing flows smoothly, contains interactive dialogue, and plays a crucial role in creating emotional connections with readers.

However, there are several areas for improvement: a). The writings by teachers and principals need more focus on a single topic. b). The presentation of ideas needs to be more specific. c). The writings need concrete data to support the ideas presented. d). The reflections are descriptive without deep analysis regarding the success or failure of the methods used. e). Language mechanics still have errors, particularly in the use of proper Indonesian spelling and grammar rules (EYD).

Based on these findings, the study suggests efforts to improve the quality of best practice writing by emphasizing narrative focus, the presentation of empirical evidence, and the development of more critical and in-depth reflections. These steps will strengthen the role of best practice writings as an inspirational and educational medium for other teachers and the general public.

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IMPROVING STUDENTS' SPEAKING SKILL THROUGH NEWS ANCHOR AND REPORTER ROLE PLAY

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Abstract

This training aims to develop communication skills, improve understanding of media, and shape character and social responsibility. This reporter training has been conducted and located at Faculty of Languages, Arts, and Cultures Universitas Negeri Yogyakarta. The participants were students from SMK Berbah, Sleman, Special Region of Yogyakarta. From the results of this training, reporter products were made by students, which were then analyzed as material for product improvement and subsequent training. The results of this training analysis are as follows. First, the training was carried out through several stages: Workshop and Direct Training, Discussion and Case Comparison, Media Literacy Training, Community Journalism Projects the Use of Technology in Journalism, Interview and Writing Simulations, Mentorships, Presentations, Exhibitions of Work Results, and Evaluations. Second, students' abilities in developing ideas are good. Third, the students' product from the linguistic aspect are quite good although there are still some things that need to be improved such as word choice, pronunciation and articulation, dialect, and nonverbal communication.

Keywords: training, reporter, communication, SMK Berbah

1. Introduction

The world of journalism in this digital era has become commonplace for every level of society. People can easily consume or access news and compile news easily and quickly. Any event in any part of the world can be easily and quickly accessed by the public and can also be reported quickly by the public. This is what is known as an independent journalist. Every individual can become a journalist, both amateur and professional journalists. Especially among teenagers.

Teenagers, with their ability to master internet technology, make it easier for them to work. Teenagers quickly compile and report every news into interesting content on social media. With this social media capital, this content emerges and becomes a means of communication among teenagers widely. According to Parwati, (2014) The contribution of teenagers to the world of communication or journalism can be a very valuable element. Although they may not have the same experience as professional journalists, teenagers can bring a fresh perspective, creative energy, and courage to voice issues that may be missed by traditional media. Teenagers can be pioneers, narrators and strong drivers for certain issues related to their generation. The topics raised range from topics of education, health, psychology, work, sports entertainment and others. What is clear is that the topics raised are hot topics to discuss in the youth community (Fakhrurozi et al., 2022; Salniwati et al., 2022; Sumbogo & Diposumarto, 2017).

In communication practice, adolescents often face a number of challenges in communicating. They often face a number of problems that can affect their level of comfort, confidence, and effectiveness. Many adolescents may not yet have good communication skills, including the ability to write and speak in public (Anwari, 2020; Fakhrurozi et al., 2022; Gama & Kusumawati, 2020; Meliala et al., 2019; Salniwati et al., 2022). Some of the obstacles teenagers face when communicating include: 1) they sometimes have difficulty conveying their ideas or opinions in writing or verbally, 2) teenagers can often be confused in navigating information received from various sources, 3) some teenagers are sometimes reluctant or not confident in participating in discussions, whether in class or in social settings, 4) some teenagers may be less concerned about social issues or do not understand their impact, 5) teenagers may not fully understand the ethics of communication, both verbally and in writing, 6) some teenagers may have difficulty organizing information in a structured and logical manner, 7) teenagers may not be very interested or involved in the world of journalism and media, 9) given the increasing role of technology in communication, teenagers may need, 10) some teenagers are less involved in social activities or community activities. Based on the above problems, through reporter training, teenagers are expected to be able to overcome a number of challenges in this form of

communication. And this is part of developing their skills that will help them in their daily lives, education, and social interactions. To see the effectiveness of this training, an analysis of the students' report results is needed, and this can then be used as a basis for developing the next communication skills.

Based on the background above, the purpose of this article is as follows: (1) to describe the training and evaluation process of reporting for students of SMK Muhammadiyah Berbah, Sleman Regency, Special Region of Yogyakarta; (2) to explain students' abilities in developing ideas based on journalistic principles and news schemes?; and (3) to analyze the results of students' news reporting in terms of language?

2. Method

This research on student reports is included in qualitative descriptive research. The approach is with the perspective of structural and functional analysis. This research will operationally describe the process of compiling news reports in the realm of formal communication. The data source for this research is the results of compiling news reports from students of SMK Muhammadyah Berbah, Sleman Regency, Special Region of Yogyakarta.

The data collection technique in this study was by using the listening/reading and taking notes technique. The reading and taking notes technique includes five steps, namely: (1) carefully listening to the results of the student's news report in the form of a video which is the source of research data, (2) identifying various forms of diction, presentation topics and functions in the news report. (3) compiling various lingual research data in a matrix to make it easy to categorize and analyze based on the diction components in the report (4) categorizing all data based on formal language diction criteria (5) describing the data.

The collected research data were analyzed descriptively qualitatively. The steps of data analysis are as follows. First, data are collected and categorized based on research themes/topics. Second, data analysis is continued based on the instruments that have been created. Data analysis is carried out in the following manner: 1) identification of data based on problems, 2) tabulation process and explanation descriptively qualitatively (3) Analysis and interpretation of data that are interrelated in speech components (4) meaning and conclusions of data. The following is a description of the data analysis techniques in this study.

3. Results and Discussion

Training and Evaluation Stage

The reporter training for students utilizing SMK Muhammadyah Berbah uses a participatory method, namely a method that involves active participation of students through practical learning and skill development. Here are some steps taken in this training.

a. Workshop: Introduction to Journalism, Reportage, and Public Speaking

This workshop or hands-on training session actively engages students. The material covers the basics of journalism, ethics, news writing, interviewing, and editing skills. Ask participants to engage in practical exercises. This training is presented for 6 hours in turns with small groups being made in its implementation.

b. Discussion and Case Comparison

Discussions on various cases in the world of journalism involving students are very effective in providing students with a direct picture of the problematic topics that can be raised in journalistic types. This discussion also includes an explanation of journalistic ethics, responsibility, and the impact of information. Students are asked to analyze and compare various cases in various perspectives according to their understanding. At the end, students are asked to make discussion results and compile conclusions to be written down.

c. Community Journalism Project

The implementation of this practical approach is by providing protection to students directly by providing group journalism projects or in youth journalist communities. On the side of students can directly cover the news by choosing local issues or stories that they want to report. The steps begin with observation, conducting simple research by interviewing local

figures, and the final result is compiling the results of the interviews and observations into news or articles.

d. Interview and Writing Simulation

The next step is to provide training in interview simulation and news writing for students. This technique is a continuation of the interview process in real situations during interviews. This practice aims to practice interview skills and express them in the form of news writing. Furthermore, the supervisor will provide constructive feedback to help students improve their writing skills.

e. The Use of Technology in Journalism

The next focus is on the use of technology in journalism. This training aims to help students use recording equipment, video editing applications, and other digital tools. It can also include training on ethics and responsibility in the use of technology. This step is interesting for students because students are invited to practice in real terms with the equipment they have, such as cellphones, cameras or other recording devices.

f. Media Literacy Traning

The inclusion of media literacy training as part of this program by involving mentors. Provision of mentorship by professionals in the field of journalism. Can provide direct experience and gain objective views from mentors who have worked in the media industry. Mentorship also provides an opportunity to ask questions and discuss. In this process, students will also be taught how to understand and critically assess information, identify reliable sources, and avoid the spread of false information. In this activity, direct compilation projects are also carried out. Giving individual or group project assignments allows students to explore their own interests and talents. This can include assignments to write personal articles, create vlogs, or investigate certain issues that they consider important.

g. Mentorships

This stage is signifiant to prove a mentor for students. The mentors are from journalism professionals. Teenagers can learn from first-hand experience and gain insight from those already working in the media industry. Mentorship also provides an opportunity for questions and discussions.

h. Presentations

The next training is related to presentations. In this activity, students will be taught how to convey information effectively by including performance and presentation exercises. Students can practice public speaking, use effective body language, and build relationships with the audience.

i. Exhibitions

At the end of the training, an exhibition of the students' work is held. They can present their projects, share their experiences, and get feedback from peers and journalistic professionals who may be invited to attend. Through this method, reporter training for students can be an empowering, educational, and skill-building experience in the world of journalism. In addition, it provides space for creativity, self-expression, and personal growth.

j. Evaluation

Evaluation of reporter training for students can be done through the practical skills assessment approach. This approach involves students in practical journalism tasks or projects as part of the training. Evaluation can be done by assessing the results of their work, be it articles, videos, podcasts, or community journalism projects. Consideration of quality, diversity of sources, and the impact of the information presented.

In addition to the evaluation model above, it is also done by utilizing tools and technology. Use of tools and technology: evaluation can be done by observing the extent to which students have mastered the use of tools and technology taught during training. This also takes into account students' abilities in using cameras, editing software, social media platforms, or other technological tools.

The next evaluation with Collaborative Activities: see the extent to which teenagers participate in collaborative activities. Evaluations can include assessments of active involvement, contributions to group projects, and the ability to work together in a team. The next step with Self-evaluation and reflection: training participants are given the opportunity to conduct self-evaluation and reflection. Students are asked to assess how much they feel they have developed, what they have learned, and which areas still need to be improved.

Based on the explanation above, it can be concluded that each evaluation method must be adjusted to the training objectives and characteristics of the participants. The results of the evaluation can be used to improve the design of future training programs and ensure that teenagers get the most out of their journalism experience.

Students' Ability in Developing Ideas

The development of ideas in compiling news for vocational high school students is a special concern, considering that this is the main objective in the news report training process. This is based on the initial objective, namely to foster students' ability to compile news, how students' ability to develop ideas, how students express ideas in writing and how students are able to compile news into a report. The development of ideas and compilation of this report news is also based on journalistic principles and news schemes in the context of media discourse.

The journalistic principles that are used as a guideline in this training refer to four general journalistic principles, namely accuracy, fairness, impartiality (Morison, 2010: 249). And what is used as a guideline in presenting news is that the news presentation certainly meets the criteria of 5 W and 1 H. These four principles will be used as guidelines for assessment in analyzing the discourse of vocational high school student report news from the results of the report training. Based on the results of the analysis of the report news of SMK Muhammadyah Berbah students, the results can be written as follows.

a. Accuracy

Thus the interview results also meet the standard truth. For example, when displaying the amount of tuition payments and total costs at the vocational school, students choose informants from the vice principal for finance to be the main source of news. This is to minimize errors in the information that will be presented.

b. Fair

News writers must be fair, balanced, complete and impartial in presenting their news information. The use of photo clippings, in a particular event must be presented in the right context, fairly and not detrimental to other parties who are the subject of the news. Information must be accompanied by details of when, where and when the clippings or events were taken. Thus, the context can be captured accurately and clearly. This has also been done by vocational high school students, additional information in the form of images accompanied by information on the time of the event. So, the images, photos that exist have a supporting function to present the contents of the news fairly and accurately.

c. Impartiality

This criterion is related to the facts presented in the news. The facts presented must be balanced and objective, must be independent. In the context of the news discourse of SMK Berbah students, the objective presentation has not been presented clearly. In the news, there are still subjective elements in the presentation of the news facts. For the presentation of the news, there are no misleading elements, and it does not highlight or side with certain groups.

d. News elements 5 W and 1 H

The presentation of news content must meet the criteria of 5 W 1 H, namely what, where, when, who and how the event took place. For the presentation of the news of SMK Berbah Sleman students, it is only limited to 5 W, but how this event took place has not been explained in detail. This is understandable because the informant interview process has not been carried out in depth. Thus, the information obtained is still limited to superficial matters.

Language Features in Students' Products

Language features are important when conveying information to others, especially when speaking in public. In terms of language features, there are things that must be considered such as the accuracy of diction selection, pronunciation, and dialect (Lamerton, 2001: 25-47; Templeton, 2010: 147-150). The following are the findings of language features used by students in their reportage products.

a. Word Choice

In the student reportage video, there are two roles that emerge and are evaluated, namely as a news presenter and a reporter in the field. In general, the choice of diction is good, but it is still necessary to pay attention to the accuracy of diction so that the information conveyed is more effective. One of the important things for successful communication is word choice (Templeton, 2010: 147). The diction used must be able to arouse the listener's imagination so that they get the right picture of the event being reported. The following is one of the inappropriate word choices.

Data 1 : …marilah kita lihat salah satu ***jurnalistik*** SMK Muhammadiyah Berbah yang sedang bersama calon peserta didik baru SMK Muhammadiyah….

In the data above, students use inappropriate diction. The word "journalistic" should be replaced with the word "journalist" or "reporter". This is because the use of the word "journalistic" is not in accordance with the context of the speech. According to the Big Indonesian Dictionary (KBBI), the word "journalistic" means 'concerning journalism and newspapers'. The word that should be used is "journalist" because refers to people who are covering or gathering news in the field. Thus, the diction in the videos produced by students still needs to be improved.

In delivering news in the mass media, the words chosen should also be as simple as possible and supported by visualization to provide a clear picture to the listeners. In addition, if there is an abbreviation that appears, it should be started with the full word so as not to confuse the listeners as the following data findings.

Data 2 : … SMK Muhammadiyah Berbah telah membuka PPDB pada tanggal 1 Desember 2024 hingga tanggal 5 Juli 2024 ….

In the data above, there is an abbreviation "PPDB" which is formed from the words "Penerimaan Siswa Didik Baru". For some people, they might understand the meaning of the abbreviation. However, some people may not be familiar with it so it is better to mention the abbreviation "PPDB" in the speech first. Moreover, viewers or listeners of the news can come from various circles. From the two data findings above, it can be synthesized that word choice is something that needs to be considered in public speaking.

b. Pronounciation and Articulation

Pronunciation can be interpreted as how someone pronounces a sound of language. By listening to someone's pronunciation, the listener can assume the level of intelligence, professionalism, and potential of a speaker (Templeton, 2010: 148). In addition, the pronunciation of a word can affect the listener's perception. Therefore, a speaker must be able to pronounce words correctly and clearly so that they are conveyed well to the listener's ears. In the video of the student's report, in general, the students' pronunciation is good, but there are some words that are pronounced less clearly. The following is the data found in the video.

Data 3 : … Puspitasari **mengundurkan diri**….

In the data above, the phrase “resign” is pronounced in a hurry so that it sounds unclear what the student is talking about. In the context of public speaking, pronunciation and intonation must be clear so as not to affect the words spoken.

c. Dialect

The third aspect of language that needs to be considered when speaking in public is dialect (Templeton, 2010: 148). Dialect can be interpreted as a variation of language (Ronald and Wardhaugh, 2010: 29). Although a group of people use the same language, there are variations that arise due to geographical differences. In addition, there is also the influence of the mother tongue or what is called interference when we speak using a second language or foreign language. In terms of speaking in public, a speaker should avoid the influence of the mother tongue in order to sound formal. In the video of the results of the student report, overall, the students' Indonesian pronunciation is good, but several words were found that were pronounced not in accordance with the standard Indonesian language. The following is the data findings.

Data 4 … saya di sini bersama calon murid SMK Muhammadiyah (m)Berbah ….

In the data above, it can be seen that the word "Berbah" is pronounced <mBerbah>. This is because of the influence of their mother tongue, namely Javanese. This pronunciation does not affect the meaning produced. It's just that it doesn't sound like standard Indonesian. Therefore, when speaking in public, a person needs to be free from interference mother tongue so that the language produced is in accordance with the language standards used.

Nonverbal Communication

Each of elements of nonverbal communications which can strongly influence what your audience hears speakers say (Templeton, 2010: 156). Nonverbal communication includes paralanguage, posture, dress, facial expression, eye contact, gestures, and body movement. From the student’s products, they need to improve their nonverbal communications to make communication more effective and interesting.

4. Conclusion

Based on the data above, we can conclude that this training can help students to improve their speaking skills. They can develop their ideas well although there are several notes that can be used to make their perfomances better. They need to pay attention several aspects such as word choice, pronounciation and articulation, dialect, and nonverbal communication.

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SOCIAL-PSYCHOLOGICAL RESILIENCE OF CIGARETTE FACTORY WORKERS IN BANGUNHARJO VILLAGE, SEWON DISTRICT, BANTUL REGENCY, SPECIAL REGION OF YOGYAKARTA

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Abstract

This research focuses on the social-psychological resilience of cigarette factory workers' families in Bangunharjo Village, Sewon District, Bantul Regency, Yogyakarta. Factory workers' families often face socio-economic challenges such as job uncertainty, tough working conditions, and unstable income, which can affect their psychological well-being. This study aims to understand how these families build resilience in facing such pressures. Using a qualitative approach with in-depth interview methods, the findings show that social support from family and coworkers is a key factor that helps them cope with stress. Additionally, stress management strategies, such as sharing workloads and maintaining a balance between work and family life, are proven effective in building social-psychological resilience. Although the work environment is relatively supportive, there is a need to improve healthcare facilities and workplace health programs. These findings provide insights for the government and other stakeholders to design programs that holistically support the well-being of factory workers' families.

Keywords: Resilience, Workers' Families, Social-Psychological Resilience

1. Introduction

Resilience is an individual's effort to adapt to stressful conditions, allowing them to overcome the difficulties they face. In general, resilience also refers to several factors that prevent a person from engaging in negative behavior associated with stress and adaptive outcomes, even when confronted with adversity or misfortune.

Resilience is closely related to the stress conditions that an individual faces, as the two are constructs that cannot be separated. Resilience can only be explained when someone is facing stressful or adverse conditions, which can trigger stress. In this context, it can be considered resilience if a person manages stress in a way that leads to positive adaptation. Conversely, a person is not considered resilient if stressful and adverse conditions instead lead them to engage in negative behavior.

Essentially, everyone possesses resilience within themselves, although in its development, resilience is understood as an attitude that is shaped not only by individual or genetic factors but also by other factors such as culture and the surrounding environment. While it cannot be denied that genetic factors have a significant influence, in reality, culture and the environment also contribute to increasing or decreasing the level of resilience.

The family is one of the key components in building resilience. It is through the family that an individual can also learn how to face challenges, manage stress, and adapt to changes. A family can be said to have a high level of resilience if it meets several aspects: 1) physical resilience, which is closely related to the fulfillment of food, clothing, housing, education, and health needs; 2) social resilience, which is oriented towards religious values, effective communication, and a high level of family commitment aimed at improving quality [1]; and 3) psychological resilience, which includes the ability to cope with non-physical problems, positive emotional control, a positive self-concept, and the husband's care and support for his wife.

In the context of factory workers' family resilience, they represent a segment that is vulnerable to complex socio-economic pressures. They often face challenges such as job uncertainty, harsh working conditions, unpredictable income, and limited access to resources and supportive social networks. As a result, factory workers' families can experience significant psychological stress that threatens their well-being and family sustainability. Therefore, it is important to understand the social-

psychological resilience strategies employed by these families to cope with pressures and build resilience.

Resilience is the ability of individuals or families to face, overcome, and even grow from adverse experiences. These strategies include stress management, strengthening social support, developing a positive mental attitude, and finding internal and external resources that enable adaptation and recovery. Ultimately, with a better understanding of these strategies, it will be more feasible for the government, non-governmental organizations, and other stakeholders to design programs that holistically support the well-being of factory workers' families.

2. Method

The focus of this research is to understand the level of social-psychological resilience in the families of cigarette factory workers in Bangunharjo Village, Sewon, Bantul, Yogyakarta. This type of research is qualitative with a naturalistic approach. Sugiyono (2008: 15) explains that the qualitative research method is used to obtain in-depth data, data that contains meaning. Meaning is the real data, the definite data, representing the value behind the apparent data. The research subjects are cigarette factory workers at PT HM Sampoerna Tbk, located on Jalan Imogiri Barat, Bangunharjo, Sewon, Wojo, Bangunharjo, Sewon District, Bantul, Special Region of Yogyakarta.

The primary data sources in this research were obtained through in-depth interviews. Meanwhile, the secondary data were collected from participatory observations and documentation. To ensure the credibility and validity of the data, triangulation techniques and member checking were used to confirm that the data interpretation aligns with their experiences.



Figure 1. Research Method

3. Results and Discussion

Based on the interviews conducted, considering the number and criteria of respondents, varied results were obtained in terms of how they face challenges and manage pressure in the workplace. In general, workers experience work-related pressure, one of which comes from strict production targets. Additionally, physical and mental health aspects present further challenges, especially due to the nature of the job involving exposure to tobacco and other chemicals. Nevertheless, the workers are ultimately able to cope with these pressures thanks to strong support from coworkers and family. The following section will elaborate on the detailed analysis of the data, followed by a discussion of how these findings relate to relevant theories and literature.

Workplace Environment Conditions and Workers' Well-Being

In reality, the workplace environment significantly affects the performance of workers within it [2], [3]. The data obtained indicates that the majority of workers assess the working environment in

the cigarette factory as good, particularly in terms of cleanliness and comfort, which undeniably contribute to a conducive work atmosphere. A clean working environment is important because it directly relates to workers' health. A well-maintained workplace helps reduce the risk of exposure to tobacco dust and chemicals that may have harmful effects on workers' respiratory health.

Moreover, relationships between workers are also considered positive, such as helping each other to meet production targets. Some workers feel that these relationships not only help them complete tasks more quickly but also enhance the sense of camaraderie and moral support in the workplace.

Although workers generally feel comfortable with the conditions inside the factory, there are certain areas that need improvement, such as adding more rest facilities and enhancing workplace health programs. Providing physical exercise facilities within the factory premises could also be beneficial, allowing workers to use them to maintain their physical health, especially for those who work overtime [4]. Therefore, improving supporting facilities and health programs should be prioritized to ensure the long-term well-being of the workers.

Workers' Physical Health

Some workers admit that they have concerns regarding the long-term health effects caused by exposure to certain chemicals and tobacco during the cigarette production process. For instance, tobacco dust, a primary ingredient in cigarette production, if inhaled frequently over a long period, can lead to respiratory issues or even serious respiratory diseases [5]. Some workers are aware of this potential risk, while others have less understanding of the health risks associated with the factory they work in.

Workers who have been employed for more than 10 years mention that they feel physically healthy at present but remain cautious about future health risks, such as respiratory problems. Repeated exposure to tobacco, even in a clean environment, still poses a risk to workers' health. Given these risks, regular health monitoring is necessary, especially for long-term employees. Some workers mentioned the company's health programs, such as routine health check-ups every six months. However, it is acknowledged that the frequency of these health checks should be increased to be more effective in detecting potential health issues early.

The main purpose of regular health examinations is to provide early detection of potential diseases, allowing for quick and efficient intervention. Additionally, regular health check-ups offer valuable input to the company regarding job placement suitability and the physical condition of workers. The results of these periodic health checks can also be used to compare health conditions over time, helping to detect work-related illnesses and offering insights for developing preventive measures [6].

Mental Health and Social Support

By nature, humans consist of two elements: the physical and the spiritual. The physical aspect relates to the body, while the spiritual aspect focuses on the metaphysical side of a person. As previously mentioned, physical health has an impact on one's performance, and in the spiritual context, it is equally important to maintain mental or spiritual health. While physical health is closely related to exercise, mental health is also strongly tied to social support [7], which includes religious norms within that support.

In general, the workers at the cigarette factory feel that their mental health remains well-maintained despite the many challenges they face. Support from coworkers and family helps workers maintain their mental well-being in the midst of work conditions that can be quite demanding and stressful.

Most workers report that they support each other in coping with stress caused by production target pressures. This support also manifests as teamwork, as stated by Riyati (24 years old), a packing department employee, who mentioned that it has become common practice among workers to collaborate in achieving the set targets. Good relationships with coworkers play an important role in maintaining a positive work environment [8]. When a worker has not yet met their target, others often step in to help complete the task, creating a more harmonious and supportive work atmosphere.

Production Target Challenges

Every company or factory is certain to have production targets, which are a crucial part of determining the profit from production [9]. However, setting excessively high production targets can ultimately lead to potential stress for workers. Especially when high targets are accompanied by other

stressors such as tight deadlines, poor quality of work supervision, an unhealthy work climate, inadequate work authority in relation to responsibilities, and workplace conflicts that further deteriorate [10] workers' mental health. Most workers consider the biggest challenge in their job to be the pressure to meet high production targets. They are faced with a daily target system that must be met, which forces them to work quickly and remain focused to complete tasks on time. As reported, if the targets are not met, their earnings will decrease. High production targets require workers to work faster and harder, and if the targets are not achieved, it will result in reduced income. This creates a situation that can exacerbate stress, especially for workers with significant financial responsibilities.

In this context, Karasek's (1979) demand-control model theory can explain the situation. This model states that work stress increases when job demands are high, but worker control over the job is low. In this case, cigarette factory workers are under high demands with low flexibility in control because they must follow the targets set by management. As a result, they feel pressured to meet the targets without having significant ability to reduce their workload.

A possible solution is to provide more flexibility for workers in managing their work hours or adjusting production targets to be more realistic. This means that the factory should also implement overtime hours for its employees. As stated by Nanik, a production worker who has been working for 14 years, she and her coworkers will take extra time or work overtime when the factory is in a busy season or when there are additional requests from large clients. In this situation, workers have to adjust their work and personal time to meet production demands, which sometimes leads to physical and mental fatigue.

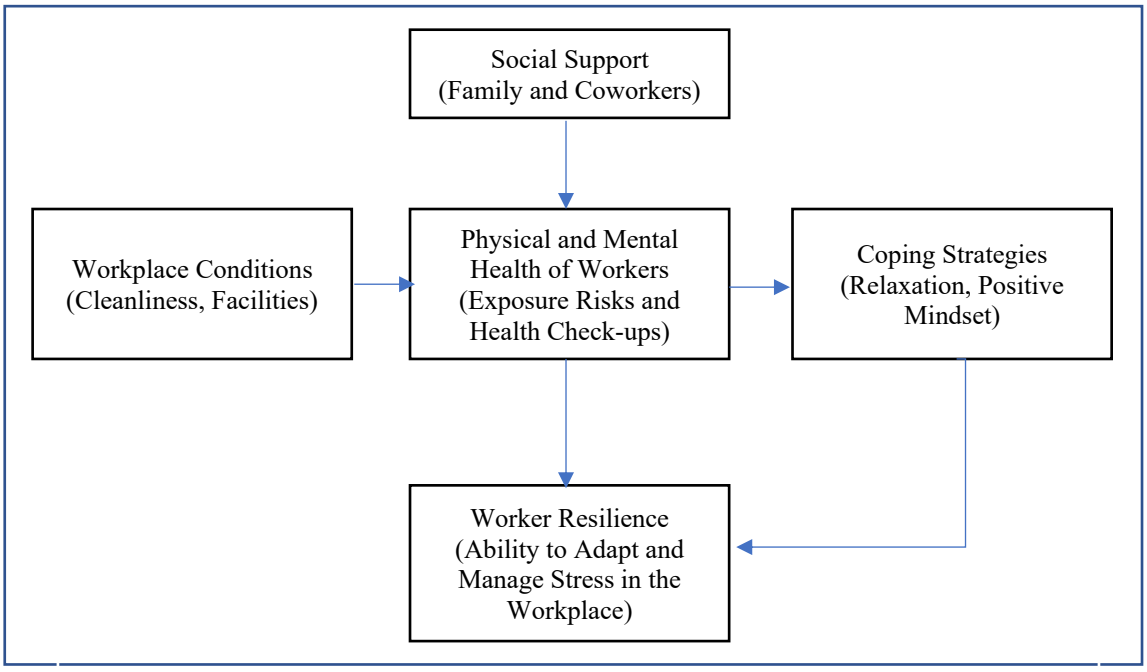


Figure 2. Factors Shaping Resilience of Cigarette Factory Workers

Stress Management Strategies

Social support from family is one of the main strategies in managing stress [11]. This support, as expressed by Qoib, includes activities like going for a walk with his family when he is feeling stressed. However, this support doesn't always have to take the form of an outing. For workers, when they are physically and mentally exhausted from work demands, simply meeting and spending time with family members, or even just talking with a spouse (for those who are married) or other family members like parents, is enough to relieve their fatigue. In addition, stress management is also carried out by factory workers through engaging in activities at home after work, such as cleaning the house, cooking, or doing laundry. These activities give them a sense of accomplishment and help distract them from work-related stress.

Social support also comes from fellow workers.They often share their problems with colleagues or help each other complete tasks. These positive relationships at work strengthen their mental resilience in facing daily challenges [12], as positive friendships can indeed reduce an individual's stress levels [13].

Other stress management strategies include engaging in physical activities like exercise. Mental health is also influenced by physical health [14], [15], [16]. Additionally, workers apply coping strategies by cultivating a positive mindset [17]. Most factory workers try to remain optimistic when facing life's challenges. They focus on things they can control and strive to maintain a positive mental attitude, even in the face of various pressures. Workers consistently avoid negative thoughts as a way to manage stress, since negative thinking is itself a major cause of stress [18].

Adequate rest is also an important way to manage stress, and it contributes to resilience-building [19]. Factory workers recognize that sufficient sleep and physical rest help them restore energy after a long workday. For some, taking short vacations or visiting extended family on weekends serves as a way to unwind and relieve stress, while also spending quality time with their families.

Overall, these stress management strategies encompass both personal and social approaches. Family support, good relationships with coworkers, as well as relaxation and self-management activities, all help factory workers build mental and emotional resilience. They are able to maintain a balance between demanding work and personal life by using various methods to handle everyday pressures.

4. Conclusion

This research shows that social-psychological resilience among cigarette factory workers in Bangunharjo Village, Sewon District, Bantul Regency, Yogyakarta, is built through strong social support from family and coworkers. This support helps them manage the pressures of a work environment that is often heavy and challenging. Although the work environment is relatively supportive in terms of cleanliness and atmosphere, there is still a need to improve healthcare facilities and workplace health programs to ensure the long-term well-being of workers.

In addition to social support, stress management strategies such as sharing workloads, maintaining a balance between work and family life, and having a positive mindset also play an important role in building workers' psychological resilience. However, more attention needs to be given to the long-term health risks workers face, particularly due to exposure to tobacco and chemicals.

The results of this study provide important insights for stakeholders, including the government and the company, in designing more holistic programs to improve the well-being of cigarette factory workers' families. These programs should include improving healthcare facilities, providing better mental health support, and ensuring a more balanced workload arrangement.

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THE INCEPTION OF ENTREPRENEURIAL DYNAMIC CAPABILITIES: A CASE STUDY OF UMKM KALURAHAN SEMANU, GUNUNGKIDUL

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Abstract

This research aims to analyse the genesis of entrepreneurial dynamic capabilities in MSMEs in Semanu sub-district, Gunungkidul. Dynamic capability is a firm's ability to integrate, build and reconfigure internal and external competencies to deal with dynamic environmental changes. This case study involves MSMEs in Kalurahan Semanu that have managed to survive and thrive amidst various economic challenges. The research method used is a qualitative approach with in-depth interview techniques and participatory observation. Data were collected from owners, employees and customers of the MSMEs to get a comprehensive picture of the practices and strategies implemented. Data were analysed thematically to identify patterns and themes relevant to entrepreneurial dynamic capabilities. The results show that MSMEs in Semanu Kalurahan develop dynamic capabilities through a process of continuous learning, adaptation to market changes, product innovation, and collaboration with various parties. In addition, community and local government support also play an important role in strengthening these capabilities. The findings provide insights for other MSMEs in developing dynamic capabilities to improve competitiveness and business sustainability in a changing era.

Keywords: dynamic capabilities, entrepreneurship, MSMEs, innovation, adaptation.

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) play an important role in Indonesia's economy, including in regions such as Semanu Village, Gunungkidul. MSMEs contribute significantly to creating jobs, improving community welfare, and supporting local economic growth [1]. However, facing challenges from an increasingly dynamic and competitive business environment, MSMEs must be able to adapt and develop effective strategies. Factors such as globalisation, technological developments, and changing consumer preferences require MSMEs to continuously innovate and improve operational efficiency. Without the ability to adapt, MSMEs risk losing their competitiveness and business continuity.

In this context, the development of dynamic capabilities is crucial for MSMEs. Dynamic capability refers to the ability of organisations to effectively identify and exploit opportunities, and reconfigure their resources and competencies in response to environmental changes [2]. This involves continuous learning, product and service innovation, and adaptation to market changes. MSMEs in Semanu Village, for example, need to utilise dynamic capabilities to remain competitive amidst intense competition. By building dynamic capabilities, MSMEs can respond more quickly to changes, find new ways to create value, and ensure sustainable growth. In addition, support from the local community and government can also strengthen MSMEs' ability to develop such dynamic capabilities.

The concept of dynamic capabilities was first as a firm's ability to integrate, build and reconfigure internal and external competencies to cope with a rapidly changing environment [3]. Since then, the concept has evolved and been applied in various business contexts. In the world of MSMEs, dynamic capabilities are key in facing challenges and rapid market changes. Three main dimensions of relevant dynamic capabilities: Sensing, Seizing, and Transforming [4]. Sensing refers to a company's ability to recognise opportunities and threats in the market, which is the first step in strategic decision-making. Seizing is the ability to capitalise on identified opportunities, including allocating resources effectively to develop new products or services. Transforming, on the other hand, is the ability to reconfigure resources and business processes to ensure continuity and adaptation to environmental changes. These three dimensions are interrelated and form the foundation for MSMEs to remain competitive and sustainable.

Entrepreneurs play a key role in the development of MSMEs by applying dynamic capabilities in daily operations. A strong entrepreneurial orientation, which includes innovativeness, proactiveness and risk-taking, can improve the performance of MSMEs, especially in the context of developing countries [5]. This orientation helps MSMEs to be more responsive to market changes and more innovative in offering new products or services. In addition, emphasised the importance of social networks and social capital in supporting the dynamic capabilities of MSMEs [6]. Strong social networks enable entrepreneurs to access the information, resources and support needed to grow their businesses. Social capital, such as trust and collaboration within the business community, also plays an important role in strengthening dynamic capabilities by encouraging the exchange of knowledge and resources between MSME actors. The combination of a strong entrepreneurial orientation and solid social network support can help MSMEs to more effectively identify, capitalise on and adapt to business opportunities, thereby improving their competitiveness and sustainability.

Semanu sub-district, located in Gunungkidul Regency, Yogyakarta Special Region, has diverse economic potential, ranging from agriculture to creative industries (BPS Kabupaten Gunung Kidul, 2023). Many communities in this area rely on micro, small, and medium enterprises (MSMEs) as their main source of income. MSMEs in Semanu Kalurahan include various types of businesses, such as processed food production, handicrafts, and tourism services. However, despite their great potential, MSMEs in this area still face various challenges, such as limited access to markets, capital, and technology. Therefore, it is crucial to explore how the dynamic capabilities of entrepreneurs can be developed to improve the competitiveness and resilience of businesses in Semanu Kalurahan.

This study aims to analyse the dynamic capabilities of MSME entrepreneurs in Semanu Kalurahan, and identify factors that influence the development of these capabilities. Entrepreneurial dynamic capabilities include the ability to identify opportunities, innovate, and reconfigure resources and competencies in response to changes in the business environment. In addition, this study will also examine the role of external factors such as support from the government, community, and access to technology in the development of dynamic capabilities. The results of this study are expected to provide valuable insights for MSME actors and policy makers in formulating effective strategies to improve dynamic capabilities and business success in Semanu Kalurahan.

2. Method

This research uses a qualitative approach with a case study design to gain an in-depth understanding of the dynamic capabilities of entrepreneurs in MSMEs in Semanu Kalurahan, Gunung Kidul. Data was collected through several methods, including semi-structured interviews with 30 MSMEs to explore their perspectives on dynamic capabilities and challenges faced. In addition, direct observation of business processes was conducted to see exactly how MSMEs operate and adapt to environmental changes. Analyses of relevant documents, such as financial reports and business plans, were also conducted to gain a more complete picture of the business performance and strategies implemented. Data analysis was conducted using thematic analysis techniques where the coding and theme identification process was iterative [7]. This approach ensured that all relevant data was thoroughly examined and key emerging themes were identified with high validity, providing comprehensive insights into dynamic capabilities in the context of MSMEs in the area.

3. Results and Discussion

The profile of the respondent MSMEs studied shows diversity in the types of businesses they run. Of the 30 MSMEs studied, 40 per cent are engaged in agriculture and agro-processing, reflecting the dominance of agrarian activities in Semanu Kalurahan. In addition, 30 per cent of the MSMEs operate in the handicrafts and creative industries sector, indicating the local potential in arts and crafts. The culinary sector also plays an important role with 20 per cent of MSMEs involved in food and beverage production, demonstrating creativity in local food processing. Finally, 10 per cent of MSMEs are engaged in the services sector, offering a range of services that support the needs of local communities. This diversity reflects the adaptability and innovation of MSME players in utilising local resources and meeting diverse market demands.

Sensing Capability

The results show that most MSME players in Semanu Kalurahan have good sensing capabilities. About 73 per cent of respondents showed good ability to identify changes in consumer tastes, while 60 per cent of respondents were able to recognise new market potential. This finding is in line with

emphasises the importance of sensing capabilities in the context of MSMEs in developing countries [8]. They found that MSMEs with strong sensing capabilities tend to be more adaptive to market changes and perform better.

However, the study also revealed significant challenges in certain aspects of sensing capabilities. Only 40 per cent of respondents felt able to anticipate technological changes, while 45 per cent of respondents had difficulty in understanding government regulations and policies. Interestingly, despite the challenges, the level of sensing capability of MSMEs in Semanu Kalurahan is relatively higher compared of MSMEs in rural Malaysia [9]. This may be due to the unique characteristics of Kalurahan Semanu which is a semi-urban area with better access to information and markets. However, in review of dynamic capabilities, sensing capabilities need to be continuously developed and aligned with seizing and transforming capabilities to achieve sustainable competitive advantage [10].

Seizing Capability

The results of the research on seizing capabilities of MSMEs in Semanu sub-district show positive developments but significant challenges remain. A total of 65% of respondents reported the ability to modify their products or services according to market demand. This finding is in line with research which revealed that flexibility in adjusting product offerings is a key factor in the success of MSMEs in dealing with market dynamics [11]. Furthermore, 55% of respondents successfully developed new business models in the past two years, indicating a good level of innovation. This supports the findings of that emphasize the importance of business model innovation as an adaptive strategy for MSMEs in facing changes in the business environment, especially in the digital era [12].

This finding reflects the results of study which identified that MSMEs often face a dilemma in allocating their limited resources between day-to-day operations and new development initiatives [1]. Furthermore, effective resource MSMEs allocation capabilities are positively correlated with innovation performance and business growth [13]. Therefore, improving capability in this aspect is crucial for MSMEs in Semanu Kalurahan to fully capitalize on opportunities identified through their sensing capability.

Transforming capability

Transforming capability emerged as the most challenging aspect for MSMEs in Semanu Village, with only 30% of respondents feeling capable of making significant changes in their business processes. This finding is in line with the research of which revealed that MSMEs often face difficulties in carrying out organizational transformation due to limited resources and resistance to change [14]. Furthermore, 40% of respondents reported difficulties in adopting new technologies. This reflects the results of a study by who identified technology adoption as one of the main challenges in the digital transformation of MSMEs [15]. They found that factors such as lack of digital skills, limited access to technology infrastructure, and uncertainty of return on investment are often barriers for MSMEs in adopting new technologies.

While 50% of respondents recognize the importance of collaboration, only 25% are actively involved in business networks or strategic partnerships. This finding suggests a gap between awareness and implementation of collaborative strategies. This result is in line the research that underscores the importance of business networks and partnerships in enhancing the transforming capabilities of MSMEs [16]. They found that MSMEs that are active in business networks tend to be more innovative and adaptive to market changes. However, MSMEs often face barriers in establishing and managing effective collaborations, including limited time, resources, and network management skills [17]. Therefore, capability building in this aspect is crucial for MSMEs in Semanu Kalurahan to improve their competitiveness and business resilience in the face of a dynamic environment.

4. Conclusion

The conclusion of this study found that MSMEs in Semanu Kalurahan, Gunung Kidul have great potential in developing entrepreneurial dynamic capabilities. Although there are variations in the level of capability among the businesses, in general they show good ability in identifying opportunities (sensing) and quite good in seizing those opportunities (seizing). However, significant challenges remain in the transforming aspect, especially in terms of technology adoption and business process reconfiguration. To improve the dynamic capabilities of MSMEs in Semanu Kalurahan, interventions are needed that focus on increasing access to entrepreneurship education and training, facilitating access to technology and market information, strengthening business networks and strategic partnerships, and

increasing government support in the form of policies and programs that support MSME innovation. This research makes an important contribution to understanding the dynamic capabilities of entrepreneurs in the context of MSMEs in semi-urban areas such as Semanu Kalurahan, and the results can serve as a basis for developing more effective policies and programs to support the growth and competitiveness of MSMEs in the area..

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The Educational Background of Learning Technology Developers: A Descriptive Qualitative Study on Academic Background and Motivation

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Abstract

In the current digital era, innovation in educational technology is crucial in enhancing the teaching and learning process. Learning technology developers play an essential role in creating innovative solutions that are relevant and adaptive to educational needs. This study aims to explore the academic background and motivations of learning technology developers (ETDs) who do not have a formal educational background in educational technology but come from various other fields such as education, social-political sciences, information technology, and even non-educational disciplines like arts and culture. These developers have transitioned into the field through functional policies such as job transfers and were provided with three months of training followed by a competency test. This descriptive qualitative study uses a questionnaire to examine ETDs' educational backgrounds and motivations for working in the educational technology field. The findings indicate that career development, supporting the implementation of programs to improve teacher competence, and an interest in educational technology were key motivational factors. The study provides important insights for policymakers in supporting ETDs with diverse academic backgrounds.

Keywords: Learning technology developers, academic background, career motivation, educational technology, qualitative study

1. Introduction

In today's rapidly evolving educational landscape, integrating technology into teaching and learning processes has become essential. Educational technology (EdTech) is transforming traditional pedagogical methods and creating new avenues for innovation in instructional design, learning management systems, and digital learning resources. As educational institutions worldwide increasingly adopt digital tools and platforms, the demand for skilled professionals capable of developing, implementing, and managing educational technologies has surged. Elearning Technology Developers (ETDs), responsible for creating and refining these digital tools, play a crucial role in this transformation (1–5).

However, unlike other technical or educational roles that typically require a specialized academic background, many ETDs come from a wide variety of academic fields. While an ideal scenario would see most ETDs having a formal degree in educational technology, this is often not the case in practice. Many ETDs have transitioned into the role from diverse disciplines such as education, social-political sciences, information technology, and even non-traditional fields like arts and culture. This interdisciplinary mix of professionals presents both opportunities and challenges to the development of effective educational technologies.

ETDs are tasked with more than just creating technological solutions; they must understand both the pedagogical needs of educators and students and how technology can be best used to meet those needs. Their work often includes designing interactive learning environments, developing instructional materials, creating learning management systems (LMS), and integrating digital tools that enhance the learning experience. Their ability to effectively perform these tasks is greatly influenced by their educational background, technical skills, and understanding of pedagogy (2).

Several competencies required in the field of work include: (1) organizing implementation (class coordinator), conducting employee needs analysis, developing syllabi, schedules, and training materials, coordinating with training instructors, and evaluating the execution of training; (2) conceptualizing, designing, and developing media such as websites, webinars, interactive e-books, and other forms of media; (3) managing and supervising employee activities and performance; and (4) conducting Training Needs Assessments, designing and implementing training programs, evaluating

training outcomes, developing training materials based on curricula, and creating assessment tools for training materials (1,2).

For those ETDs coming from technical backgrounds, the challenge lies in understanding educational theories, learning processes, and instructional design principles. Conversely, for those with educational backgrounds, the primary challenge is gaining proficiency in the technological aspects of EdTech development. This dynamic creates an interesting tension where complementary skills are needed for effective EdTech innovation. Consequently, the field of educational technology benefits from the interdisciplinary knowledge that diverse backgrounds bring, but only if ETDs are provided with adequate training and professional development.

In Indonesia and other regions, functional policies, particularly in government and educational institutions, have allowed for job transfers that move professionals from unrelated fields into educational technology roles. Many of these professionals, now ETDs, entered the field without formal training in educational technology. Upon transitioning, these individuals are typically required to undergo a three-month training program designed to equip them with the foundational skills necessary for EdTech development. This training is often followed by competency tests to ensure they meet the basic requirements for their new role.

The educational backgrounds of ETDs can significantly impact their ability to adapt to the technical and pedagogical demands of EdTech development. For instance, ETDs with degrees in education have a solid grasp of teaching methodologies and learning theories, which are critical when designing tools that align with educational goals. However, they may struggle with the technical aspects of the job, such as programming, software design, or digital content creation.

On the other hand, ETDs with backgrounds in information technology possess the technical expertise to build robust educational platforms and tools but may lack the pedagogical knowledge required to ensure that these technologies are truly effective for learners and educators. Those from social-political sciences may contribute valuable insights into the social and policy-related implications of technology in education, while those from creative fields like arts and culture can bring innovative perspectives on user experience and design.

Moreover, motivation is a key factor that influences ETDs' performance and success in the field of EdTech. This study explores the various reasons that drive individuals to pursue careers in educational technology despite having academic backgrounds in unrelated fields. For some, career advancement opportunities in the rapidly growing field of educational technology may serve as a powerful incentive. For others, the chance to support educational programs, improve teaching and learning outcomes, or engage in the innovative potential of EdTech may be their primary motivation.

While diverse academic backgrounds contribute to the richness of the EdTech field, the lack of formal educational technology training among many ETDs necessitates structured training programs. The three-month training that many ETDs undergo after transitioning into the field is an essential component of their preparation. This training typically covers both the technical and pedagogical aspects of EdTech, ensuring that all ETDs, regardless of their background, have the necessary skills to succeed.

However, the effectiveness of this training has been a subject of debate. Some ETDs, particularly those with technical backgrounds, may find the pedagogical components of the training too brief to fully grasp the complexities of educational theory and instructional design. Others, particularly those from educational backgrounds, may find that the technical training provided is insufficient to master the tools and technologies they are expected to use. The competency tests that follow the training program are meant to assess the readiness of ETDs to perform their roles, but many developers feel that these assessments do not fully capture the complexity of the work they are expected to do.

This study explores the educational backgrounds and motivations of ETDs who transitioned into the field from non-EdTech disciplines, shedding light on how their diverse educational backgrounds influence their work in the EdTech sector. Understanding these dynamics is important for developing more effective training programs and support mechanisms that cater to ETDs' unique needs.

This research contributes to a deeper understanding of the role that academic background and motivation play in shaping the experiences and success of ETDs. The findings may inform policymakers and educators on how best to support and nurture talent within the rapidly growing and evolving EdTech sector.

2. Method

This research employs a qualitative descriptive method, with data collected through a questionnaire. The questionnaire was designed to explore the academic backgrounds of learning technology developers, including their education level, fields of study, and any specialized training they have undergone. The participants in this study included 25 learning technology developers.

3. Results and Discussion

Academic Background of Learning Technology Developers

Based on the questionnaire results, learning technology developers have diverse academic backgrounds. They came from a variety of academic backgrounds, none of which were directly related to educational technology.

The academic background of Learning Technology Developers (ETDs) in this study varied significantly, especially when analyzed across undergraduate (S1) and graduate (S2) levels. At the undergraduate level, there was a noticeable divide between those who graduated from education-related disciplines and those who came from non-educational fields. Specifically, only 18.75% of the ETDs held degrees in education-related fields, while a striking majority of 81.25% came from non-educational backgrounds.

Among those with an educational background, their degrees were in specialized fields such as; dance education, music education, and fine arts education. These disciplines, while technically falling under the broader education category, reflect a focus on artistic and creative instruction, which contrasts with traditional educational technology training. This suggests that even within the education group, there was minimal formal exposure to instructional design or educational technology at the undergraduate level.

In contrast, the majority of ETDs - those from non-educational fields - had a broad array of academic backgrounds, including degrees in social-political sciences, law, history, animation, cultural anthropology, accounting, and engineering. These disciplines are far removed from formal education or educational technology but represent a diverse range of skills and knowledge that ETDs bring to their roles. This academic diversity points to the interdisciplinary nature of educational technology development, where skills from various fields such as IT, social sciences, and the arts can be leveraged to create innovative learning solutions. However, this also highlights the need for structured training and professional development programs to bridge the gap between their previous education and the specialized demands of the EdTech field.

At the graduate level (S2), the data indicates a shift in focus. Here, 62.5% of ETDs pursued education-related degrees, while 37.5% remained in non-education disciplines. This shift towards education at the graduate level suggests a growing recognition of the importance of educational theory and pedagogy in their work. Many ETDs may have recognized the need to enhance their pedagogical understanding and thus pursued further education in teaching and learning to complement their technical or non-educational undergraduate degrees. This trend demonstrates a proactive approach by ETDs in seeking to enhance their competencies for the EdTech field, indicating their commitment to bridging the gap between their academic backgrounds and the practical demands of educational technology development.

Motivational Factors Behind Career Transition

The motivation for ETDs to transition into the field of educational technology was another key focus of this study. Several motivating factors emerged from the data, highlighting the diverse reasons that drive individuals to work in the EdTech field, despite their varied academic backgrounds.

One of the most significant motivations, reported by a large number of respondents, was the desire to contribute to the national education system. Many ETDs expressed a strong sense of responsibility and commitment to improving education in Indonesia, viewing their work in EdTech as a way to make a meaningful impact. This aligns with broader national and global trends where technology is increasingly seen as a vital tool in addressing educational challenges and promoting equity and access to learning resources.

Another common motivating factor was the desire to align their work with their career aspirations and find a suitable match for their existing skill sets. Many ETDs had previously worked in roles that

were not directly related to educational technology, and transitioning into EdTech allowed them to apply their previous expertise while also growing professionally. For example, individuals with backgrounds in animation or IT found that their technical skills were highly valuable in EdTech, allowing them to build innovative learning platforms, media content, and interactive resources.

The desire for career development was also frequently cited as a key motivator. ETDs viewed the EdTech sector as an area of significant growth and potential, both in terms of personal career advancement and the broader evolution of education. This was particularly true for those ETDs who had pursued graduate education (S2) in education-related fields. Their advanced degrees provided them with new perspectives on learning and teaching, which they could integrate with their existing skill sets to further their careers.

Additionally, many ETDs expressed a strong interest in supporting programs aimed at improving teacher competence. This reflects the broader trend in the educational technology field, where technologies are increasingly being developed to aid teachers in delivering more effective instruction. ETDs saw their role as facilitators in this process, developing tools and resources that could help educators improve their teaching practices and better engage students.

Other significant motivators included the desire to make learning more enjoyable for students and the personal interest in educational technology. ETDs were often drawn to the creative and innovative aspects of the field, where they could develop new teaching tools and digital learning platforms that made education more interactive and engaging. This intrinsic motivation to explore and develop educational media was a key factor driving many ETDs to stay committed to their roles, even when faced with challenges related to their diverse academic backgrounds.

Training and Competency Tests

All participants underwent a mandatory three-month training program upon entering the EdTech field. The training was designed to equip them with the necessary technical and pedagogical skills to succeed as ETDs. The competency tests that followed the training aimed to assess their readiness for the role.

Participants with IT backgrounds found the training particularly beneficial in terms of gaining insight into pedagogical principles and instructional design. Conversely, participants from education and social-political backgrounds appreciated the technical training but felt that the three-month period was insufficient to fully grasp the complexities of EdTech development.

Implications for Educational Technology Development

The diverse academic backgrounds of ETDs, coupled with their varied motivations, have significant implications for the field of educational technology. First, the large number of ETDs from non-educational fields at the undergraduate level suggests that EdTech development is not confined to traditional educational theory. Instead, it benefits from interdisciplinary collaboration, where technical expertise, creative design, and an understanding of societal issues come together to create innovative learning tools.

However, the data also reveals a need for ongoing professional development and training for ETDs, especially for those who do not have formal educational training. The shift towards education-related graduate degrees reflects a recognition among ETDs of the importance of pedagogical knowledge in their work. Training programs should, therefore, focus not only on technical skills but also on deepening ETDs' understanding of learning theories, instructional design, and educational psychology.

The diverse motivations of ETDs—ranging from career development to personal interest in educational technology—underscore the importance of fostering a supportive and dynamic working environment that allows ETDs to explore and grow within their roles. Tailored professional development programs, mentorship opportunities, and collaborative projects can help sustain ETDs' engagement and passion for the field, ultimately leading to more innovative and effective educational technologies.

Challenges and Recommendations

One of the main challenges faced by ETDs with non-educational backgrounds is the difficulty in bridging the gap between their technical expertise and the pedagogical requirements of educational technology development. While technical skills are crucial, a deep understanding of how learners

engage with content and how teachers use technology in the classroom is equally important. Thus, it is recommended that institutions provide more robust and longer-term training programs that offer a comprehensive overview of both the technical and pedagogical aspects of EdTech.

Furthermore, creating collaborative teams that include both educational experts and technology developers can lead to more effective outcomes (6). This interdisciplinary approach allows ETDs from non-educational backgrounds to work alongside education professionals, learning from their expertise while contributing their own technical skills to the project. Such collaboration can lead to the creation of more holistic educational technologies that are both technically sound and pedagogically effective.

In conclusion, the diversity of academic backgrounds and motivations among ETDs is both a strength and a challenge for the EdTech field. With proper support, training, and collaboration, this diversity can lead to innovative solutions that enhance learning experiences for students and educators alike.

4. Conclusion

This study provides valuable insights into the academic backgrounds and motivations of learning technology developers who have transitioned into the field from non-EdTech disciplines. The diversity of academic backgrounds presents both challenges and opportunities for the EdTech sector. While participants from IT backgrounds bring technical expertise, those from education and other fields contribute valuable pedagogical knowledge and creativity.

The findings suggest that motivation plays a key role in driving ETDs to succeed in their roles, with career development, support for educational programs, and interest in EdTech being the primary motivating factors. However, the study also highlights the need for more comprehensive training programs to bridge the gap between developers' prior knowledge and the demands of the EdTech field.

Policymakers and educational institutions should consider extending the duration of training programs and offering ongoing professional development opportunities to support ETDs from diverse academic backgrounds. By doing so, the EdTech sector can continue to grow and innovate, meeting the evolving needs of the modern educational landscape.

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STUDENT PERCEPTIONS OF ACTIVE LEARNING, LEARNING CLIMATE, AND ENGAGEMENT IN ONLINE LEARNING

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Abstract

The development of technology also requires the world of education to adapt and develop new skills. Education has undergone a significant transformation, one of which is the shift in learning models from face-to-face to online learning. In online learning, the level of student academic engagement can be influenced by many factors, including how lecturers design active learning and the learning climate created. The purpose of this study is to provide an overview of the relationship between active learning, learning climate and student engagement in online learning. This study uses a *cross-sectional - survey approach* . Data collection using a questionnaire by adapting the grid from which has formulated the variables of online active learning, online learning climate, and student engagement that have been developed. The subjects in this study were 400 students. Data analysis used includes descriptive statistics and correlation matrices for research scale variables. A series of multiple regression models were used to answer the research hypothesis. The results showed that student perceptions of active learning and online learning climate have a significant contribution to academic engagement in online lectures, with a contribution of 61.98%. These results confirm that active learning strategies and the creation of a supportive learning climate play a major role in encouraging student engagement cognitively, emotionally, and behaviorally.

Keywords: active learning, learning climate, student engagement, online learning

1. Introduction

In this modern era, technology has become an inseparable part of everyday life. Rapid technological developments, especially in the field of information and communication, have brought major changes in various aspects of life including education [6]; [34]. This progress not only facilitates activities in the world of education, but also opens up new opportunities in creating innovation and increasing productivity for teachers [21]; [30]. Technological developments also require us to adapt and develop new skills. Proficiency in using technology is now an important requirement to remain relevant and competitive in the job market [10]; [12]; [28]. In addition, challenges such as data security, privacy, and the social impact of technology use also need serious attention so that technological developments can be utilized optimally and responsibly [18]; [38]; [41].

Along with the development of information and communication technology, education has undergone a significant transformation, one of which is the shift in learning models from face-to-face to online learning. Technology has revolutionized the teaching and learning process. Access to learning resources is no longer limited to physical classrooms, but can be accessed through online learning platforms. This opens up opportunities for anyone to obtain quality education, without being limited by location or time [3]; [8]; [16]. Online learning has become a solution to various educational challenges, especially in the pandemic situation that has pushed educational institutions around the world to adapt quickly [1];[2];[9];[39]. However, this sudden change raises various questions about the effectiveness of online learning, especially in creating meaningful and interactive learning experiences for students.

Learning in higher education plays an important role in shaping students' critical, analytical, and creative thinking skills as a provision for facing the complex world of work and community life[5]; [31]; [35]. One approach that has long been recognized as effective in supporting this process is active learning. Unlike traditional one-way learning methods, where lecturers are the main source of information and students are passive, active learning emphasizes students' direct participation in the learning process. This approach encourages students to engage in discussions, problem solving, collaboration, and critical reflection on the material being studied [22]; [33].

Active learning not only provides students with the opportunity to develop deeper understanding, but also enhances higher-order thinking skills, such as analysis, evaluation, and synthesis of information [29]; [45]; [46]; [47]. In the context of higher education, where students are expected to be independent learners, this approach is particularly relevant. In addition, active learning can help increase motivation and academic engagement, as students feel more in control of their learning process [13]; [29]; [44].

Along with the development of technology and modern learning methods, active learning in higher education can now be implemented through various techniques, such as problem-based learning, collaborative projects, simulations, and the use of digital technology to enrich classroom interactions. This is also increasingly important in the digital era, where critical thinking skills and collaboration skills are the keys to success in a dynamic, knowledge-based workplace.

Active learning has long been considered an effective approach to increasing student understanding and engagement.[15];[37]. In the context of online learning, active learning practices face their own challenges due to the limitations of physical interaction and technological challenges. Therefore, understanding students' perceptions of the effectiveness of active learning in an online environment is important to study.

The online learning climate also plays an important role in the success of the teaching and learning process [7];[24]. This climate includes various factors, such as technological support, interaction with lecturers and fellow students, and the learning atmosphere created in the digital platform. A positive learning climate is believed to increase student motivation and academic engagement, while a less conducive climate can cause boredom, saturation, and reduced active participation[25]; [48].

Student engagement in academic activities is an important aspect of successful learning [11]; [27]; [49]. In online learning, the level of student academic engagement can be influenced by many factors, including how lecturers design active learning and the learning climate created. Online learning, which includes the quality of interaction between students and lecturers, as well as the learning atmosphere created through digital platforms, also plays an important role in supporting academic engagement. Academic engagement, or the extent to which students are cognitively, emotionally, and behaviorally involved in the learning process, is a key indicator of the success of online education [4];[42]. Therefore, this study aims to collect students' perceptions of active learning and online learning climate that affect their academic engagement. By examining the relationship between these three aspects, it is hoped that this study can provide insights for teachers and educational institutions in designing more effective and interactive online learning strategies.

2. Method

This study uses a cross-sectional - survey approach . Data collection using a questionnaire by adapting a grid from which has mixed online active learning variables, online learning climate, and student engagement that has been adapted from Dixson [17]. The active learning scale is adapted from[14], the online learning climate scale is adopted from [26] and the student engagement scale is adopted from [17]. The instrument has been translated, validated, and analyzed so that it is fit for use in data collection in this study.

Respondents in this study were undergraduate and master students at the Department of Elementary School Education, Yogyakarta State University. The number of respondents in this study was 400 students, where students actively participated in online and offline (blended) lectures. This survey asked students about their online learning experiences during the current academic year.

The data analysis used includes descriptive statistics and correlation matrix for the research scale variables. A series of multiple regression models are used to answer the research hypotheses and research questions. The research questions asked are, 1) What are the characteristics of students and what courses predict student engagement in online lectures? 2) How does student engagement in online lectures differ across academic years?

3. Results and Discussion

Assumption Test Results

The normality test is used to see whether the sample comes from a normally distributed population. Since this study used 400 samples, the researcher did not conduct a normality test. However, the Central Limit Theorem test is used to test the assumption. This is because the increasing number of samples

taken randomly, the distribution of possible mean values from the samples will follow a normal distribution. The results of the normality test with the Central Limit Theorem assumption can be seen in Figure 1 below.

Based on Figure 1. Above, it is clearly illustrated that the distribution form of the sample mean approaches a normal distribution even though the population is not normal. The results of the *Central Limit Theorem test* state that if a sample is taken from a population with finite data, then the mean of the sample taken from a population will be in accordance with the mean of the same population. Thus, the research data is normally distributed.

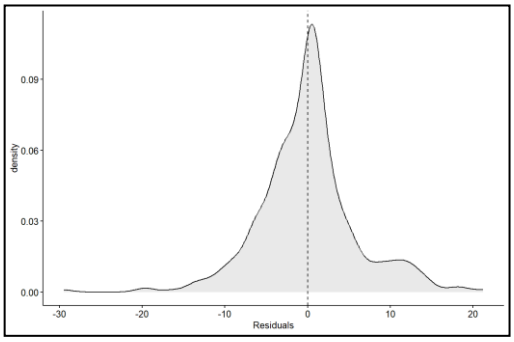


Figure 1. Results of the Central Limit Theorem assumption test

Linearity Test Results

Linearity test is used to determine whether there is a linear relationship between independent and dependent variables. This assumption test is important in regression analysis to show the linearity of the variables studied. The linearity test in this study uses the Ramsey RESET Test. The results of the linearity analysis of the regression model are shown below.

First, a linearity test will be conducted with the student engagement variable (Y) and the online active learning variable (X). The hypothesis proposed is as follows.

H_0= There is a linear relationship
H_1= There is no linear relationship

The results of the linearity test between student involvement (Y) and the online active learning variable (X) are shown in Figure 2 below.

```
> #KM~PA
> Linear.PA <- resettest(Data$KM~Data$PA)
> Linear.PA

        RESET test

data:  Data$KM ~ Data$PA
RESET = 1.6647, df1 = 2, df2 = 396, p-value = 0.1906
```

Figure 2. Results of the Linearity Test of Student Involvement and Active Learning

Based on the calculation results above, we can see the p-value = 0.1906. So, it can be concluded that the significance level is more than the set alpha value of 0.05 so that H_0 accepted. This means that there is a linear relationship between the student engagement variable (Y) and the online active learning variable (X).

Second, a linearity test will be conducted with the student engagement variable (Y) with the online learning climate variable (X). The results of the linearity test with the student engagement variable (Y) with the online learning climate variable (X) are more completely shown in Figure 3 below.

```
> #KM~IPO
> Linear.IPO <- resettest(Data$KM~Data$IPO)
> Linear.IPO

        RESET test

data:  Data$KM ~ Data$IPO
RESET = 0.31421, df1 = 2, df2 = 396, p-value = 0.7305
```

Figure 3. Results of the Linearity Test of Student Engagement (Y) with Online Learning Climate Variables (X)

Based on these results, we can see the p-value = 0.7305. So, it can be concluded that the significance level is more than the set alpha value of 0.05 so that H_0 accepted. This means that there is a linear relationship between the student engagement variable (Y) and the online learning climate variable (X).

Results Multicollinearity Test

Multicollinearity test is a condition in regression analysis where there is a high correlation or strong linear relationship between two or more independent variables. The VIF (*Variance Inflation Factor*) value can be used to detect the level of multicollinearity in the regression model. The results of the multicollinearity test are shown in Figure 4 below.

```
> ViF <- vif(Reg)
> ViF
 Data$PA Data$IPO
2.371722 2.371722
```

Figure 4. Multicollinearity Test Results

Based on Figure 4 above, it can be interpreted that the PA and IPO variables both have the same VIF value, which is 2.3717. The VIF value is in the range of 1 <VIF <5, which is generally still considered as an indication of moderate correlation between independent variables. This indicates that there are multicollinearity results, although small, but still within acceptable limits.

Heteroscedasticity Test Results

The heteroscedasticity test is a condition of regression analysis where the variance of the residual is not constant across the range of independent variable values. This study uses the *Breuch-Pagan test* . A good regression model is one that is homoscedastic or does not have heteroscedasticity. The results of the heteroscedasticity test are shown in Figure 5 below.

```
> #Pengecekan Asusmi Heteroskedastisitas
> bptest(lm(Data$KM~Data$PA+Data$IPO, data = Data))

        studentized Breusch-Pagan test

data:  lm(Data$KM ~ Data$PA + Data$IPO, data = Data)
BP = 0.65618, df = 2, p-value = 0.7203
```

Figure 5. Heteroscedasticity Test Results

The hypothesis proposed is as follows.

H_0= No heteroscedasticity occurs

H_1= Heteroscedasticity occurs

Based on Figure 5 above, it is shown that the p-value result = 0.7203. This shows that the significance level value is more than the predetermined alpha value of 0.05. then, it can be concluded that H_0it is accepted. This means that there is no heteroscedasticity.

Multiple Regression Test Results

This study will get an overview of how independent variables including Active Learning (PA) and Online Learning Climate (IPO) affect the dependent variable of Student Engagement (KM). The significance level used in this study is 0.05. The proposed hypothesis is as follows:

H_0= Simultaneously, the variables Active Learning (PA) and Online Learning Climate (IPO) do not affect the dependent variable of Student Involvement (KM)

H_1= Simultaneously, the variables Active Learning (PA) and Online Learning Climate (IPO) influence the dependent variable Student Involvement (KM)

The results of the multiple regression test are shown in Figure 6 below.

```
> #Model Regresi Berganda
> Reg.1 <- lm(Data$KM~Data$PA+Data$IPO, data = Data)
> summary(Reg.1)

Call:
lm(formula = Data$KM ~ Data$PA + Data$IPO, data = Data)

Residuals:
     Min       1Q   Median       3Q      Max
-29.4685  -3.1665   0.3798   2.3879  21.2285

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.27844    1.74493   5.317 1.76e-07 ***
Data$PA      0.07174    0.05140   1.396    0.164
Data$IPO     0.74475    0.04825  15.434  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 5.947 on 397 degrees of freedom
Multiple R-squared:  0.6198,    Adjusted R-squared:  0.6179
F-statistic: 323.6 on 2 and 397 DF,  p-value: < 2.2e-16
```

Figure 6. Multiple Regression Test Results

Based on the image, the multiple regression equation is obtained as follows:

$$\hat{Y} = 9{,}2784 + 0{,}0717X_1 + 0{,}7447X_2$$

From the multiple regression equation, the following results are shown. First, the constant value (Intercept) has a positive value, which is 9.2784. A positive sign indicates a unidirectional influence between the independent variable and the dependent variable. which includes PA (X_1) and IPO (X_2) if the value is 0 then KM (Y) will be worth 9.2784. Second, the regression coefficient value for the PA variable (X_1), which is 0.0717. This value shows a positive influence between the PA and KM variables. This can be interpreted that if PA increases by 1%, then the KM variable will increase by 0.0717. Finally, the regression coefficient value for the IPO variable (X_2), which is 0.7447. This value shows a positive influence between the IPO and KM variables. This can be interpreted that if IPO increases by 1%, then the KM variable will increase by 0.7447.

Next, it is necessary to see whether the variables of Active Learning (PA) and Online Learning Climate simultaneously affect the dependent variable of Student Engagement (KM). Based on the test results, a p-value of 2.2e-16 or p-value = 0.000 was obtained. These results indicate that the level of significance is smaller than the predetermined alpha value of 0.05. Therefore, it can be concluded H_0 rejected. This means that simultaneously the variables Active Learning (PA) and Online Learning Climate affect the dependent variable Student Engagement (KM). Second, the p-value of the partial T will be seen, which is used to see whether the independent variables in the regression model have an individual influence on the dependent variable by considering the existence of other variables in the model. For the independent variable PA (X_1), the p-value of the partial T is 0.164. So, it can be concluded that the p-value is more than 0.05. This means that there is no individual influence on the KM variable. For the independent variable IPO (X_2), the p-value of the partial T is 0.000. So, it can be concluded that the p-value is less than 0.05. This means that there is an individual influence on the KM variable.

Finally, the R-square value or multiple determination coefficient will be seen. The output results from the R program show the R-square value is 0.6198 or 61.98% which means that the KM variable can be explained by the PA and IPO variables simultaneously by 61.98%, while the remaining 38.02% is explained by variables other than PA and IPO or variables that are not studied.

The results of the study above indicate that students' perceptions of active learning and online learning climate have a significant contribution to students' academic engagement. The contribution

value obtained reached 61.98%. This finding is in line with previous studies that emphasize the importance of active learning strategies in encouraging student engagement, especially in online learning environments that are often considered less interactive [17]; [20]; [32]; [36]. Active learning encourages students to be more involved in the learning process, increase motivation, and deepen understanding of the material [40]. In the context of online learning, the use of technology and digital platforms allows the implementation of active learning strategies such as group discussions, collaborative problem solving, and interactive simulations that can be done online.

In addition, a positive learning climate plays a major role in building student engagement [19]. A supportive online learning climate, with a good atmosphere of interaction between students and lecturers, as well as between students, increases the sense of social and emotional connectedness in the learning process. Another study conducted by Hrastinski [23] also showed that a socially interactive learning climate can increase academic engagement in online learning.

In this study, the contribution of 61.98% of students' perceptions of active learning and learning climate indicates that these two factors play a dominant role in increasing academic engagement. When students feel actively involved in learning, they tend to be more motivated to participate, both in discussions and group assignments, and are more focused on achieving academic outcomes. A supportive learning climate, such as effective communication with lecturers and easy access to materials and online discussion forums, also increases students' feelings of comfort in interacting and absorbing materials better. However, the contribution of 62% also indicates that there are still other factors that influence students' academic engagement in online learning. Factors such as digital literacy skills, time management, and social and emotional support from the learning environment could be additional variables that contribute to the 38% of academic engagement that is not explained by the perception of active learning and learning climate. Redmond [42] said that these factors need to be further considered in an effort to improve overall student engagement.

Thus, the results of this study emphasize the importance of integrating active learning strategies and building a positive learning climate in the context of online lectures. Teachers and educational institutions need to design more interactive and supportive approaches in online learning to maximize student academic engagement.

4. Conclusion

This study shows that students' perceptions of active learning and online learning climate have a significant contribution to academic engagement in online lectures, with a contribution of 61.98%. These results confirm that active learning strategies and the creation of a supportive learning climate play a significant role in encouraging student engagement cognitively, emotionally, and behaviorally. When students feel more engaged through meaningful interactions and a conducive learning atmosphere, they tend to be more motivated and focused in attending online lectures.

However, there are still 38% of students' academic engagement influenced by other factors outside the perception of active learning and learning climate. This suggests that other aspects such as digital literacy skills, time management, social support, and other personal factors may also influence students' engagement in online learning.

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DESIGN AND IMPLEMENTATION OF CHILI LEAF DISEASE DETECTION SYSTEM ON SPRAYING ROBOT USING YOLOV8

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Abstract

Chili peppers are one of the staple foods whose availability and price stability are important to monitor, in accordance with Presidential Regulation No. 48 of 2016 to maintain national food security. A major challenge for the agricultural industry is that chili plants are susceptible to pest and disease attacks, which can reduce productivity. Although these attacks are varied, many farmers still detect them manually with the naked eye, which is often inaccurate as it relies on the individual farmer's experience and skills. Therefore, this research utilizes a deep learning algorithm based on CNN, namely YOLOv8, to assist farmers in detecting pest and disease attacks on chili plants. This detection system is a feature of a spraying robot that uses the NVIDIA Jetson Nano as its computing device. With a model trained for 120 epochs, it achieved an average mAP50 of 0.932 and an average mAP50-95 of 0.752. The results of this study's testing show an average accuracy of 73%, and the reports are sent via a Telegram bot to be easily accessed by farmers, enabling them to determine the appropriate strategy to address the detected attacks.

Keywords: *Chili, YOLOv8, Spraying Robot, Disease detection*

1. Introduction

The growing global population and climate change are challenges for the agricultural industry in maintaining food security [1]. In overcoming this, the Government of Indonesia made a regulation, namely Presidential Regulation No. 48 of 2016 concerning the Assignment to Perum Bulog in the Framework of National Food Security in which chili is categorized as one of the 12 types of staple foods that need to be considered for availability and price stability [2]. However, chili plants are susceptible to pest and disease attacks, especially on the leaves which are an important part of the plant, causing many losses, especially decreased productivity because the nutrients produced during the photosynthesis process are inhibited and cannot run optimally because the amount of chlorophyll in the leaves is insufficient [3].

Meanwhile, the diseases found in chili plants have various types [4], including jaundice and spotting. To deal with this, it is necessary to do accurate detection so that the strategy used is appropriate in overcoming existing attacks. However, currently there are still many farmers who detect pest and disease attacks manually using the naked eye, which is often inaccurate because it depends on the experience and skills of individual farmers [5]. Therefore, it is necessary to have a system to detect diseases and pests on the leaves of chili plants quickly and accurately in order to help farmers to take preventive measures and timely treatment, so as to minimize losses due to pest and disease attacks.

There is an algorithm using CNN that is popularly used for object detection, namely YOLO (You Only Look Once) [6]. The YOLO algorithm also continues to develop so that in 2023 YOLOv8 was introduced which has better performance than the previous version of YOLO [7]. The focus of this research is to utilize YOLOv8 to assist farmers in detecting diseases in chili plants. To support the image processing process, this research uses NVIDIA Jetson Nano and Webcam camera as an object detector, which will be attached to a robot that moves between rows of chili plants. In addition, there will be a report on the detection results that will be sent to farmers so that it is easy to analyze and take appropriate action.

2. Proposed Methodology

In the proposed method, the creation of a disease detection system in chili plants using a spray robot goes through several stages as shown in Fig. 1. Starting with designing mechanical and electronic spray robots that are useful as a body or media for detection systems in detecting diseases in plantations. Model design YOLOv8 which is the process of making a model for disease detection in chili plants later. Continued with the data transmission design, which is used as a method for the system to send detection results so that farmers can access them easily. System integration is made to combine both mechanical, electronic, detection and data transmission systems into a unified system. Testing of this system is done until the results are as desired, if not then checks or improvements will be made to the hadware design process (mechanical and electronic) or the YOLOv8 and Data Transmission models.

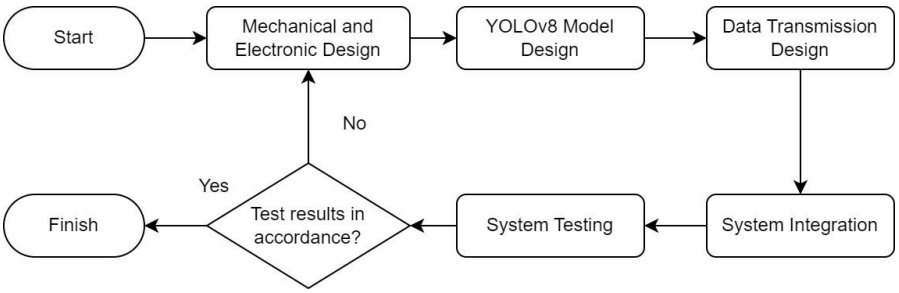


Fig. 1: Flowchart of proposed methodology.

2.1 Mechanical and Electronic Design

The spray robot frame is designed using two types of aluminum profiles, which are aluminum profile 3030 and aluminum profile 2020. Aluminum profile 3030 is used as the basic frame of the robot because it has higher strength and is able to support heavier loads, besides that it also facilitates the assembly process [8]. While aluminum profile 2020 is used for other additional frames, such as the sprayer pole, junction box bracket, and nozzle bracket. The use of aluminum profile 2020 for this additional frame was chosen because it has a lighter weight so that it does not burden the base frame. The total dimensions of this robot are 750 mm long and 600 mm wide. The sprayer pole on this robot is designed to have a minimum height of 75 cm and a maximum height of 200 cm so that it can be adjusted according to needs.

The robot drive system is powered by 2 DC motors that use 250W 24V power source. Each motor is connected to a wheel that has a ring size 6 4.10, and is connected to each other at the front and back using a chain, so that the robot can move and minimize slippage. This mechanical design resulted in a 3D design that can be observed in Fig. 2.

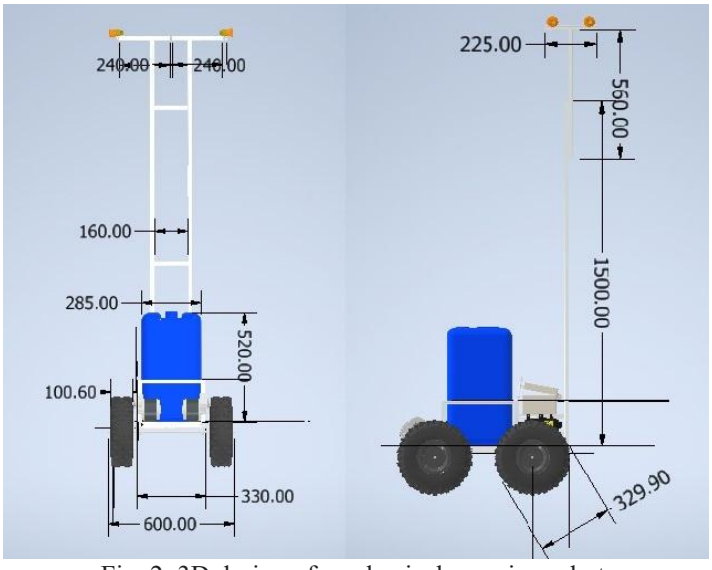


Fig. 2: 3D design of mechanical spraying robot.

For the electronic design as shown in Fig. 3, there are 3 power supplies used, which are 11.1V 2200mAh battery, 12V 5Ah battery and 24V 25Ah battery, each of which is used to supply power to the ESP32 microcontroller, water pump, and 24 V DC motor. In this design, the ESP32 is connected to 2 relays to turn the water pump on and off. In addition, the ESP32 is also connected to the BTS7960 motor driver through the PWM pin which functions as a regulator of the speed and direction of rotation of the 24V DC motor. All commands contained in the ESP32 can be controlled with the FlySky FS-i6 radio control which is connected to the ESP32 via the RX pin with Ibus communication.

In this design, NVIDIA Jetson Nano will be used as the unit to process the detection. The Jetson Nano is powered from 24V 25Ah which is reduced by XL4015 to 5V 4A so that it can be used optimally and increase the speed of the detection process. As a source of image to be processed, a USB Webcam will be connected to the Jetson Nano. In addition, the Jetson Nano is also connected to the ESP32 via a digital signal pin. This allows the Jetson Nano to access the information provided by the ESP32, so that it can start and stop the detection process easily.

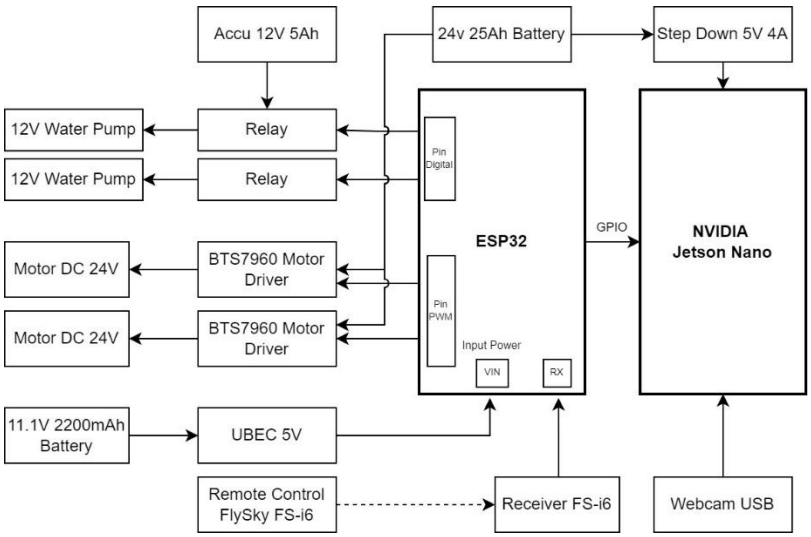


Fig. 3: Architecture of the electronic system of the spraying robot.

2.2 YOLOv8 Model Design

2.3 YOLOv8 was chosen due to its proven ability to detect objects with high accuracy and good speed, such as the research conducted by Sary et al. [9]. The process of designing the YOLOv8 model in this system includes several stages as shown in Fig. 4, namely image acquisition, image annotation, image split, preprocessing, augmentation, and training.

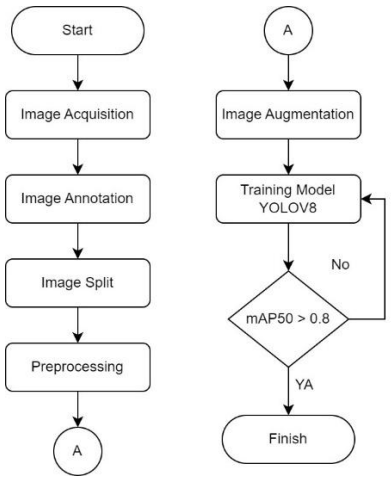


Fig. 4: Flowchart of YOLOv8 model design process.

Image Acquisition

The image acquisition step is an important step in the data collection process for training the detection model to be designed. This will be done by collecting images from various sources including cameras and online searches to compile a suitable dataset. The images obtained can be either photos or videos. For videos, multiple frames will be extracted as needed, so as to form a diverse dataset that covers various situations that the detection model may encounter. The dataset will include four object classes, namely yellow, spot, hole, and chili fruit. An example of the results of image acquisition can be seen in Fig. 5.

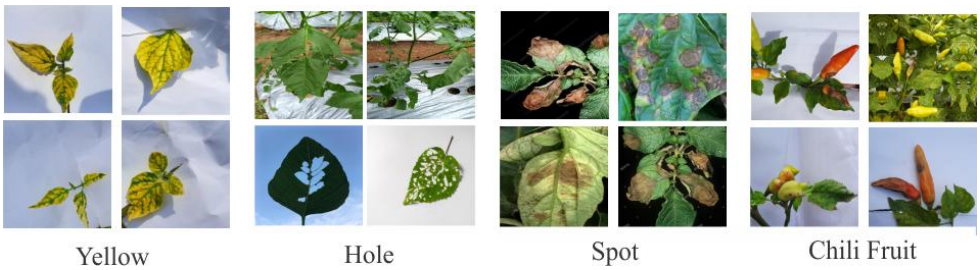


Fig. 5: Example results of image acquisition.

Image Annotation

In the image annotation stage, an approach that involves marking or labeling objects in the image using the Polygon method will be used. Unlike the conventional bounding box method, as practiced by Li et al [10], annotation using polygons makes it possible to follow the contours of the object to be detected with more precision. This stage makes use of the smart polygon feature available on the Roboflow platform. This feature helps this stage to easily mark the object to be annotated in the image, and automatically creates a polygon that follows the contour of the object. Fig. 6 is an example of an annotated image.



Fig. 6: Annotated image example.

Image Split

This image split stage is executed by dividing the dataset into different subsets, namely train, valid and test. This division is done to provide a good balance between training the model with enough data, validating and optimizing the model, and evaluating the model performance independently with a limited number of images on the dataset. In this design, the subset division is carried out with the composition as in Table 1, which is based on the dataset division before the augmentation process.

Table 1: Dataset split

Subset Dataset	Percentage	Total images
Train Set	80%	597
Valid Set	10%	75
Test Set	10%	74

Preprocessing

At this stage, preprocessing is applied to the compiled dataset. The purpose of preprocessing is to prepare the data before it is used in model training. Preprocessing helps improve data quality and consistency, so that the model can learn better and produce more accurate results. Roboflow provides features that make it easy to select and apply the necessary preprocessing techniques. The following are the preprocessing techniques used:

- Auto-Orient: This technique corrects the orientation of images automatically, ensuring that all images have a consistent orientation, so there is no confusion when processed by the model.
- Resize (Stretch to 480x480): This technique resizes all images to 480x480 pixels. This is to make sure that all images have uniform dimensions, ease the model training process and improve the performance of the model in detecting objects.

Augmentation

To improve the variety of the dataset, an augmentation process was carried out on the creation of this dataset. Similar to the previous process, this process uses existing features in Roboflow. Several augmentation methods will be applied to enrich the variety of data. Data augmentation has a very important role in the field of computer vision and deep learning, as it greatly enhances model performance and generalization capabilities [11]. In Table 2 below are the augmentation methods that will be used.

Table 2: Augmentation method applied

Augmentation Methods	Description
Flip: Horizontal	The image will be flipped horizontally.
Flip: Vertical	The image will be flipped vertically.
Saturation	Saturation values in the image will be changed in the range between -15% to +15%.
Exposure	Exposure level on the image will be changed in the range between -10% to +10%.
Blur	Images are blurred with a blur level of up to 1 pixel

From the performed augmentation, there are changes in the composition of the created subsets. Since the augmentation is aimed at the train set, the dataset split composition has changed to 92% for the train set, and 4% each for the validation and test sets, as shown in Table 3.

Table 3: Dataset split after augmentation

Subset Dataset	Percentage	Total images
Train Set	92%	1791
Valid Set	4%	75
Test Set	4%	74

Training Model YOLOv8

In the dataset training process, there are several configurations that need to be adjusted, such as the training model used, the image size, and the number of epochs. This configuration adjustment is carried out through a trial-and-error method to produce a good model. To make the training process easier, Google Colab is used, a platform that allows running and managing Python code online using GPUs or TPUs provided by Google for free, thus speeding up the training process. The training process will be repeated repeatedly until it reaches the desired performance target, which is mAP50 above 0.8 for all classes.

In this research, the YOLOv8n model is used for training. It is because the YOLOv8 model is the lightest model when compared to other YOLOv8 models [12]. This is considered by maximizing the detection speed using the NVIDIA Jetson Nano computing device, but this will sacrifice the resulting accuracy. This dataset training was executed for 56.58 minutes with 120 epochs and an image size of 480. Information about the process of training the dataset can be seen in Fig. 7.

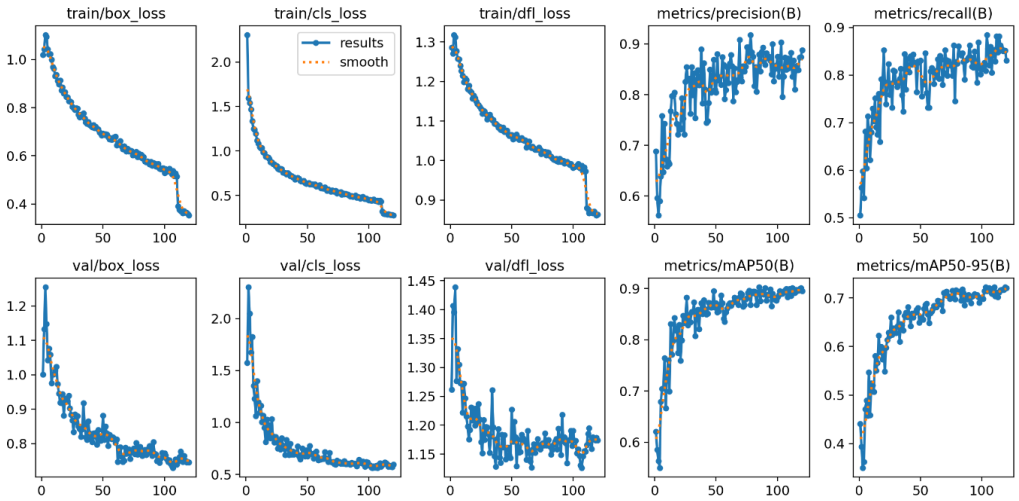


Fig. 7: Dataset training process graph.

In Figure 7, it can be followed that there are several graphs that show the process of running the training model. Shown in the train/box_loss, train/cls_loss and train/dfl_loss graphs whose loss values decrease as the epoch progresses, which is around 0.4, 0.5, 0.9 respectively. Similarly, val/box_loss, val/cls_loss and val/dfl_loss whose values also decrease as the epoch progresses and the value is quite stable when the epoch is more than 100.

Meanwhile, the precision(B) and recall(B) metrics show consistent improvement, despite some fluctuations. Both precision and recall values approach 0.9, indicating that the model is becoming more accurate in predicting and detecting objects. Additionally, the mAP50(B) and mAP50-95(B) metrics demonstrate significant improvement, with mAP50 stabilizing around 0.9 and mAP50-95 around 0.7. This signifies enhanced model performance in object detection across various IoU thresholds. The training process of this model can be said to run well, because the result loss is getting smaller and the results of the precission and recall values are getting bigger and closer to the value of 1 as the epoch progresses.

2.3 Data Transmission Design

This Telegram bot was chosen because it has interesting features, such as the ability to be created without the need for a phone number and its ease of use, and is widely recognized by many people. Based on the flowchart in Fig. 8, this system is designed so that when the Telegram Bot starts, users are presented with two menu options. The first menu option is "Send Latest PDF". If the user selects this option, the system will search for the latest PDF Report based on time and send it directly to the user. The second menu option is "Select Date". Here, users are asked to enter a date in the specified format. After the date is entered, the system will search for the Report file based on that date. If no report file is found for that date, the system will inform the user that there are no reports available for that date. However, if a report file is found, the system will display a list of reports based on the date and detection time. The user is then prompted to choose one from the provided list, and the selected Report file will be sent directly to the user.

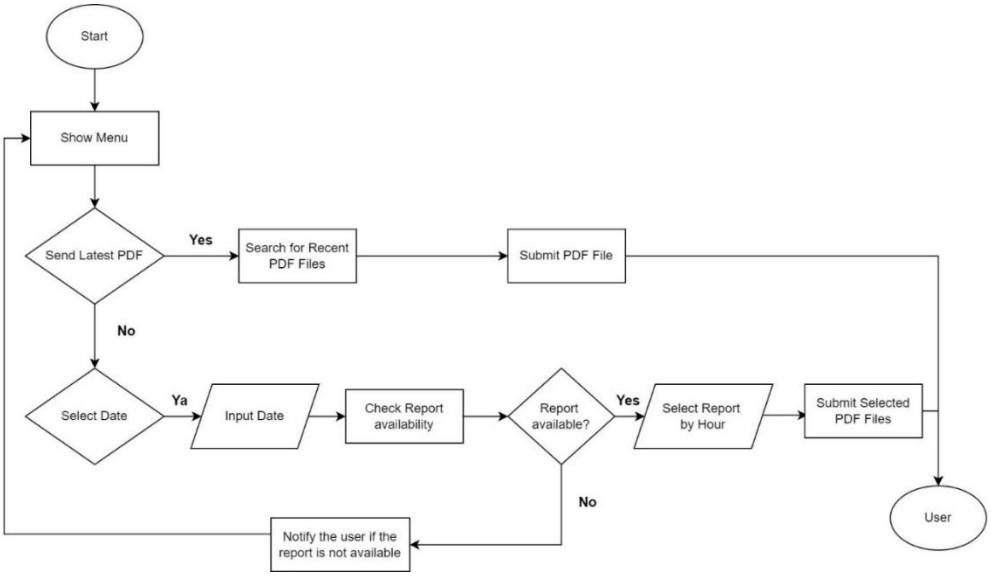


Fig. 8: Telegram Bot Flowchart.

2.4. System Integration

System integration is a step that combines all the results of the processes that have been carried out previously, both from mechanical and electronic design, YOLOv8 model design and data transmission design. This system integration makes one whole system as shown in the flowchart Fig. 9.

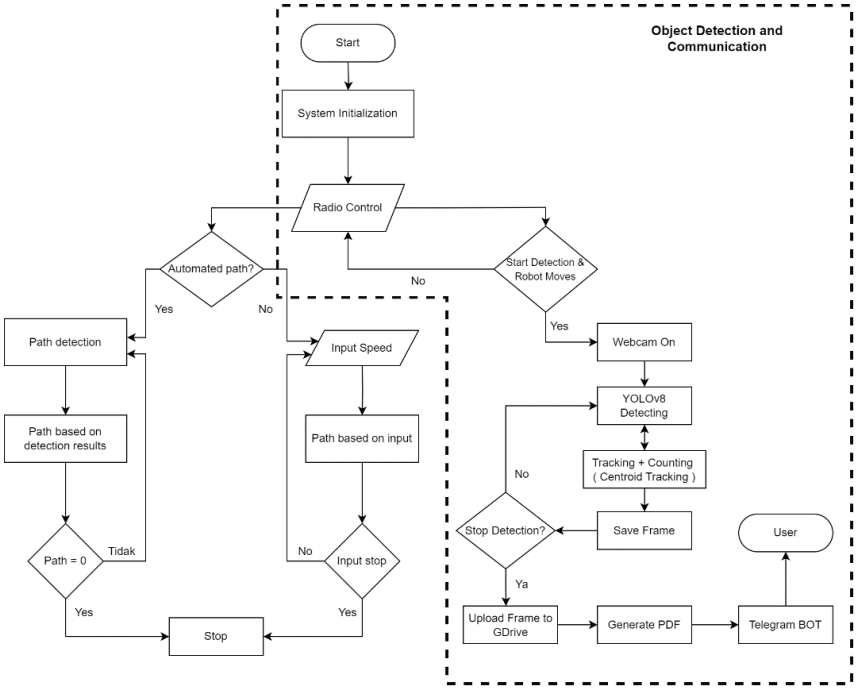


Fig. 9: Overall System Flowchart.

Based on the flowchart in Fig. 9, the program begins by initializing the system, which is the initial process in the operation where all system components are configured and prepared for use. The robot's path control can be done via radio control, either manually or by switching to automatic mode. However, the main focus of this research is on the detection system.

Detection can be initiated by activating it through radio control. The detection starts by turning on the webcam and launching the pre-trained YOLOv8 inference model. Once detection begins, the

program performs tracking and counting using the centroid tracking method. This process results in the count of each detected disease, and the program also saves frames when a disease is counted by the centroid tracking.

The centroid tracking algorithm allows the program to track the movement of objects from one frame to the next using the centroid of each detected object. As part of frame manipulation, a vertical guide line needs to be added in the middle of the frame. When an object's centroid crosses this guide line, the object is counted. This approach ensures that objects are not counted more than once. The implementation of this concept can be seen in Fig. 10. The created dataset has four classes, but the object counting is only performed for three classes. The class that is not counted is chili fruit, because chili fruit is used to reduce the error that occurs, so that when chili fruit is detected, the disease is not detected incorrectly.

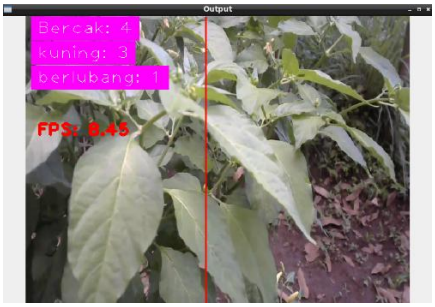


Fig. 10: Centroid tracking implementation.

The detection process can be stopped using radio control. Once stopped, the program uploads the previously saved frames to Google Drive. Then, a link to the file is created to be included in a PDF file that contains the count of each detected disease, several example frames from the detection results, and the estimated location of the detected diseases. To access this PDF file, users can communicate with the Telegram Bot.

3. Result

3.1. Dataset Evaluation

From the training process of the dataset that has been conducted, the best model was obtained from the completed epochs. This best model stores the parameters of the model's best version during training, which has a file type of "pt" because the trained model is saved in PyTorch format. The "pt" format allows for the storage of model weights and configurations, enabling them to be reused for inference in the detection system. This best model is evaluated using several metrics, including the confusion matrix, Precision (P) curve, Recall (R) curve, and F1 curve.

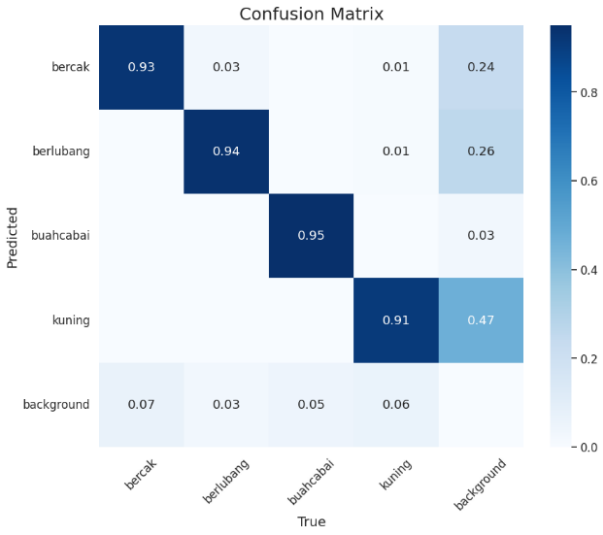


Fig. 11: Confusion matrix of the best model.

The confusion matrix in Fig. 11 demonstrates the performance of the YOLOv8 model in classifying various object categories. The model shows high accuracy in classifying objects as spots (93%), holes (94%), chili fruit (95%), and yellow (91%). However, there are significant misclassifications, such as 24% of spots, 26% of holes, and 47% of yellow objects being misclassified as background. The most significant error occurs with yellow objects, where 47% are classified as background. This indicates that the model has difficulty detecting yellow objects, often mistaking them for background. This issue may arise because the images of yellow disease in the dataset have colors similar to the background, making it challenging for the model to distinguish between the two.

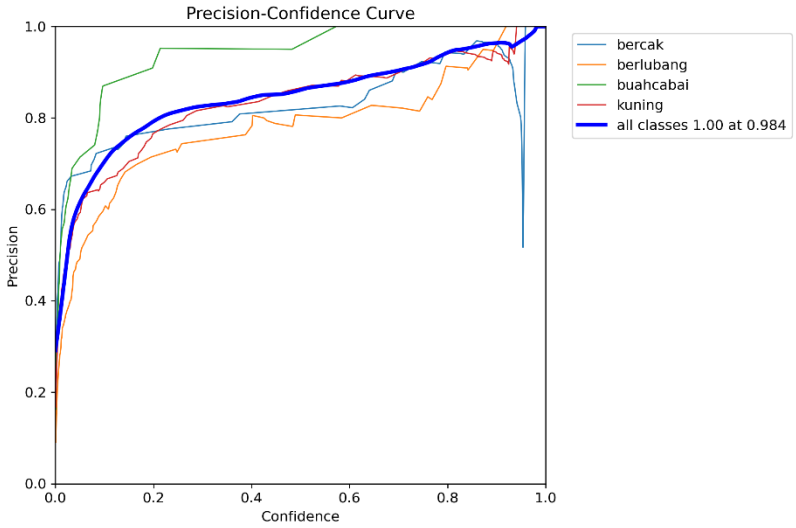


Fig. 12: Precision (P) curve of the best model.

Precision-Confidence curve in Fig.12 shows the correlation between precision and confidence score of the YOLOv8 model for various object categories. From the graph, it can be seen that all classes achieve a precision close to 1.0 at a very high confidence level (close to 1.0). In particular, the chili fruit category shows a very high precision, close to perfect at a high confidence level, indicating that the model is very accurate in its presumed predictions. The blotchy and yellow categories show fairly good precision with precision values close to 0.8 at high confidence levels. The pitted category also shows good precision, above 0.6, at the high confidence level. This shows that the model is generally capable of providing accurate predictions for most object categories at a high confidence level.

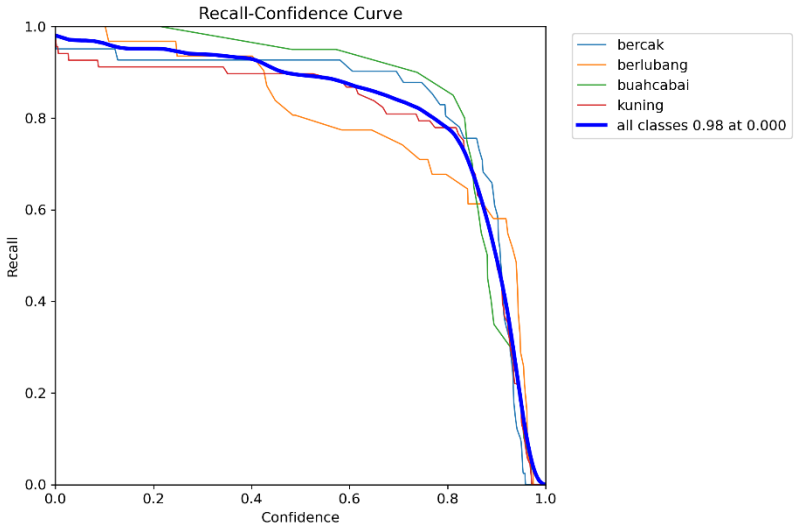


Fig. 13: Recall (R) curve of the best model.

The Recall-Confidence curve in Fig.13 shows how recall changes as the confidence threshold of the model changes. The model has very good recall at low confidence levels for all categories, close to

1.0, which means that almost all objects that actually exist are detected. However, as the confidence level increases, the recall decreases, indicating that the model becomes more selective and starts to miss some objects that are actually present. The chili and hollow fruit categories show higher performance than spot and yellow, with a recall of around 0.9 at a confidence level of 0.5.

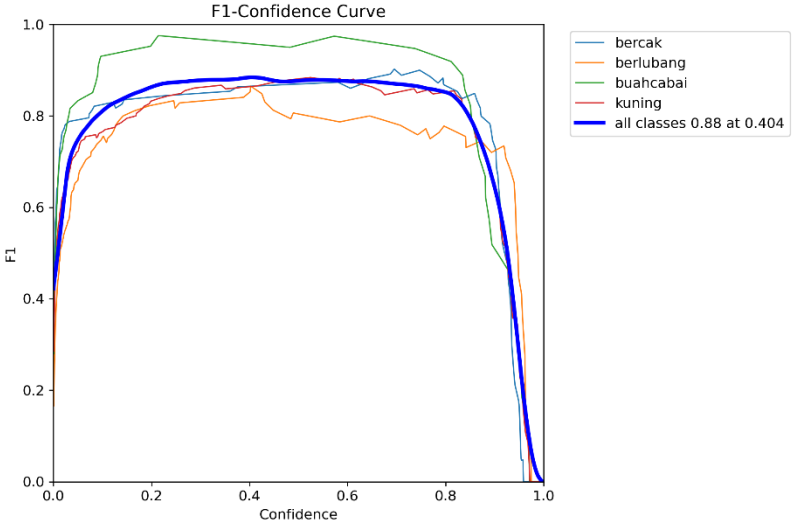


Fig. 14: F1 curve of the best model.

Based on Fig.14, the F1-Confidence curve shows that the YOLOv8 model has a very good performance in detecting and classifying objects. For the spot and chili fruit categories, the model achieves an F1-score close to 0.9, while the hollow and yellow categories have an F1-score of around 0.8, which still shows good performance. Overall, the YOLOv8 model shows good balance with F1-score values for all classes reaching 0.88 at a confidence level of about 0.4, reflecting solid performance in detecting and classifying different categories of objects with high accuracy.

3.2. Testing YOLOv8 Models with Video Input

Testing the YOLOv8 model was carried out on three different videos. The first video has a duration of 66 seconds, the second video has a duration of 33 seconds, and the third video has a duration of 22 seconds. All three videos have a resolution of 1920x1080. The visual conditions of the three videos are also different: in the 66-second and 33-second videos, the chili leaves are still attached to the plant, while in the 22-second video, the chili leaves have already been picked. The results of this test are presented in Table 4.

Table 4: YOLOv8 Model test results with Video Input

Video	Total		Accuracy
	Actual	Predict	
66 Second	Spot: 0	Spot: 0	86,33%
	Yellow:19	Yellow: 16	
	Hole: 8	Hole: 6	
33 Second	Spot: 1	Spot: 1	82,6%
	Yellow:26	Yellow: 23	
	Hole: 3	Hole: 5	
22 Second	Spot: 3	Spot: 3	93,3%
	Yellow:7	Yellow: 7	
	Hole: 5	Hole: 4	

Table 4 shows the actual and predicted number of diseases detected by the detection system. Through the comparison of actual and predicted counts, the detection accuracy for each video is also calculated. The detection accuracy for the 66-second video is about 86.33%, the 33-second video is about 82.6%, while the 22-second video reaches about 93.3%. The accuracy results are influenced by the performance of the Jetson Nano which can be shown by the resulting FPS as in Fig. 15.

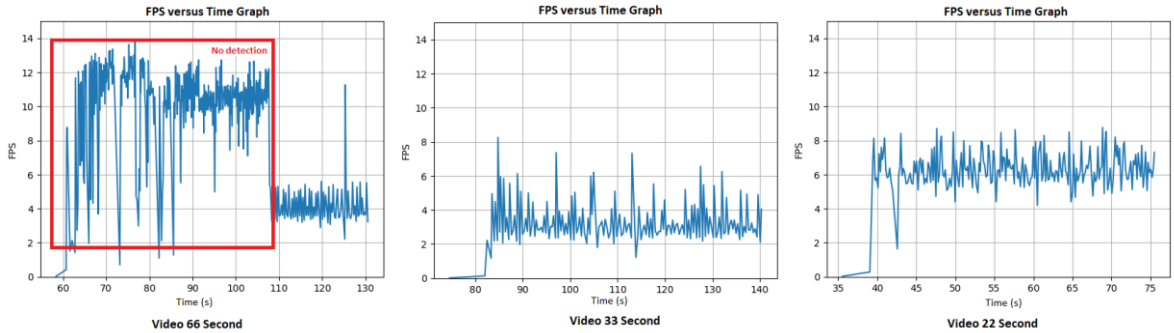


Fig. 15: FPS Graph.

Based on the graph, the average frames per second (FPS) produced in a 66-second video is 9.39 FPS, in a 33-second video is 5.3 FPS, and in a 22-second video is 6.29 FPS. The 66-second video has a high FPS when no diseases are detected. Initially, the 66-second video has a high FPS because no diseases are detected at that time. This average FPS is relatively low, which can affect the performance of the centroid tracking algorithm and result in less accurate calculations. Low FPS causes the object's centroid to miss the vertical guide line accurately due to the delay between frames. As a result, objects are not counted or detected correctly, reducing the accuracy of the detection system.

It can also be observed from the graph that there is a delay in the time required for the FPS to increase. This delay occurs when the Jetson Nano is compiling the program to perform inference on the YOLOv8 model. The duration of this delay in the two videos is quite long, approximately 59 seconds, 82 seconds, and 39 seconds.

3.3. Field Testing

Field testing was conducted by using the YOLOv8 model for real-time detection with a webcam mounted on the spraying robot. Additionally, this test evaluated the functionality of the entire system, including generating detection reports for the user. In Fig. 16, the process of the spraying robot operating to detect diseases on the leaves of chili plants in the plantation is shown. In this test, two scenarios were performed: traveling a distance of 2 meters and 4 meters, with each scenario repeated three times. The robot was manually operated using radio control at a low and constant speed of approximately 4 meters per minute. For the results of testing at this step can be seen in Table 5.



Fig. 16: Spray robot process operates for disease detection.

Table 6: Field testing results

Test-	Time	Predict Result	Manual Count	Accuracy	PDF Delivery
					Testing over 2 meters
1	34 second	Spot: 0 Yellow: 16 Hole: 1	Spot: 0 Yellow: 19 Hole: 4	69.74%	Success
2	27 second	Spot: 0 Yellow: 11 Hole: 4	Spot: 0 Yellow: 19 Hole: 4	85.96%	Success
3	25 second	Spot: 0 Yellow: 12 Hole: 0	Spot: 0 Yellow: 19 Hole: 4	54.39%	Success
					Testing over 4 meters
1	51 second	Spot: 0 Yellow: 22 Hole: 1	Spot: 0 Yellow: 28 Hole: 7	64.29%	Success
2	57 second	Spot: 0 Yellow: 26 Hole: 4	Spot: 0 Yellow: 28 Hole: 7	83.33%	Success
3	59 second	Spot: 0 Yellow: 20 Hole: 5	Spot: 0 Yellow: 28 Hole: 7	80.95%	Success

From the tests conducted, there is a time difference between the two scenarios. In the 2-meter walking scenario, the completion time ranged from 25 to 34 seconds, while in the 4-meter walking scenario, the completion time ranged from 51 to 59 seconds. This difference is due to uneven terrain conditions, causing the robot to move at varying times.

The prediction results also showed some differences. In the 2-meter walking scenario, the test results showed detections of spots: 0, yellow: 11-16, and holes: 0-4. In the 4-meter walking scenario, the test results showed detections of spots: 0, yellow: 20-26, and holes: 1-5. The accuracy of the predictions varied, with the lowest being 54.39% and the highest reaching 85.96%. The average accuracy of all tests was around 73%. Despite differences in the number of detections, the detection results remained consistent: no spots, a relatively high number of yellow detections, and a relatively low number of hole detections.

Several factors influenced the difference in the number of detections. The first factor is the disturbance from the wind, which causes the leaves to move, making accurate detection difficult. The second factor is the unstable camera position. Additionally, the performance of the Jetson Nano also affects the detection process. With an average FPS of only 7.07 during testing, the number of frames captured is limited. This has a significant impact, especially during fast movements, which can cause the centroid of the disease to pass without touching the vertical guide line, resulting in inaccurate detection. The results of this test can be seen in Fig. 17, which is a sample of some detected leaves.



Fig. 17: Example of detected disease frames.

This field test also tested the transmission of detection results. This process can be seen in Fig. 18, where the detection results obtained by the spraying robot are sent via the Telegram Bot. The success of this transmission indicates that the system is not only capable of detecting diseases on chili plant leaves in real-time but also successfully communicates these detection results to the user. This demonstrates that the integration between the spraying robot, the YOLOv8 detection model, and the Telegram communication platform works well.

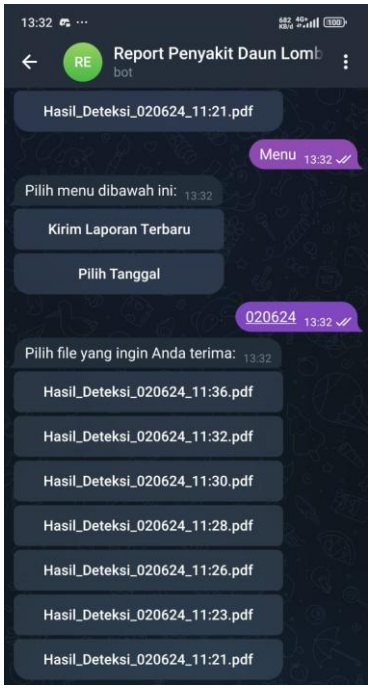


Fig. 18: Telegram Bot Testing.

4. Conclusion

This research applied the YOLOv8 method to detect diseases on chili leaves, including yellow disease and spots, as well as to detect the presence of pests indicated by holey leaves. YOLOv8 was implemented using a dataset trained for 120 epochs with the YOLOv8n model. The training results showed that the model achieved an average mAP50 of 0.932 and an average mAP50-95 of 0.752. Additionally, YOLOv8 was supported by a centroid tracking algorithm to count the detected diseased leaves. The accuracy of disease detection on chili leaves was relatively good. Video testing showed the lowest accuracy at 82.6%, while the highest accuracy reached 93.3%. Field testing also demonstrated that the system could detect diseases with fairly consistent quantities. The accuracy of the prediction results varied, with the lowest value at 54.39% and the highest at 85.96%, with an average accuracy of around 73% across all tests. However, the performance of YOLOv8 on the embedded system of the spraying robot using NVIDIA Jetson Nano was not optimal. The FPS produced during testing ranged from 5.3 to 9.39 FPS, which is relatively low and can interfere with the detection and counting process. Additionally, there was a significant delay at the start of the program, ranging from 59 seconds to 82 seconds.

The detection results will be delivered via the Telegram Bot in PDF format. This detection report will include information on the number of detections, sample images of the detected diseases, and the estimated locations of the detected diseases. Additionally, a link will be provided to view all images of the detected diseases. The purpose of this is to facilitate farmers in accessing the detection results and taking appropriate actions based on the information provided.

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IMPLEMENTATION OF DIFFERENTIATED LEARNING AND ITS INFLUENCE ON STUDENT LEARNING MOTIVATION AT PENGGERAK ELEMENTARY SCHOOL IN SLEMAN REGENCY

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Abstract

Differentiated learning is a learning approach designed to accommodate individual differences among students in a class. This approach recognizes that each student has different learning styles, needs, interests, and ability levels. This study aims to (1) determine teachers' understanding of differentiated learning; implementation and influence of differentiated learning on students' learning motivation. The research approach used is qualitative descriptive with information from 37 informants from 9 Driving Schools in Sleman Regency at the Elementary School level. The results of the study found that teachers understand the meaning or intent of differentiated learning and implement it, but it turns out that it is not optimal. Several things that underlie the less-than-optimal implementation of differentiated learning include the number of students being too many, student openness, teacher knowledge and understanding, teacher skills, lack of preparation and time, administrative burden, exam/test questions from the office, and inadequate facilities and infrastructure. Meanwhile, the influence of motivation itself based on the teacher's point of view is that students become interactive, enthusiastic, understand faster, happy, and actively, enthusiastic, and their exam results improve. Meanwhile, from the student's point of view, they feel happy and pleased. Other factors that influence learning motivation are ice breaking, doing quizzes and games, and watching videos and activities outside the classroom in the form of practice such as the Pancasila Student Profile Strengthening Project.

Keywords: Differentiated Learning, Penggerak School, Learning Motivation, Independent Curriculum

1. Introduction

Education as a system certainly consists of sub-systems, one of which is the programs that have been designed. The programs that are designed must of course be adaptive, flexible, and responsive to changes that occur and the needs of institutions/agencies, educators, education personnel, and students. The program that is currently being glorified is the independent curriculum program. The independent curriculum has a curriculum framework that focuses on essential and interesting material and encourages the development of competencies possessed by students [1], [2]. The independent curriculum is a policy proposed by the government to give freedom to educational institutions to innovate and develop their curriculum [3].

This independent curriculum has given birth to a new learning paradigm with the term independent learning as an effort to humanize humans through the freedom to learn according to the abilities and interests of students [2]. One of the learning approaches that supports humanizing humans in the independent curriculum is differentiated learning [4]. Differentiated learning is a set of learning activities that focus on the learning needs of students [5]. Differentiated learning is an effort to accommodate the diversity of students based on the differences in their characteristics [6] This learning principle is related to the ability of educators to understand the diversity of differences in each student which is then used as a benchmark for teachers in creating the learning process [7]. The diversity of students themselves includes different abilities, experiences, learning styles, interests & talents, languages, cultures, and social groups. Differentiated learning provides opportunities for students to naturally and efficiently develop their potential [8]. Of course, with the help of educators in collaborating methods and approaches, it is important to implement because it can accommodate the diverse learning needs of students [9].

Differentiated learning has a significant influence in improving students' creative thinking, increasing students' creative thinking because differentiated learning accommodates students' learning

needs, and increases students' interest and motivation to learn [10]. Differentiated learning can improve students' learning outcomes and create a pleasant learning atmosphere and students can freely express their potential according to their interests [11], [12]. In addition, the application of differentiated learning helps in knowing the cognitive development of students because it refers to children's development in thinking and the ability to provide reasons [13].

The diversity of students in the classroom has been recognized long before the promotion of differentiated learning, but attention to this condition has not been applied optimally. For example, as expressed by [14], an educator who has to deal with around 30 students is certainly less able to accommodate this diversity, not to mention the curriculum system which is dense with material makes the teacher's attention more focused on the strategy of delivering lesson materials and the indicator of the educator's success lies in the completion of student grades. Educators who still apply a learning system that assumes all students are the same without considering the diversity of students even though one class consists of 20-30 students will have an impact on boredom and lack of motivation [15]. Other problems include difficulties in identifying the needs of individuals with diverse learning styles, classroom management with students who have varying and complex ability levels, teacher skills in designing and delivering learning materials that are appropriate for each level, and the uneven distribution of educational technology and its accessibility are also issues that need to be considered to ensure inclusivity in learning [16].

The Special Region of Yogyakarta itself is a province that is labeled as an education province that does not want to be left behind, 80% of schools in the Special Region of Yogyakarta have implemented the Independent Curriculum which is indeed more able to accommodate the creativity and potential of students. Based on the latest data distribution map from the Ministry of Education and Culture [29], schools in the Special Region of Yogyakarta that have implemented the independent curriculum from the Early Childhood/Equivalent, Elementary School Junior High School/Equivalent, Senior High School//Equivalent levels in 5 Special Region of Yogyakarta cities/regencies totaled 7.369 or have reached 96%. In general, this means that many schools have become driving schools. Driving schools are an acceleration program for public/private schools in all school conditions to move 1-2 stages ahead of other schools as pilot schools (Ministry of Education and Culture website). In every driving school, there must also be a driving teacher who is the driving force in running the driving school programs and the independent curriculum [17]. However, based on the results of research conducted by [18] there are still problems experienced by driving teachers in implementing the independent curriculum, including (1) problems in unifying teacher perceptions in educational units to work together in supporting the strengthening teaching and learning methods according to the instructions in the independent learning curriculum; 2) Optimization of teacher teaching materials, human resources, and the failure of teacher working groups in subject units in each school to run optimally; 3) Geographical location, intranet or interNET infrastructure is inadequate; 4) The skills of driving teachers need to be further strengthened.

Of course, this is actually something to be proud of in the sense that the Special Region of Yogyakarta is not left behind in following the new learning paradigm, but it is not yet known for sure how the implementation of differentiated learning as part of the independent curriculum approach is running or is it just mere talk that is covered up because of the pride of having adopted the independent curriculum. Differentiated learning is indeed expected to be a solution to humanize learners amid a paradigm shift that is centered on students. However, because this approach is a new approach that is being promoted in the current era of the independent curriculum, of course, it is not easy or that fast to succeed on a large scale because of its complexity. Cooperation and commitment are needed between systems and components in education and learning. Therefore, this study aims to analyze in more depth the implementation of differentiated learning in the Special Region of Yogyakarta.

2. Method

This research focuses on the level of understanding and implementation of differentiated learning in Sleman Regency Penggerak Elementary School and finds out the perception of the influence of differentiated learning on students' learning motivation. So that a descriptive qualitative approach was chosen to research this. Setting the location was conducted in 9 elementary schools in Sleman Regency. The reason the researcher chose these 9 elementary schools was because they were driving schools in Sleman Regency. The research itself was conducted in August 2024. The research subjects were the Principal, Deputy Curriculum or Curriculum Development Team, Teachers, and Students with a total of 34 research subjects. The following is a list of schools that will be displayed in Table 1.

Table 9. List of Primary Schools in Sleman Regency

No.	School Name	Subdistrict
1.	Gayamharjo Elementary School	Prambanan
2.	Salsabila Klaseman Integrated Islamic Elementary School	Ngaglik
3.	Sleman Model Elementary School	Ngemplak
4.	Malangrejo Elementary School	Ngemplak
5.	Kadisobo 2 Elementary School	Turi
6.	Ngemplak Nganti Elementary School	Mlati
7.	Glagah Harjo Elementary School	Cangkringan
8.	Percobaan Elementary School 3	Pakem
9.	Merdikorejo Elementary School	Tempel

The most important data collection technique is in-depth interviews through first-person stories in informal and formal conversations and interviews [19]. While the research instrument is actually the researcher himself. Human instruments or researchers as key instruments play a major role in obtaining carrying out planning and implementing data collection. So it is necessary to determine the focus, choose instruments, analyze data, and draw conclusions from the findings. In addition, in determining the focus to be obtained, researchers use a guideline, namely an interview protocol in the form of a form prepared by the researcher containing interview process instructions, questions, and informant response record space [20].

The stages carried out by researchers in conducting research, namely: (1) Compiling interview protocols and interview questions. (2) Obtaining permission. (3) Researchers coordinating with the school regarding permission and determining the interview schedule. (4) Conduct interviews guided by key informants/gatekeepers from the school to help determine the informants to be interviewed. (5) Transcribing interview results and compiling research reports.

Data analysis is the process of organizing and sorting data into patterns, categories, and basic description units so that themes can be found and working hypotheses can be formulated [21]. Qualitative data analysis in general is data reduction, categorization, synthesis, and working hypotheses [21]. Data reduction is related to the identification of units and coding of data that has been identified. Categorization is an effort to sort out several units that have similarities by being labeled. Furthermore, it is synthesized to find the relationship between one category and another. Finally, a working hypothesis is formulated by formulating a statement that answers the research question.

3. Results and Discussion

The purpose of this study is to determine the understanding, implementation, and motivation of differentiated learning in the Sleman Regency Penggerak Elementary School. Through a qualitative descriptive approach, the results of the analysis revealed three basic or main themes, namely teacher understanding, implementation (planning, implementation, evaluation, and obstacles), and student learning motivation related to the implementation of differentiated learning. This chapter presents the categorization of meaning units, synthesis, and working hypotheses related to differentiated learning in Penggerak Elementary School will be presented in the discussion.

Table 10. Theme Categorization

No.	Theme	Sub Themes
1.	Teachers' Understanding of Differentiated Learning	• Adapting to Student Needs • Adjusting Interests and Talents • Adapt Student Characteristics
2.	Differentiated Learning Planning	• Diagnostic Assessment • Coordination • Learn to be Independent • Material Preparation • Training • Infrastructure
3.	Implementation of Differentiated Learning	• Diagnostic Assessment • Group

No.	Theme	Sub Themes
		• Collaboration Strategy and Model • Method • Time
4.	Evaluation or Assessment of Differentiated Learning	• Summative • Internal Evaluation • External Evaluation
5.	Constraint	• Number of Students • Student Transparency • Teacher Knowledge and Understanding • Teacher Skills • Lack of Preparation and Time • Administrative Expenses • Exam/Test Questions from the Department • Infrastructure
6.	Student Learning Motivation	• Teacher's Point of View (Interactive, Enthusiastic, Faster Understanding, Happy, Active, Enthusiastic, Daily Test Results Increase) • Student's Perspective (Like and Enjoy)

Teachers' Understanding of Differentiated Learning

Understanding is born from something experienced, known, and remembered by someone. Understanding is intended to get the views of the teachers regarding differentiated learning. The views here mean whether they understand something that has been experienced, remembered, and known. So that the understanding of each teacher will produce various points of view. The following are examples of statements from teachers regarding differentiated learning.

> "Differentiated learning is learning where we carry out learning according to the needs of our students, according to my understanding, so various methods, various ways, we do it to meet the needs of these students" (Ms. IT).
>
> "Learning that adapts to the child's talents and interests, so according to the child's needs and according to the child's development" (Mr. PM).
>
> "Learning to meet all student characteristics" (Ms. SW).

Understanding differentiated learning is marked by the implementation of the independent curriculum. The independent curriculum is an approach that emphasizes diversity in learning content and gives teachers the freedom to choose a variety of tools. Teaching aids [22]. The Independent Curriculum according to [23] is a learning method that refers to the interest and talent approach so that students can choose what lessons they want to learn according to their passion.

The above is in line with the concept of differentiated learning which is one of the learning approaches and is used to accommodate the uniqueness of students in learning. Differentiated learning is learning that accommodates, serves, and acknowledges the diversity of students in learning according to the readiness, interests, and preferences or independent learning styles of students [24]–[28]. Therefore, this independent curriculum and differentiated learning are related and based on humanism and constructivism learning that is based on students.

Based on the research results, the understanding of the teachers is relevant to the theories explained above, meaning that teachers already know or even experience differentiated learning. There are three sub-themes found, namely adjusting student needs, adjusting interests and talents, and adjusting student characteristics. The use of methods or various ways carried out by teachers in facilitating the learning process are all adjusted to the needs, interests, talents, and learning styles of students, that's how they understand differentiated learning.

Differentiated Learning Planning

Something that is to be achieved requires planning so that it is right on target according to the goal. In many ways, everything needs to be planned, one of which is in the world of education. More specifically in the process of differentiated learning. Principals and teachers must understand the principles of differentiated learning before implementing it, this is to plan learning programs that support student diversity [29]. In differentiated classes, student success is through growth toward achieving goals and exceeding the goals that have been set. Of course, this growth is not practical and coincidental but depends on the role of teachers in making decisions in learning planning [30]. The following are examples of statements from teachers regarding things that need to be planned in implementing differentiated learning.

> "First of all, we do an initial assessment, it can be from their interests and talents, or their learning styles" (Ms. SH).
>
> Previously, we had to coordinate with fellow teachers who had implemented the independent curriculum, but it was still in the trial stage because it was only the first year, we coordinated between grade 1 teachers and the principal about the mechanism for differentiated learning, where to start, determining what the program would be like" (Mr. PM).
>
> "Since we were appointed as a driving school and the curriculum changed, maybe other schools have not dared to do that, so from that moment on we started learning through PMM, PMM is an application owned by the Ministry of Education and Culture, yes, it is an application for independent learning teachers that contains CP, module creation and others. So our initial preparation was independent learning at PMM and KKG/KOMBEL" (Ms. SR).
>
> Preparing materials according to the child's abilities" (Mr. AS).
>
> "In-house training for you, we put everything in a workshop or activity at school, then I and the learning committee that have been trained will convey it to the teachers, from the understanding, implementations until later at the implementation stage in their respective classes" (Mr. SG).
>
> "Why infrastructure because the name differentiation is different, various patterns or learning techniques, maybe group A needs paper but group B needs a screen or projector" (Mr. JM).

According to [36], the steps in implementing differentiated learning are 1) mapping students' learning needs based on their interests, learning readiness, and learning profiles. 2) designing differentiated learning plans, and selecting approaches, models, strategies, media, and materials which will then become strategies for implementing differentiated learning which include content, processes, and products. 3) carrying out reflection and evaluation activities, providing feedback on the implementation of learning that has been implemented. There is another opinion that the initial stage of differentiated learning planning is to provide an in-depth understanding of the curriculum and foundations of differentiated learning and revolutionize teachers' mindsets from outcome-oriented learning to learner-oriented learning [29].

Some things that are relevant to the theory and research results include diagnostic assessments, some teachers conduct diagnostic assessments to map or group based on student characteristics. In addition, teachers also prepare materials by selecting materials that are appropriate to the child's abilities. Facilities and infrastructure also need to be planned in this differentiated learning to accommodate the needs of groups based on diagnostic assessments.

Training is also strengthened in this differentiated learning planning, the purpose of which is of course to provide understanding and skills to teachers before implementing it in class. The training is usually held internally by the school by inviting other speakers or held by external parties or from the local government. The forms of training that are followed are in-house training, workshops, and workshops. All of these training activities are a forum for principals and teachers to gain knowledge and skills regarding the implementation of differentiated learning.

The latest findings show that in planning differentiated learning, coordination is also needed between teachers and principals to find out the mechanisms and programs that must be implemented because differentiated learning is still something new. In addition, several teachers conduct independent learning to support knowledge and skills in differentiated learning through the Merdeka Mengajar Platform (PMM) and the Learning Community (KOMBEL).

Implementation of Differentiated Learning

The cycle of stages after planning is implementation. The designed plan is implemented and practiced. Implementation includes real practices carried out to achieve targets or goals. Specifically in differentiated learning itself, namely managing an effective class including procedures, and routines that can allow flexibility with a clear structure even though carrying out different activities the class can still run well [30]. The following are examples of statements from teachers regarding the implementation of differentiated learning.

> "Initially, an assessment was given to see the students' needs, how the students prefer what content learning or product or process is assessed, then after being analyzed, the teacher prepares the learning to differentiate it, miss" (Ms. NR).
>
> "After the diagnostic assessment is carried out, then divided into groups" (Ms. AI).
>
> "Process, Content, and Product are all carried out. Sometimes the product that is made is a craft. Sometimes in the learning process, it collaborates with the project based learning model and also collaborates with other subject teachers, such as ICT teachers. Pancasila Student Profile Strengthening Project activities are also project learning activities, later for grade 1 students, they wrap their snacks or sell them as an entrepreneurial activity" (Ms. SW).
>
> "The differentiation that is carried out is only child guidance, not as far as and up to the process, content, product stages. Then, during the learning activities to catch up in class, it also collaborates with the problem-based learning and project-based learning models" (Ms. VT).
>
> So if we only differentiate or create different groups according to needs, it can sometimes be boring, so we also have to provide students with methods, for example, how to shop from other groups, this group, then later it will be like a market made like that or later learning or what, there are many methods used for this material" (Ms. RN).
>
> "The implementation of differentiated learning is not carried out every week, so it is gradual, not every week because not all materials can be differentiated" (Mr. PM).

The results of the study revealed that there are several views on diagnostic assessment. Some of them do it at the planning stage, but some are of the view that diagnostic assessment is included in the realm of initial implementation of differentiated learning. This is relevant to what was expressed by [31] that the first step taken in differentiated learning is mapping learning preferences (readiness, interests, and learning styles) of students or diagnostic assessment by providing questions related to the previous meeting material as a pre-test. After that, study groups are formed, learning in groups can consist of students with the same or different levels of ability. These groups can be flexible, changing according to conditions, so that students have the opportunity to collaborate with various colleagues and develop various skills. Homogeneous groups allow teachers to provide in-depth material and challenging tasks, while heterogeneous groups allow students to learn and collaborate [32].

The implementation of differentiated learning must be focused on the differentiation aspect, either through content, process, or learning products [7]. Educators or teachers in implementing differentiated learning must be on the needs and abilities of students, models, and strategies must also be centered on students, and materials must be adjusted to their level of understanding. The learning model that is often collaborated with content, process, and product strategies is usually the project-based learning model.

Although the implementation has been planned, it does not rule out the possibility that educators/teachers will still improvise according to the conditions during the learning process [33]. Improvisations that can be made include the use of various approaches and methods because some students may be more responsive to visual presentations, while others prefer interactive learning. Responding to student needs with educators paying special attention to individual needs.

New findings explain that the implementation time of differentiated learning is not always applied, but rather adjusts to several conditions. These conditions include not all materials that are suitable for differentiation, student diversity, and teacher implementation that is not yet optimal. So it is not implemented every week but gradually. In addition, some do not implement it but are more focused on direction and guidance.

Differentiated Learning Evaluation/Assessment

The final stage after the implementation of the differentiated learning process is evaluation. The purpose of the evaluation is of course to see the achievement of goals, information collection, and assessment that can be used as recommendations for improvement. The evaluation consists of internal and external evaluations. Internal evaluation is an assessment process carried out within an agency or institution, more specifically at school. While external evaluation is an assessment process carried out by parties outside the school. The following are examples of statements from teachers regarding differentiated learning evaluation.

> "Summative assessment follows the final exam standards determined by the office" (Ms. RN & Mr. PM).
>
> "Usually there is a tri-semester evaluation and there is also a reflection on what is lacking" (Ms. PB).
>
> "External evaluation is carried out by the facilitator of the driving school and supervisor from the office or district" (Mr. SG, Mr. AS, Ms. SR).

Internal evaluation is usually carried out by the principal as the holder of leadership responsibility in the school to monitor the learning process. The form of internal evaluation is usually carried out by supervision and class observation, in addition, teachers also conduct independent reflection. Another means to evaluate each other and share experiences with fellow teachers is through a Learning Community. In a Learning Community, the principal and teachers can share about obstacles and solutions or good practices. The external evaluation itself involves school facilitators, movers, and supervisors from the office or district.

The assessment of the differentiated learning process itself is based on summative assessment and based on tests from the service even though teachers actually have the authority to determine assessments for students. Tomlinson [34] explains that assessment in differentiated learning considers the criteria set by the teacher, not the norms. The assessment pattern that still follows the wishes of the service certainly does not reflect the differentiated learning assessment determined directly by the teacher.

Differentiated Learning Constraints

Differentiated learning certainly wants to be implemented and run successfully. However, in its journey it is certainly not easy to run according to will or plan, there will be obstacles that hinder, limit, and have their problems that have an impact on complicating the process of implementing differentiated learning. Knowing and understanding these obstacles is important in planning and implementing differentiated learning because it allows individuals or schools to identify potential problems early on and find solutions. The following are examples of statements from teachers regarding the obstacles to differentiated learning.

> "It is still difficult to control because indeed one of our classes is quite a large class, so it is difficult for twenty-seven to thirty children" (Ms. AM).
>
> "The obstacle for a teacher is having to serve 28 children with various characteristics" (Ms. MT).
>
> "From the children themselves, they may not dare to express themselves in which way, sometimes they don't dare and just follow along" (Mr. AS).
>
> "Need adjustments and changing the mindset again from teacher-centered to student-centered (Mr. HR).
>
> "Difficulty in developing materials, because we have to find materials that are by the characteristics of students" (Ms. DV).
>
> "Lack of preparation and time (Mr. ZN)
>
> "Administration to prepare to learn requires a lot of ideas, concepts, and time. Then, sometimes there is an administration given by the school to be done" (Ms. MG)
>
> "Tests determined by the office, that is the main obstacle for those schools, because if we have tried to differentiate like now, a 4th grader named Mika or that child has difficulty writing, even her writing is illegible, but she can speak to convey it, well, later when the test from the office

is in written form and must be descriptive and so on, that is the obstacle, even there is ASPD, the exam was removed this year, there is another exam, then the PTS which was removed yesterday has now appeared again, PSAS which is just a summative test is held simultaneously with the same problem, that is even more confusing, that is the obstacle" (Ms. SR, Mr. ZN, Ms. YN).

"The obstacle is the exam with the same measuring instrument, the exam questions that are made are the same without differentiation, the office is still ranking" (Ms. AR).

"The infrastructure is not ready, such as only having 1 LCD, each class should have an LCD" (Ms. AA & Ms. HN).

Some of the obstacles in implementing differentiated learning in Sleman Regency's driving schools include the large number of students in each class while there is only one teacher, teacher knowledge and understanding, teacher skills in using methods and developing learning materials, lack of preparation and time, exam/test questions from the office and facilities and infrastructure. Other research results also reveal things that are relevant to the obstacles in Sleman Regency's driving schools including time, teacher understanding, diversity of student needs, unpreparedness in making learning plans and modules, educational background, unfair and inaccurate assessments, and availability of facilities and infrastructure [9], [10], [14], [32], [35]–[37].

There is a new finding in this study that student openness is also one of the obstacles to implementing differentiated learning. Lack of self-confidence to bring out students' potential or uniqueness, makes students just follow other students' choices. This will also make it difficult for teachers to recognize and explore the superior uniqueness of students. Another new finding related to obstacles in implementing differentiated learning is the administrative burden. Teachers as teaching implementers are still burdened by administrative matters that interfere with the teaching and learning process.

The Influence of Learning on Learning Motivation

Elementary schools have two class groups consisting of lower and upper classes. Elementary school students in lower classes consist of classes one, two, and three, while students in higher classes consist of classes four, five, and six [38]. Lower-class students still need a lot of attention because their concentration focus is still lacking, attention to speed and learning activities is also still lacking [39]. Meanwhile, in higher classes, they can already think practically and solve problems [40]. Based on these characteristics, the application of differentiated learning is very appropriate to accommodate various student characteristics and help increase motivation. Here are some statements from teachers regarding the influence of differentiated learning on student learning motivation.

Ms. IT disclosed that now children are more motivated because there is ice breaking that makes learning more interesting. Students also interact more through exploration activities (Ms. AM). Through the Pancasila Student Profile Strengthening Project project program, children are also more enthusiastic (Ms. RN and Ms. UM), for now, the emphasis is more on the Pancasila Student Profile Strengthening Project. The disclosure of Mr. PM and Ms. SW that the existence of differentiated learning affects understanding faster and being happier because there is no assumption that they can't. Differentiated learning also affects student activity (Mr. AS). Students are more enthusiastic about learning in learning because with this differentiated learning, teachers are required to be creative, for example, teachers often use student worksheets in class (Ms. MG). Giving students worksheets in class makes students challenged to do it because for them there is something new while in the practice questions in the book sometimes there are students who have done it at home. Motivated, especially in learning activities I usually include games, such as Wordwall and Quizizz (Mr. DM). In the end, this motivation also had an impact on improving daily test results (Mr. ZN & Ms. YN).

Meanwhile, from the students' perspective, AB and AL expressed that they were motivated because there was practical learning of the Pancasila Student Profile Strengthening Project. After all, the activities could be done outside the classroom. While KE and ZU expressed that their motivation was because there were fun ice-breaking activities and Pancasila Student Profile Strengthening Project practices. Because it was fun to watch videos often (NA). Motivated, because there were many quizzes, and could watch videos (VA). Motivated and happy, because the learning used a projector (ID).

The results of previous studies have revealed its positive impacts, for example on elementary school learning motivation. The results show that differentiated learning can increase students' learning

motivation. *Differentiated learning increases students' motivation and learning outcomes* [41]. *Students also feel happy and enthusiastic in following the lessons* [33], [42]. *Differentiation also has a significant effect on creative thinking skills* [43].

Relevant to the results of this study is that students feel happy, happy, and excited because the learning includes ice breaking, doing quizzes, watching videos, practicing, and doing activities outside the classroom by collaborating through the Pancasila Student Profile Strengthening Project. The teacher's perspective sees this differentiated learning as having a positive effect on learning motivation with indicators that children are more interactive, enthusiastic, understand faster, are happy, active, and enthusiastic so as to improve learning outcomes.

4. Conclusion

Elementary school teachers at the Sleman Regency Mover School already understand the meaning of differentiated learning. The implementation of differentiated learning at the Sleman Regency Mover School has gone through a structured stage, namely through the planning, implementation, and evaluation stages. However, in its implementation it is still not optimal, there are still several obstacles experienced by teachers including the number of students being too many, student openness, teacher knowledge and understanding, teacher skills, lack of preparation and time, administrative burden, exam/test questions from the office, and inadequate facilities and infrastructure. Learning motivation in differentiated learning is indicated by indicators that students are more interactive, enthusiastic, understand faster, like, enjoy, have fun, and are active and enthusiastic. Other factors that influence learning motivation are ice breaking, doing quizzes and games, and watching videos and activities outside the classroom in the form of practice such as the Pancasila Student Profile Strengthening Project.

So for further research, there needs to be a differentiated learning model that collaborates with Pancasila Student Profile Strengthening Project activities. Based on the results of the study, the Pancasila Student Profile Strengthening Project is not entirely a differentiated learning program but a Pancasila Student Profile Strengthening Project based on strengthening Pancasila characters. Therefore, differentiated learning has not stood strong and totally in an effort to increase learning motivation. The solution to this responsibility is to integrate differentiated learning into Pancasila Student Profile Strengthening Project (P5) activities.

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TRAINING PROGRAM ON MOODLE E-LEARNING PORTAL UTILIZATION FOR ENHANCED LEARNING AT SMK MUHAMMADIYAH 1 BANTUL

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Abstract

The rapid development of information and communication technology (ICT) has revolutionized education, particularly through the adoption of e-learning platforms like Moodle. During the COVID-19 pandemic, online learning became essential for maintaining educational continuity. This study aims to assess the effectiveness of a teacher training program at SMK Muhammadiyah 1 Bantul in utilizing the Moodle-based e-learning portal. Using a mixed-methods action research design, we collected data from 76 teachers through pre-tests, post-tests, observations, and interviews. The results revealed significant improvements in teachers' understanding of Moodle, their ability to design online courses, and the effectiveness of e-learning implementation. Quantitative analysis indicated a substantial increase in pre-test and post-test scores ($p < 0.05$), while qualitative feedback highlighted enhanced confidence and motivation among teachers. Despite positive outcomes, challenges such as time management and infrastructure support were identified. The findings underscore the importance of ongoing professional development and institutional support for sustaining effective e-learning practices. This study contributes valuable insights into enhancing digital competencies among educators, serving as a reference for similar training initiatives in vocational education.

Keywords: e-learning, Moodle, teacher training, ICT, online learning, professional development, digital competencies, vocational education, Indonesia, COVID-19

1. Introduction

The development of information and communication technology (ICT) has significantly transformed various aspects of life, including the field of education. One notable manifestation of this technological advancement is the increasing use of e-learning as a medium for facilitating learning [1]. Amid the COVID-19 pandemic, online learning emerged as the primary solution to ensure the continuity of teaching and learning processes in an environment where face-to-face interactions were restricted [2]. The utilization of e-learning portals based on Learning Management Systems (LMS) like Moodle has become highly relevant and essential, providing educators and students with innovative tools for effective learning experiences.

In the era of digitalization, the education sector has been compelled to adapt and innovate in response to the rapidly changing landscape of learning. The COVID-19 pandemic has accelerated the shift to online learning, transforming it into an essential component of modern education systems across the globe [3]. The Indonesian government has also recognized and emphasized the importance of online learning through the "Merdeka Belajar" program, which aims to promote digital literacy and technology-based education among students and educators alike [4]. This initiative underscores the need for educational institutions to embrace technological advancements and integrate them into their curricula effectively.

One of the main challenges in implementing online learning is the effective utilization of e-learning platforms. Learning Management Systems (LMS) serve as critical components of online education, providing a structured platform for teachers to design, deliver, and manage online courses while enabling students to access learning materials and participate in various online activities [5]. Among the available LMS options, Moodle stands out as an open-source platform that has been widely adopted by educational institutions worldwide due to its flexibility, extensive customization options, and cost-effectiveness, making it accessible for diverse educational contexts [6].

In Indonesia, SMK Muhammadiyah 1 Bantul, a progressive vocational school, recognizes the pivotal role of technology in enhancing the learning experience. In response to the demands of modern education, the school has implemented an e-learning system based on the Moodle LMS to support online learning activities effectively. However, the success of this implementation heavily relies on teachers' ability to navigate and utilize the platform effectively to design and manage engaging online courses [7]. This dependence on teachers' competencies highlights the crucial need for targeted training programs.

Teacher training emerges as a key factor in ensuring the successful adoption of e-learning platforms [8]. Educators must possess the requisite skills and competencies necessary to design and deliver online courses, facilitate meaningful online learning experiences, and comprehensively assess student performance [9]. Therefore, the training program for utilizing the Moodle LMS e-learning portal is specifically designed to equip teachers at SMK Muhammadiyah 1 Bantul with the essential knowledge and skills required for effective use of Moodle. This training focuses on enhancing teachers' competencies in managing online courses, fostering improved interactions between teachers and students, and facilitating engaging and interactive learning experiences.

Through this comprehensive training initiative, it is anticipated that the quality of online learning at SMK Muhammadiyah 1 Bantul can be continuously improved, fostering a more enriching educational environment. Furthermore, emphasizing the importance of teacher training in optimizing e-learning platforms will serve as a strategic step in supporting digital transformation within educational institutions. To evaluate the effectiveness of the training program, a robust evaluation will be conducted based on the Kirkpatrick framework [10], which encompasses four levels: reaction, learning, behavior, and results. This structured approach ensures a thorough assessment of the training's impact on educators and, consequently, on students' learning outcomes.

With this multifaceted approach, it is hoped that the implementation of the Moodle-based e-learning system can operate optimally, significantly enhance the quality of online learning, and contribute meaningfully to the overall development of digital education within vocational schools. By empowering educators with the tools and knowledge they need, we pave the way for a brighter, more innovative future in education.

2. Method

This study was conducted at SMK Muhammadiyah 1 Bantul, which is one of the progressive vocational schools in Indonesia. The research design employed is action research with a mixed-methods approach that combines quantitative and qualitative methods. This approach was chosen to provide a comprehensive understanding of the effectiveness of teacher training in utilizing the Moodle-based e-learning portal. Action research allows the researcher to adapt and make continuous improvements to the training process and the implementation of e-learning, thereby enhancing the quality of education in the school [11].

The population of this study consists of all teachers at SMK Muhammadiyah 1 Bantul, totaling 76 individuals. To obtain representative and relevant data, the researcher applied purposive sampling in determining the research sample. The inclusion criteria used in selecting the sample include several aspects: (a) permanent teachers working at the school, (b) teachers who teach at least one subject, and (c) teachers who are willing to fully participate in the training. Based on these criteria, the total sample taken in this study is 76 teachers from various fields of study. The purposive sampling technique is important to ensure that the sample selected aligns with the research objectives, allowing the results obtained to provide a more accurate depiction of the effectiveness of the training conducted [12].

The variables in this study consist of independent and dependent variables. The independent variable in this study is the training program for utilizing the Moodle-based e-learning portal, aimed at enhancing teachers' capabilities in managing online learning. Meanwhile, the dependent variables include several aspects to be measured, namely: (a) the level of teachers' understanding of the Moodle LMS, (b) teachers' ability to design and manage online courses, and (c) the effectiveness of e-learning implementation in the classroom. Thus, this research focuses on the impact of training on improving teachers' competencies, which is a crucial aspect for the success of online learning [8]

To collect data, this study employs various instruments that are systematically designed. First, pre-test and post-test questionnaires are used to measure changes in teachers' understanding and competencies before and after the training. These questionnaires are designed to assess three main

aspects: understanding of Moodle, ability to design online courses, and effective assessment strategies. Second, a rubric for evaluating online courses is applied to assess the quality of the courses designed by the teachers. Additionally, an observation checklist for implementing e-learning is used to observe and record the learning processes occurring in the classroom. Finally, semi-structured interviews are conducted to gain in-depth feedback regarding teachers' experiences and perceptions of the training and the use of Moodle. The diversity of these instruments is vital to ensure that the collected data encompasses various relevant perspectives [13].

Data collection in this study is carried out through several structured stages. The first stage is the pre-test conducted before the training, aimed at assessing the initial understanding level of teachers regarding the Moodle LMS. Following this, observations during the training are conducted to record teachers' interactions and engagement in the learning process. After the training is complete, a post-test is conducted to evaluate the teachers' competency improvement. Subsequently, an evaluation of the online courses designed by the teachers is performed to assess the quality of the learning content. The process of observing e-learning implementation in the classroom is also carried out to identify the effectiveness of using the Moodle platform. Lastly, interviews with participating teachers are held to explore their perspectives on the training and the application of the LMS in the teaching and learning process. By collecting data through various methods, this study aims to produce comprehensive and in-depth information [14]

Data analysis is conducted using a mixed-methods approach that involves both quantitative and qualitative analysis. In the quantitative analysis, paired t-tests are used to compare pre-test and post-test results, while descriptive analysis is performed to describe the characteristics of the data and the results obtained. Additionally, correlation analysis is used to determine the relationship between the variables studied. On the qualitative side, thematic and content analysis are employed to explore data from interviews and observations. The evaluation framework used in this study is the Kirkpatrick model, which consists of four levels: reaction, learning, behavior, and results. This model is very useful for evaluating the effectiveness of training programs, enabling researchers to understand how participants respond to the training, the extent to which they learn, behavioral changes that occur, and the final impact of the training [10]. Fig 1 illustrates the Kirkpatrick Evaluation Model, highlighting the interconnectedness of each level and the importance of a comprehensive evaluation strategy in ensuring the success of educational interventions. It is hoped that this study can yield valid and reliable findings related to efforts to enhance teachers' competencies in utilizing Moodle-based e-learning at SMK Muhammadiyah 1 Bantul.

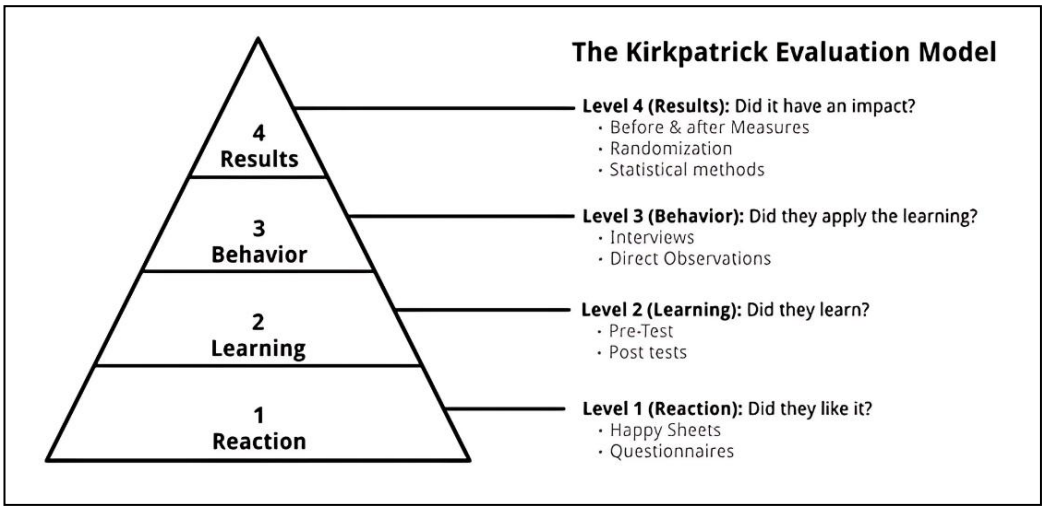


Figure 1. The Kirkpartrick Evaluation Model [15]

3. Results and Discussion

a. Results

This study aimed to evaluate the effectiveness of the teacher training program in utilizing the Moodle-based e-learning portal at SMK Muhammadiyah 1 Bantul. Data were collected through pre-test and post-test questionnaires, observations, and interviews. The findings are outlined below.

1) Level of Teacher Understanding of LMS Moodle

The analysis of pre-test and post-test results revealed a significant improvement in teachers' understanding of the Moodle Learning Management System (LMS) following the training program. This analysis not only highlights the effectiveness of the training but also underscores the importance of ongoing professional development for educators in adapting to technological advancements in education.

Table 1 presents the results of the comparative analysis of pre-test and post-test scores of teachers before and after their participation in the training program focused on the utilization of the Moodle LMS. The evaluation involved a paired t-test to determine whether there was a statistically significant difference in the mean scores obtained by the teachers in the pre-test and post-test assessments. The results indicated a notable difference, with a p-value < 0.05, demonstrating a significant enhancement in understanding.

Table 1. Pre-Test and Post-Test Scores of Teachers' Understanding

Test Type	Mean (M)	Standard Dev. (SD)
Pre-test	62,4	12,3
Post-test	82,7	8,5

Specifically, the mean pre-test score was 62.4 (SD = 12.3), indicating a moderate level of familiarity with Moodle prior to the training. In contrast, the post-test score significantly increased to 82.7 (SD = 8.5), reflecting a robust understanding of Moodle's features and capabilities as an e-learning platform. This substantial increase in scores suggests that the training was effective in enhancing teachers' knowledge and skills related to the implementation and utilization of Moodle in their instructional practices.

The improvement observed emphasizes the critical role of structured training programs in facilitating the understanding of educational technologies among teachers. Such initiatives are essential for equipping educators with the necessary tools to create engaging and effective online learning environments, ultimately benefiting student learning outcomes in digital contexts[16]. he findings of this analysis reaffirm the value of professional development in fostering technological proficiency and encouraging the integration of innovative teaching methods in the classroom.

2) Level of Teacher Understanding of LMS Moodle

The evaluation of the online courses developed by teachers following the training program yielded notably positive outcomes. As detailed in Table 2, the assessment results indicate that an impressive 72% of teachers successfully designed online courses that were rated as "very good" according to the established assessment rubric. This rubric evaluated several key aspects of course design, including course structure, visual design, content quality, and the effective integration of activities and assessments.

Table 2. Evaluation of Online Courses Designed

Criteria	%	Description
Course Structure	75%	Good
Visual Design	82,7	Good
Content Quality	80%	Very Good
Activity Integration	68%	Good
Assessment and Feedback	72%	Very Good
Total	72%	Very Good

The evaluation criteria focused on various elements that contribute to the overall effectiveness of online learning experiences. Course structure assessed the organization and flow of content, ensuring that it was logical and easy to follow. Visual design examined the aesthetics and user-friendliness of the course interface, which plays a crucial role in keeping learners engaged. Content quality evaluated the relevance, accuracy, and depth of the educational materials provided, while the integration of activities and assessments looked at how well these components were woven into the learning experience to facilitate active participation and feedback.

These findings underscore the significant impact of the training program on enhancing teachers' competencies in designing effective online learning experiences. By equipping teachers with the necessary skills to create engaging and high-quality online courses, the training has contributed to a more robust e-learning environment. The ability to design captivating online courses is particularly essential for maintaining student motivation and engagement in e-learning contexts, where traditional face-to-face interaction is often limited. Overall, the positive results from this evaluation highlight the importance of continued professional development for educators in order to meet the evolving demands of online education [17].

3) Effectiveness of E-learning Implementation in the Classroom

Observations of e-learning implementation in the classroom revealed that a notable 68% of teachers were delivering online learning at a "high" level. This assessment took into account various evaluated indicators, which included the effective use of Moodle features, the nature and quality of interaction with students, and the degree to which e-learning was integrated with traditional face-to-face learning processes.

Figure 2 presents the detailed results of these observations regarding the implementation of e-learning within the classroom setting at SMK Muhammadiyah 1 Bantul. The findings indicate that the majority of teachers effectively utilized various Moodle functionalities, which played a significant role in enhancing student engagement during online learning sessions.

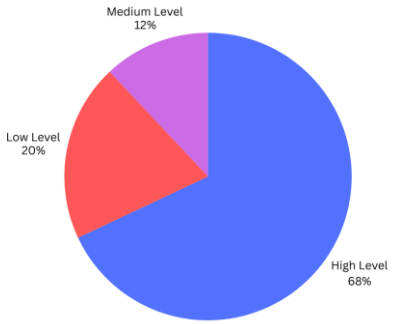


Figure 2. E-learning Implementation Observations in the Classroom

In addition to the high-performing teachers, the observations also categorized the performance of other educators: 12% of teachers were found to be operating at a medium level of effectiveness, while 20% were identified as operating at a low level. This distribution of performance levels underscores the diversity in teaching practices among educators in the context of e-learning.

Despite the overall positive trend, it is important to note that 32% of teachers still needed to improve their ability to manage and integrate e-learning effectively. This gap highlights specific areas for further development and training, emphasizing the necessity for ongoing professional development programs that can equip teachers with the skills and knowledge required to enhance their online teaching practices. Addressing these areas will be crucial for fostering a more cohesive and effective e-learning environment that benefits both teachers and students alike.

4) Teacher Perceptions of Training and Moodle Usage

The thematic analysis of interviews conducted with participating teachers provided a wealth of insights into their experiences with the training program. Overall, teachers responded positively to the training, reporting enhanced confidence and motivation to integrate Moodle-based e-learning into their instructional practices. Many expressed a newfound competence in navigating the platform, indicating that the training successfully equipped them with the necessary skills to effectively utilize Moodle for

online teaching. This eagerness to apply what they had learned is a promising sign of their commitment to enhancing their teaching methods through technology.

However, alongside these positive reflections, some teachers voiced challenges that could potentially hinder the effective implementation of e-learning. A recurring concern was related to time allocation; many teachers felt that the demands of their existing workloads made it difficult to dedicate sufficient time to effectively design and manage online courses. This sentiment is particularly important as it highlights the need for schools to consider workload adjustments to allow teachers to engage meaningfully with e-learning initiatives.

Additionally, issues regarding technological infrastructure were raised. Some teachers pointed out that inadequate access to reliable internet and technological resources could limit their ability to fully implement the features of Moodle in their teaching. Such infrastructural challenges underscore the importance of schools investing in the necessary technological support to facilitate successful e-learning experiences.

Moreover, the teachers expressed a strong desire for ongoing support as they transitioned to using e-learning platforms. This need for continuous professional development and institutional backing is crucial in sustaining effective technology use in education. Teachers emphasized the value of having access to resources, mentorship, and follow-up training sessions to reinforce their skills and ensure they could navigate any difficulties they might encounter in the future.

These insights are vital as they underline the necessity for a holistic approach to professional development in educational institutions. By addressing the challenges highlighted by teachers, schools can create an environment that not only fosters the effective use of technology in education but also promotes continuous growth and adaptation among educators in an increasingly digital learning landscape [17].

b. Discussion

The findings of this research provide empirical evidence of the effectiveness of teacher training in enhancing the competencies needed for the use of Moodle-based e-learning at SMK Muhammadiyah 1 Bantul. These results align with various theories and prior research emphasizing the importance of teacher professional development as a key to successful technology integration in education [18].

The significant increase in teachers' understanding of LMS Moodle post-training indicates that the intervention was successful in improving knowledge and skills. This finding is consistent with the TPACK (Technological Pedagogical Content Knowledge) model, which emphasizes the integration of technology knowledge, pedagogy, and content in the teaching and learning process [19]. Through the training, teachers not only learned the technical features of Moodle but also understood how to leverage the platform pedagogically to design effective learning experiences.

The finding regarding teachers' ability to design quality online courses further suggests that the training equipped them with the necessary skills to develop engaging and interactive online learning content. Creating captivating online courses is a primary challenge teachers face in e-learning implementation [20]. The comprehensive training provided teachers with a better understanding of instructional design principles and how to effectively integrate Moodle's features.

Moreover, the observations of e-learning implementation in classrooms indicated that a majority of teachers successfully adopted online learning practices. This reflects not only an enhancement in teachers' knowledge and skills but also a shift in behavior in classroom learning practices. According to the Kirkpatrick evaluation model, such behavioral changes are key indicators of a training program's success [10]. The positive shift in behavior among teachers demonstrates the potential of training programs to facilitate lasting changes in teaching practices, contributing to improved educational outcomes for students.

However, the presence of a notable number of teachers who still need to enhance their integration of e-learning suggests ongoing challenges. The issues raised by teachers, such as time management, technological infrastructure, and the demand for continuous support, highlight essential considerations for effective e-learning implementation. These challenges resonate with previous research, which underscores that the success of technology adoption in education is influenced by organizational factors and institutional support [17]. To address these challenges, schools may consider implementing regular

follow-up sessions, mentorship programs, and technical support to ensure that teachers can continually develop their skills and effectively integrate e-learning into their pedagogical practices.

4. Conclusion

This study unequivocally demonstrates that the training program focused on utilizing Moodle-based e-learning has a substantial and positive impact on enhancing the competencies of teachers at SMK Muhammadiyah 1 Bantul. The findings indicate significant improvements across various dimensions of teaching effectiveness, including teachers' understanding of the Learning Management System (LMS), their ability to design and implement effective online courses, and the overall integration of e-learning strategies in their instructional practices.

The quantitative analysis revealed that the teachers exhibited a remarkable increase in their knowledge and skills following the training, as evidenced by the statistically significant differences between pre-test and post-test scores. This highlights the effectiveness of the training intervention in elevating teachers' expertise in leveraging technology for educational purposes. Furthermore, qualitative feedback from participants affirmed their increased confidence and motivation to utilize Moodle in their teaching, underscoring the training's relevance and impact.

Despite these positive outcomes, some challenges were identified, including issues related to time management, infrastructure, and the necessity for ongoing support to fully realize the benefits of e-learning. These barriers underscore the importance of not only providing initial training but also ensuring that there are systems in place for continuous professional development and institutional support.

Overall, this study contributes valuable insights into the effectiveness of professional development programs aimed at enhancing digital competencies among educators in vocational education settings. The results serve as a foundational reference for other educational institutions seeking to implement similar training initiatives, ultimately leading to improved quality of online learning experiences in the context of the digital transformation of education.

In conclusion, the successful implementation of the Moodle training program at SMK Muhammadiyah 1 Bantul highlights the critical role that targeted professional development plays in equipping educators with the skills necessary for effective online teaching. As the educational landscape continues to evolve, it is essential to prioritize such training to meet the demands of modern teaching and learning environments. The findings advocate for a strategic approach to enhancing the quality of education through well-designed training programs that support teachers in navigating the complexities of e-learning.

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INVOLVEMENT OF TEACHER PROFESSIONAL EDUCATION (PPG) STUDENTS IN THE LEARNING MANAGEMENT SYSTEM (LMS)

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Abstract

Learning Management System (LMS) is used in PPG (Teacher Professional Education) activities to support online learning. LMS is a facility for innovative and effective learning, but PPG students have different characteristics and developments. Some students can be very involved and active, but some others are not involved at all. This diversity is a challenge to see how student involvement affects transferable skills. Based on these problems, this study aims to determine the effect of student involvement in LMS on the transferable skills of PPG Culinary Arts Education and Fashion Design Education students at UNY. The research method used is a descriptive analysis method with a quantitative approach. The results of this study are the level of involvement of PPG students in using LMS is in the good category so that it can be seen that students are actively involved in using LMS. The cognitive engagement indicator gets the lowest interval results compared to other indicators, while social engagement is at the highest interval.

Keywords : Learning Management System, Teacher Professional Education, transferable skills, student involvement

1. Introduction

In recent years, vocational technology education has experienced very rapid progress, especially in the use of learning technology. Current learning has welcomed the challenges of the VUCA world, so universities need to prepare students to face it.[1], [2] VUCA stands for *Volatility* , *Uncertainty* , *Complexity* , and *Ambiguity* . This term first appeared in the military world and was later adopted in the context of business organizations. [3]. VUCA is used to describe the constantly changing and often unpredictable environment in work organizations [4].

Higher education as a provider of educational services, plays a role in the VUC phenomenon , to facilitate prospective teachers and teachers to join the Teacher Professional Education (PPG) online or offline. The integration of technology in the implementation of learning in PPG is an attraction in terms of effectiveness and efficiency of the application of the technology. The technology that is often integrated in learning is the *Learning Management System* (LMS). The use of LMS provides a number of advantages in the context of education, including accessibility from anywhere, 24/7 flexibility, structured, interactive and collaborative content management, and progressive value monitoring [5], [6].

The LMS used in PPG has certainly been developed with adequate requirements because it was developed by a credible PPG education center. The LMS used in PPG organized by UNY can be assumed to be a reliable and feasible LMS. The use of the LMS has an impact on students, such as how widely students can be involved in learning. Involvement in the LMS, whether it can affect *transferable skills* also needs to be explored.

Previous research has shown that student engagement *can* keep students focused and persist in online learning [7], [8]. Student engagement can have a positive impact on learning performance [9]. Even more importantly, there is research that uses machine learning algorithms *to* identify students with low engagement in order to assess the effect of engagement on student performance [10].

Student engagement refers to students' active participation, involvement, and emotional investment in academic, social, and learning activities. This engagement encompasses various aspects of the student experience, including interactions with instructors, participation in class discussions, involvement in student organizations, and out-of-class learning experiences [10]. In the context of an LMS, student engagement has the following characteristics:

1. Participation in Class Discussions: Engaged students will actively participate in class discussions, ask questions, provide opinions, and contribute to collective learning.
2. Engagement in Projects and Assignments: Engagement includes the seriousness and quality of student participation in completing projects, assignments, or other learning activities.
3. Interaction with Lecturers: Students are engaged if they interact positively with lecturers, seek guidance, and take advantage of consultation time.
4. Involvement in Campus Activities: Activities outside of class, such as participation in student organizations, clubs, or social activities, also reflect a student's level of involvement.
5. Project-Based Learning Experiences or Practicums: Engagement can be strengthened through practicum experiences, internships, or projects that involve direct application of learning concepts.
6. Participation in Research Activities or Conferences: Students involved may be interested in participating in research activities, seminars, or conferences relevant to their field of study.
7. Online Engagement: In the era of online learning, student engagement can also be reflected in active participation in online learning platforms, discussion forums, and online-based projects.

Student engagement can be behavioral, cognitive, and emotional engagement. The three types of engagement are related as shown in Figure 1.

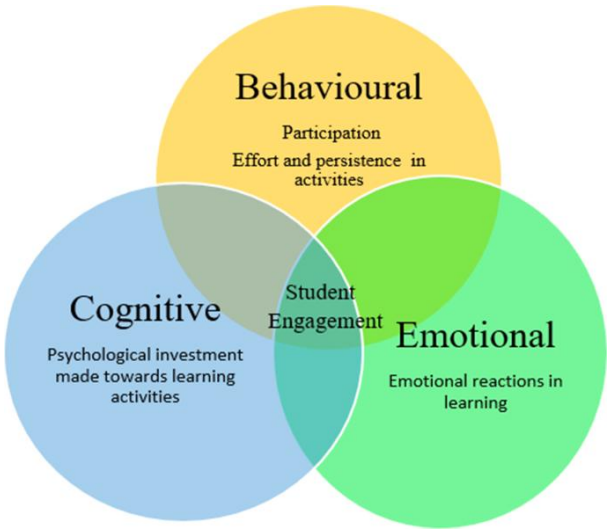


Figure 1. Three types of learner online engagement[11]

Behavioral engagement is the level of student participation and behavior in learning activities and activities in the learning system. The activities consist of active responses and attendance. Students who are behaviorally engaged will respond actively to learning materials. They may ask questions, answer questions, or participate in class discussions. Regular attendance in class is a sign of good behavioral engagement. Students who attend regularly tend to be more engaged in academic activities.

Cognitive engagement is the degree to which students participate in the process of thinking, understanding, and applying the concepts taught in the context of learning. It involves the mental and intellectual involvement of students in the learning activity. Measure cognitive engagement by observing student behavior or asking them directly what topic they recently attended and trying to learn more about it. Emotional engagement means enjoying the educational experience and having positive relationships with the instructor and other students. You can measure this by conducting anonymous surveys. You are more likely to get genuine answers if you allow a third party to collect and analyze the results.

Emotional involvement can be in the form of students' attitudes towards educational institutions, educators, and the learning itself.

Learning engagement for learners is driven by learning motivation [12]which is an internal factor. External efforts to foster learning engagement for students have been done through gamification [13]. In addition to gamification, Dubey said learners should connect with each other and complete the

desired activities. Their view is that the use of new technologies in learning activities engages students more than conventional methods [14].

The benefits of student engagement include increased conceptual understanding, development of social skills, increased knowledge retention, and better preparation for careers or life after graduation. It can also enrich the college experience, motivate students, and help them feel connected to the campus environment. Initiatives and support from educational institutions can help foster student engagement.

2. Method

The research method used is a descriptive analysis method with a quantitative approach. This research can be done by collecting statistical data on student performance in LMS. This research was conducted at Yogyakarta State University with research subjects of PPG students of the Culinary Arts Study Program and Fashion Design Study Program totaling 160 people. The objects in this study were PPG students in using *the Learning Management System* (LMS). Data collection techniques used in this study were observation, interviews and questionnaires.

The instruments in this research were taken from the research variable indicators as follows:

Table 1. Research Instruments

Indicator	Sub Indicators
Cognitive Engagement	Sincerity in learning
	Project-based or practicum learning experiences
	Mastery of the knowledge learned
	Ability to perform tasks
	Participation in research activities or conferences
Behavioral Engagement	Comply with applicable rules and norms
	Active participation in class discussions
	Positive interactions with lecturers and peers
Emotional Engagement	Interest in learning
	Feelings of liking lecturers, friends, and learning
Social Engagement	Involvement in projects and tasks
	Interaction with lecturers
	Online engagement

3. Results and Discussion

a. Cognitive Engagement

Based on data analysis from cognitive engagement indicators, it was found that 20.45% of LMS can help respondents achieve the required competencies with a score of 696. 20.39% of LMS can help respondents repeat the material that has been studied with a total score of 694. 19.98% of respondents reflect on the contents of the material in the LMS for deeper understanding with a score of 680. 19.62% of respondents read all learning guidelines in the LMS carefully with a total score of 668. Then 19.57% of LMS make it easier for respondents to carry out project-based learning or practicums with a total score of 666.

Table 2. Criteria for Student Involvement in the *Cognitive Engagement Aspect*

Criteria	n	%	
$X < M - 1SD$	25	15.52	Not good
$M - 1SD \leq X < M + 1SD$	91	56.52	Good
$M + 1SD \leq X$	45	27.95	Very well
Amount	161	100	

Based on table 5, it can be seen that in terms of student involvement in the cognitive engagement aspect, 56.52% of respondents have good *cognitive engagement , 27.95% of respondents have* very good *cognitive engagement , and 15.52 respondents have* poor *cognitive engagement* .

b. Behavioral Engagement

Based on data analysis from behavioral engagement indicators, it can be seen that 22.19% of respondents routinely access LMS to follow learning developments with a score of 774. 20.41% of LMS helps respondents to be disciplined in completing assignments on time with a score of 712. 20.07% of respondents find out assignment *feedback* from lecturers through LMS with a score of 700. 19.32% of LMS helps respondents actively participate in class discussions. with a total score of 674. Then 17.98% of respondents often provide feedback or comments on materials and assignments posted by lecturers on LMS with a total score of 627.

Table 3. Criteria for Student Involvement in the *Behavioral Engagement Aspect*

Criteria	n	%	
X < M - 1SD	21	13.04	Not good
M – 1SD ≤ X < M + 1SD	99	61.49	Good
M + 1SD ≤ X	41	25.46	Very well
Amount	161	100	

Based on table 3, it can be seen that in terms of student involvement in the behavioral engagement aspect , 61.49% of respondents have behavioral engagement. good engagement , 25.46% of respondents have very good behavioral engagement , and 13.04% of respondents have poor behavioral engagement

c. Emotional Engagement

Based on data analysis from the emotional engagement indicator, it can be seen that 20.55% of learning through LMS helps respondents to interact with lecturers with a score of 653. 20.42% of respondents enjoy learning through LMS with a score of 649%. 20.08% of respondents are enthusiastic about learning through LMS with a score of 638. 19.73% of learning through LMS helps respondents to interact with friends with a total score of 627. Then 19.20% of respondents often read material on LMS because LMS is fun with a total score of 610.

Table 4. Criteria for Student Involvement in the *Emotional Engagement Aspect*

Criteria	n	%	
X < M - 1SD	31	19.25	Not good
M – 1SD ≤ X < M + 1SD	97	60.25	Good
M + 1SD ≤ X	33	20.5	Very well
Amount	161	100	

Based on table 4, it can be seen that in terms of student involvement in the emotional engagement aspect , 60.25% of respondents have emotional engagement. good engagement , 20.5% of respondents have very good emotional engagement , and 19.25% of respondents have poor emotional engagement.

d. Social Engagement

Based on table 10, it can be seen that as many as 21.28% of respondents always work on projects and assignments given through LMS with a score of 730. As many as 21.05% of respondents feel that collecting assignments through LMS is easier with a score of 722. As many as 20.2% of respondents find it easy to collaborate to complete assignments with LMS with a score of 693. As many as 19.27% of respondents can actively express ideas through LMS with a total score of 661. Then as many as 18.19% of respondents find it easy to discuss with lecturers through LMS with a total score of 624.

Table 5. Criteria for Student Involvement in the *Social Engagement Aspect*

Criteria	n	%	
X < M - 1SD	15	9,317	Not good
M – 1SD ≤ X < M + 1SD	104	64.6	Good
M + 1SD ≤ X	42	26.09	Very well
Amount	161	100	

Based on table 5, it can be seen that in terms of student involvement in the social engagement aspect , 64.6% of respondents have good social engagement , 26.09% of respondents have very good social engagement , and 9.317% of respondents have poor social engagement.

Based on the overall analysis the data can be summarized into table 6.

Table 6. Results and Category for Student Involvement in the *Social Engagement Aspect*

No	Indicator	Results	Category
1	Cognitive Engagement	56.52%	Good
2	Behavioral Engagement	61.49%	Good
3	Emotional Engagement	60.25%	Good
4	Social Engagement	64.6%	Good
	Average	60.71%	Good

In table 6, it is known that the cognitive engagement indicator got a result of 56.52% with a good category, but got the lowest interval result compared to other indicators, this is because students who are not intrinsically motivated or do not have a great interest in the material presented through the LMS tend to have low cognitive engagement. For the other four indicators in this category, social engagement is already in the good category with the highest result of 64.6%. This is because the LMS that provides an easily accessible and interesting discussion forum can increase social engagement. The existence of group assignments or projects that are designed to be carried out collaboratively through the LMS encourages interaction between students. Students share ideas, communicate, and work together actively in an online environment, which increases their social engagement. From the results of the analysis that has been carried out, the average level of PPG student involvement in using the LMS is in the good category with a result of 60.71%, so it can be seen that students are already actively involved in using the LMS.

Previous research on student engagement in using LMS revealed that there is a correlation between student engagement and learning activities through learning in LMS.[15], [16], [17]. Other studies have shown that LMS will be optimal when instructors use more multimedia such as video conferencing and audio discussions to enhance critical thinking and student engagement in LMS activities, thereby improving student learning outcomes [18].

4. Conclusion

Based on the results of data analysis and discussion that have been described, it can be concluded that the level of PPG student involvement in the use of LMS is in the good category so that it can be seen that students have been actively involved in the use of LMS. The cognitive engagement indicator gets the lowest interval results compared to other indicators, while social engagement is at the highest interval.

Suggestions from researchers Future research can focus on developing interactive features in LMS, such as live chat, video conference, and more dynamic discussion forums. These features can enhance students' social and cognitive interactions, so that their engagement will be higher.

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AGITATION TECHNIQUES IN THE 2024 PRESIDENTIAL AND VICE-PRESIDENTIAL DEBATE DISCOURSE (CASE STUDY OF PRESIDENTIAL CANDIDATE ANIES BASWEDAN)

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Abstract

This research aims to explain and describe the agitation process in the discourse of the 2024 presidential and vice-presidential election debates. The research problem consists of two main questions: How are agitation techniques utilized in the discourse of the presidential candidate pairs from the perspective of critical discourse? This study employs a descriptive qualitative research design using a critical discourse analysis approach, grounded in agitation theory. The research object is the debate discourse from the three pairs of presidential and vice-presidential candidates in the 2024 election. The data analysis technique is conducted qualitatively, focusing on describing the forms and use of agitation techniques that arise in the debate discourse. The research approach uses an agitation theory framework within critical discourse analysis. Based on the analysis, 17 agitation techniques were identified. These techniques are an integral part of effective political communication, particularly in the presidential and vice-presidential debates. The dominant technique is repetition, where emphasis is repeatedly made. This is understandable because, in debates, speakers must emphasize abstract concepts through repeated words and phrases to make them more concrete. The use of these agitation techniques also serves to clarify ideas, act as propaganda to shape opinions, and function as political rhetoric for the candidates.

Keywords: Critical discourse analysis, presidential and vice-presidential debates, diction, agitation.

1. Introduction

The five-year democratic event has once again been held by the Indonesian nation. This five-year event determines the future of the nation and selects the leaders of the country to come. This election includes the selection of the president, vice president, DPR, DPRD I, and DPRD II. The selection of leaders through elections is part of the realization of democracy.

The general election is the largest public event as a manifestation of democracy, conducted under the principles of being direct, general, free, confidential, honest, and fair. This general election took place on February 14, 2024. Before this democratic event, a series of activities were carried out to support it.

Unlike the election of DPR or DPRD members, the presidential election (Pilpres) is a very important political tool because it directly affects the future of Indonesia for at least the next five years. The people try to select the best leader for the future of the nation. Through the presidential election, the people express their aspirations, cast their votes, and choose the leader they deem best. Therefore, each presidential and vice-presidential candidate must showcase their best ideas and track record to win the people's vote. Thus, there is a need for a platform to convey the visions and missions and to exchange ideas between the candidates. The chosen platform is the debate, known as the Presidential and Vice-Presidential Debate, in the 2024 Pilpres.

A debate is an exchange of opinions between two opposing parties (Detiknews, December 11, 2023). In this Pilpres process, the exchange of ideas is facilitated through the presidential and vice-presidential debates, which are broadcast live on television during the campaign period and scheduled periodically. Through this debate, it is hoped that the contestants, in this case, the presidential and vice-presidential candidates, will have space to convey their ideas regarding their vision and mission for leading the nation for the next five years. This debate forum is interesting because it presents important discourses containing ideas and visions packaged in engaging and persuasive political language. In this analysis, the debate discourse that becomes the direct object is the debate discourse from presidential candidate No. 1, Anies Baswedan. Anies was chosen because he is a presidential candidate coming

from outside political parties, without government support, and not a leader or member of any political party, though he is supported by several political parties. Anies is a former government official, having served as Governor of Jakarta. With this background, Anies certainly needs to work harder to gain public support. This support-gathering process is done through campaigning, and one method is participating in presidential and vice-presidential debates broadcast on several television stations.

Based on initial observations, Anies requires considerable effort to convince the public of his eligibility as a presidential candidate compared to the other two candidates who receive full support from the government and major political parties. His debate performance is crucial in convincing the public and helping build a positive opinion of him as someone from outside the political party system. In other words, his debating ability is key to gathering his supporters. How effective is this debate in shaping public opinion and increasing his popularity? Can the ideas presented in the debate attract the masses to support his ideas? These questions are interesting to explore in the analysis of this debate discourse, particularly regarding the performance of Anies Baswedan. Thus, debate discourse becomes a subject of study in discourse analysis, especially political discourse, which can be approached through critical discourse analysis.

Discourse can mean communication of thoughts through words; the expression of ideas or concepts; communication in general; conversation or dialogue, especially as a subject of study; a written treatise; a formal dissertation; a sermon; a lecture. Meanwhile, debate discourse falls into the category of oral discourse. Several aspects must be considered in the context of oral discourse, such as speech events, speech acts, intended addressees, and other factors. Communication will not proceed well without shared knowledge and assumptions between the speaker and the listener [1]. Discourse within a text has a function, and in its context of use, whether orally or in writing, discourse always carries a hidden ideology as part of the process of producing that text. Likewise, the discourse of the presidential debate serves as a text used to represent the ideology of the presidential and vice-presidential candidates. This means that this forum is a platform for spreading ideas, gaining legitimacy, and serving as a form of public social control. Therefore, it is appropriate to approach discourse using critical discourse analysis.

The emphasis of critical discourse analysis can be used to analyze every linguistic event as a value-free entity. In this regard, the study of critical discourse analysis goes beyond conventional linguistic norms; discourse is no longer seen merely as language organization above the sentence level, so it involves more than just text and talk but also socio-political and ideological factors. The study of critical discourse analysis in this debate script can relate to media agitation and propaganda. These two concepts are often used to describe the media's influence strategies with various goals. Agitation refers to efforts to stir up, energize, or trigger mass emotions. It involves the use of strong rhetoric, often with the aim of motivating people to take action or change their views [2]. Agitation can be achieved through dramatic and impactful cinematic techniques [3]. The goal of agitation is to create an emotional state that supports a particular cause or ideology. In the media context, agitation can appear in the form of speeches, debates, articles, or visual content designed to motivate the audience and evoke an emotional response. Walter Lippmann, a journalist and political commentator, discussed the media's role in shaping public opinion. He observed that the media often acts as a mediator between the real world and public perception, which can lead to agitation and propaganda [4].. He emphasized that the media has the power to shape the reality accessible to society. The aim of agitation and propaganda, in this context, is to create a world image that aligns with the interests of those controlling the information.

Research on agitation was conducted by Yamani (2011). This study showed that after the events of September 11, there was an increase in agitation among the Saudi Arabian public, triggered by transnational media coverage, particularly Al-Jazeera television. This media outlet played a significant role in stirring pan-Arab and pan-Muslim sentiments, as well as sparking popular reactions against U.S. policies in the Middle East [5]. In Saudi Arabia, despite demonstrations being considered illegal, protests often took place in mosques and online. Some imams began preaching against U.S. aggression and even advocated for jihad, leading to official statements forbidding them from discussing issues beyond their expertise. Online discussions were also intense, with accusations that U.S. actions caused further chaos in other Muslim countries and insulted Arabs in Afghanistan. Additionally, admiration for Osama Bin Laden emerged among some Saudi citizens, primarily based on opposition to the dominant U.S. presence in the region and its support for Israel. Debates on these issues intensified after September 11, despite the lack of formal outlets for political expression, leading to discussions often happening in homes while watching Arab television channels.

Subsequent research on agitation was conducted by Chung et al. (2016). The results showed that media presentations featuring natural scenery could provide a positive experience for dementia patients in long-term care facilities. Although quantitative data did not indicate significant changes, the experience of viewing nature scenes became a new and positive aspect of the patients' daily lives. This helped reduce agitation and provide emotional stability [6].

In Indonesia, research on agitation was conducted by Pangestu (2023). The findings indicated that various forms of agitation exposed in the media served to build humanizing and liberating values for all people in a just and safe manner. Gender and anti-sexual harassment agitation represented attention from marginalized groups seeking to overcome isolation, both among survivors and their advocates. This study also highlighted the importance of progressive and consistent agitation in realizing a more humanistic and liberative social order [7].

The research gap between this study and previous research can be identified based on the focus, media, and objectives of agitation. The studies mentioned above discuss agitation in social and psychological contexts, while presidential debates are more closely related to rhetorical strategies and electoral mobilization in public spaces through television.

In media analysis, agitation can be identified through various elements, such as the language used, news selection, framing, and visual presentation. Media involved in agitation and propaganda may emphasize a particular perspective, omit information that does not align with the desired narrative, or use strong rhetorical techniques.

Based on the explanation above, one of the common objectives in crafting debate discourse in the media or media discourse is to influence public opinion. Some ways to influence public opinion include: 1) trying to shape people's views on an issue or entity, 2) generating support: encouraging backing for an ideology, group, or government, 3) changing perceptions: altering how society views an event or entity by manipulating the presentation of information, and 4) controlling the narrative: determining how an issue or event is presented and interpreted by the public [2]–[4], [8]. It is crucial to be critical of the media and recognize the potential presence of agitation and propaganda in the various forms of information consumed. A careful media analysis can help the public understand how these messages are shaped and how they may influence perceptions.

Given this background, it is understandable that these debates serve as an important arena for the candidates to present their vision and mission to win the hearts of voters and supporters. Due to the importance of this debate forum as an effort to garner votes, it is not uncommon to encounter certain opinions and embellishments aimed at swaying the masses toward each candidate’s vision and mission. In the context of communication, there is a fairly intensive process of agitation as an effort to increase electability. Based on this background, it is very appropriate for this debate forum to become one of the topics of research to reveal how deeply the process of agitation influences this debate forum. To what extent are the candidates able to influence voters' thoughts and steer their understanding of the concepts presented? How is this agitation manifested in the verbal forms chosen by the candidates? Therefore, this study is important to conduct with the aim of uncovering and revealing the agitation processes that emerge in the presidential and vice-presidential debates in the 2024 election.

Based on the background explanation, the research problem focuses on a critical discourse analysis of the 2024 presidential and vice-presidential debates using the agitation theory approach. The vision, mission, and ideas of the candidates will be described through the content of their debates, responses to questions, answers, or arguments regarding the concepts and ideas they present. The research questions are as follows: What are the agitation techniques in the discourse used by the presidential candidates from a critical discourse perspective? What is the function of the agitation techniques in the discourse used by the presidential candidates from a critical discourse perspective?

2. Method

The research on agitation in the discourse of the 2024 presidential and vice-presidential debates falls under qualitative descriptive research. The approach used is critical discourse analysis combined with agitation theory in discourse. This study will operationally describe the forms of agitation that emerge in the discourse of the 2024 presidential debates, specifically focusing on presidential candidate Anies Baswedan. The data sources for this research are the debates broadcast five times on national television.

The data collection techniques used in this research are observation/reading and note-taking. The observation and note-taking process involves five steps: (1) carefully observing the debate discourse that serves as the data source for this research, (2) identifying various forms of speech acts within the debates, (3) organizing the collected linguistic data into a matrix to facilitate categorization and analysis based on discourse components, (4) categorizing all data based on the theory of political discourse agitation, and (5) describing the data.

This research is qualitative descriptive in nature, so the collected data will be analyzed descriptively and qualitatively. The steps in data analysis are as follows: First, the data is collected and categorized based on the research themes/topics. Second, the data analysis continues based on the instruments that have been developed. The data analysis process includes the following steps: (1) identifying data based on the research questions, (2) tabulation and descriptive qualitative explanation, (3) analysis and interpretation of data in relation to discourse theory and agitation in discourse, and (4) interpretation and conclusion of the data. Below is an overview of the data analysis technique used in this research.

3. Results and Discussion

The following are the research findings on the agitation techniques of presidential candidate number 1, Anies Baswedan.

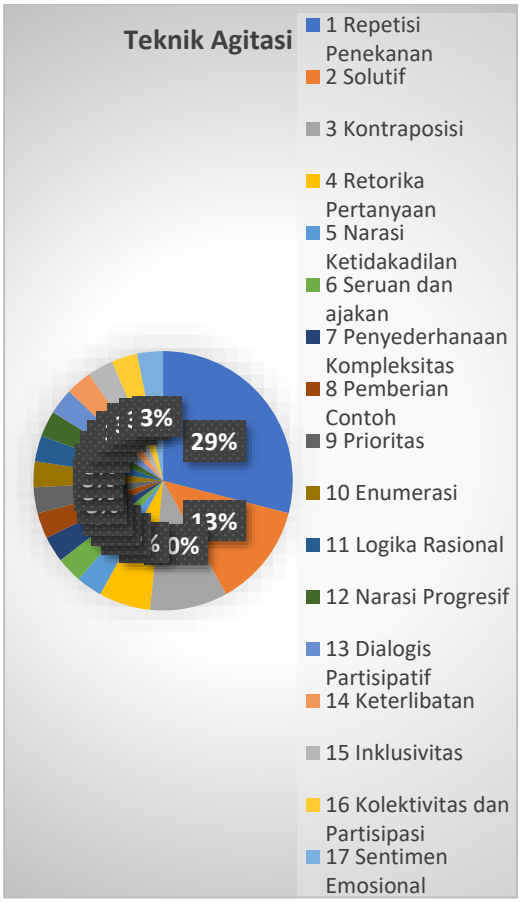


Figure 1. Agitation Techniques of Presidential Candidate Number 1 (Anies Baswedan)

Based on the data calculations in the data summary, several agitation techniques and three functions of agitation techniques were identified. The following outlines the agitation process through the use of agitation techniques and their functions in the campaign discourse of presidential candidate number 1, Anies Baswedan.

a. Agitation Techniques of Presidential Candidate Number 1 (Anies Baswedan)

1) Emphasis Repetition

Emphasis repetition in the context of agitation is a rhetorical technique used to repeatedly emphasize certain words, phrases, or ideas to underline the importance of the message being conveyed. This technique, similar to the findings of Yamani (2011) [5], aims to reinforce the main idea and embed it in the audience's mind, making it easier for them to remember and feel the urgency or emotion intended by the speaker.

[1] "This must change, this must be restored" and "it cannot be ignored, it cannot be left alone, and it must change."

Statements like "This must change, this must be restored" and "it cannot be ignored, it cannot be left alone, and it must change" were repeatedly delivered to stress the importance of change. This repetition serves to reinforce the message and instill the idea in the audience's minds. Repetition can also amplify the emotional intensity felt by the audience, such as anger, anxiety, or enthusiasm. Hearing the same words repeatedly makes the audience more likely to be emotionally influenced. Repetition gives structure to the speech or statement, allowing the audience to follow the logic or argument more easily. The pattern created by repetition provides a rhythm that can affect the mood and focus of the listeners.

2) Solution-Oriented

The concept of being solution-oriented in agitation refers to an approach or strategy in agitation communication that not only highlights problems or criticism but also offers clear, concrete, and actionable solutions. In the context of agitation, using a solution-oriented approach aims not only to provoke emotions or reactions from the audience but also to provide direction and guidance for the desired action.

[2] "We plan to create a program called an e-online service for free legal assistance."

By offering a concrete solution to the identified problem, such as the "Hotline Paris" program, the speaker not only criticizes the current situation but also provides clear steps to resolve it. This aims to demonstrate commitment and motivate the audience to support or engage in implementing the solution. In solution-oriented agitation, there is a focus on building a vision of a better future. By offering solutions, agitation not only raises awareness of problems but also paints a picture of an ideal condition and how it can be achieved.

3) Contraposition

Contraposition in agitation is a technique used to emphasize certain ideas by contrasting two opposing things, making the differences clearer and evoking emotions or thoughts in the audience. In agitation, contraposition is used to contrast undesirable ideas, values, or conditions with the ideal state, making the message more effective and encouraging the audience to take action.

[3] "Rule of law and 'rule of power.'"

The speaker uses contraposition by comparing two concepts, "rule of law" and "rule of power." This highlights the difference between the desired ideal situation (rule of law) and the perceived unjust condition (rule of power). This technique aims to strengthen the speaker's stance and show disapproval of the current state. Contraposition often creates the impression that there are only two choices: one right and one wrong. This technique encourages the audience to take a specific stance by presenting clear and compelling choices.

4) Rhetorical Questions

Rhetorical questions in agitation are a technique of using questions that do not require a direct answer but are used to emphasize a point, stir emotions, or prompt the audience to think in the direction the speaker desires. These rhetorical questions are often used in agitation to strengthen an argument, raise awareness, or guide the audience toward a specific conclusion that supports the speaker's agenda.

[4] "Will this continue?" and "Will this be allowed?"

Rhetorical questions like "Will this continue?" and "Will this be allowed?" are used to provoke emotions and lead the audience to the desired answer, which is not to allow the perceived injustice. This rhetoric builds a sense of urgency and the need for change. By posing questions that lead to a certain conclusion, rhetorical questions help reinforce the argument that has already been made.

5) Injustice Narrative

The use of an injustice narrative in agitation is a highly effective technique for evoking emotions, mobilizing support, and encouraging action. This narrative emphasizes inequalities, discrimination, and suffering experienced by certain individuals or groups. In the context of agitation, the injustice narrative is typically delivered to spark dissatisfaction, anger, or solidarity, thereby urging the audience to pursue certain changes or actions. This aligns with research conducted by Pangestu (2023) [7].

6) Call to Action

Agitation in the form of a call to action is a technique used to urge the audience to take specific actions. In this context, calls to action are often delivered with a firm and passionate tone, aiming to mobilize the masses, influence public opinion, or push for social and political change.

[5] "No, this must change" and "we must make a change."

Statements like "No, this must change" and "we must make a change" are calls to action that encourage the audience to act and not passively accept the situation. The use of the word "must" emphasizes that change is not merely an option but a necessity. Calls to action in agitation are typically delivered with strong emotion and energy. This energetic style aims to ignite enthusiasm and participation from the audience. Therefore, agitation through a call to action is a powerful rhetorical tool to move the masses and spark collective action. With a firm, passionate tone and emphasis on urgency, this technique can evoke emotional responses and real action from the audience. It is often used in political speeches, social protests, advocacy campaigns, and various contexts where swift change and broad support are needed.

7) Simplification of Complexity

Simplification of complexity in agitation is a technique where the message is condensed or simplified to make it easily understood by the audience, particularly those from diverse backgrounds. The speaker uses this technique to reduce complicated or complex information into clear, straightforward, and memorable messages. The goal is to ensure that the main idea or message can be received by as many people as possible without confusion or varying interpretations.

[6] "In Jakarta, there are differing views. What is the main issue? The main issue is the lack of justice in Papua; that's the main problem."

This statement simplifies the complexity of various views on the violence in Papua by declaring that the core problem is "the lack of justice." By simplifying the issue to one main point, the speaker aims to make it easier for the audience to understand and accept the narrative being conveyed. Simplifying complexity in agitation is a technique aimed at distilling a complicated issue into a message that is easy to understand, remember, and follow by the audience. By emphasizing simplicity, this technique can broaden the message's reach, evoke emotions, and drive action, though there is a risk of overlooking important details and inciting polarization.

8) Providing Examples

Providing examples in agitation is a rhetorical technique used to strengthen arguments, facilitate understanding, and evoke emotions in the audience by presenting concrete illustrations or real-life situations. Examples help turn abstract ideas into something more tangible and easier to grasp.

[7] "The problem isn't violence, because when we talk about violence, even in Jakarta, there are three views: some see it as terrorism, others as separatism, and some as criminality. Even here in Jakarta, there are different views. What is the main issue? The main issue is the lack of justice in Papua; that's the main problem."

Statements like "Even here in Jakarta, there are different views" provide a concrete example of the confusion or differing opinions on understanding the violence in Papua. This example is used to reinforce the argument that differing views should not divert attention from the main issue, which is justice.

9) Prioritization

Prioritization in agitation refers to emphasizing the issues or actions deemed most urgent or important to address first, compared to others. In the context of agitation, this concept is used to direct the audience's attention and energy towards the most fundamental problems, those considered the root of larger issues, or those that have the most significant impact on the goals to be achieved.

[8] "Prioritize serving the vulnerable. First, people with disabilities. Second, women, especially pregnant mothers. Third, children and the elderly."

The speaker directly highlights prioritization for vulnerable groups such as people with disabilities, pregnant women, children, and the elderly. By stressing the importance of services for these groups, the speaker taps into the audience's empathy to push for the desired change. This approach aims to create awareness that special attention must be given to groups that are often neglected in public services.

10) Enumeration

Enumeration in agitation is a technique used to list or detail various points, issues, or arguments in a structured manner, typically in the form of a list or sequence. The goal is to make it easier for the audience to understand complex information by breaking it down into clear parts. Enumeration is often used in agitation rhetoric to emphasize the importance of each point and show that the issue being raised has many aspects or dimensions that need attention.

[9] "Prioritize the services for the vulnerable. First, people with disabilities. Second, women, especially pregnant mothers. Third, children and the elderly."

The speaker uses the enumeration technique by listing key points in order: "First," "Second," and "Third." This approach makes the ideas easier for the audience to understand and remember, while also giving the impression that the proposed solution is well-planned. This structure also conveys that the problem being discussed is complex but can be solved through a systematic approach. Enumeration in agitation is an effective technique for detailing various points in a logical and systematic order. By organizing arguments in a clear list, the speaker can deliver the message in a more structured way, improving audience comprehension and acceptance. Enumeration also helps simplify complex topics and adds depth and strength to the message being conveyed.

11) Rational Logic

Rational logic in agitation refers to the use of arguments based on logical and rational reasoning to build or strengthen a position or viewpoint. In the context of agitation, rational logic is used to convince the audience by relying on arguments supported by data, facts, and systematic reasoning. The goal is to strengthen the credibility of the agitational message and convince the audience of the validity and urgency of the issue being raised.

[10] "JAKI is a super app that makes every service measurable, for example, if someone reports a fallen tree, we give instructions to the team on how many hours it should take to resolve. When a report is filed about event X, how long it should take to resolve is also specified."

The speaker explains a concrete solution by prioritizing transparent and measurable services, such as using the JAKI application. This technique combines a logical approach with technology, emphasizing that the solution can be practically implemented and deliver tangible results. The audience is encouraged to think rationally about how this approach can improve efficiency and public trust. Rational logic in agitation involves using data- and fact-based arguments that are structured systematically and consistently. This technique aims to convince the audience with logical and evidence-based reasoning, strengthening the credibility of the message and addressing doubts in a clear and structured way. It ensures that agitation is not only emotional but also reasonable and accountable.

12) Progressive Narrative

A progressive narrative in agitation is a rhetorical technique used to convey a message by emphasizing positive change and progress as solutions to existing problems. This concept focuses on ideas of renewal, improvement, and social or political advancement as responses to dissatisfaction or issues faced by society.

[11] "Prioritize services for the vulnerable. First, people with disabilities. Second, women, especially pregnant mothers. Third, children and the elderly. That's the priority, then create transparent and measurable services. Government services are not new; everything the government handles is recurring. If there is a problem, it has happened before and will happen again, so what do we do? We create JAKI, like we did before in Jakarta."

In this statement, there is a repetition of the idea that public service problems often recur, and therefore, they must be addressed with measurable and transparent solutions. Repetition is used to reinforce the idea that the problems being faced are not new, making the proposed solution seem reasonable and necessary. A progressive narrative in agitation is a technique used to depict positive change as a solution to existing problems. By emphasizing a vision for a better future, innovative solutions, and the importance of community participation, this narrative seeks to inspire a sense of

change and encourage support for the proposed initiatives. This technique plays a key role in motivating the audience to engage and contribute to social, political, or environmental change.

13) Participatory Dialogue

Participatory dialogue in agitation is a communication technique that involves direct and active interaction between the agitator (such as a leader, activist, or politician) and their audience. The goal is to foster engagement, collaboration, and support from the audience through two-way dialogue, rather than simply delivering a one-sided message. This technique supports the development of shared solutions and creates a sense of ownership and responsibility for the proposed change.

[12] "All service standards are made transparent, and the public who report know exactly when the issue they report should be resolved. In this way, standardization can occur."

The speaker emphasizes the importance of transparency and public involvement in the process of reporting and resolving issues. This technique highlights the principle that change and improvement in service systems can only be achieved through active public participation, while also reinforcing a sense of ownership over the proposed solution. Participatory dialogue in agitation is a technique that focuses on actively engaging the audience through two-way communication and collaboration. By involving the audience in the discussion and decision-making process, this technique functions to increase support, gather valuable feedback, and build trust. Participatory dialogue makes the audience an integral part of the agitation process, ensuring that the proposed changes are more relevant and acceptable.

14) Engagement

The engagement technique in agitation is an approach used to capture the audience's attention and encourage their active participation in a specific issue or campaign. The primary goal is to create a sense of ownership and responsibility for the issue being discussed, as well as to increase support and involvement in efforts for social or political change. This technique uses various methods to engage the audience directly, ensuring they are not passive listeners but active participants in the process.

[13] "When Muslims want to build a mosque and cannot obtain the permit, I speak up" and "When Christians want to build a church and cannot obtain the permit from the community, I speak up."

This technique emphasizes the speaker's direct involvement in solving problems. By mentioning personal actions like "I speak up," the statement shows that the speaker is actively engaged in addressing obstacles, which enhances trust and support for their actions. The engagement technique in agitation focuses on attracting the audience's attention and encouraging their active participation. Through methods like interactive campaigns, discussion forums, social activities, and social media, agitators can create a sense of ownership, increase support, and foster deeper involvement. This technique is essential for ensuring that the audience does not remain passive listeners but also takes an active role in the proposed change efforts

15) Inclusivity

Inclusivity in agitation is a technique used to ensure that the messages, activities, or agitation campaigns involve and represent various groups in society, without discrimination based on background, social status, or political views. The primary goal of inclusivity is to create a sense of ownership and participation among all members of society, making them feel valued and contributing to the process of social or political change.

[14] "Long queues that never end, and many religious groups, from Buddhists, Hindus, and Christians, face difficulties obtaining permits for their places of worship, but they eventually receive the permits and can worship peacefully."

By mentioning various religious groups, this statement shows that the actions taken are inclusive and unbiased, encompassing different religions. This creates the impression that the actions are fair and aim to serve all groups equally. Inclusivity in agitation focuses on involving and representing various groups in society, without discriminating based on background or social status. By prioritizing the acceptance of diverse perspectives, accessibility, and active participation, this technique aims to create a sense of ownership and broader support for the campaign or social movement. Inclusivity not only enhances the effectiveness of the campaign but also ensures that the proposed changes reflect and serve the interests of all parties in society.

16) Collectivity and Participation

Collectivity and participation are two key concepts in agitation techniques that focus on mobilizing and engaging the masses to support a specific goal or change. Collectivity in agitation refers to the formation and strengthening of a sense of community and solidarity among individuals or groups

involved in a social movement or campaign. The aim is to create a collective force stronger than separate individuals by motivating them to work together towards a common goal. Participation in agitation involves the active engagement of individuals or groups in activities supporting the goal or campaign, whether through contributing ideas, time, or resources. Participation is crucial to ensuring that people feel they have a role and responsibility in the movement, which can strengthen support and effectiveness.

[15] "The entire people are involved in fighting corruption" and "a universal movement involving all the people"

Statements like "the entire people are involved in fighting corruption" and "a universal movement involving all the people" emphasize that the fight against corruption is not solely the task of law enforcement, but that society as a whole must be involved. This agitation technique focuses on fostering solidarity and a sense of togetherness in the struggle. Collectivity in agitation emphasizes the formation of solidarity and shared identity among group members to create collective power, while participation emphasizes the active involvement of individuals in the activities and processes of the campaign. Both are essential for the effectiveness of agitation, as collectivity builds a sense of unity and support, while participation ensures active engagement and contributions from all members.

17) Emotional Sentiment

Emotional sentiment in agitation refers to the use of emotions to motivate, influence, or mobilize the audience to support a specific goal or agenda. This technique focuses on triggering strong emotional reactions to rally support, increase participation, or foster a sense of solidarity among the audience.

[16]"When we talk about democracy, there are at least three things. First, freedom of speech. Second, there must be a free opposition to criticize the government and balance it. Third, the presidential election process must be neutral, transparent, honest, and fair."

The speaker expresses concerns about the decline of freedom of speech, the lack of opposition, and uncertainty about election neutrality. This technique evokes the audience's feelings, particularly a sense of injustice and worry about the future of democracy. By appealing to the audience's emotions, the speaker encourages them to think critically and engage in efforts for change. Emotional sentiment in agitation is an effective technique for motivating and moving the audience by harnessing emotions such as anger, empathy, or pride. By using personal narratives, evocative language, visual imagery, and calls to action, agitators can create a strong emotional reaction that influences the audience's attitudes and actions.

b. Functions of Agitation Techniques in Debate Discourse

The presidential debate discourse is a form of political discourse used for political purposes or propaganda. It is classified as propaganda because it presents detailed ideas systematically with the goal of building or shaping public opinion. The propaganda is structured using agitation techniques as part of political communication. This aligns with Herbert Blumer's (1969) view that agitation is an activity aimed at mobilizing and stirring the public, especially in political activities, whether through speech or writing. Political activities here can be seen as efforts to encourage public participation in politics, such as elections. Therefore, it is reasonable that candidates use agitation techniques to convey their ideas in a way that is understandable to the public. Based on this theoretical foundation, several functions of agitation techniques in the 2024 presidential debate can be described as follows.

1) Clarifying Function

The presidential debate, which presents candidates' ideas and plans, naturally serves as a clarification for the public regarding the candidates' views, ideas, and policies they plan to implement over the next five years. Agitation techniques support the clear, detailed, and systematic presentation of these ideas, which appear in both the opening and closing segments of the debate. These sections contain candidates' visions and missions related to the debate topics. In the closing segment, each candidate delivers a closing statement that illustrates the plans they intend to implement over the next five years. Explanations also appear during the question-and-answer session, where candidates strive to provide precise and accurate answers. This can be seen in the following explanation:

[17] "JAKI is a super app that measures every service. For example, if there's a report about a fallen tree, we direct our team on how many hours it must be resolved. When there's a report about event X, we set the time to resolve it."

The candidate explains a concrete solution emphasizing transparent and measurable services, such as through the use of the JAKI app. This technique combines a logical approach with technology, highlighting that solutions can be implemented practically and yield real results. The response serves

to explain future work programs. The audience is encouraged to think rationally that this approach can improve efficiency and public trust. Rational logic in agitation involves the use of data- and fact-based arguments arranged systematically and consistently. This technique aims to convince the audience with logical, evidence-based reasoning, enhancing the message's credibility and addressing doubts in a clear and structured manner. Thus, the explanation provided by the candidate is backed by facts, aimed at clarifying their vision and mission. This data is based on previous development efforts in Jakarta.

2) Political Propaganda Function

Propaganda is common in political activities, and its aim is to present both truth and falsehood to shape the beliefs or attitudes of a group of people. According to William E. Daugherty (via Primasari, 2013), there are three types of propaganda: white propaganda (open propaganda), black propaganda (using seemingly accurate but false sources), and grey propaganda (appearing neutral). In this debate, candidate number one employs white propaganda, as evidenced by the data presented in their statements. Thus, the propaganda is based on clear, factual data from reliable sources. Opinion-shaping is conducted using accurate and truthful information. This can be seen in the following example:

[18] "When Muslims wanted to build a mosque but couldn't get a permit, I spoke up," and "When Christians couldn't get community approval to build a church, I spoke up."

These statements explain the candidate's involvement in ensuring equal treatment among religious communities, promoting tolerance and fairness in religion. This data highlights the speaker's direct involvement in problem-solving, which boosts trust and support for their actions. The propaganda presented is based on facts from when the candidate served as Governor of Jakarta, making the data valid, sourced, and accountable.

3) Political Rhetoric Function

This debate is a platform for shaping political attitudes among its audience. These attitudes are built on the explanations and propaganda provided by the presidential and vice-presidential candidates. The construction of these opinions is done through political rhetoric presented in public speeches and campaigns. It is expected that these open speeches will build public opinion through persuasion. Persuasion is drawn from ideas, concepts, and systematic rhetoric. This is a characteristic of candidate number one, who presents all ideas in persuasive speeches. Their persuasion is based on open, transparent ideas grounded in data and systematically structured. An example of this can be seen when the candidate discusses public service priorities, such as transportation. This is evident in the following example:

[19] "Prioritize services for the vulnerable. First, people with disabilities. Second, women, especially pregnant women. Third, children and the elderly."

This data is structured based on facts and a systematic order to explain priority areas for development. The speaker directly mentions priorities for vulnerable groups such as people with disabilities, pregnant women, children, and the elderly. By emphasizing the importance of services for these groups, the speaker appeals to the audience's empathy to push for the desired change. This approach aims to raise awareness that special attention is needed for groups that are often neglected in public services.

4. Conclusion

Based on the explanation above, it can be concluded that agitation techniques are part of political communication, whether in campaigns, speeches, or other political activities. The agitation techniques employed in this debate discourse consist of 17 techniques. The most dominant technique is repetition or emphasis. This is understandable because, in debates, speakers must provide emphasis through repeated words and phrases. The purpose of this is to strengthen the main idea or concept being conveyed to the audience, making it easier for them to grasp the idea concretely. Therefore, the use of repetition aims to reinforce the main idea and embed it in the audience's minds, making it easier for them to remember and feel the urgency or emotion the speaker wants to convey. This approach serves as a persuasive method.

The presidential and vice-presidential debates can be classified as political communication activities aimed at building public opinion and persuading the audience to follow the message delivered by the speaker, in this case, the 2024 presidential and vice-presidential candidates. The attempt to influence the audience is carried out through agitation techniques. The functions of these techniques are to clarify ideas, serve as propaganda to build opinion, and act as political rhetoric for presidential candidate number 1, Anies Baswedan.

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ANALYSIS OF YOUTH JOURNALISM TRAINING PRODUCT (CASE STUDY OF THE VIDEO REPORT ON THE REVITALIZATION OF MUSEUM BENTENG VREDEBURG)

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Abstract

The purpose of this research is to describe the journalism training product created by youth. The product of this training is a video report on the revitalization of Museum Benteng Vredeburg. This research is classified as qualitative research. The data sources for this research are the video report on the revitalization of Museum Benteng Vredeburg, and the research data consists of the use of journalistic elements in the video report. The data collection technique used is observation and note-taking. Data analysis is carried out through categorization. The validity of the data is ensured through intrarater verification and peer discussions. The results of this research are as follows: The video report on the revitalization of Museum Benteng Vredeburg contains the following elements: 1) identifying actual events, 2) gathering data from news sources, and 3) utilizing the 5W+1H elements.

Keywords: video, report, revitalization, Museum Benteng Vredeburg

1. Introduction

Research on youth journalism products plays a significant role as it provides deep insights into various aspects of youth development within the context of literacy, communication, and critical thinking skills. Youth contributions to the field of communication or journalism can be a highly valuable element. Although they lack the same experience as professional journalists, youth can bring fresh perspectives, creative energy, and the courage to voice issues that may be overlooked by traditional media [1]. Youth can be powerful narrators of issues that specifically affect their generation. They are capable of addressing topics such as education, youth mental health, part-time jobs, and other issues relevant to the youth community [2]–[4]. Youth contributions in communication bring dual benefits, offering a different perspective to the audience while also providing learning and personal development opportunities for the youth themselves tersebut [4]–[7]. Through their active participation, youth can become a positive force in creating a more diverse and inclusive media environment. In practice, however, not all youth have developed strong communication skills, including writing and public speaking abilities [3]–[6], [8].

Several researchers have conducted studies on journalistic products [9]–[12]. A study titled "Normalization of Violence Against Women Through Journalistic Products" was conducted by Angi et al. (2023). This study aimed to analyze media discourse related to journalistic products on the normalization of violence experienced by women and to reveal the subject-object positions and reader positioning in journalistic products displayed by Sindonews.com and Tribunnews.com between April 2022 and January 2023. The study's findings show that when presenting texts to readers, both Sindonews.com and Tribunnews.com objectified women (the victims) through sexist language, constituting a violation of the Journalistic Code of Ethics. This can be observed in the word choices and news headlines that portray a negative image of women [12]. Annisa and Junaidi (2022) conducted research on the language style used in cyber media. Their research revealed that Okezone.com's travel section adhered to journalistic language, although the language style was tailored to fit the readership segmentation and search engine requirements. Another study on journalistic products was conducted by Hidayat et al. (2020). Their research showed that certified journalists at PWI Agam emphasized the importance of competency testing. Field professionalism was interpreted subjectively by certified journalists through news reporting. Certified journalists construct reality into news that is not free from the interests of sources and media owners. Meanwhile, Pratiwi (2023) analyzed the credibility of journalistic products. The findings indicated that citizen journalism on Infomjlk demonstrated credibility in terms of believability or transparency of sources, and accuracy in the information published. However, Infomjlk's citizen journalism lacked full credibility in terms of bias regarding the "cover both sides" principle and completeness, particularly in meeting the 5W+1H elements.

The similarity between this study and the aforementioned research lies in the analysis of journalistic products. This study on youth journalism products analyzes how youths produce news, while studies by Angi et al., Hidayat et al., and Pratiwi also focus on the journalistic content produced by mainstream media or citizen journalism. Both the study on youth journalistic products and others, such as Angi et al. and Pratiwi, assess the quality of journalistic content. They evaluate journalistic products in terms of language use, objectivity, accuracy, and journalistic ethics. However, the difference between this study and previous research is that youth journalism products focus on high school students as the main subjects, who are not professionally trained in journalism. Although both studies examine journalistic products, the primary difference lies in the research subjects, research objectives, and the type of journalistic products analyzed. The study on youth journalistic products focuses more on the development of journalistic skills and education among students, while other studies primarily focus on ethics, professionalism, and discourse in professional media and citizen journalism.

Research on youth journalistic products is crucial because it focuses on the development of journalistic skills and student education. There are several strong reasons for this, particularly within the context of education and character formation for youth. In the digital era, youth are not only consumers of information but also content producers. Research on youth journalistic products is important to measure the extent of their media literacy development. The study of youth journalistic products focuses on how students consume and produce content, ultimately enhancing media literacy. Amid the rising flow of information in digital media, the ability to understand and assess the credibility of information is a critical skill. This study can demonstrate how journalism education in schools can help students become smart media consumers and responsible information producers. By conducting this research, researchers can assess their ability to understand, analyze, and produce accurate and ethical information, which are crucial skills in combating the prevalence of hoaxes and misinformation.

2. Methods

This research falls under the category of descriptive qualitative research. Operationally, it describes the journalistic product in the form of a video report produced by students of SMA Muhammadiyah 7 Yogyakarta through a youth journalism training program. The data collection techniques used were observation and note-taking. The observation and note-taking techniques involved five steps: (1) carefully observing the video report that serves as the research data source, (2) identifying various components of the video report and recognizing keywords relevant to the research topic, (3) organizing the research data into cards to facilitate categorization, (4) categorizing all data based on the research topic and problem formulation, and (5) analyzing the data based on the provided instruments. The steps for data analysis are as follows. First, data are collected and categorized based on the research theme/topic. Second, data analysis proceeds based on the established instruments. The data analysis is conducted as follows: (1) identifying data based on the research problem, and (2) tabulating and explaining the data descriptively and qualitatively.

The validity of the data in this research is ensured through the following methods. First, intrarater validity is carried out by repeatedly reviewing the available data. This process is aimed at discovering as much relevant data as possible and identifying aspects pertinent to the research problem, thereby ensuring the data's accuracy. Second, the validity of the data is also achieved through interrater reliability, where the researchers engage in discussions to verify the accuracy and interpretations made during the research. The researchers discuss and align their perspectives on the collected data.

3. Research Results and Discussion

In the creation of news reports, the training participants aimed to produce news that was accurate, well-structured, and engaging. The emphasis on producing accurate and correct news played a crucial role, as it serves as an essential source of information for the public. The participants attempted to present new information about an ongoing event that was of public interest. They sought to act as reporters or journalists, whose role is to gather and deliver news. The participants learned how to deeply investigate the facts of an event or incident in order to fulfill the information needs of the public. Below are the results of the training activities in writing news scripts and delivering news by the participants.

a. Identifying Actual Events

The training participants were able to identify an actual event to report on. An event that is currently being discussed by the public is highly sought after for information and verification. The participants carefully identified a significant event happening in Yogyakarta, one of which was the

revitalization of Museum Benteng Vredeburg. They chose to feature this event and developed it into an interesting news report.



Figure 1. News Report on the Revitalization of Benteng Vredeburg

Benteng Vredeburg is highly relevant in the social and cultural context of Yogyakarta society. This revitalization not only involves the physical aspects of the building but also has the potential to reshape how the community interacts with their history and culture. The revitalization process, carried out by the Indonesian Heritage Agency (IHA), aims to repair damage and enhance visitor experiences through the addition of interactive and educational programs [13]. Therefore, news about this revitalization can attract public attention as it touches upon local cultural identity.

When current events appear in the media, there is a tendency for the public to seek further information to verify the accuracy of the news. In this case, the training participants conducted in-depth research on the revitalization of Museum Benteng Vredeburg. They successfully gathered data from various credible sources to present an accurate and informative report. For instance, they collected information about the new ticket prices and the new programs offered after the revitalization. This effort is essential for building the credibility of the news they presented.

The participants' ability to turn actual events into engaging news stories largely depended on how they constructed their narrative. They needed to consider elements such as perspective, writing style, and the use of supportive visuals. The revitalization of Museum Benteng Vredeburg, with all the changes taking place, provided plenty of material to be developed into an interesting story. For example, descriptions of the new interactive experiences at the museum or how the space now serves as a gathering place for the younger generation. Thus, the training participants successfully identified and presented actual events like the revitalization of Museum Benteng Vredeburg in Yogyakarta, highlighting the importance of journalistic skills in identifying significant local issues. Through careful research and engaging news presentation, they not only contributed to the dissemination of information but also helped the community to understand and appreciate their cultural heritage.

b. Gathering Data from News Sources

The training participants made efforts to delve deeper into data collection to obtain the most comprehensive information possible. They conducted interviews, observations, and documentation. Interviews were conducted to gain a sequential understanding of how the event unfolded and to collect data related to those involved. Field observations were carried out to directly observe the surrounding environment, helping them describe the location when crafting the news story.



Figure 2. Interview with a Source

In-depth data gathering is a crucial step in producing high-quality journalistic content. In the context of video reporting, thorough information not only enhances the accuracy of the news but also enriches the narrative. The training participants did not solely rely on secondary sources; they also conducted field research, allowing them to better understand the context and dynamics of the event. Their data gathering process involved the following steps:

1) **Interviews** were conducted to collect qualitative data. Through interviews, participants gathered information from various individuals involved in or affected by the event. By understanding the sequence of events, they were able to craft a clearer and more informative narrative. Additionally, interviews with visitors provided a human perspective, often missing in more factual news reports. This is essential for building a narrative and fostering understanding among the audience.
2) **Field observations** were carried out to obtain a direct picture of the event's situation on-site. By observing the physical conditions, social interactions, and surrounding atmosphere, they captured nuances that could not be conveyed through interviews or statistical data alone. Observations also allowed them to note key visual elements for the video report, such as crowds, public reactions, or relevant environmental conditions.
3) **Documentation** was used as an auxiliary tool during information gathering. Through photos, videos, or field notes, they were able to collect visual and audio evidence to support their narrative. This documentation not only strengthened their arguments but also provided additional context for the audience. In the world of visual journalism, the quality of documentation greatly influences the appeal and credibility of the report.

Overall, the trainee reporters made concerted efforts in data gathering through interviews, observations, and documentation. They demonstrated a holistic approach to modern journalism. These methods complemented each other and added dimensions to their news reports. With this approach, the participants not only presented facts but also built a rich and in-depth narrative, thereby enhancing the quality of the video report produced. This is a key step in creating journalism that is informative, accurate, and empathetic towards existing social issues.

c. Applying the 5W+1H Elements

In creating their news reports, the training participants adhered to the 5W+1H elements. They attempted to apply the material they had learned by incorporating the following elements:

1. **What**: What event occurred?
2. **Who**: Who was involved in the event?
3. **Where**: Where did the event take place?
4. **When**: When did the event occur?
5. **Why**: Why did the event happen?
6. **How**: How did the event unfold?

The use of the 5W+1H formula in producing the video report on the revitalization of Museum Benteng Vredeburg was crucial for constructing a clear and informative narrative. The following explains how each element was applied in the video report created by the students:

1) What Element

The "What" element was used to explain the revitalization process itself. The video report on the revitalization of Museum Benteng Vredeburg provided information about the various changes that had taken place, such as the addition of new facilities, the redesign of the interior and exterior, and the introduction of new programs.



Figure 3. Initial Information about the Revitalization of Museum Benteng Vredeburg

Here is the analysis of the "What" element presented in the video report on the revitalization of Benteng Vredeburg Museum:

a) The **What** element in the video report effectively answers the main question of what occurred during the event or incident being reported. They have successfully provided the core information by identifying the main event or topic of the report. Without a clear explanation of what happened, the audience would not grasp the context or essence of the report.
b) Through the **What** element, they clearly explained what was happening at the beginning of the video, capturing the audience's attention. If viewers do not know what is being discussed, they might lose interest. The **What** element also provides the foundation for the entire narrative of the report. From here, the report can further expand by explaining who was involved (Who), where the event took place (Where), when it happened (When), why it happened (Why), and how it happened (How).
c) The **What** element was presented to give the audience a quick understanding, making the content easy to comprehend. This element refers to the core or essence of the message or information that is delivered clearly and directly. Its goal is for the audience to quickly grasp the main message or point being conveyed without needing much additional explanation. Thus, this element functions to simplify and focus the audience's attention on the most important aspects, ensuring the information is easier to understand and not confusing.
d) Through the **What** element, they successfully presented the main facts directly, showing that the report was based on reliable data and information. This helps to build credibility for the journalists and the media presenting the report. This element effectively and clearly ensures that the audience understands the event being reported and remains engaged to watch the entire news video.

2) Who Element

The **Who** element is important for providing information about the parties involved in the revitalization of Benteng Vredeburg Museum. These parties include the Yogyakarta Government, the Indonesian Heritage Agency (IHA), which manages the museum, architects or designers responsible for the project, and local communities that may contribute to or be affected by these changes. Interviews with these individuals could offer deeper insights [6].



Figure 4. Interview with the Source

Interviews with local residents or museum visitors before and after the revitalization can provide insights into how the changes have impacted the community. They can share their experiences and expectations regarding the museum following the revitalization.

The use of interview techniques to explore the **Who** element in the video report on the revitalization of Benteng Vredeburg Museum is very effective in creating a rich and informative narrative. By involving various sources, the trainees can present diverse perspectives, offering a comprehensive view of the impact of this revitalization project on the local community and culture.

3) When Element

The **When** element records the timeline of the revitalization of Benteng Vredeburg Museum, including the start date and target completion date of the project. For instance, the revitalization project began in April 2024 and is scheduled to be completed in June 2024. Additionally, the news video provides information on when the museum will resume operations and the admission ticket prices. This information is crucial for giving the audience a temporal context.



Figure 5. Museum Operational Information

The conclusion regarding the **When** element in the video report on the revitalization of Benteng Vredeburg Museum highlights the importance of documenting the project timeline, including the start and target completion dates. The revitalization project began in April 2024 and is scheduled to be completed in June 2024, with the museum closing for visits from early March 2024 until early June 2024. Additionally, information about when the museum will reopen and the new admission fees is provided, offering crucial temporal context for the audience to understand the changes and their impact on visitors and the community.

4) Where Element

The **Where** element refers to the location of the ongoing events. In the video report, the location of Benteng Vredeburg Museum in Yogyakarta is prominently featured. Visuals of the location can help the audience understand the geographical and cultural context of this revitalization. The video report is capable of showcasing the surrounding atmosphere and the accessibility of the site, which can enhance the visual appeal of the video.



Figure 6. Front of Vredeburg Museum

In the video report, the location of Benteng Vredeburg Museum in Yogyakarta is prominently featured. This is done to provide a clear visual representation of the site where the revitalization is taking place. Highlighting this location not only shows its geographical position but also offers relevant cultural context related to the event.



Figure 7. Another Side of Benteng Vredeburg Museum

He visuals of the location can help the audience understand the geographical and cultural context of this revitalization. For example, the video report features a map of Yogyakarta highlighting the location of Benteng Vredeburg Museum or captures the surrounding atmosphere, such as crowds of visitors and activities around the museum. These visuals are not only informative but also capture the audience's attention.



Figure 8. Visitors at Vredeburg Museum

Analysis of the video report produced by training participants

a) The video report has provided geographical context by mentioning the location of the event. Viewers can understand where the event took place, thus grasping its relevance to a specific region.
b) The results of the video report help viewers connect information. Audiences often relate the location of the incident to other information they already know, such as the revitalization of historical buildings in other places.
c) The video report created by the students can enhance the credibility of the report. They accurately reported the location of the event, which adds to the precision and credibility of the report, demonstrating that the journalists truly conducted research or were even present at the site.
d) The video report has shown both local and global relevance. The location can determine whether a report is appealing to a local, national, or even international audience. For instance, events in a small town may only be relevant to local viewers, while occurrences in a capital city or well-known place could have broader implications.
e) This video report aids in visualizing the context for viewers. Viewers of the video report are often not present at the scene of the event. By illustrating where the incident occurred, they can visualize the situation and the surrounding environment, thus feeling more connected to the news.
f) The video report can shape the visual narrative. In the video report, the location can also dictate how visuals are presented. Images of the site, landmarks, or specific panoramas can add an additional dimension to the story being told, making the report more vibrant and informative.

Thus, the element of "where" in the video report is crucial for providing context, clarity, and credibility to the news narrative, as well as facilitating the audience's understanding and connection to the story with a specific backdrop.

5) Why Element

The why element explains why the event is significant. In the context of the revitalization of the Benteng Vredeburg Museum, this concept is presented by training participants as an effort to preserve cultural heritage, enhance visitor experiences, and make the museum a public space that is more relevant to contemporary societal needs [14]. An explanation of the goals and benefits of revitalization will add depth to the narrative. The "why" element provides a more profound and meaningful explanation of the reasons behind the project. Here is the analysis of the "why" element used in the video report about the revitalization of the Benteng Vredeburg Museum:

a) The "why" element helps provide context regarding why the revitalization of the museum is necessary. They successfully explained the historical background of the Benteng Vredeburg Museum and its current condition. This helps viewers understand the urgency and relevance of the action. For example, explaining why this museum needs to be revitalized, from the historical, cultural heritage, or social relevance perspectives to the community today.
b) The "why" element in the video report on the revitalization of the Benteng Vredeburg Museum allows the audience to connect emotionally. If the video report only focuses on what is being done (such as the technical details of revitalization) without explaining why the project is important, the audience may lose interest. Understanding why this museum is important as part of Yogyakarta's cultural identity and why it needs to be preserved and adapted to current needs can foster empathy and interest among viewers.
c) In the context of museum revitalization, the "why" element is also essential for emphasizing the social and cultural benefits. Viewers receive information that this revitalization is not only important for the museum itself but also for the wider community, in terms of preserving historical heritage, enhancing cultural education, and providing a more relevant and interactive public space. This can increase public support for the revitalization.

d) The "why" element has helped clarify the long-term impacts of this revitalization. Viewers understand that revitalization is not just about physical improvements, but also about how this museum can function as an educational center, a space for cultural dialogue, and an inclusive area for the community in the future. This will enrich the narrative and provide strong reasons why this revitalization is a vital investment for future generations.
e) The "why" element has assisted the video creators in framing a stronger narrative. By answering the question of why the revitalization is undertaken, the video report can incorporate interviews with experts, museum managers, historians, and local communities to provide a more comprehensive perspective. This makes the story more nuanced and engaging, allowing viewers to engage more deeply with the presented topic.
f) Audiences will naturally ask, "Why is this revitalization necessary now?" or "Why is it important for me as a viewer to care?" The "why" element in this video report effectively answers these questions by offering broader insights, such as the role of the museum in historical education and national cultural identity. If this element is not explained, the audience may not find the video relevant to their lives.

Overall, the "why" element in the video report acts as a framework connecting the technical facts of revitalization with values, emotions, and broader benefits for society, thus making the story more relevant, meaningful, and persuasive.

6) How Element

The final element is "how," which describes the process of revitalization. This includes the methods and techniques used in the project, such as architectural redesign and the implementation of new technologies to create interactive experiences for visitors. Presenting images or videos of the revitalization process can give the audience a real picture of the changes taking place [15].



Figure 9. Interactive Screen of Vredeburg Museum

In producing the video report on the revitalization of the Vredeburg Fort Museum, the element of how plays a crucial role in explaining the methods and processes involved in the revitalization. This is important so that the audience not only understands what is happening but also comprehends the processes involved in updating and rejuvenating the historic museum. Below is the implementation of the how element in the making of the youth report video.

a) The how element provides an explanation of how the revitalization process is carried out, from planning to implementation. This can include how the physical buildings are renovated without damaging their historical value, how the museum's collections are updated or preserved, and how modern technology is introduced to enhance the visitor experience.
b) The video report highlights the use of new technology. Various digital technologies, such as interactive exhibitions and the use of augmented reality (AR), are showcased in the museum to enhance the visitor experience.
c) The results of the video report provide details about infrastructure changes. They explain how infrastructure improvements are made to enhance visitor comfort without compromising the museum's historical value. For example, how public facilities such as exhibition spaces are expanded or how accessibility for disabled individuals is improved.
d) The how element explains how revitalization impacts the local community, in economic, social, and cultural terms. Museum revitalization can increase tourist visits and revive the surrounding economy, as well as how the community is involved in this process.
e) They build an informative visual narrative. In the video report, the how element is supported by visualizations, such as the use of advanced technology or interviews with those involved in the revitalization. This provides the audience with a visual understanding of how the entire process is carried out in reality.

By effectively utilizing the how element, the video report on the revitalization of the Vredeburg Museum can become more informative, in-depth, and engaging, allowing the audience to grasp the intricacies of the revitalization process, as well as its impact on historical preservation and the future development of the museum.

The systematic application of the 5W+1H formula can produce informative and engaging content. This approach not only helps in conveying information clearly but also enhances the audience's understanding of the importance of revitalization as part of cultural and historical preservation in Yogyakarta.

4. Conclusion

The video report on the revitalization of the Vredeburg Museum meets the essential elements in the preparation of quality news. First, the video contains current events, which means the topic addressed is relevant to current conditions, thus attracting viewers' attention. Second, the coverage process is supported by comprehensive news source data excavation, demonstrating in-depth research on the reported events. Third, the report is structured using the 5W+1H elements (What, Who, When, Where, Why, and How), an essential framework for providing complete and clear information to the audience. Therefore, this video report can be considered a journalistic work that adheres to reporting standards.

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INNOVATION IN LEARNING MEDIA: INDUSTRIAL-BASED AUTOMATIC MAIN FAILURE POWER SYSTEM TRAINING UNIT

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Abstract

This research aims to develop an industrial-based Automatic Mains Failure (AMF) Power System training unit using authentic components in line with industrial standards. The study's primary focus is to address the challenge of limited practical equipment in vocational education in Indonesia, which impacts students' understanding and skills in electrical engineering. The research method employed is Research and Development (R&D) using the ADDIE model, which includes analysis, design, development, implementation, and evaluation. Data was collected through black-box testing and questionnaires to assess the unit's validity and feasibility. The research findings show that the training unit is feasible for use, with a performance test score of 38, categorized as "Very Good." Validation from material and media experts yielded scores of 94.5 and 109.5, respectively, both categorized as "Very Feasible." Feedback from students, with an average score of 107.1, indicated an effective learning experience. The development of this training unit not only improves accessibility in learning but also facilitates student independence in practical sessions. The implementation of this product in educational institutions is expected to enhance the quality of learning in AMF Power System installations.

Keywords: training unit,Automatic Main Failure(AMF),vocational education,industry based system.

1. Introduction

A. Background of the Problem

Vocational education in Indonesia faces significant challenges, particularly regarding the availability of adequate practical equipment, which directly impacts students' understanding and competencies. The absence of effective learning media and practical tools hinders educational progress [1]. To address these challenges, it is essential to develop learning facilities that align with the curriculum and incorporate the latest technological advancements [2]. The integration of technology into the learning process is believed to enhance students' understanding and outcomes, preparing them for the complex demands of the workforce [3].

Learning media are crucial in electrical engineering training units, facilitating hands-on learning and realistic simulations that allow students to apply theoretical knowledge in practical contexts. Research indicates that media-based training significantly enhances cognitive, affective, and psychomotor skills compared to traditional methods [4]. Moreover, combining simulations with direct experimentation promotes deeper conceptual understanding, effectively bridging theory and practice [5]. Mobile learning media, particularly Android-based applications, enhance accessibility to resources, fostering independent learning and engagement [6]. The development of specialized trainers, such as load-shedding trainers, has proven to be effective learning tools, receiving positive feedback and demonstrating high feasibility [7]. Ultimately, these innovative learning media align educational practices with industry needs, equipping students for real-world challenges [8].

The latest innovation in developing the AMF power system training unit is industrial-based, utilizing authentic components that enable students to interact directly with real equipment. This approach emphasizes direct practice, linking theory to practical work in the electrical engineering field. It is anticipated that this model will serve as a reference for other institutions seeking to enhance industrial-based electrical vocational training. The authentic component approach in this AMF training unit effectively enhances students' skills and prepares them for industry demands, bridging the gap between theory and practice [9]. However, traditional perspectives highlight the importance of hands-on experience, arguing that while technology aids in delivering theoretical content, practical fieldwork is vital for producing industry-ready graduates.

B. Problem Limitations

This study recognizes several limitations to ensure its relevance and focus in developing the AMF Power System training unit:

Scope of Material: The study focuses solely on the AMF training unit, excluding other technologies outside electrical installation systems, such as IoT or advanced technologies. The primary emphasis is on practical installation and maintenance of the AMF system in accordance with industrial standards.

Authentic Components and Industry Standards: The research prioritizes the use of authentic components and widely accepted industry standards, avoiding components that do not conform to current industry practices.

Modular and Adaptive: The training unit developed is designed to be modular and adaptable to specific lessons within electrical installations, excluding training units for other disciplines or topics unrelated to the AMF Power System.

Limitations in Practical Tools: The study does not encompass the development of practical tools beyond the AMF training unit, focusing specifically on solutions to the limited availability of practical equipment in vocational schools, which impacts students' competencies in electrical engineering.

Context of Vocational Education in Indonesia: This research is tailored to the Indonesian vocational education context, making its findings and recommendations potentially less applicable to other countries with differing systems and requirements.

This research is anticipated to make significant contributions to enhancing the quality of vocational education in Indonesia, particularly within the electrical engineering domain through the development of relevant and practical training units.

C. Research Questions

How can the development process of an industrial-based Automatic Mains Failure (AMF) Power System training unit address learning needs in the context of digitalization and Industry 4.0 automation?

How can the results of black-box testing validate the function and performance of the AMF Power System training unit in relation to the designed specifications?

How can validation by subject matter and media experts regarding the content, learning efficiency, and visual quality of the AMF Power System training unit establish the product's feasibility for use in electrical installation learning?

D. Research Objectives

This study aims to:

Develop an industrial-based Automatic Mains Failure (AMF) Power System training unit that aligns with learning needs in the era of digitalization and Industry 4.0 automation.

Conduct black-box testing to evaluate the function and performance of the AMF Power System training unit, ensuring compliance with industrial specifications.

Validate the AMF Power System training unit's feasibility through assessments by subject matter and media experts, focusing on content, learning efficiency, and the visual quality of the interface as an educational medium for electrical installation.

2. Research Method

A. Research Development Method

The Research and Development (R&D) method, employing the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), is particularly effective for creating educational products in the realm of industrial electrical installations. The analysis phase involves conducting needs assessments through interviews and questionnaires to pinpoint gaps in practical teaching, ensuring the developed training unit aligns with industry standards [10]. This systematic approach not only facilitates

the creation of training units validated by industry requirements but also results in high feasibility scores [11].

Conducting a needs analysis is essential in vocational education as it ensures that training programs are relevant and effective by aligning them with industry demands. This systematic identification of necessary skills and competencies in the job market allows educational institutions to develop modules that address these requirements, as evidenced by studies linking technical skills to job advertisements in the industrial sector [12]. Additionally, needs analysis supports curriculum design that prioritizes practical skills, which are crucial for students' success in vocational fields [13]. The implementation of On-The-Job Training (OJT), guided by this analysis, significantly enhances students' transitions to the workforce by emphasizing recognized job standards and practical components [14]. Ultimately, effective needs analysis improves educational outcomes and better prepares students for employment [15].

B. Data Collection Techniques

Black Box Testing is a crucial methodology for evaluating the functionality of training unit systems based on industry standards, identifying errors early in development. This approach assesses system outputs based on various inputs without needing knowledge of the internal code structure, facilitating external functionality evaluation [16]. Techniques like Equivalence Partitioning are used to categorize input values into test cases, ensuring comprehensive scenario coverage [17]. The findings from these tests help rectify implementation errors and enhance overall training unit quality, adhering to software testing best practices [18]. By systematically identifying and addressing errors, Black Box Testing contributes significantly to the reliability and effectiveness of training systems [19].

Ensuring the feasibility of industry-based electrical engineering training units is vital for meeting pedagogical and technical standards. Research indicates that structured methodologies like the ADDIE model lead to the development of training modules that achieve high feasibility ratings in content and media assessments [20]. Moreover, addressing the skilled labor shortage in manufacturing through targeted training programs can be validated through expert questionnaires [21]. Feasibility tests on various educational tools, including spectrum analyzers, show the effectiveness of expert evaluation in determining the suitability of training media [22].

C. Instrument Testing

Instrument validation in industry-based electrical engineering training units is critical to ensure content appropriateness and technical functionality, aligning with standards like ISO/IEC 17025:2017, which emphasizes reliable measurement results [23]. This validation involves metrological confirmation, including verification and calibration of measuring instruments to ensure they meet established norms [24]. Instrument evaluation encompasses performance testing under various conditions to ensure compliance with specifications [25]. Simulation training equipment development enhances practical learning, allowing students to engage in realistic scenarios [26]. Ultimately, reliable instruments are essential for accurately assessing competencies in fields such as automotive electricity [27].

D. Data Analysis Techniques

Validity analysis entails evaluating expert validation data using a 1-5 rating scale to assess the feasibility of the training unit. High expert ratings across various studies indicate substantial feasibility; for instance, training modules for industrial electrical installations achieved scores of 94.5 for content feasibility [20]. Similarly, an electrical installation trainer received a validation score of 93.5%, confirming it meets essential instructional standards [28]. The ADDIE model ensures comprehensive evaluation, with media and material aspects rated above 87.5%, reflecting high user satisfaction [29]. These findings highlight the effectiveness of structured validation processes in developing training units that meet educational and industry standards.

Feasibility analysis in education systematically evaluates training units based on data from students and experts, often employing descriptive methods. For example, Mahardika et al. demonstrated high ratings for impulse and momentum modules after expert validation [30]. Similarly, Armi and Dewi's assessment of interactive learning media achieved an average score of 87% from content experts, indicating a "Very Valid" category [31]. Furthermore, Sari et al. emphasized the importance of expert validation in assessing interactive multimedia, which was deemed suitable for educational use [32].

Collectively, these studies underscore the significance of expert evaluation and student feedback in determining educational interventions' effectiveness and feasibility [33].

3. Research Results and Discussion

This research aims to develop an industrial-based Automatic Mains Failure (AMF) Power System training unit integrated with industrial technology as a learning medium in the Electrical Engineering Education Study Program. It aligns with the needs of Industry 4.0, which promotes the digitalization and automation of electrical systems. The approach used is the ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation, known for its effectiveness in developing technology-based learning tools.

A. Research Results

1. Development Results

This research focuses on developing an industrial-based AMF Power System training unit for the Electrical Engineering Education Study Program. By applying the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), this development addresses the demand for digitalization and automation in Industry 4.0. The ultimate goal is to enhance students' competence in industrial-based electrical power system installation.

a. Analysis Phase

In this phase , a needs analysis was conducted on the practice equipment in the Electrical Engineering laboratory, revealing limitations in practice tools. There were only two outgoing cubicles and one cubicle trainer available for 17-20 students. This hampered the quality of learning, especially in electrical installation practice. As a solution, this research proposed developing an industrial-based training unit that allows students to conduct independent practice, even outside class hours.

b. Design Phase

The training unit was designed to meet industry standards, including 2D and 3D visualizations to help students understand electrical installation schemes. The unit is compatible with commonly used student devices, such as laptops, and can simulate real-world industry scenarios like Automatic Mains Failure (AMF). This physical and interactive design enhances the relevance of practice to the working world.

c. Development Phase

During this phase, hardware and industrial-based learning materials were developed. The developed unit was tested using black-box testing to ensure the functionality of all components according to specifications. Test results indicated that the training unit functions well and is ready for educational use.

d. Implementation Phase

The training unit was tested in the Electrical Engineering laboratory and validated by media and material experts. Validation results showed that the unit is highly feasible for use as a learning medium. The real-world scenario simulation provided by the unit offers students a deeper learning experience, reinforcing their understanding of AMF system workflows.

e. Evaluation Phase

Formative evaluation was conducted by involving experts and students. Survey results showed that this training unit effectively improves students' competence in AMF Power System installation. The evaluated aspects include an easy-to-use user interface and realistic simulations that closely resemble field conditions.

B. Product Testing

The product testing involved black-box testing, expert validation, and student feedback surveys. This testing was conducted to assess the functionality, performance, and feasibility of the product for use in industrial electrical system education.

a. Black-Box Testing

Black-box testing was conducted to test the functionality of the training unit. This involved two respondents from the Electrical Engineering Department who assessed the unit's function and performance. The test results are presented in the following table:

Table 1. Black-Box Testing Assessment Scores

Respondent	Function	Performance
1	34	4
2	34	4
Average	34	4

Based on the black-box test results, the product is considered highly feasible in terms of function and performance. The average function score of 34 indicates optimal performance as per the designed specifications. The following table explains the score conversion for the function assessment:

Table 2. Black-Box Testing Function Score Conversion

Aspect	Interval	Category
Function	$25.5 \leq x \leq 34$	Highly Feasible
Function	$17 \leq x < 25.5$	Feasible
Function	$8.5 \leq x < 17$	Less Feasible
Function	$0 \leq x < 8.5$	Not Feasible

The performance results also show an average score of 4 on a maximum scale, indicating that the unit has quick response times and high accuracy in operation. The following table explains the score conversion for performance:

Table 3. Black-Box Testing Performance Score Conversion

Aspect	Interval	Category
Performance	$3.0 \leq x \leq 4.0$	Highly Feasible
Performance	$2.0 \leq x < 3.0$	Feasible
Performance	$1.0 \leq x < 2.0$	Less Feasible
Performance	$0 \leq x < 1.0$	Not Feasible

Overall, the black-box test resulted in a highly feasible rating for both the function and performance of the training unit.

b. Material and **Media Validation**

Material and media validation were carried out by four experts, consisting of two material experts and two media experts. The assessed aspects included content, learning process, and efficiency. The following table presents the material validation scores:

Table 4. Material Validation Assessment Scores

Aspect	Material Expert 1	Material Expert 2	Average
Content	51	52	51.5
Learning	19	20	19.5

Aspect	Material Expert 1	Material Expert 2	Average
Efficiency	23	24	23.5

The average content score of 51.5 indicates that the training unit is highly feasible as a learning medium. The following table provides the score conversion for content:

Table 5. Material Validation Content Score Conversion

Aspect	Interval	Category
Content	$43 \leq x \leq 52$	Highly Feasible
Content	$34 \leq x < 43$	Feasible
Content	$25 \leq x < 34$	Less Feasible
Content	$0 \leq x < 25$	Not Feasible

Media validation assessed the visual design and interface of the training unit. The average media validation results are shown in the following table:

Table 6. Media Validation Assessment Scores

Aspect	Media Expert 1	Media Expert 2	Average
Visual Design	17	18	17.5
Interface	23	24	23.5

Thus, the results of material and media validation show that the training unit is highly feasible in terms of content, learning, efficiency, as well as visual design and interface quality. The following is an overview of the development results of the AMF power system installation training unit.

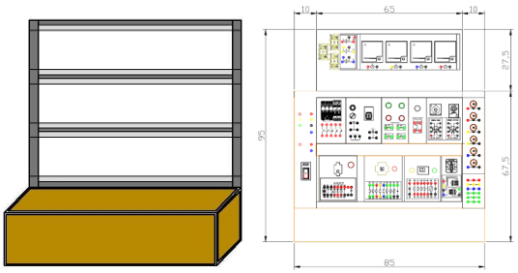


Figure 1. Design of the framework and circuit of the modular AMF power system component unit based on industry.

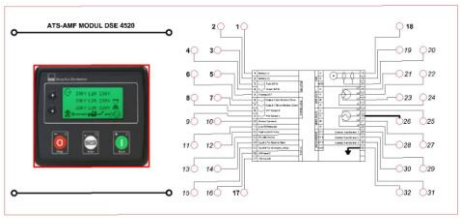


Figure 2. Design of the AMF control component module.

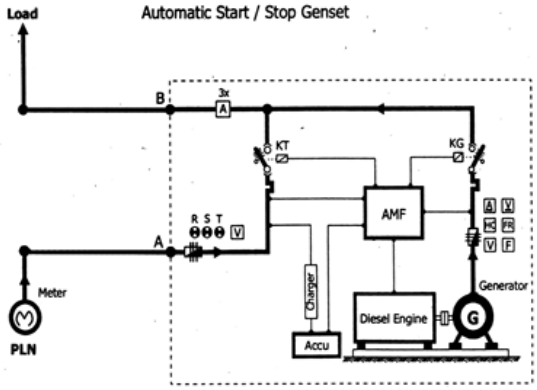


Figure 3. AMF power system based on industry.

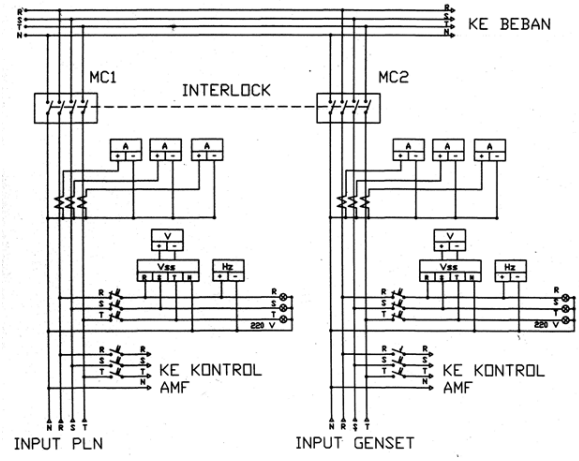


Figure 4. Wiring installation of the AMF power system.



Figure 5. Photo of the industrial-based AMF power system training unit installation.

The development of this industry-based training unit is effective in enhancing students' competencies in AMF power system installation, providing a solution to the limitations of practical facilities in engineering institutions. The product trial results indicate that this unit has been thoroughly tested through black-box testing, expert validation, and user feedback assessments to evaluate its performance in industrial electrical learning.

4. Discussion

In the development of the industrial-based Automatic Mains Failure (AMF) Power System training unit, this research shows that the approach used successfully improved the quality of learning

in the Electrical Engineering Education Study Program. By applying the ADDIE model, the phases of analysis, design, development, implementation, and evaluation have been traversed to create a practical tool relevant to the demands of Industry 4.0 and the digitalization of electrical power systems. In this study, the developed training unit was rated highly feasible by experts and students through various trials and validations conducted, such as black-box testing, material and media expert validation, as well as student questionnaires.

The Analysis phase began with identifying the need for practical equipment in the laboratory, which revealed the limitations of the available practical tools. Identifying limitations in practical equipment within technical education laboratories is crucial, as highlighted by Woraphiwut et al., who noted that inadequate facilities can significantly hinder the teaching and learning process [34]. This concern is echoed in various studies, including Woraphiwut's investigation into safety management and instructional issues in engineering workshops, which identified equipment and facility deficiencies as major barriers to effective learning [34]. Similarly, research by Olojuolawe and Adeoluwa in Nigeria revealed a significant gap in the availability of essential tools for vocational training, impacting graduates' employability [35]. Furthermore, Asniwaty et al. emphasized the disparity in laboratory facilities between vocational high schools and colleges, which can hinder practical learning experiences [36]. Addressing this gap through the development of training units for independent student practice, both during and outside class hours, is essential for enhancing quality and learning outcomes in technical education [37].

The Design phase in technical education emphasizes the creation of training unit designs that align with industry standards, utilizing 2D and 3D visualization to enhance students' understanding of electrical installation schemes. Research indicates that such visualization significantly improves spatial visualization skills (SV), which are crucial for engineering success [38]. For instance, the development of a valid and effective industrial electrical installation trainer achieved a validation score of 93.5%, highlighting its practical application in real-world scenarios [11]. Additionally, visualization-based learning approaches for technical drawing have shown promise in addressing students' difficulties with complex topics, thereby fostering better problem-solving skills. Furthermore, a simulation training system for transformer substations has been designed to

The research on the development of an industrial-based Automatic Mains Failure (AMF) Power System training unit demonstrates that the adopted approach effectively enhances learning quality within the Electrical Engineering Education Study Program. Utilizing the ADDIE model, the phases of analysis, design, development, implementation, and evaluation were successfully navigated to create a practical tool relevant to Industry 4.0 and the digitalization of electrical power systems. Expert and student evaluations of the training unit confirmed its high feasibility through various validation processes, including black-box testing and student questionnaires.

The Analysis phase began by identifying the need for practical equipment in laboratories, revealing significant limitations in existing tools. This finding aligns with Woraphiwut et al., who emphasized that inadequate facilities hinder teaching and learning processes [34]. Their research highlights equipment deficiencies as barriers to effective education, corroborated by findings from Olojuolawe and Adeoluwa in Nigeria, which identified a gap in essential vocational training tools, adversely affecting graduates' employability [35]. Additionally, Asniwaty et al. noted disparities in laboratory facilities between vocational high schools and colleges, indicating a need for enhanced practical learning experiences [36]. Addressing these gaps through the development of training units for independent student practice is crucial for improving educational quality and learning outcomes in technical fields [37].

The Design phase emphasized creating training unit designs that align with industry standards while employing 2D and 3D visualizations to improve students' comprehension of electrical installation schemes. Research indicates that such visualizations enhance spatial visualization skills (SV), vital for engineering success [38]. For instance, the development of an industrial electrical installation trainer received a validation score of 93.5%, confirming its practical applicability [11]. Furthermore, simulation training systems for transformer substations have demonstrated significant learning enhancement through immersive 3D environments [39]. The integration of industrial knowledge management tools in educational contexts has also proven beneficial, highlighting the success of such tools in enriching curricula [40]. These findings collectively underline the necessity for innovative teaching strategies in technical education to align with industry requirements.

During the Development phase, hardware and learning materials were created and tested using black-box testing, confirming the training unit's functionality. The results indicated that all components operated as intended, verifying the unit's feasibility for educational settings. Effective industrial-based learning tools are vital for improving educational quality and aligning academic competencies with market demands, underscoring the importance of product testing to meet quality standards prior to implementation [41]. Integration of industrial activities into vocational education has been shown to enhance mechanical engineering competencies significantly [42].

The Implementation phase occurred in the Electrical Engineering laboratory with validation from media and material experts. The validation results confirmed the training unit's high feasibility as a learning medium, supported by various studies indicating the effectiveness of industry-based electrical engineering training units in vocational education. Furthermore, practical learning tools have been shown to significantly improve student outcomes across cognitive, affective, and psychomotor domains [11]. The successful development of training kits for electrical and power electronics machinery, scoring above 87%, indicates their readiness for vocational applications [27]. These findings highlight the essential role of validated learning media in enhancing educational effectiveness within electrical engineering programs.

In the Evaluation phase, expert and student questionnaires revealed significant improvements in student competencies, particularly in AMF Power System installation. The training unit, developed using the ADDIE model, received high scores in various feasibility aspects, including content and usability, averaging 94.5 and 109.5, respectively. The emphasis on realistic simulations and user-friendly interfaces is essential for effective technical learning, as supported by studies linking industrial training with enhanced technical and non-technical skills essential for graduates [43].

Positive outcomes from product trials, including black-box testing and material validation, indicated high feasibility concerning functionality and performance, with average scores affirming optimal performance. Previous studies have demonstrated that well-designed teaching aids, such as electronic tools for AC circuits and Arduino-based applications, yield high feasibility ratings and positive student feedback [44]. The success of these tools reinforces the conclusion that the industrial-based AMF Power System training unit effectively addresses educational needs and enhances student competencies.

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READING LITERACY STRATEGY: TRAINING AND MENTORING FOR TEACHERS UNDER THE SUSPICION OF INDONESIA KINABALU SCHOOL MALAYSIA

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Abstract

The importance of reading literacy skills for elementary school students today cannot be ignored. Reading literacy is the key to opening the door to knowledge and broadening students' horizons. It is a challenge for teachers at the Indonesian Kinabalu School (SIK), to make these skills a success considering the different locations and cultures of the teaching places while the curriculum implemented is from Indonesia. The purpose of this training is to assist teachers at the Indonesian Kinabalu School in developing reading literacy strategies in their schools. The method used in this training is training and mentoring using the Participatory Training model. The training participants numbered 57 participants from groups of schools under the auspices of SIK. Training participants are delegates/appointed by the SIK principal based on certain criteria. The success criteria used in this training program are (1) A minimum of 80% positive response from participants, (2) Participants can be categorized as skilled in developing teaching materials/readings, and (3) Development products can be implemented in the training participant's class. The training results showed that the positive response of training participants reached 96% and 35% of development products were in the good category. All training development products can be implemented in each teacher's classroom learning.

Keywords: Training, Reading Literacy, Elementary School, Kinabalu Indonesian School

1. Introduction

Education is the main foundation in shaping character, broadening horizons, and preparing the younger generation to face the complexities of the modern world. In today's information and technology era, access to various sources of information is increasingly easy, and reading literacy skills are becoming increasingly important for elementary school students [1], [2], [3]. Reading literacy is not just the ability to recognize letters and words, but also the ability to understand, analyze, interpret, and evaluate information presented in various formats, including printed, digital, and multimedia texts [4], [5].

The importance of reading literacy skills for elementary school students today cannot be ignored. Reading literacy is the key to opening the door to knowledge and broadening students' horizons in various fields. The ability to read well not only helps students understand the subject matter at school, but also allows them to be actively involved in social, economic, and political life [6], [7]. Students who have good reading literacy skills tend to be more successful in their academics, careers, and daily lives.

The abundance of information scattered in various media makes reading literacy skills important in helping students filter and evaluate the information they receive. With the advancement of technology, students are often faced with information that is not always accurate or reliable. Therefore, the ability to understand and assess the authenticity of information is an important skill that students must have so that they do not get caught up in false or misleading information [8], [9].

In addition, reading literacy also provides an opportunity for students to develop critical thinking and analytical skills [10], [11]. Through reading, students are invited to question, reflect on, and understand different points of view and perspectives. Students learn to identify arguments, recognize thinking patterns, and ask relevant questions. This ability is not only useful in academic contexts but also in everyday life, where students need to make the right decisions based on a good understanding and assessment of the information available.

Not only that, reading literacy also provides access to the world of imagination and creativity [12], [13], [14]. Through reading, students can gain insight into the culture, history, and traditions of various parts of the world. They can explore the world of fantasy and fiction, develop empathy and a sense of caring for others, and stimulate their imagination and creativity. Reading literacy opens the door to a wide and deep world [15], [16], where every book is a window that leads to new experiences and unlimited knowledge.

Nowadays, technology is increasingly rampant, and information is spread quickly. The challenges of elementary school students developing reading literacy skills are also increasing. Many students prefer to spend their time with gadgets and social media rather than reading more educational books or articles. In general, this problem of elementary school students' reading learning is also found in several countries. Many early-grade students in the United Arab Emirates experience difficulties in reading school materials due to a lack of phonological awareness or detecting the sounds that make up words which are the main cause of reading difficulties [17]. Similar cases were also found in Tanzania [18]. There is a very serious literacy problem, namely that most second and third-grade elementary school students are unable to read, write, and do simple arithmetic. One of the causes is that some teachers do not have adequate teaching skills. Therefore, the role of teachers in developing reading literacy skills is very important.

Teachers have a crucial role in helping students develop reading literacy skills [19], [20], [21]. They are not only teachers but also facilitators and guides in the learning process. Through a creative and innovative approach, teachers can bring a love and interest in reading to students. They can create a learning environment that stimulates students' interest and curiosity, and provide the support and guidance needed to overcome obstacles in developing reading literacy skills.

In addition, teachers also have an important role in choosing reading materials that suit the interests and level of understanding of students. By choosing interesting and relevant books and reading materials, teachers can help students find pleasure in reading and motivate them to continue developing reading literacy skills. Thus, teachers are not only teachers but also mentors who help students find their best potential in reading and learning.

In facing the challenges and opportunities in this digital era, all of us need to recognize the importance of reading literacy skills for elementary school students [10], [13], [14]. Reading literacy is not just a skill, but also the key to opening the door to a bright and successful future for the younger generation. With the crucial role of teachers in developing reading literacy skills, we can help students face the challenges of the future with confidence and strong independence.

Sekolah Indonesia Kinabalu (SIK), is an Indonesian educational institution abroad that plays a vital role in maintaining Indonesian culture and education curriculum in a diverse environment. Teachers at SIK have a great responsibility in building students' reading skills because reading literacy is the foundation for learning in various subjects and daily activities. Different cultures provide their challenges to continue to introduce Indonesian culture into everyday life. The use of technology is an inseparable part of the daily lives of students in Kinabalu. Reading literacy through digital media is the key to providing access to knowledge and strengthening students' reading skills. In this context, the role of teachers at SIK is very important in understanding and developing reading literacy media.

As technology advances, reading literacy is no longer limited to the ability to read printed books but also includes the ability to understand and interpret information from various media, such as the internet, e-books, and videos [22], [23]. Therefore, teachers at Sekolah Indonesia Kinabalu need to understand and master reading literacy media as an integral part of their learning practices.

The importance of SIK teachers' ability to understand and develop reading literacy media is not only limited to understanding technology but also to their ability to integrate the media into the learning curriculum effectively. Teachers need to understand how to select and evaluate reading literacy media that suit the needs and interests of their students, and how to use them to improve their reading skills. This involves not only understanding the various tools and applications of technology but also the right learning strategies to integrate the media into learning activities.

At Sekolah Indonesia Kinabalu, students are exposed to various cultures and diverse information media, and the ability of teachers to understand and develop reading literacy media becomes increasingly important. Teachers in SIK not only need to face challenges in teaching language and reading literacy but also in helping students filter information from various media sources. Therefore,

teachers in SIK need to have a deep understanding of reading literacy media, as well as the skills to use them effectively to support their students' learning.

In addition, understanding reading literacy media also allows teachers to develop innovative and interesting learning strategies [24], [25], [26]. By utilizing various media, teachers can create a dynamic learning environment and trigger students' interest in reading. For example, they can use animated videos to illustrate stories or create interactive quizzes in the form of applications to test students' understanding. Thus, reading literacy media is not only a tool for conveying information, but also a means to increase student involvement in the learning process. The ability of teachers to understand and develop reading literacy media also helps them to identify and overcome obstacles that students may face. Thus, this is an important foundation for the service team to assist teachers at Sekolah Indonesia Kinabalu in developing reading literacy strategies in their schools.

2. Method

The implementation method of activities in community service includes training and mentoring using the Participatory Training model [27]. The participation training model was chosen because it emphasizes the learning process, where training participants are actively involved in all aspects of the activity, from planning, and implementation, to evaluation. The focus of this training is to motivate participants and actively involve participants. The training methods applied include lectures, discussions, and guided practice, with a division of 30% for theory and 70% for practice.

Lecture, discussion, and question-and-answer methods are used to transfer knowledge about improving teacher competence, and milieu development. In addition to providing materials, this activity involves participants by providing information about training objectives, implementation instructions, and interaction through question-and-answer sessions to better understand the material. Tutorial and practice methods are used to guide participants in developing teaching materials/readings. In this activity, the community service will provide direct examples, while participants with their respective laptops will participate in joint practice.

Training Participants

Participants in this training were 57 elementary school teachers, from 7 CLCs under the auspices of Sekolah Indonesia Kinabalu. Teachers have the responsibility to identify their own professional development needs. Second, teachers as training participants are expected to actively participate in training activities. This includes discussing, asking questions, and engaging in simulations or direct practice according to the training topic. Third, teachers are expected to apply the lessons learned in their daily teaching context. Thus, it makes the training have a real impact. The target training participants are directly appointed by the Principal of Indonesia Kinabalu Malaysia School, considering the needs of each school, the number of teachers and students they have, and the accessibility (location access) of the training participants. Thus, the delegation of each school the distribution of origin of the training participants is shown in Table 1 below.

Table 1. Distribution of Participant Origins

No	Which school are you from	Number of Delegates
1	CLC Budi Luhur Biah	12
2	CLC Jawa Etania	4
3	CLC SLDB Inandung	6
4	CLC Budi Luhur Asbon	8
5	CLC Pasir Putih	8
6	CLC Good Samarintan	13
7	CLC Budi Luhur Bingkor	6
	Total	57

Evaluation

Evaluation of program implementation and program sustainability is carried out through evaluation and reflection of program implementation. Evaluation and reflection are carried out through questionnaires and direct interviews with training participants. The questionnaire and interview aim to determine the extent to which the implementation of community service activities is accepted by

participants, as well as related to the performance of the community service team. In addition, evaluation is also carried out to determine participants' knowledge of the training material and assess the products produced. This evaluation aims to determine participants' knowledge and skills after the training is carried out.

The implementation of the program evaluation is carried out after a series of program activities are carried out. The criteria for the success of the program activities carried out are:

1. A minimum of 80% positive response from participants.
2. Participants can be categorized as skilled in developing teaching/reading materials.
3. Development products can be implemented in the training participant's class.

Role of the Community Service Team

Each member of the community service team has a role and task that is adjusted to their competence. The implementing team for this activity is 4 people with the main task of providing training related to product development. The community service team is also assisted by students from the Elementary School Education Department. Students are expected to be able to assist with training techniques. Results and Discussion

3. Result

The community service program was implemented for three months (July to August 2024) with a hybrid activity (online and offline). However, a long communication process has been carried out with partners in this case the Indonesian Kinabalu School (SIK) Malaysia, since April 2024 which finally agreed to establish cooperation. The composition of the training activity materials carried out is shown in Table 2 below.

Table 2. Structure of Training Program Materials

Meeting	Activity Materials	Form
1	Introduction and Training mechanism	Daring
2	Introduction to Literacy	Daring
3	Reading Literacy and Its Forms	Daring
4	Development of Reading Literacy Teaching Materials for Elementary Schools	Luring
5	Practice/Implementation of Products that have been developed	Luring
6	Evaluation of Training Program and Closing of Activities	Daring

The training participants were very enthusiastic about participating in the training. The activities went well, the discussion was very positive, and the participants were able to relate the material presented to the conditions in the field (which they experienced). The enthusiasm of the participants can be seen from the positive responses given by the participants. The positive responses of the participants were obtained from the results of the survey that had been conducted. The results of the positive responses from the training participants are shown in Table 3 below.

Table 3. Positive Responses from Training Participants

Meeting	Participants Present	Positive Response (%)
1	57	88
2	57	93
3	57	93
4	57	100
5	57	100
6	57	100
Average		96

The training program can be said to be effective and successful. This can be seen from the products produced. All participants developed reading literacy teaching modules on certain subjects, with their respective limits of understanding and ability. Although all participants have developed and produced products, the distribution of products in the good category is no more than 50%. This product category is obtained from the results of a product review conducted by the service team. The distribution of product categories is shown in Figure 1 below.

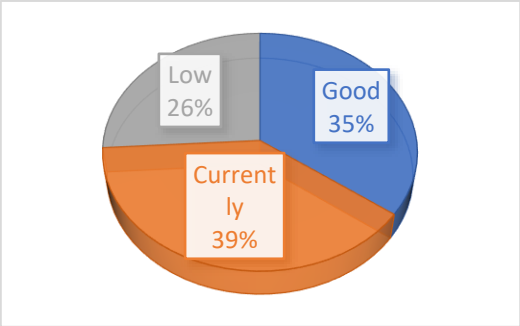


Figure 1. Distribution of Training Product Categories

Discussion

Training and mentoring for the development of reading literacy media organized by a team of community service lecturers from Yogyakarta State University (UNY) at Sekolah Indonesia Kinabalu, Malaysia, received a positive response from participating elementary school teachers. This positive response was seen in several aspects, namely increasing teacher professional competence, motivation to apply the results of the training, and appreciation for the learning methods used.

Improving Teacher Professional Competence

Teachers who participated in the training felt that this activity made a major contribution to increasing their competence in designing and developing innovative literacy learning media. Several participants stated that they gained new insights on how to overcome literacy challenges in the classroom, especially related to low student interest in reading. Research shows that quality teacher training can have a significant impact on teachers' ability to implement more effective learning strategies [28]. Through practical activities and the creation of literacy media, teachers at Sekolah Indonesia Kinabalu were trained to produce materials that were relevant and interesting for their students.

Motivation for Implementation in the Classroom

One of the important impacts of this training is the high motivation of teachers to apply the results of the training in the classroom. Several teachers plan to immediately implement the methods and media they have learned to improve students' reading literacy skills in elementary schools. Motivation to implement training results is closely related to the effectiveness of the training and its impact on daily teaching practices [29]. Teachers who feel they have new skills tend to be more motivated to bring about change in their classrooms.

Appreciation of the Andragogy Learning Method

Teachers also appreciated the learning methods used in the training, which emphasized the andragogy approach. This approach provides space for participants to collaborate, share experiences, and be actively involved in the learning process. Adults tend to learn more effectively when they feel directly involved in the learning process, by the andragogy approach that values the experiences and contributions of participants [30]. In this context, the training conducted by the UNY service team not only teaches technical skills but also strengthens the role of teachers as facilitators in literacy learning.

Relevance to Literacy Development in Schools

Overall, teachers at Sekolah Indonesia Kinabalu felt that the training was very relevant to their efforts to improve the quality of literacy education. Calkins stated that the development of appropriate literacy media can play an important role in building students' reading literacy skills, especially in elementary schools [31]. Teachers at Sekolah Indonesia Kinabalu felt that the training provided a strong

foundation to continue developing literacy materials in their classrooms, with the hope of creating a better reading culture among students.

Training Outcome Development Products

Although the training and mentoring for the development of reading literacy media for elementary school teachers at Sekolah Indonesia Kinabalu went well, the evaluation results showed that only 35% of the products produced by participants could be categorized as good. Several factors that influence this can be analyzed in terms of the demographics of the training participants, including educational background, teaching experience, and comfort level with technology.

Educational Background of Participants

One factor that can influence the quality of the products developed is the educational background of the participants. Based on the evaluation results, participants with educational backgrounds that are more relevant to educational technology or literacy tend to produce better products. This is in line with Darling's findings which show that educational background can affect teachers' ability to adapt to new learning, including the development of literacy media [29]. Participants with non-educational backgrounds or those who do not have skills in educational technology may face more challenges in absorbing training materials and implementing them effectively.

Teaching Experience

Teaching experience is also an important factor that affects training outcomes. Teachers who have more than five years of teaching experience show better results in developing literacy products compared to teachers who are new to teaching. This shows that experience in dealing with various dynamics in the classroom helps teachers understand students' needs and how learning media can be adapted according to the characteristics of their students. In line with Desimone's research, more experienced teachers tend to be better able to utilize professional training to improve their learning practices [28].

Comfort Level with Technology

In addition to educational background and teaching experience, participants' comfort level in using technology also affects the quality of the products developed. Participants who have a higher level of technological literacy tend to produce products that are more innovative and relevant to modern literacy needs. In contrast, participants who are less comfortable with technology often produce simpler products that are less aligned to improve reading literacy. In andragogy learning, adult participants are more motivated when they have adequate basic skills to follow the training material [30]. Unpreparedness or discomfort with technology can be a barrier for teachers in making the most of the training.

4. Conclusion

Positive responses from training participants indicate that the activities carried out by the UNY team of community service lecturers have had a significant impact, both in terms of improving teacher professional competence, implementation motivation, and appreciation of the learning methods used. Thus, the continuation of similar mentoring and training programs is very important to continue to strengthen teacher skills in facing literacy challenges in the future.

Overall, although this training has had a positive impact on improving teacher competence, the quality of the products produced is still influenced by the demographic factors of the participants, including educational background, teaching experience, and comfort level with technology. To improve future training outcomes, efforts need to be made to improve mentoring and differentiate approaches according to the needs of the participants, so that more teachers can develop high-quality products.

Based on the finding that only 35% of the products developed were categorized as good, it is recommended that subsequent training provide more individual mentoring sessions, especially for participants who have limitations in technological literacy. In addition, there needs to be a differentiated approach in training, where participants with different needs and backgrounds receive a tailored approach. Strengthening basic technological skills is also important so that each participant can develop higher-quality products.

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EVALUATION AND ALTERNATIVE SOLVING FLOOD PROBLEMS IN JAKARTA CITY AND SURROUNDINGS

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Abstract

In the Jakarta area and provinces outside Jakarta, there is a lot of residential expansion, so that infiltration space is decreasing. Flooding is an annual problem that occurs in Jakarta. To understand the problem of flooding, this research aims to obtain an overview of the physical condition of Jakarta, obtain an overview of the pattern and amount of rainfall, obtain the size of the built area, and provide an alternative for building absorption wells to reduce flooding in Jakarta.

The research method uses a quantitative approach by searching for secondary data about regional physiography, image interpretation to determine the size of the built-up area, and estimating the number of rainwater absorption wells based on the size of the built-up area.

The research results show that most of the upstream watersheds come from outside Jakarta, namely from West Java and Banten provinces, there are 6 watersheds that pass through Jakarta. The six watersheds have an area of 108,316 ha, or 1083.16 km². Most areas of Jakarta have clay soil which is difficult to absorb rainwater. High rainfall patterns have occurred since the beginning of the year, since January, February, March and April. Likewise at the end of the year in October, November and December. The lowest rainfall occurs in the months of June, July, August and September. The area of DKI Jakarta through which these six watersheds pass is 654 km². Based on the results of image interpretation, the DKI area that will become built-up land in 2024 covers an area of 600.37 km², or 91.8%. The number of infiltration wells that should be built in DKI Jakarta is estimated to cover 50% of DKI's area at 3.3 million wells. If the construction of an infiltration well requires 3 million Rupiah, then in DKI it requires IDR 9.9 trillion.

Key words: flood, built-up area, infiltration

1. Introduction

Flooding is now almost a routine problem in both urban and rural areas in downstream areas. Jakarta is flooded, Semarang is flooded, Banjarmasin, even Bandung is flooded. Floods not only hit Indonesia, but also other countries. In Asia, big cities such as Bangkok, Manila, New Delhi, Beijing are also big cities that are flood victims. The respective local authorities usually argue that flooding occurs because the intensity of the rain is very high. If the amount of rainfall is excessive, it must be stored properly, rather than wasting the rainfall by throwing rainwater into the sea.

How to store rainfall? Naturally, rainwater will be stored in the best storage place, namely underground as groundwater. Groundwater that is stored for a long time means fresh water has the best quality compared to when it is stored in reservoirs, lakes, lakes or swamps. In various regions, there is currently a problem of decreasing groundwater levels, characterized by a decline in groundwater levels, as can be seen from the deeper water levels in wells. Groundwater decline varies by region. In Yogyakarta there was a decline of 30 cm per year (Wilopo, 1999). In Jakarta, groundwater levels have decreased by up to 12 cm per year. The decline in groundwater levels in large cities can even have an impact on land subsidence. Several cities such as Jakarta and Bandung have seen land subsidence of around 7-10 cm/year.

The flood case that occurred in Jakarta is very complex. As a result of extracting groundwater that exceeds capacity, the volume of groundwater will eventually decrease and land levels will subside, and even seawater intrusion. In areas near the coast of Jakarta Bay, the land level is almost the same as sea level, and some parts are even below sea level when high tide occurs. The denser the occupancy level, the narrower the absorption space is, it also becomes a problem. The reduction in infiltration space is not only in urban areas of DKI Jakarta but also in the downstream areas of several rivers that enter the Jakarta area. This is what causes Jakarta to often be hit by floods when the rainy season comes. Is there a way to reduce flooding in the area? To contribute ideas to solving the flood problem, here is a study of the flood problem and how to overcome it in DKI Jakarta.

Problems

The upstream rivers that flow in DKI Jakarta originate from areas outside Jakarta. In the provinces outside Jakarta, a lot of residential expansion has also begun, so that the infiltration space is decreasing. Rainwater in the river basin (DAS) can be engineered in a way that is appropriate to what is available in that area, both upstream and downstream, artificial recharge can be built. Artificial infiltration can be in the form of infiltration wells or dams. To estimate the amount of infiltration, the volume of rainwater must first be calculated. What is the rain pattern and how much rainfall volume, how wide is the built-up area, and how many artificial infiltration wells are needed in the area?

Flood

Some of the rainwater that falls on the earth's surface absorbs, some evaporates, and some flows as run-off. According to Seyhan (1977), factors that influence the size of the output flow in a watershed are climatic factors, basic watershed factors such as topography, soil, geology and geomorphology, as well as land use factors. These three factors are what result in an area frequently flooding or not flooding. In hydrology there is a special study of flood routing. According to Lawler in Harto, Sri (1993), flood tracking is interpreted as a procedure for determining the time and magnitude of flooding in a river based on river data upstream. Generally, the search is based on the relationship between water level and storage (stage storage), or the relationship between discharge and storage (discharge storage). Therefore, discharge data with a return period is needed to estimate the magnitude of the flood (Suyono Sosrodarsono, 1984).

To predict the amount of discharge, rainfall data with its return period is also needed. Based on the flood investigation, we actually only consider one factor, namely climatic. Other factors are basic factors that are very likely not to change. Topography, soil, rocks, landforms are unlikely to change. For the third factor, namely land use, which is very likely to change. Therefore, of the three influencing factors, the climatic and land use factors are the most influential. The factor that is still very likely to be engineered is land use, although the climate in certain cases, such as diverting rain, can already be controlled.

Changes in land use in the study of the hydrological balance of a watershed are very influential. The wider the built-up area, the narrower the absorption space. The narrower the infiltration space, the deeper the groundwater surface. The wider the built-up area, the higher the river flood flow (Purwantara, Suhadi, 2019).

Most of the watersheds that pass through DKI Jakarta have become built-up areas. Built-up areas, both in the downstream, middle and even some upstream areas, have changed their function, the majority have become built-up areas. Changing the area to built-up land results in the loss of its function as a rainwater catchment area (recharge area). To restore the function of the area as a catchment area, it can be engineered by building an artificial catchment area. Artificial infiltration can be in the form of infiltration wells, reservoirs, embungs, even biopores. The artificial infiltration with the highest use value for infiltration is the absorption well. The size of the infiltration well can be predicted based on rainfall and permeability. Based on the area of the built-up area, permeability and rainfall, the number of infiltration wells that should be in the river basins that pass through DKI Jakarta can be calculated.

Framework of Thought

A river basin that catches rain is bounded by watershed boundaries in the form of high surface ridges. A normal watershed has a hydrological balance of rain which is caught and then some of it is infiltrated, some of it flows into surface runoff, and some of it is retained in vegetation and some of it evaporates. Under normal conditions, rainwater flows until it is collected in rivers, ponds, lakes, and finally into the sea. Problems will arise if the absorption space is disturbed, the drainage space is reduced, the storage space is reduced.

A reduction in the function of space can occur if a watershed that was previously used for rainwater absorption changes its function to buildings that cannot absorb water, such as residential areas, office buildings, business centers, etc. Likewise, the drainage space which was previously sufficient was reduced because the width of the river was reduced due to people building riverside settlements, or the river bed became shallow due to excessive sedimentation due to massive erosion in the upstream area due to deforestation or changing land that was previously forest or homestead. Likewise, water reservoirs such as ponds and lakes in many locations are also experiencing a reduction in space.

Reduced absorption space, drying space, storage space, with rainfall of the same thickness will result in flooding.

There are many ways to avoid flooding. Ways to avoid flooding include creating artificial catchments to replace natural catchments, and returning the drainage function to its original condition, building artificial reservoirs to replace natural reservoirs. The problem is that not all soil has good absorption. Clay soil has slow infiltration. For this reason, there needs to be other alternatives to avoid flooding, for example building larger drainage, larger water reservoirs, and planting trees that have deep enough roots to be able to withstand rainwater.

Research Methods

This research is a type of explanatory research. The aim is to obtain an overview of the physiographic conditions of the Jakarta area and its surroundings. To achieve this goal is done by interpreting satellite imagery, collecting secondary data. To achieve this goal, data on the shape, area of the watershed, topography, land use and soil type of the watershed are needed.

Furthermore, to obtain the second research objective, an overview of the pattern and amount of rainfall in the watersheds of the research area, was carried out by collecting rainfall data, then analyzing rainfall patterns, and predicting the amount of rain in several return periods.

To answer the third research objective, namely the size of the built area, this was carried out using satellite image interpretation. The first step is to map the area of the watershed. Then, with the help of satellite imagery, the area of built-up land is interpreted. The result is a map of the built-up area and its area figures.

Furthermore, to answer the fourth research objective, estimating the number of infiltration wells that should be built to reduce flooding in Jakarta, the area size that allows artificial infiltration to be built is first analyzed. After that, look for a map of soil type, depth of groundwater level. Areas where it is possible to build artificial catchments are estimated on average for every 100 m^2, one artificial catchment well multiplied by the area of a very effective catchment area.

2. Research Results And Discussion

1. Location, Area and Boundaries

This research was carried out in the DKI Jakarta River Watershed (DAS) unit. The research area is a combination of several watersheds, namely the Angke Watershed, Krukut Watershed, Buaran Watershed, Cakung Watershed, Sunter Watershed, and Ciliwung Watershed. Administratively, the research area is located in 12 districts and cities in three provinces, namely Banten Province, DKI Jakarta and West Java. Most of the research areas cover the entire DKI Jakarta area, namely West Jakarta, Central Jakarta, North Jakarta, East Jakarta and South Jakarta. The research area also covers a small part of Banten Province, namely Tangerang City and South Tangerang City, as well as West Java Province in Bogor Regency, Bogor City, Bekasi Regency and Bekasi City.

Physiographically, the research area is included in the Jakarta Coastal Plain Zone and the Bogor Zone as compiled by Van Bemmelen (1949). The morphology of the Jakarta Coastal Plain Zone is generally flat and dominated by river sediment cover, and partly by young volcanic lava. To the south of the Jakarta Coastal Plain Zone is the Bogor Zone which has a hilly morphology. This zone is a folded hill area formed from tertiary sedimentary rocks which form an anticlinorium.

2. Geological Conditions

The research area has geological conditions that are dominated by alluvial deposits and alluvial fan extrusions. Overall, the research area is composed of Banten Tuff, Alluvium, Alluvium Fan, Coastal Pematang Deposits, Young Volcanic Rocks, Volcanic Breccia, G. Kencana and Mt. Limo Breccia and Lava, Old Volcanic Rock Deposits, Bojongmanik Formation and Serpong Formation. Alluvium deposits are often found in the northern part of the study area and a small part is composed of Pematang Coastal Deposits. The geological composition in the central part of the study area is dominated by Alluvium Fans and Alluvium Deposits which spread following river flow patterns. In the south, the study area is composed of mostly Old Volcanic Rock and Breccia Deposits as well as Mount Kencana and Mount Limo Lava. Apart from that, young volcanic rocks were also found in a small part of the southern research area.

In the eastern part of the research area, precisely in the Angke watershed, it is composed of Banten Tuff, Alluvium Fan in most of the area, Alluvium in the northern part and a small part of the Pematang Coastal Deposit. The Banten Tuff is a formation composed of tuff rock, pumice breccia, and tuff rock which is estimated to be of Early Pleistocene age with the characteristics of the rocks that make up this formation containing components of pumice, feldspar, mica, and mafic minerals (Rusmana et al., 1991). In the Serang Geological Sheet, Rusmana et al, (1991) added that in some areas the Banten Tuff deposits can have a thickness of more than 200 meters.

In general, the surface deposits of the northern research area (DKI Jakarta) generally consist of three rock units that dominate the geological structure in the area, namely Alluvium, Pematang Pantai Deposits and Alluvium Fans. The Alluvium Rock Unit consists of a mixture of clay, sand, gravel, gravel and consolidated boulders (Purnomo & Grahitandaru, 1998). Furthermore, Purnomo & Grahitandaru (1998) also explained that the Pematang Beach deposits consist of fine to coarse sand and based on the morphological appearance and constituent rocks, this unit is thought to have been formed due to wind deposits which formed sand dunes. Purnomo & Grahitandaru (1998) also explained that the Alluvium Fan is a rock unit consisting of fine tuff, conglomerate tuff, sandy tuff and pumice tuff whose formation originates from young volcanic rocks in the Bogor Highlands which are then deposited in the terrestrial environment and form a fan morphology (spread). This Alluvium Fan Unit is estimated to be approximately 300 meters deep and is Late Pleistocene or younger.

Apart from that, the Angke Watershed is also composed of a small portion of Volcanic Breccia in the middle part, the Serpong Formation, the Bojongmanik Formation and Young Volcanic Rocks in the southern part of the watershed. The Serpong Formation is composed of interbedded conglomerates, sandstones, siltstones, mudstones with plant remains, pumice conglomerates and pumice tuffs. The Bojongmanik Formation is composed of interbedded sandstone and mudstone with limestone inserts whose thickness is estimated at 1,000 m (Martodjojo, 2003).

Similar to the Angke watershed, the Krukut watershed and the Ciliwung watershed are also dominated by alluvium deposits which spread following river flow patterns, alluvium fans and a small portion of Pematang Coastal deposits. Apart from that, the Ciliwung watershed is also composed of young volcanic rocks, Serpong formation, old volcanic rock deposits, volcanic breccias, as well as breccias and lava from Mount Kencana and Mount Limo. Breccia and Laba of Mount Kencana and Mount Limo consist of andesite chunks and andesite breccia with lots of pyroxene phenocrysts and basalt lava (Effenfdi, 1998). In the eastern part of the research area there are the Sunter Watershed, Buaran Watershed, and Cakung Watershed which are composed of Alluvium and Alluvium Fan deposits in most of the area. Apart from that, there are also Pematang Pantai deposits in the northern part which are distributed unevenly.

3. Soil Type

The majority of soil types in Jakarta are clay. Types of clay sand and sandy loam soils formed from river and beach deposits, clay sand soils formed from beach embankment deposits, sandy loam and silty sand formed from flood deposits, and silty clay and sandy silt soil types. Thus, based on this type of soil, the research area generally has a slow infiltration rate. Based on research by Yusril Ihsa et al, 2022, Cipayung, eastern Jakarta is dominated by soil types with an average infiltration rate of 1 cm/hour. This research took samples at 15 points, the results of which were the fastest infiltration rate of 2.0 cm/hour, 13 points with an infiltration rate of 1-2 cm/hour, and only 2 points with an infiltration rate of 0.4 cm/hour.

4. Climatic Conditions

Rainfall

Rainfall data in the Cakung Watershed, Buaran Watershed and Sunter Watershed as in the Rainfall Table is always high in the 1984-1993 period, 1994-2003, 2004-2013 and 2014-2023. High rainfall has occurred since the beginning of the year, since January, February, March and April. Likewise at the end of the year in November and December. The lowest rainfall occurs in the months of June, July, August and September.

This also happened in the Ciliwung watershed. For two other watersheds, namely the Krukut Watershed and the Angke Watershed, there is a slight deviation in the amount of rainfall in the season

which is supposed to be dry, namely in June-September, the amount of rainfall is relatively high at above 100 mm.

5. Hydrological Conditions

The Special Capital Region of Jakarta is traversed by six watersheds. The six watersheds include the Angke Pesanggrahan watershed with an area of 49317 ha, the Krukut watershed with an area of 22656 ha, the Ciliwung watershed with an area of 39097 ha, the Sunter watershed with an area of 18621 ha, the Buaran watershed with an area of 8100 ha, the Cakung watershed with an area of 14911 ha. The six watersheds have an area of 108,316 ha, or 1083.16 km². The area of DKI Jakarta through which the six watersheds pass is 661.52 km². Based on the interpretation results, the DKI area that has become built-up land in 2020 covers an area of 404.98 km², or 61.22%.

Ciliwung Watershed

Among the six watersheds, the largest and longest is the Ciliwung watershed with 39,097 ha or 390.97 km², with a river length of 82 km. The Ciliwung watershed originates on the slopes of Mount Pangrango, is a watershed that has the longest river that originates in DKI Jakarta. In 2010, more than half of the Ciliwung watershed area became a residential area. Based on interpretation results using Sentinel 2 Satellite Imagery in 2020, the residential area covers 5,556 hectares, industrial and government areas cover 453.28 ha, and other built-up land such as roads and sports facilities cover 9,200 ha. Total built-up land is 152.09 km² or 38.90%. Densely settled areas lie in the downstream area, namely in DKI Jakarta, while areas with few settlements are located in the upstream area of the Ciliwung river which is located on the slopes of Mount Pangrango.

Krukut watershed

The Krukut watershed has an area of 22,656 hectares or 226.56 km², with a river length of around 40 km, with its headwaters in the Depok area. Settlements in this watershed are also very dense. Based on interpretations based on 2020 satellite imagery, the residential area covers 4709.8139 ha or 47.09 km², the industrial and government area covers 4.35 km², and other built-up land such as roads and sports facilities, covers 79.36 km². The total built-up land covers 130.82 km² or 57.74%.

Sunter Watershed

The Sunter watershed is to the east of the Ciliwung watershed. The Sunter watershed area is 18,621 hectares or 186.21 km², with a river length of 41 km, with its headwaters in the Depok area. The area of the built-up area, which consists of residential areas covering 3772 ha, industrial and government areas covering 398 ha, as well as other built-up land such as roads, sports facilities covering 6228 ha so that the built-up area covers 163.98 km² or 88.06% .

Angke Pesanggrahan Watershed

The Angke Pesanggrahan watershed stretches across the western part of DKI, Tanggerang and Depok. The area of the Angke Pesanggrahan watershed is 493.17 km². The area of the built-up area, in the form of settlements covering an area of 9051 ha or 90.51 km², the area of industrial and government areas covering an area of 813 ha or 8.13 km², as well as other built-up land such as roads, sports facilities covers 14898 ha or 148.98 km², so the area Built area covers 247.62 km² or 50.21%.

Buaran Watershed

The Buaran watershed has an area of 8,100 hectares or 81.00 km², with a river length of around 26 km, with its headwaters in the Depok area. Settlements in this watershed are also very dense. Based on interpretations based on 2020 satellite imagery, the residential area covers 1629 ha or 16.29 km², the industrial and government area covers 158 ha or 1.58 km², and other built-up land such as roads covers 3706 ha or 37.06 km². Total built-up land is 54.93 km² or 67.81%.

Cakung Watershed

The Cakung watershed stretches across eastern DKI and Bekasi. The Cakung watershed has an area of 14,911 hectares or 149.11 km², with a river length of around 29 km, with its headwaters in the Bekasi area. Settlements in this watershed are also very dense. Based on interpretations based on 2020

satellite imagery, the residential area covers 2,548 ha or 25.48 km², the industrial and government area covers 282 ha or 2.82 km², and other built-up land such as roads and sports facilities covers 4,946 ha or 49.46 km² . Total built-up land is 77.75 km² or 52.14%.

Based on interpretation, data shows that the built-up land in the six watersheds that pass through DKI Jakarta is 767.21 km², while the built-up land specifically in DKI is 600.37 km². This means that there is an area of 362.23 km² of built-up land stretching across the Depok, Bekasi and Tanggerang areas which are crossed by these six watersheds. The area of the six watersheds is 1,527.02 km². In relation to the absorption well estimate, the subsequent calculations are based on the DKI area and outside DKI.

6. Jakarta floods

Based on records of flood events in Jakarta sourced from Tempo magazine (tempo.co), a major flood event occurred in 1918 during the reign of the Dutch East Indies, for 22 days in January and February. The next major flood occurred on January 9 – 20 1979 with 71 thousand people displaced and 20 people missing. Next, on 9 - 11 February 1996, 30 thousand people were displaced and 20 people died. The next major floods occurred in the 2000s, namely from 27 January to 1 February 2002, 1 February 2007, 15 - 21 January 20013, January 2014, 9 February 2015, 5-15 February 2015, and 1 January 2020.

7. Flood Mitigation Directions

Various efforts to prevent flooding in Jakarta have been attempted since the New Order era. Among other things, by building several canals. However, these efforts have not been able to solve Jakarta's flooding problem. Another effort that some have made is building infiltration wells. It should be noted that infiltration wells can indeed be effective in reducing flooding problems provided the soil is not watertight, but most of the Jakarta area is clay soil which has aquicluded properties or is difficult for water to pass through. Another effort is to build river weirs in the upstream areas, so that river water originating from the slopes of Mount Salak, Bogor and its surroundings can be controlled, at least temporarily confined upstream.

a. Recharge wells

The construction of recharge wells in the DKI Jakarta area is needed to balance the built-up land covering an area of 600.37 km², while the built-up area outside DKI covers 41,741 ha, or 417.41 km². Infiltration wells are effective for areas that have porous soil, sand, at least with sufficient permeability, or sufficient infiltration, above 1 cm per hour. The area of Jakarta that has the possibility of being a catchment area is the southern part, because the groundwater level is relatively deep, above 10 meters. The Central region also still meets the requirements because the groundwater level is 5 meters to 10 meters. The northern region, which is a downstream area, does not qualify as an absorption area, because the groundwater level is too shallow, and sea tides often occur. A rough calculation shows that the land that allows artificial catchment to be built reaches 50% of Jakarta's area, around 330 km². Assuming that every 100 m² needs one infiltration well, the number of infiltration wells that should be built in DKI Jakarta is estimated at 3.3 million units, while outside DKI it is 4 million units of recharge wells. If the construction of an recharge well requires IDR 3 million, then in DKI it requires IDR 9.9 trillion, while outside DKI it requires IDR 12 trillion. This estimate is if there are no infiltration wells, reservoirs or *embungs* at all. In fact, although very few artificial catchments have been built, the DKI government claims to have built less than 20,000 units. The problem is how many artificial catchments, especially recharge wells, do the community own? Another thing that must be considered is that the type of clay soil in the research area is not effective at absorbing rainwater, it only reduces it.

b. Dam

Apart from being used for irrigation and agricultural purposes, dams or reservoirs and other water reservoirs are used to reduce the flow of water passing through rivers, especially if the dam is built with the capacity to handle excess water during the rainy season. At least, dams can slightly prevent flooding. This technology has been successfully applied by the Mount Morris and Seven Oaks dams in the United States. In Jakarta's flood conditions, the Katulampa dam in Bogor, West Java was used as a benchmark for predicting the overflow of water that would come to Jakarta. Apart from Katulampa, there are currently 231 dams recorded in various regions in Indonesia (PUPR Ministry data as of May 2021).

3. Conclusion

The conclusions of this research are:

1. Jakarta is crossed by 6 watersheds, including the Angke Pesanggrahan watershed, 49317 ha, the Krukut watershed 22656 ha, the Ciliwung watershed 39097 ha, the Sunter watershed 18621 ha, the Buaran watershed 8100 ha, the Cakung watershed 14911 ha. The six watersheds have an area of 108,316 ha.
2. The rainfall pattern is almost even, in 6 watersheds, while the wet months occur from October to April, the rest of the months are humid.
3. Built-up land in 2024 covers an area of 600.37 km², or 91.8%.
4. The land that allows artificial catchment to be built reaches 50% of the area of Jakarta, around 330 km². The number of infiltration wells that should be built in Jakarta is estimated at 3.3 million infiltration wells. If the construction of an infiltration well requires Rp. 3 million, then in Jakarta IDR 9.9 trillion is needed.

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Improving the Productivity and Efficiency of Moringa MSMEs using Moringa Leaf Grinding Machine

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Abstract

This community service activity was motivated by the challenges faced by Kelorida MSMEs in increasing the productivity and efficiency of moringa leaf flour production, considering that previously, production was carried out manually with a blender that could only produce 2 kg of flour per day. This limitation hinders Kelorida MSMEs from meeting the increasing market demand. This community service activity aims to evaluate the impact of using a moringa leaf flour machine on increasing productivity and operational efficiency in Kelorida MSMEs. The method used is a case study with steps including problem identification, selection and implementation of a new flour machine, and measuring productivity before and after using the machine. The activity results showed that after the implementation of the flour machine, production capacity increased significantly to 15 kg per day, with more consistent flour quality and following food grade standards. This activity concludes that using a moringa leaf flour machine has proven effective in increasing the productivity and efficiency of Kelorida MSMEs, as well as opening up opportunities for product diversification and wider market expansion. This technology is crucial in driving business growth and sustainability in the MSME sector.

Keywords: Moringa leaves; Flour machine; Food grade; Productivity

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) are important in the Indonesian economy [1]. MSMEs are the driving force of economic growth and the foundation for creating jobs and reducing poverty. Among the various types of MSMEs that exist, businesses in the field of agricultural product processing have great potential to grow, along with Indonesia's abundant natural wealth. One of the businesses in this field that has shown rapid development is the production of moringa flour [2]. Moringa leaf flour is becoming more widely recognized due to its high nutritional content [3]. Moringa leaves, known scientifically as Moringa oleifera, contain various vitamins, minerals, and antioxidants beneficial for health, such as vitamin C, vitamin A, calcium, and iron [4-7]. Due to its abundant benefits, demand for moringa-based products continues to increase in domestic and international markets. These products are used as food supplements and as ingredients in the cosmetic, pharmaceutical, and animal feed industries.

However, this high market demand poses challenges for MSME players. To meet the increasing demand, MSMEs must be able to produce moringa flour in large quantities with consistent quality [8]. This is where efficiency in the production process becomes very important. Without good efficiency, MSMEs will find it difficult to meet market standards and compete with other producers who may already use more sophisticated technology.

One of the MSMEs focusing on moringa processing is Kelorida MSME, a center for producing food products made from moringa flour, the only one in the Special Region of Yogyakarta Province. UMKM Kelorida is located in the Trirenggo sub-district, Kapanewon Bantul, Bantul Regency, Yogyakarta Special Region. The food products produced by Kelorida MSMEs include Moringa Flour, Moringa Mask, Moringa Tea Dip, Ketor Noodles, Moringa Tea Tubruk, Moringa Chocolate Cookies, Moringa Chocolate, and Moringa Powder Herbal Capsules [9]. This MSME involves at least 10 workers in producing flour and processed food.

Kelorida has abundant moringa, but the current technology is still reasonably ineffective. The moringa-based flour production process still relies on manual blenders and sieves, which causes the process to be useless and not optimal. As a solution to increase the capacity and productivity of partner businesses, the main focus of this goal and program is Kelorida MSMEs. By involving Kelorida MSMEs in this program, it is hoped that technological updates and more effective equipment in the moringa flour production process can be carried out. Using more sophisticated and efficient moringa flour machines can help increase production capacity and improve the quality and efficiency of moringa flour production.

Kelorida has successfully utilized social media platforms such as Instagram, Facebook, Google Business, and WhatsApp to expand its marketing reach. In addition, they are active in marketplaces such as Shopee and Tokopedia, and collaborate with mass media to increase exposure and branding [10]. Regarding marketing and branding, Kelorida managed to overcome the challenges well. They also demonstrated good financial management capabilities, following their capacity and future targets showing a strong commitment to developing the business.

The main problem of Kelorida MSMEs is related to moringa flour machines that do not meet food-grade standards and rust quickly, making them unsafe for moringa flour production [11]. Old machines that use gasoline motors are also fuel-intensive and polluting. As a result, production switched to a food-grade blender, but its capacity is limited, producing less than 2 kg of moringa flour daily while market demand exceeds 5 kg. Although the supply of moringa leaves is sufficient, production capacity remains a significant constraint.

Thus, the challenge faced by Kelorida MSMEs is to increase capacity and productivity in the moringa flour milling process to meet high market demand. In addition, Kelorida MSMEs also need to pay attention to the safety and quality aspects of raw materials, as well as operational efficiency in using the new flour machine. In addition, this program also aims to provide training to the Kelorida MSME workforce in the use of new technology, as well as the preparation of appropriate SOPs for an effective and efficient production process. Thus, Kelorida MSMEs can improve their competitiveness in the market, increase their income, and provide greater economic benefits to the local community.

2. Method

This research used a case study approach at Kelorida MSME, which aims to evaluate and improve productivity using more efficient moringa leaf press technology. The case study approach was chosen because it allows researchers to conduct an in-depth analysis of the real situation faced by Kelorida MSMEs, as well as to identify and understand the challenges and the most effective solutions in that context.

The first step in this research was to identify the main problems faced by Kelorida MSMEs related to the moringa leaf flour production process. The researcher thoroughly examined the problems that arose from using the old flour machine, which was made of non-food grade carbon iron and was prone to rust. This issue impacts not only product quality but also food safety, which is a critical factor in the food industry. In addition, the old flooring machines that used gasoline motor drives proved inefficient in fuel usage and produced high levels of air pollution, noise and vibration. Although food-grade safe, the blender used as a temporary alternative had a limited capacity that could not meet the growing market demand. Identifying this problem formed the basis for the next steps in the research.

After identifying the problem, the next step was to select a new flouring machine that could overcome the existing limitations. The selection of this machine was done by considering several main criteria, namely:

1. Compliance with Food Grade Standards: The machine must be made of materials safe for contact with foodstuffs, thus ensuring the safety of the moringa flour product produced.
2. Fuel Efficiency: The new machine is expected to be more energy efficient than the old machine that uses a gasoline motor, which is not only wasteful but also not environmentally friendly.
3. Pollution Level: The selected machine should have low levels of air, noise, and vibration pollution, to create a better working environment and meet applicable environmental standards.
4. Production Capacity: The new machine should be able to significantly increase production capacity to meet market demand, which a blender cannot achieve.

The selection process involved assessing the available machine models, focusing on technical specifications, efficiency and long-term running costs. The choice of machine ultimately fell on a model that met all these criteria and was supported by adequate after-sales service.

Once the new flouring machine was selected, the next step was to implement the machine in the daily production process at Kelorida MSME. This process began with replacing the old machine with the new one, which involved rearranging the production layout to accommodate the larger and more sophisticated machine. Workers were trained to ensure they could operate and maintain the new machines properly. The implementation also included work process adjustments to maximize production efficiency and initial monitoring of the machine's performance during the first few weeks of use.

Productivity measurements were conducted to evaluate the new pressing machine's impact on production performance at Kelorida MSMEs. This measurement involved a comparison between the conditions before and after the implementation of the new machine, with several key indicators:

a. Production Capacity: The amount of moringa leaf flour that can be produced daily, before and after using the new machine.
b. Product Quality: The consistency and quality standard of the flour produced, including the fineness and cleanliness of the product.
c. Operational Costs: Daily expenditure on fuel, electricity, and machine maintenance, as well as labor costs.
d. Production Time: Time efficiency in each production stage, from raw material processing to final product.

The data from these measurements was then analyzed to determine whether the new machine significantly improved productivity, efficiency, and product quality.

The final stage of the study was analyzing the data collected during the measurement period. The data was analyzed using quantitative and qualitative methods to get a clear picture of the impact of using the new pressing machine on the productivity of Kelorida MSMEs. This analysis includes calculations of increased production capacity, reduced operational costs, and improved product quality. In addition, a qualitative study was conducted by interviewing workers and MSME management to get their perspective on the changes.

3. Results and Discussion

The implementation of community service activities at Kelorida MSMEs was carried out on August 7, 2024. This activity involves active collaboration between students, lecturers, and Kelorida MSME players to increase business efficiency and productivity. On that day, the community service team, consisting of students and lecturers, acted as facilitators in operating the new moringa leaf flour machine. Before starting the operation, a brief training session was conducted to ensure that all participants understood the standard operating procedures, including the safety and maintenance aspects of the machine. This activity focuses on technical aspects and prioritizes community empowerment through knowledge and skills transfer. The students and lecturers assisted Kelorida MSME players in optimizing the use of the flouring machine, starting from the raw material input process to the packaging of the final product. They also provided tips on routine machine maintenance so that it can be used optimally in the long run.

This moringa leaf pressing machine is designed with compact dimensions of 80 x 50 x 100 cm, as shown in Figure 1, so it can be placed easily in various production rooms with limited and larger areas. Weighing about 30 kg, the machine is still relatively light and can be moved if needed, although its stability is maintained during operation. The machine can shearing moringa leaves with a production capacity of about 50 kg per hour, a significant capacity for MSMEs. This capacity allows for a considerable increase in production, meeting the challenges of the growing market demand. The efficiency of this machine in pressing moringa leaves is one of the main advantages that provide added value to its users, especially in the herbal or health food product processing industry.



Figure 1. Moringa Leaf Flouring Machine

Table 1. Specification of moringa leaf flouring machine

No.	Description	Specification
1.	Machine Name	Moringa leaf flouring machine
2.	Dimensions	80 x 50 x 100 cm
3.	Capacity	50 kg/hour
4.	Weight	30 kg
5.	Sieve size	0.8 mm
6.	Rational speed	5800 rpm
7.	Motor power	5.5 Hp

This flouring machine has a 0,8mm sieve inside, ensuring the moringa flour has a fine and uniform texture. This sieve size has been customized to produce optimal-quality flour, which is important in maintaining the standard of the final product, especially if the flour is used in the food or cosmetics industry. To support optimal flouring performance, the machine uses a COSMEC CX-160RX drive motor with a power of 5.5 HP. This motor is known for its reliability and energy efficiency, which makes it an ideal choice for small industrial machines such as the moringa flour mill. The 5.5 HP power provides enough power to run the flouring process continuously without experiencing performance degradation. In addition, the COSMEC motor is designed to be durable and easy to maintain, reducing operational costs in the long run. Table 1 shows the specifications of the moringa leaf pressing machine.



Figure 2. Operation of moringa leaf machine



Figure 3. Operation of moringa leaf machine

Furthermore, the lecturers provided comprehensive training to Kelorida MSME players on the operation of the moringa leaf flour machine, shown in Figure 2 and Figure 3. This training not only focused on the basic steps in operating the machine but also included an in-depth understanding of the working principles of the machine so that MSME players could optimize its performance. In this session, the lecturer explained how to turn on and off the machine properly, set the operating speed, and ensure that the sieve and other components work optimally to produce fine, high-quality moringa flour. Not only that, the lecturers also emphasized the importance of safety when using the machine. They provide guidance on safety procedures that must be followed, such as using personal protective equipment (PPE) when operating the machine, maintaining the work area's cleanliness, and handling emergency situations in case of breakdowns or technical problems. Thus, Kelorida MSME players can operate this machine safely and efficiently, minimizing the risk of work accidents.

In addition to operation, machine maintenance is one of the main focuses of this training. The lecturers explained how to maintain the moringa flour machine to keep it durable and functioning well in the long run. They provided instructions on machine cleaning routines, including how to clean the sieve and other components after use to prevent residue buildup that could interfere with machine performance. Lecturers also provide guidance on routine maintenance, such as lubricating moving parts of the machine, checking the condition of the drive motor, and periodically checking electrical connections and cables to ensure no damage could cause operational disruption. They also emphasized the importance of recording every maintenance activity in the machine maintenance logbook so that every maintenance action can be monitored and followed appropriately.



Figure 4. Dried Moringa leaves



Figure 5. Moringa leaf flour

Before entering the crushing stage, moringa leaves go through a drying process until they reach the optimal dryness level. This drying process is done carefully to ensure the leaves retain their nutritional content and quality. As shown in Figure 4, moringa leaves are dried in a place protected from direct sunlight. This is done to avoid damage to the leaf pigments and nutrients due to excessive heat. Drying is done in a well-ventilated room or under a shade that allows sufficient airflow so the drying process can occur evenly without reducing the quality of the leaves.

Drying time varies depending on weather conditions and environmental humidity but generally takes a few hours to a few days. During this process, moringa leaves are stirred or turned periodically to ensure the entire leaf surface dries evenly. This careful handling is important to avoid mold or bacterial growth if the leaves are not fully dried before further processing. Once the moringa leaves have reached the desired dryness level, when the leaves crumble easily when squeezed, the next stage is processing into flour. These dried moringa leaves are then fed into a flouring machine, as shown in Figure 5. The flouring machine crushes and pulverizes the moringa leaves into fine particles, which are then sieved to ensure a consistent size. This process not only changes the physical form of the leaves into flour but also maintains the stability of the nutrients in them so that the moringa flour produced remains rich in health benefits.



Figure 6. Processed Moringa leaf flour

Moringa leaf flour produced by Kelorida MSMEs is a very versatile basic ingredient with the potential to be processed into various high-value food and health products. After a grinding process, this moringa flour is processed into various products that have become the mainstay of Kelorida MSMEs, such as antioxidant-rich moringa tea, delicious and healthy moringa crackers, highly nutritious moringa noodles, moringa chocolate that offers a unique combination of flavor and health benefits, and moringa capsules that are practically consumed as a daily supplement. Figure 6 displays the various processed moringa products from Kelorida MSMEs, which have received a positive response from consumers thanks to their well-known health benefits.

After Kelorida MSME started using the new moringa flour machine, their productivity increased significantly. Previously, when relying on manual blenders, Kelorida MSMEs could only produce around 2 kg of moringa flour daily. This amount was minimal and often unable to meet the increasing market demand. This limitation also restricted their ability to develop more processed products. However, after implementing the new flouring machine, the productivity of Kelorida MSMEs increased drastically to reach 15 kg of moringa flour per day. This increase in productivity allows them to meet

existing demand and opens up opportunities for business expansion. With greater production capacity, Kelorida MSMEs can now produce more moringa products in larger quantities, significantly increasing their income.

This increase in productivity also has a positive impact on operational efficiency. With a more advanced flouring machine, the production process is faster and requires less manual labor, which translates to time and cost savings. In addition, the machine enables Kelorida MSMEs to maintain consistent flour quality, which is crucial to ensure that all processed products produced meet the quality standards expected by consumers.

4. Conclusion

The implementation of the moringa leaf flour machine in Kelorida MSME has had a significant impact on increasing productivity and operational efficiency. By switching from the limited use of manual blenders, Kelorida MSMEs can now increase their moringa flour production capacity from only 2 kg to 15 kg per day. This increase allows them to meet the growing market demand and opens up opportunities to develop more value-added processed products, such as tea, crackers, noodles, chocolate, and moringa capsules. In addition to increased capacity, using the flouring machine also ensures more consistent and efficient flour quality, which is a key factor in maintaining consumer satisfaction and product standards. This increase in productivity and efficiency supports Kelorida MSMEs in expanding their market reach, both locally and internationally. It strengthens their position as a major player in the moringa processed products industry. Overall, investing in the right technology, such as moringa flour machines, has proven to be a crucial strategic move for Kelorida MSMEs, driving sustainable business growth and increasing their competitiveness in an increasingly competitive market.

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Pay-per-click Digital Marketing Strategy for Empowering MSMEs in Wukirsari Village, Bantul

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Abstract

The current urbanization phenomenon cannot be separated from the opportunities for rural communities to access jobs. Micro, Medium and Small Enterprises (MSMEs) are a solution for people, especially those living in rural areas, to improve the economy by getting decent jobs. Along the way, MSMEs face several challenges in being able to develop their businesses in addition to empowering rural communities. MSMEs that do not survive sometimes fail to respond to developments by failing to provide innovation, utilize technology, and compete with other competitors. Wukirsari Village, Bantul District is one of the areas that has diverse craft potential, but after the COVID-19 pandemic, several businesses have slumped and need assistance for recovery. The mandatory outputs of this activity are (1) Publication of Scientific Journals in the Panrita Abdi journal: Scientific Journal of Community Service, (2) Collaboration Manuscripts/IA, (3) Community Service Videos, and (4) Community Service Posters. Additional outputs from this output are (1) Publication of Social Media and IPR.

Keywords: Digital Marketing, Pay-Per-Click, MSMEs, Wukirsari Village

1. Introduction

Indonesia has regulated the existence of Small, Micro and Medium Enterprises (MSMEs), namely through Law Number 20 of 2008 concerning Small, Micro and Medium Enterprises (MSMEs). The regulation explains that Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for micro businesses as regulated in this Law. While small businesses are productive economic businesses that stand alone, carried out by individuals, or business entities that are not subsidiaries or branches of companies owned, controlled, or become part of either directly or indirectly of medium-sized businesses or large businesses that meet the small business as referred to in this Law. For medium-sized businesses, it is defined as productive economic businesses that stand alone, carried out by individuals or business entities that are not subsidiaries or branches of companies owned, controlled, or become part of either directly or indirectly with small businesses or large businesses with the amount of net assets or annual sales results as regulated in this Law.

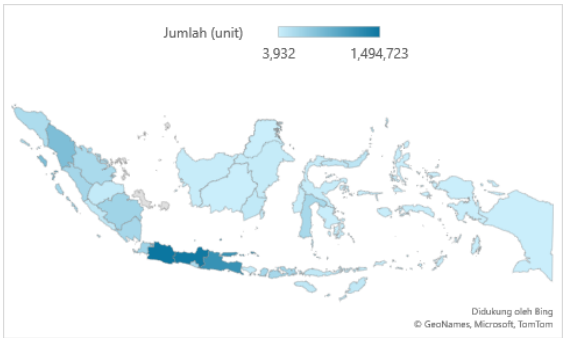


Figure 1. Number of MSMEs in Indonesia

Source: Ministry of Cooperatives, Small and Medium Enterprises, 2022 (processed)

Micro, Small and Medium Enterprises (MSMEs) are increasingly emerging in Indonesia. This is due to the increasingly tight global market competition. Micro, Small and Medium Enterprises (MSMEs) are one of the drivers of the Indonesian economy. The large number of MSMEs reflects the country's increasingly good economy. The development of Micro, Small and Medium Enterprises (MSMEs) can also provide benefits in the form of the availability of jobs that are currently needed by the community. In the long term, the existence of MSMEs can help solve the poverty problem that has hit Indonesia. As stated by Delfina Novianti (2018) that it has been proven that so far, Micro, Small and Medium Enterprises (MSMEs) can accommodate a large number of workers so that the poverty rate can decrease.

Bantul Regency, which is one of the regencies located in the Special Region of Yogyakarta, also has abundant potential for Micro, Small and Medium Enterprises (MSMEs). Micro, Small and Medium Enterprises (MSMEs) in Bantul Regency are growing rapidly, thus encouraging the growth of the community's economy. The rapid development of Micro, Small and Medium Enterprises (MSMEs) is expected to improve community welfare and reduce poverty rates (Sujarweni, 2019). Based on data from the Yogyakarta Special Region Cooperative and MSME Service, the largest distribution of Micro, Small and Medium Enterprises (MSMEs) in the Yogyakarta Special Region Province in 2022 is in Bantul Regency with a percentage of 26%, followed by Gunung Kidul Regency with 22%, then Kulon Progo Regency with 20%, followed by Sleman Regency with 18%, and finally Yogyakarta City with 14% which is the smallest distribution of MSMEs compared to the other four regencies. These data prove that micro, small and medium enterprises (MSMEs) in Bantul Regency are growing very rapidly and their numbers are spread throughout Bantul Regency.

Wukirsari Village located in Imogiri Sub-district, Bantul Regency is one of the villages that has various potentials for Micro, Small and Medium Enterprises (MSMEs). Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village include batik crafts, puppet crafts, knitting crafts, various food preparations, and so on. Micro, Small and Medium Enterprises (MSMEs) have grown quite significantly, but after the Covid-19 pandemic, the existence of Micro, Small and Medium Enterprises (MSMEs) began to decline. This is due to the various obstacles they face.

Common obstacles that usually occur are limited capital, difficulties in marketing and providing raw materials, minimal knowledge about the business world, limited mastery of technology. Other problems that exist such as low quality of human resources (formal education), inability to carry out financial management, and no clear division of tasks and often relying on family members as unpaid workers. These obstacles also occur in MSMEs in Wukirsari Village, but the main obstacle felt is the difficulty in marketing products from Micro, Small and Medium Enterprises (MSMEs). MSMEs in Wukir sari also experience obstacles in limited knowledge about modern marketing techniques, such as digital marketing and market access where MSMEs in Wukirsari Village find it difficult to reach a wider market, both local and export markets.

The majority of Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village market their products in traditional ways. Some market their products by entrusting them to traders or shops. Some market them through word of mouth. Several Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village have marketed using information and communication technology (ICT), but their use is limited to using WhatsApp for marketing. Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village have not fully utilized information and communication technology (ICT) in marketing, such as social media or websites.

The low utilization of information and communication technology (ICT) in marketing Micro, Small and Medium Enterprises (MSMEs) products in Wukirsari Village is because Micro, Small and Medium Enterprises (MSMEs) do not understand the use of information and communication technology (ICT). The absence of direction and assistance in the use of information and communication technology (ICT) in marketing, results in the marketing of MSME products still using traditional methods. In fact, most MSME business actors feel like using information and communication technology (ICT) for marketing so that their products are better known to the public. So that it can increase the profits they get.

Wukirsari Village, located in Imogiri Sub-district, Bantul Regency, is one of the villages where many people are engaged in Micro, Small and Medium Enterprises (MSMEs). Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village operate in various fields, such as food, crafts, and many others. Although there are many, Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village experience various obstacles. The main obstacle or problem for Micro, Small and Medium

Enterprises (MSMEs) in Wukirsari Village is related to marketing products from Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village. Marketing of Micro, Small and Medium Enterprises (MSMEs) products in Wukirsari Village has so far only been traditional, not utilizing advances in information and communication technology (ICT).

Marketing carried out by Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village still does not use digital platforms, such as social media. This is evidenced by the absence of social media from several Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village. This was also directly acknowledged by Micro, Small and Medium Enterprises (MSMEs) in Wukirsari Village. In fact, the use of social media in marketing can increase sales and have an impact on increasing income from the Micro, Small and Medium Enterprises (MSMEs) themselves.

2. Method

Based on Figure 3 *State of The art of* the initial problem, this community service program plans several mentoring activities that include the stages of (i) Planning and public policy for the use of Pay Per Click as a promotional media, (ii) Development of promotional infrastructure, (iii) Recommendations for regulations and standardization of promotional content creation, (iv) Recommendations for forms of promotion and marketing, and (v) Capacity development and empowerment of the Wukirsari Village community and stakeholders who have the potential to support community service this time. The problem-solving framework in this community service activity can be carried out in stages as in the following table (Zhang et al., n.d.).

Table 1. Stages in the problem solving framework

No	Problem Solving Stages	The problem	Solution to problem
1	Planning and public policy on the use *of Pay Per Click* as a promotional medium	There is no planning for using *Pay Per Click* as a promotional tool for the Indrayanti beach tourist area.	Making *Pay Per Click Promotion Media* and planning to make Adsense
2	Promotion infrastructure development	There is no marketing method that is distinctive and integrated in Wukirsari Village	Using the *Pay Per Click marketing method* as a promotional tool
3	Recommendations for regulation and standardization of promotional content creation	There are no regulations that require Wukirsari Village MSMEs to use digital media to promote products in an integrated manner.	Create promotional content creation training on the ones created on the solution
4	Capacity development and empowerment of the Wukirsari Village community and stakeholders	There is no mapping of the skills of Wukirsari Village MSME members in using social media and creating promotional content on digital media.	Training in making interesting videos as content material for Wukirsari Village *Pay Per Click Advertising* .

The benchmarks used as a result of implementing this PKM activity are as follows:

- Advertising with pay per click method
- The displayed advertisement is clicked by potential consumers
- Wukirsari Village UMKM products are sold and purchased by consumers using the pay per click method
- Cooperation Report with the Department of Public Administration
- Detailed structured cooperation plan, including scope, objectives, and responsibilities of each party.
- Realization of activities that have been planned in cooperation, including training, events, and promotional activities.
- Assessment of the results of cooperation, including target achievement, obstacles faced, and suggestions for improving cooperation in the future.
- Event and Festival Documentation
- Video Production Quality

The output targets and achievement indicators will be achieved in four major activities that will be implemented, namely:

- Assistance for UMKM in Wukirsari Village as a partner in utilizing digital media with the pay per click method as a promotional tool for UMKM.
- Assistance for Wukirsari Village MSMEs in creating interesting content to be used as advertisements to attract potential consumers.
- Training for UMKM participants in Wukirsari Village in using digital media.

Evaluation of program implementation and program sustainability in the field after the completion of PkM activities. The implementation and sustainability of the program in the field after the completion of PkM activities can be evaluated from the aspects of implementation, results, finance, and social aspects. Several evaluations of program implementation and sustainability can be seen in table 3.

Table 2. Evaluation of the implementation and sustainability of the program in the field after the completion of the PkM activities.

No	Evaluation Aspects	Evaluation Example
1	Implementation process	Program implementation methods
		Level of community participation in program implementation
		Stakeholder involvement in program implementation
2	Results	The resulting impact
		Program success
		Sustainability of the program
3	Finance	Sources of program funding
		Program financial management
		Program budget realization

The implementation of PkM also has an impact on the development of student recognition potential by directly and intensively involving them in every stage of PkM. This student recognition potential is able to provide basic competency achievements to improve cognitive abilities and practical abilities in the application of science, self-development, skills and expertise of students through active participation in the PkM team and cooperation partners and community empowerment. This is in line with efforts to realize the achievement of UNY's IKU regarding students gaining experience outside the campus through internships, research, village projects, entrepreneurship, and also through teaching activities. Through this IKU, it is hoped that the campus will provide more facilities for students to develop themselves. Not only passive in class but also carrying out learning activities with varied models, and being able to provide qualified skills practically. In accordance with the direction in the implementation of the MBKM curriculum policy, recognition of practical learning that can be converted into a workload of up to a maximum of 20 credits or into additional points in courses supported by proof of a certificate.

3. Results and Discussion

a. Making Pay Per Click Promotion Media and planning to make Adsense

Based on data from the Bantul Cooperatives and UMKM Service, the number of UMKM in Wukirsari in 2023 reached 500 units. Around 30% of them have utilized e-commerce platforms to market their products. The results of a survey conducted in May 2023 showed that the main obstacles faced by UMKM in Wukirsari were the lack of knowledge about digital marketing and limited access to capital. However, after participating in digital marketing training organized by the local government, the average turnover of UMKM increased by 20% in the last three months . This turnover can be increased by using the right promotional media and at affordable prices.

The creation of promotional media has been carried out by involving the service team with several residents of Wukirsari village. The creation of media is indeed focused on the creation by the service team. However, the service team also conducted a survey first related to the needs and characteristics of Wukirsari so that it can be adjusted to the promotional media created. The content included is also adjusted to what has been given by the village, especially from the head of Wukirsari Village.

b. Using the Pay Per Click marketing method as a promotional tool

The use of social media by MSMEs in Wukirsari has increased significantly in the last 5 years. In 2018, only around 20% of MSMEs were active on social media. However, in 2023, that number will increase to 75%. Instagram is the most popular platform, with 60% of MSMEs having an active Instagram account. A case study of 50 MSMEs in Wukirsari showed an average increase in turnover of 30% after participating in digital marketing training. In addition, 80% of respondents stated that the training was very helpful for them in increasing product sales online.

At this stage, the implementation of pay per click marketing is indeed not easy so it requires special assistance and monitoring. At the beginning of the creation of promotional media, the main holder is the service team, then the service team also provides direction to UMKM owners or managers to be able to use this promotional media properly. In its implementation, it is indeed not easy where many UMKM owners are accustomed to traditional methods and unstable networks in Wukirsari Village. For this reason, the service team also carries out periodic monitoring and evaluation.

c. Create promotional content creation training on the ones created on the solution

To improve the knowledge and sustainability of this program, the service team also prepared prospective pay per click media promotion management teams. This management team was selected based on the knowledge and commitment of the candidates to run this program. At the beginning, the service team invited around 60 MSME entrepreneurs in Wukirsari and provided training to create promotional content that could attract more consumers.

d. Training in making interesting videos as content material for Wukirsari Village Pay Per Click Advertising.

The next training conducted is digital marketing training using moving images, namely videos. Participants are given knowledge related to good shooting angles, choosing the right words in promotions, and how to create interesting advertising content or storylines.

e. Potential and Opportunities of Pay Per Click Advertising

Wukirsari itself has a high cultural wealth, which can be used as a selling point for MSME products. This is reflected in the appointment of Wukirsari as one of the cultural villages in Bantul Regency. Another potential is that Wukirsari Village has the availability of local raw materials to support the development of unique and sustainable MSME products. For example, gadung chips, links with raw material providers such as knitting yarn, and so on. Wukirsari Village's opportunities also lie in technological developments and government support. The development of information and communication technology opens up opportunities for MSMEs to market online and reach a wider market. Local governments and various related parties often provide support in the form of training, mentoring, and access to capital for MSMEs.

Based on a survey conducted in 2023, 65% of MSMEs in Wukirsari stated that the main obstacle they face is increasingly tight competition, especially from imported products. In addition, 40% of respondents complained about difficulties in gaining access to capital. Wukirsari, with a population of around 30,000, has great potential in MSME development. There are around 1,500 MSME units spread across various villages, with the handicraft and culinary sectors as the largest contributors. Based on a survey conducted in 2022, the average turnover of MSMEs in Wukirsari is IDR 5,000,000 per month. However, only around 30% of MSMEs have succeeded in penetrating the export market, with the main destination countries being neighboring countries such as Malaysia and Singapore. This is what needs serious attention and requires proper development planning efforts.

f. MSME Development Efforts

Various efforts have been made to develop MSME marketing in Wukirsari. The local government and various institutions often hold training on digital marketing, branding, and product development. Various exhibitions are also held to introduce MSME products to the wider community. Partnerships between MSMEs and various parties, such as hotels, restaurants, and souvenir shops are also carried out. Many MSMEs in Wukirsari have started to utilize e-commerce platforms and social media to market their products. However, there are some whose implementation is less than optimal and return to conventional methods and are less fond of partnering.

4. Conclusion

Marketing of MSMEs in Wukirsari has a very large potential to be developed. With support from various parties and the use of technology, MSMEs in Wukirsari can grow further and contribute to the regional economy. Suggestions for the next activity are (1) building a solid MSME community to support each other and share information, (2) developing technology applications that can help MSMEs in managing their business and marketing, (3) building an effective marketing strategy by utilizing local potential and developing market trends, and conducting a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to identify the strengths, weaknesses, opportunities, and threats faced by MSMEs in Wukirsari. How much of this is also specifically done to be able to map out the MSME development plan in Wukirsari Village appropriately.

Acknowledgement

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E-TAX MODULE AS A SUITABLE MEDIA IN ACCOUNTING LEARNING

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Abstract

Income Tax Reform Law Number 7 of 2021 concerning Harmonization of Tax Regulations was implemented on January 1, 2022. This means that tax material has also undergone changes. This change is not supported by the existence of effective learning media. The use of technology in the world of education can encourage students to think more critically and creatively. The research carried out is research and development, but in writing this article there are restrictions on research procedures to product feasibility tests. The media feasibility test is carried out through validation to material, language, media, and practitioners experts, initial feasibility tests and broad feasibility tests.The media feasibility test consists of material, media, language and practitioner validation tests involving various experts in their respective fields. Based on the validation results of experts (material experts, media experts, language experts and practitioner experts), the ETM teaching material media (E-Tax Module) was declared valid and suitable for use as a Taxation learning media. Apart from assessments from experts, the ETM (E-Tax Module) teaching material media was tested on students which included limited trials and extensive trials. The results of limited trials and extensive trials stated that the ETM (E-Tax Module) media was declared valid and suitable as a tax learning medium. So based on these two assessments it can be concluded that the ETM (E-Tax Module) media is declared valid and appropriate as a Taxation learning media.

Keywords: *E-Tax Module, Learning Media, Interactive Learning Media, E-Module, Accounting Education*

1. Introduction

The reform of income tax through Law No. 7 of 2021 on the Harmonization of Tax Regulations was implemented on January 1, 2022. There are four new policies: taxation on employee benefits, changes in individual income tax rates and brackets, incentives for micro and small businesses, and taxpayer participation in the voluntary disclosure program. These changes in tax regulations are related to the learning material covered in the Taxation course. The Tax course is one of the subjects taken by accounting students at UNY. The most crucial aspect of the learning process is achieving learning objectives. Many factors influence the achievement of learning objectives, including teachers, students, the environment, methods and techniques, and learning media [1]. Learning media is essential in enhancing the quality of education[2]. It can help make concepts concrete, thereby increasing student motivation and improving the quality of learning to achieve educational goals[3].

Based on observations, the Taxation course requires learning media that contain the latest tax regulations, as there is currently no educational material addressing the most recent tax regulations. Textbooks on taxation have not released updated editions on these new regulations. Consequently, students face difficulties in studying taxation under the new rules that have been applied since the beginning of 2022.

The utilization of technology in education can encourage students to think more critically and creatively[4]. Learning media is very beneficial for both teachers and students, as it makes the learning process more engaging, interactive, and accessible for students anywhere and anytime[5]. One supportive medium for taxation learning is the e-module. E-modules support the learning of Applied Accounting students, whether in online, offline, or blended learning environments. An e-module is a modification of conventional modules, integrating the use of information technology to create more engaging and interactive content by adding multimedia features[6].

As a teaching resource, the e-module can help students learn independently, using communicative and interactive language that facilitates their understanding of the material. Learning that employs e-modules can enhance students' creativity[7]. The e-module to be developed will be based on the case

method. The subject matter of taxation is well-suited for the case method approach, as there are many cases and issues to address. Case-based learning involves solving problems or cases, which enhances critical thinking, communication skills, collaboration, and creativity[8]. This method can improve critical thinking skills necessary for resolving various tax calculation issues and aligns with the Key Performance Indicators (KPI) of higher education institutions in implementing case-based learning.

The e-module will be developed using the Canva application. Canva is a software tool for creating digital books, offering comprehensive features compared to other applications, and its prototypes are lightweight, user-friendly, and compatible with all types of devices. The Canva application can create e-modules that include material and relevant tax cases presented in an engaging and complete manner. The goal of this research is to develop a taxation e-module that supports case-based learning, thereby enhancing students' understanding and critical thinking abilities, and achieving educational objectives.

Based on survey results, students require an ICT-based teaching medium that can improve their learning outcomes and help them better understand taxation material. Therefore, the researcher aims to provide a solution to this issue through the research and development titled "DEVELOPMENT OF THE E-TAX MODULE AS A SOLUTION TO ENHANCE ACCOUNTING STUDENTS' UNDERSTANDING."

2. Method

The method used in this research is research and development. Within the research and development method, there are several types of models. The model used is the 4-D development model. The 4-D model (Four D) is a learning device development model developed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel (1974: 5). The 4-D development model consists of four main stages: Define, Design, Develop, and Disseminate. This method and model are chosen with the aim of producing an application in the form of an e-book. The developed product will then be tested for its feasibility through validity and product trials to determine the extent of improvement in students' learning outcomes after using the e-TAX module.

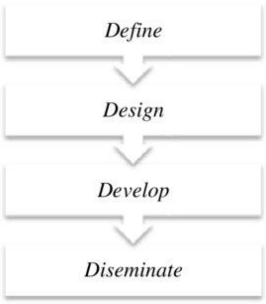


Figure 1. 4-D Development Procedure

The assessment instrument used in the feasibility test of the E-ATCM employs a questionnaire. The data and information obtained will be analyzed using qualitative descriptive data analysis. Qualitative data analysis is used for the feasibility testing conducted by content experts, including validation of material, media, language, and practitioners. The feasibility assessment measurement used is based on Riduwan (2009), where the percentage obtained is then transformed into qualitative data to determine improvement decisions in product development.

Table 1 Decision-Making for Product Development Revisions

Interval	Criteria	Description
81%-100%	Very Feasible	Valid, revision needed
61%-80%	Feasible	Valid, revision needed
41%-60%	Fairly Feasible	Fairly valid, revision needed
21%-40%	Less Feasible	Not valid, revision needed
0%-20%	Not Feasible at All	Not valid, revision needed

Sumber: Riduwan (2009: 15) yang dikembangkan

Thus, based on Table 1, the E-module media is considered suitable and valid as a teaching resource for Taxation if it receives a score within the interval of 61% - 100%

3. Results and Discussion

This development stage aims to produce the (ETM) E-Tax Module, which has been revised based on expert feedback and trials with students. There are two steps in this stage as follows: a. Expert Validation. The (ETM) E-Tax Module that has been compiled will be assessed by subject matter experts and media experts to determine whether the (ETM) E-Tax Module is suitable for implementation. The results of this validation will be used as a basis for improving the developed (ETM) E-Tax Module

Product validation

Product validation is conducted to assess the feasibility of the product. Validation involves subject matter experts, media experts, language experts, and practitioners.

a. Subject Matter Expert Validation

The subject matter expert validation is carried out to determine the appropriateness of the material regarding the accounting cycle of trading companies. The material validation is conducted by Syahida Norviana, S.Pd., M.Si, a lecturer in Applied Accounting, and Imam Hasan, M.Pd, a lecturer in Accounting at the Harapan Bersama Polytechnic in Tegal. The instrument used by the lecturers is a product assessment questionnaire. The evaluation results from the subject matter experts can be found in the appendix, while the summary of the evaluations from the subject matter experts is presented in the table below:

Table 2. Summary of ETM Media Validation by Subject Matter Experts

No	Aspect	Assessment Scale				
		Σni	ΣN	100%	Score	Criteria
1.	Content Feasibility	83	88	100	94,32	Very Feasible
2.	Presentation Feasibility	76	80	100	95	Very Feasible
	Skor total	Total Score	168	100	94,64	Very Feasible

Source: Processed Data, 2024

Based on Table 2 above, it is known that the assessment of the content feasibility aspect received a score of 94.32% with a 'very feasible' criterion. This content feasibility aspect includes evaluations of the material coverage, material accuracy, timeliness and contextual relevance, and compliance with laws and regulations. Meanwhile, the presentation feasibility aspect received a score of 95% with a 'very feasible' criterion. The presentation feasibility aspect encompasses presentation techniques, presentation support, and completeness of the presentation. The total score for the ETM media evaluation by the subject matter experts is 94.64%, which falls under the 'very feasible' criterion. The results from the subject matter experts also indicate that the ETM is deemed suitable for use in the learning process with revisions, including adding examples of various transaction evidence in the e-module and providing a time duration for solving problems.

b. Media Expert Validation

Media expert validation is conducted to obtain an evaluation of the E-ATCM media. The media validation is carried out by Septiningdyah Arianisari, S.Pd., M.Sc., and Tri Nugroho Budi Santoso, M.Pd. The instrument used for validation is a product assessment questionnaire. The evaluation results from the media experts can be found in the appendix, while the summary of the evaluations from the media experts is presented in the table below:

Table 3. Summary of ETM Media Validation by Media Experts"

No	Aspect	Assessment Scale				
		Σni	ΣN	100%	Score	Criteria
1.	Display Quality	89	96	100	92,71	Very Feasible
2.	Technical Quality	97	104	100	93,27	Very Feasible
	Total Score	186	200	100	93	Very Feasible

Source: Processed Data, 2024

Based on table 3 above, it is known that the assessment of the display quality aspect received a score of 92.71% with a 'very feasible' criterion. The display quality aspect includes the background display, layout design, appropriateness of font size and type, and the placement of images and navigation buttons. The assessment of the technical quality aspect received a score of 93.27% with a 'very feasible' criterion. This technical quality assessment includes readability, ease of use, ability to provide feedback, and suitability for use in various learning contexts. The total score for the ETM media evaluation by the media experts is 93% with a 'very feasible' criterion. The results from the media experts also indicate that the ETM media is deemed suitable for use in the learning process, with revisions suggested, such as providing instructions for answering essay questions.

c. Language Expert Validation

Language expert validation is conducted to assess the language used in the ETM media. The language validation is performed by Sri Sugiarti, M.Pd., a lecturer from the Faculty of Teacher Training and Education at Universitas Sebelas Maret. The instrument used for validation is a product assessment questionnaire. The evaluation results from the language expert can be found in the appendix, while the summary of the evaluations by the language expert is presented in the table below:

Table 4 Summary of ETM Media Validation by Language Experts

No	Aspect	Assessment Scale				
		Σni	ΣN	100%	Score	Criteria
1.	Language Component	87	96	100	90,63	Very Feasible
	Total Score	87	96	100	90,63	Very Feasible

Source: Processed Data, 2024

Based on Table 4 above, it is evident that the assessment of the language component received a score within the 'very feasible' criterion. The expert's evaluation indicates that the ETM media is deemed suitable for use in the learning process, with the recommendation to revise the content by checking the grammar, specifically ensuring that the spelling adheres to the revised spelling standards.

d. Practitioner Validation

Practitioner validation is conducted by involving the lecturer of the Taxation course, Ms. Syahida Norviana, S.Pd., M.Sc, who is responsible for teaching the Taxation course. The evaluation results from the practitioner can be found in the appendix, while the summary of the evaluations by the practitioner is presented in the table below:

Table 5. Summary of ETM Media Validation by Practitioners

No	Aspek	Skala Penilaian				
		Σni	ΣN	%	Nilai	Kriteria
1.	Content Feasibility Aspect	29	32	100	90,63	Very Feasible
2.	Presentation Feasibility Aspect	42	44	100	95,45	Very Feasible
3.	Learning Approach	23	24	100	95,83	Very Feasible
4.	Media Usefulness	35	36	100	97,22	Very Feasible
	Total Score	129	136	100	94,85	Very Feasible

Source: Processed Data, 2024

Discussion

a. Development of the E-ATM Media**

Although several media have already been developed, the ETM media has several advantages, including not requiring a strong signal and not needing data to open the application. The ETM media

also offers easy access, allowing users to access the media anytime and anywhere. Additionally, the ETM media includes practice questions to deepen understanding of material related to the accounting of trading companies.

The development of the ETM media is based on the results of a needs analysis of the students. This analysis was conducted using a survey method by distributing a questionnaire. The results of the questionnaire distributed to Economics Education students indicated that many students felt difficulties in this distance learning process. A total of 78 students, or 84.8%, reported difficulties in attending classes. According to the questionnaire results, 83.7% (77 students) found it challenging to understand taxation material, while 16.3% (15 students) did not have difficulties understanding the lessons. Based on the survey results, students agreed on the need for the development of learning media for taxation to enhance their understanding of the material being taught. With the creativity of an educator, students will find it easier to grasp the material presented. According to research involving 92 students, 98.9% expressed that there is a need for media development to improve understanding of the material.

Students indicated that the right learning media significantly affects their understanding of the material. The survey revealed that 99% of students stated that appropriate learning media would influence their comprehension of the content delivered by educators. From the survey conducted, the researcher noted that 69.56% of students, or 64 students, desired interactive media tailored to the new regulations for teaching taxation. In the needs analysis stage, an analysis of faculty needs was also conducted through interviews. The results from interviews with taxation lecturers indicated that they agreed that learning media plays an important role in education.

b. Feasibility of ETM Media (E-Tax Modules)

The assessment of the feasibility of ETM media (E-Tax Modules) was conducted by experts, including subject matter experts, media experts, language experts, and practitioners. The results of the feasibility study by the experts are as follows:

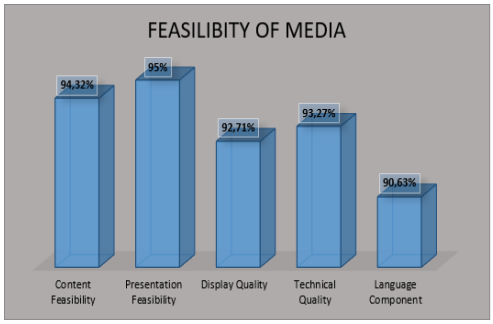


Figure 2. Results of Assessment by Subject Matter, Media, and Language Experts

Based on Figure 2, it is evident that the assessments of the content feasibility aspect, presentation feasibility, display quality, technical quality, and language component all received scores within the 'very feasible' criterion. This means that the developed media is suitable for use in accounting education. In addition to the evaluations from subject matter experts, media experts, and language experts, assessments were also conducted by practitioners. The results of the assessment by practitioners are as follows:

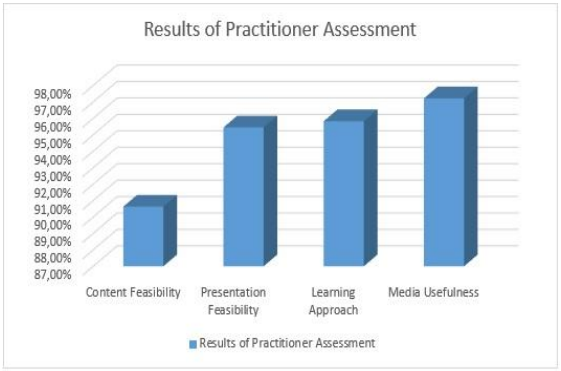


Figure 3. Results of Assessment by Practitioners

Based on Figure 3, it is evident that the assessments of the content feasibility aspect, presentation feasibility, learning approach, and media usefulness all received scores within the 'very feasible' criterion, meaning that the ETM media (E-Tax Modules) is suitable for use in accounting education.

4. Conclusion

Based on the results of the development research of the ETM (E-Tax Modules) that has been conducted, the following conclusions can be drawn:

a. The ETM (E-Tax Modules) learning media has been successfully developed by following the 4D development procedure, which consists of four stages.

b. Based on the validation results from experts (subject matter experts, media experts, language experts, and practitioners), the ETM (E-Tax Modules) learning media is deemed valid and suitable for use as a teaching media for Taxation. In addition to the assessments from the experts, the ETM (E-Tax Modules) learning media was tested with students, which included both limited and extensive trials. The results of both the limited and extensive trials indicate that the ETM (E-Tax Modules) media is valid and suitable for use as Taxation learning media. Therefore, based on these two evaluations, it can be concluded that the ETM (E-Tax Modules) is valid and appropriate as a teaching media for Taxation.

Acknowledgement

We would like to express our gratitude to the Directorate of Research and Community Service of Yogyakarta State University for their financial support for the Community Service activities. We also extend our thanks to Accounting Studied Program, Business and Finance Department, Faculty of Vocational, UNY for being our partner in this initiative.

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OPTIMIZING ENERGY EFFICIENCY IN OUTDOOR RESIDENTIAL LIGHTING USING TIMER SWITCH TECHNOLOGY

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Abstract

This service activity aims to optimize energy efficiency in outdoor lighting in Rejowinangun, Yogyakarta, through the application of Timer Switch technology that can be timed 24 hours. This technology is implemented to reduce electrical energy consumption caused by lights that are often left on unattended. The implementation of the technology includes systematic steps, from site identification to field trials, while the evaluation of the activity focuses on the impact of energy efficiency and the level of community participation in implementing the solution. The results of this service activity have installed energy efficiency on 20 light points in two locations, namely RT 34 and RT 36 Rejowinangun, Yogyakarta. The results show that the system works well and according to the time setting and provides a decrease in electrical energy in lighting energy consumption. The community response to this technology is very positive at 77% categorized as "Very Good". The potential for further service activities can be given additional technology in the form of sensors.

Keywords: energy efficiency, timer switch, outdoor residential lighting

1. Introduction

The demand for electrical energy continues to increase along with technological development and population growth. Efficient use of electrical energy is a crucial aspect in an effort to maintain environmental balance. The electrical energy consumption of urban residences is increasing every year [1]. One sector that has increased energy consumption is lighting, both for indoor and outdoor purposes. Outdoor lighting, which includes streetlights, parks, and other public areas, is often a significant source of energy waste. Conventional outdoor lighting systems consume more energy compared to smart lighting systems [2]. The problem of wasting electrical energy due to forgetting to turn off outdoor lights is common in the community. The phenomenon of outdoor lights being left on unattended, especially at times when they are not needed, is a major cause of electrical energy waste [3], [4].

The problem of electrical energy wastage not only affects individuals, but also has a significant impact at the collective level, especially in terms of greenhouse gas emissions. Therefore, an innovative approach is needed to improve the efficiency of electrical energy utilization, especially in the context of outdoor lighting. One example of inefficient energy use is the phenomenon of outdoor lighting that is left on unattended. Outdoor lights that are constantly on, even when not needed, not only cause a waste of electrical energy, but also have a negative impact on the environment [5],[6],[7],[8].

A situation analysis was conducted in Rejowinangun Yogyakarta facing the problem of wasting electrical energy. The inefficient use of outdoor lighting is a problem that needs special attention. Based on preliminary analysis, outdoor lighting in this area is often on all night until noon without considering the actual needs. This situation not only significantly increases electrical energy consumption, but also adds to the cost burden for the community and has a negative impact on the environment in the form of increased carbon emissions.

The continuous operation of lighting systems consumes a lot of energy, so it is necessary to implement energy efficiency to reduce energy consumption and solve energy waste. [9]. Efforts to increase the efficiency of electrical energy utilization in outdoor lighting can be done through the application of energy-saving technologies and automatic control systems, such as the use of timers to monitor and control tools or devices that use energy [3], [4]. A 24-hour timer switch allows users to set specific time schedules when lights should be on or off, providing greater control over energy

consumption [10], [11]. This innovation provides better control over sustainable energy use. The implementation process of this technology involves the identification of strategic light points, the incorporation of installation lines, to the installation and configuration of Timer Switches integrated with relay control systems.

This community service activity aims to utilize 24-hour Timer Switch applied technology to improve electrical energy efficiency in outdoor lighting in Rejowinangun, through a participatory approach involving the local community. In addition to evaluating the performance of the technology in reducing energy waste, this service activity also assesses the community's response to the applied solution. The expected result is a real contribution in sustainable energy management that can be adopted by other communities with similar characteristics, so that it not only benefits the Rejowinangun community, but also becomes a reference for similar initiatives in other areas.

2. Method

This community service methodology is designed to ensure that the implementation of electrical energy efficiency solutions is structured and oriented to the needs of the community. The following are the steps of the methodology that will be implemented can be seen on Figure .

a. Site Identification and Initial Assessment. The first step was to identify the location in the Rejowinangun area of Yogyakarta. An initial assessment was conducted to understand the environmental characteristics, energy consumption patterns, and infrastructure conditions related to outdoor lighting. Data was collected through direct observation.
b. Socialization and Community Participation. A socialization event was held to explain the benefits, objectives, and the process of installation integration and time scheduling. The concept of sustainable energy management was also introduced, highlighting how the community could actively participate.
c. Lighting Point Analysis and Installation Site Selection. From the identification process, 20 light points were determined for the application of the proposed technology.
d. Automation System Integration. At this stage, installation integration is carried out, which include the installation of time control devices.
e. Follow-up socialization and education. During and after implementation, further socialization and education of the community on how to operate the system, the benefits of energy efficiency, and the positive impact on the environment is conducted.
f. Installation of 24-hour timer switch. After the integration of the automation system, a 24-hour timer switch was installed at 20 light points. The timer switch is set to turn on the lights at 5.45 PM and turn off the lights at 05.00 AM.
g. Field trials. Field trials are conducted to monitor and evaluate the performance of the implemented solution.
h. Analysis of results and adjustments. Trial results were analyzed to evaluate the impact of technology implementation on reducing electrical energy wastage. The analysis was conducted by comparing energy consumption data as well as community feedback before and after implementation.

The subjects who participated in the service were the people of Rejowinangun Yogyakarta, focusing on RT 34 and RT 36, RW 11 with a total of 20 family heads.

3. Results and Discussion

This community service activity aims to improve the efficiency of electrical energy utilization in outdoor lighting in Rejowinangun, Yogyakarta. Observations were made to identify the location and initial studies that had been carried out in February 2024 in RW 11 Rejowinangun Yogyakarta. The observation found that most people use outdoor lighting without an automatic control system. Most lights are left on all night without supervision, especially in areas that do not require intensive lighting. Based on the observation, two locations, RT 34 and RT 36, were identified.

The socialization was carried out as an initial step to educate the community about the benefits, objectives, and process of incorporating a light installation with an automatic timing system. This activity was attended by residents of RT 34 and RT 36, with a total of 20 households participating. Through interactive socialization sessions, participants were given an in-depth understanding of the importance of energy efficiency in home lighting and how Timer Switch technology can help reduce electricity waste. The enthusiasm of the residents can be seen from the willingness of all participants to

participate in this applied technology installation program, which is expected to provide an effective solution in saving energy consumption in their environment.

A thorough analysis of the light points and the location of the merged installation was conducted to determine the most optimal area for the installation of the Timer Switch. As a result of this analysis, two main locations were identified that were considered strategic for the merging of light installations. Each location includes a group of lights that are arranged in such a way that they can be controlled efficiently. These two groups consisted of 10 light points each, which were selected based on the frequency of use and lighting requirements in the area. This grouping was designed to maximize the effectiveness of the Timer Switch in regulating the switching on and off of the lights, so that energy consumption could be reduced at the expense of lighting functionalit.

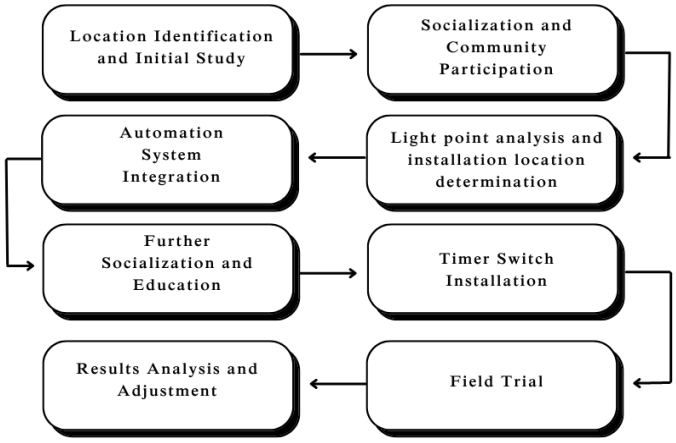


Figure 1. Method of Activities

The automation integration process is carried out on two predetermined groups of lights. Each group is equipped with an automatic control system consisting of a contactor and a Timer Switch. This integration allows each group of lights to be controlled efficiently, with the contactor acting as the main link that delivers the electric current, while the Timer Switch organizes the lights on and off schedule automatically. With this combination of technologies, lighting management becomes more structured and energy-efficient, ensuring lights are only on at the required times without manual intervention. A one-line diagram of the integration of the lighting system with the timer switch is shown in Figure .

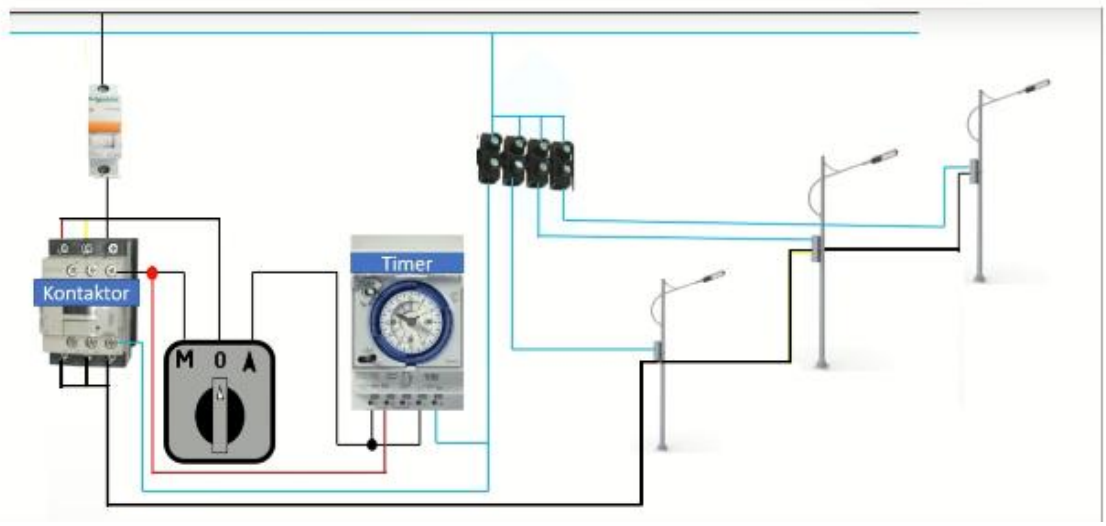


Figure 2. Line Diagram of Automation System

A follow-up socialization program was held to provide the community with a deeper understanding of the operation of the lighting automation system. During this activity, participants were given practical guidance on how to set the time on the Timer Switch, ensuring that lights turn on and off as needed. In addition, the long-term benefits of implementing this automation system, such as energy savings, reduced electricity costs, and contribution to the environment, were thoroughly explained. This socialization aims to equip the community with a comprehensive understanding of the technology, so that they can operate the system independently and promote sustainable energy efficiency.

The implementation of the automation system using a 24-hour Timer Switch has been carried out on 20 outdoor lighting points in the designated area. After the automation system integration process was completed, the Timer Switch was installed and set to automatically turn on the lights at 17:45 WIB and turn off the lights at 05:00 WIB. This setting is specifically designed to optimize the efficiency of energy use, by ensuring that the lights are only on at the required times, thus reducing the energy waste that often occurs due to uncontrolled manual use. The control panel for outdoor energy efficiency utilizing timer switches is shown at Figure .



Figure 3. Control Panel

The results of the field test showed that the automation system functioned well (see Figure), in accordance with the preset timings. During the test period, the lights turned on and off consistently on time, according to the schedule programmed on the Timer Switch. The automation system operated without any interruptions during the test period.



Figure 4. Field Trial

An analysis of the use of a timing system in outdoor lighting shows a reduction in electricity consumption. This decrease is due to the automation settings that ensure lights are only on at the required times, thus avoiding the energy wastage that commonly occurs when lights are left on all night until morning unattended. The community response to the implementation of this automation system

has been very positive. As shown in Figure , 77% of the community is very satisfied with the installation of the outdoor lighting automation system, recognizing that the technology not only improves energy efficiency, but also provides convenience in lighting management.

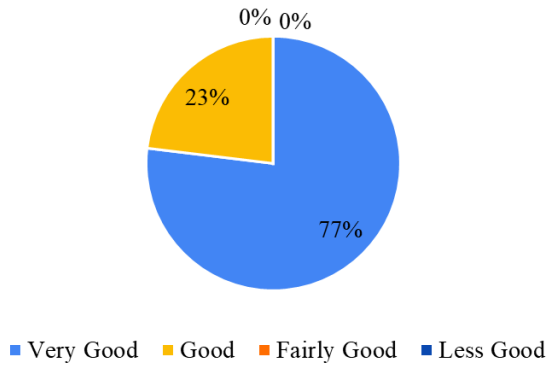


Figure 5. User Response Results

Electrical energy savings and emission reduction can be achieved by energy management utilizing advanced technology [12]. The use of Timer Switch technology can improve energy efficiency and reduce electricity consumption, which has a direct impact on reducing operating costs for the community. Outdoor lighting systems that utilize technology can significantly reduce operational costs and Co2 emissions [2]. The technology helps people create a more regular and sustainable pattern of energy use, and supports environmental conservation efforts. In addition, the positive response given by the community shows that the implementation of this technology is not only welcomed, but also provides concrete benefits in the form of tangible energy savings, making it an effective solution to optimize energy management at the household level.

The utilization of easily accessible automation technologies, such as Timer Switches, has proven to be an effective solution for improving energy efficiency at the household level. This automatic control technology can drive energy efficiency improvements at the local scale by optimizing the use of resources in a timely manner. Active participation from the community in supporting the implementation of these applied energy technologies is crucial, as it can strengthen collective awareness and shared responsibility in more efficient and sustainable energy use. Energy-saving behavior is closely related to daily life [13], so through the application of this technology it can increase human awareness of the importance of energy saving. This also confirms the central role of humans in the success of energy efficiency programs [14].

Future service activities can consider adding additional technologies, such as light sensors or motion sensors, to improve responsiveness to environmental conditions. The utilization of sensors in lighting has been shown to reduce costs by only lighting the areas that need it [15]. This innovation has the potential to open up opportunities for the development of smarter and more adaptive automation systems, capable of adjusting energy needs in real-time. The utilization of automation technology plays an important role in reducing energy consumption, and in practical terms, the findings from this service activity can be used as a model for other areas interested in adopting similar technology to support energy efficiency in the residential environment.

4. Conclusion

This service activity shows that the application of a 24-hour Timer Switch to the outdoor lighting system in Rejowinangun, Yogyakarta, can effectively improve electrical energy efficiency. Well-regulated light automation ensures that energy use only occurs when it is really needed, thus preventing waste due to uncontrolled manual operation. The successful implementation of this program is also supported by the high level of community participation, where most residents are satisfied with the technology implemented. In addition to energy efficiency, the technology also has a positive impact in lowering operational costs and carbon emissions, contributing to the environment.

It also highlights the importance of continued innovation by integrating technologies such as light sensors and motion sensors to increase sensitivity to environmental conditions. These additional technologies can make the lighting automation system more intelligent and responsive, allowing real-time adjustments to energy use based on needs. Thus, the results of this service activity can be used as

a reference to be applied in other areas that have similar needs, especially in efforts to improve energy efficiency in residential areas.

Acknowledgement

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THE INFLUENCE OF FORGING DEFORMATION ON THE TENSILE STRENGTH, HARDNESS, AND IMPACT OF ALUMINUM A356

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Abstract

The purpose of this research is to investigate the effect of forging deformation on mechanical properties, including, tensile strength, hardness, impact toughness of aluminum A356, and the most optimal level of deformation to enhance the mechanical properties of aluminum A356. With the specimen creation method using metal casting techniques. The research method used is pure experimentation by conducting tensile, impact, and hardness tests on forging specimens heated to 300°C. The forging deformation levels are 8.3%, 16%, and 24%, compared to specimens that did not undergo the forging process. After all the tests were conducted, it was found that the specimen without forging achieved the highest average test values, with an average maximum stress of 166.6 N/mm², an average maximum strain of 15.1%, an average impact toughness of 0.05187 J/mm², and an average Vickers hardness of 45.51151 HVN.

Keywords: Aluminium A356, Forging, Mechanical Properties.

1. Introduction

Along with the development of the industry, forging is an integral process that supports success in manufacturing processes. Due to its important role in the manufacturing world, almost every production process involves elements of forging at every stage of metal production.The principle of forging is the working of metal with heat through striking or pressing its surface. Determining the optimal forging parameters, such as temperature and pressing strength on the workpiece, becomes a crucial point in the success of the forging process to ensure the improvement of the mechanical properties of the material without compromising the quality of the material used [1] .

Aluminium A356 is one type of aluminum alloy used for metal casting processes. This type of aluminum alloy has relatively good casting and machining performance. Therefore, it is suitable for use in components for aircraft, pump housings, high-speed impellers, and various other structural castings that require high structural strength. As a result, Aluminium A356 is sometimes used as an alternative to Aluminium 6061 [2]

Metal casting process is the method of creating objects by melting metal and pouring it into a mold cavity, resulting in a model that matches the shape and pattern of the mold [3] . The main advantage of using casting techniques for metal formation is undoubtedly the ability to produce products from various types of metal with complex shapes. Additionally, several casting methods are very suitable for mass production of metal products [4] .

Issue that arises in the wheel manufacturing process at CV. C-MAXI Alloycast Yogyakarta is the use of A356 cast aluminum, which requires high strength. The process of enhancing its strength is carried out through heat treatment, which takes a long time and incurs relatively high costs [5]. This research is conducted to find an alternative solution to improve the hardness of A356 cast aluminum through forging, which is relatively cheaper and does not take much time [6]. The results will reveal the differences in mechanical properties and hardness levels. The forging deformation that will be used in this research is 8.3%, 16%, and 25%. The forging method used is the Hot Forging method, where the object is heated to a certain temperature; the temperature used in this study is 300° before the forging process is carried out.

Casting results with the Aluminum Alloy A356, several issues may arise, including the castings being prone to dimensional changes, a decrease in strength and toughness, as well as reduced corrosion resistance. To address these problems and enhance ductility and toughness, heat treatment processes involving one or more heating steps can be applied to the castings [7].

2. Method

This research employs a pure experimental method aimed at investigating the optimal forging deformation level in aluminum A356. The study uses forging deformation variations of 8.3%, 16%, and 24%, with specimens without forging also included as a comparison [8]. These specimens are then heated to a temperature of 300°C before undergoing the forging process. To determine the best forging deformation level, tensile strength tests, Charpy impact toughness tests, and Vickers hardness tests are conducted on the forged aluminum A356.

Research Design

The forging process of aluminum A356 with deformation levels of 8.3%, 16%, and 24%, along with specimens that have not undergone the forging process used as a comparison material. The forging process will utilize the hot forging method, where the test specimens are heated to a temperature of 300°C before the forging process is carried out. The following is an explanation of the research design that will be used in the research process:

a. D0

Specimen D0 is a test specimen sample that has not undergone any forging process or treatment, with a thickness of 12mm. This specimen will undergo tensile testing three times, hardness testing three times, and impact testing three times.

b. D8,3

Specimen D8.3 is a test specimen sample that has undergone a forging process with a deformation of 8.3%, resulting in a thickness of 11mm. It is heated to a temperature of 300°, after which it will undergo tensile testing three times, hardness testing three times, and impact testing three times.

c. D16

Specimen D16 is a test specimen sample that underwent a forging process with a deformation of 16%, resulting in a specimen thickness of 10mm, heated to a temperature of 300°, and will undergo tensile testing three times, hardness testing three times, and impact testing three times.

d. D24

Specimen D24 is a test specimen sample that underwent a forging process with a deformation of 24%, resulting in a specimen thickness of 9mm, heated to a temperature of 300°. This specimen will also undergo tensile testing three times, hardness testing three times, and impact testing three times.

Design of Tensile Test Specimen

In this research, the design of the tensile test specimen will refer to the ASTM E8 tensile test standard [9]. The details of the size and dimensions of the specimen used can be seen in the following Figure 1.

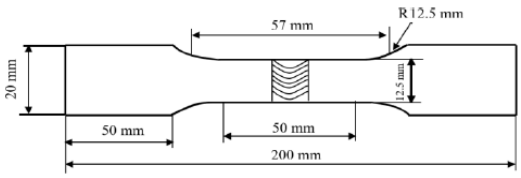


Figure 1. Tensile Test Specimen ASTM E8

Design of Impact Test Specimen

In this research, the design of the impact test specimen will refer to the impact test standard JIS Z 2202. The details of the size and dimensions of the specimen used can be seen in the following Figure 2:

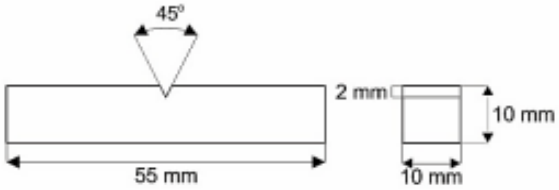


Figure 2. Impact Test Specimen JIS Z 2202

3. Results and Discussion

a. Casting Result

The specimens used in this study were made using the Metal Casting Technique with the Permanent Mold Casting method. After the casting process, specimens were obtained for testing that will be used in the research. The specifications for the size and shape of the cast specimen are that the specimen has a total length of 200mm with a thickness of 12mm. An example of the casting result can be seen in the following figure 3:



Figure 3. Casting Result

b. Forging Result

After undergoing the forging process with deformations of 8.3%, 16%, and 24%, and being heated to a temperature of 300°C, with an initial specimen thickness of 12mm, the results showed that the object with an 8.3% deformation experienced an average widening of 13.4mm, the object with a 16% deformation experienced an average widening of 14.5mm, and the object with a 24% deformation experienced an average widening of 15.8mm.

c. Tensile Test Result

After each specimen underwent the forging process with a deformation of 8.3%, 16%, and 24%, heated to a temperature of 300°C, the specimens were then subjected to tensile strength testing. After conducting tensile strength tests, the results are presented in the form of diagrams to compare the results of one test with another. Here is the diagram along with its explanation:

1) Ultimate Tensile Strenght

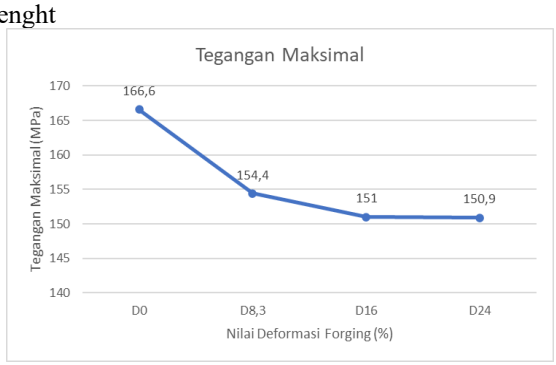


Figure 4. Ultimate Tensile Strenght

From the figure 4 above, it can be concluded that the specimen that did not undergo the forging process (D0) achieved the highest average maximum stress value of 166.6 N/mm², while the specimen with a forging deformation of 24% (D24) obtained the lowest average maximum stress value of 150.9 N/mm².

2) Maximum Average Strain Value

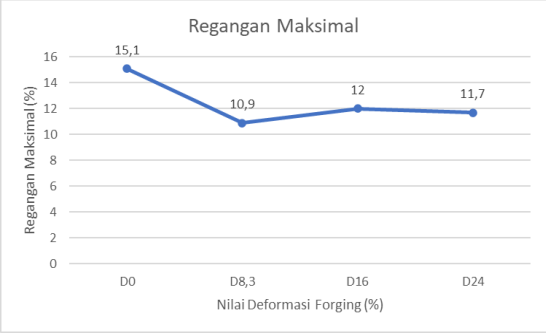


Figure 5. Maximum Average Strain Value

From the figure 5 above, it can be concluded that the specimen that did not undergo the forging process (D0) achieved the highest average maximum strain value of 15.1%, while the specimen with a forging deformation of 8.3% (D8.3) obtained the lowest average maximum stress value of 10.9%

3) Average Value of Modulus Elastic.

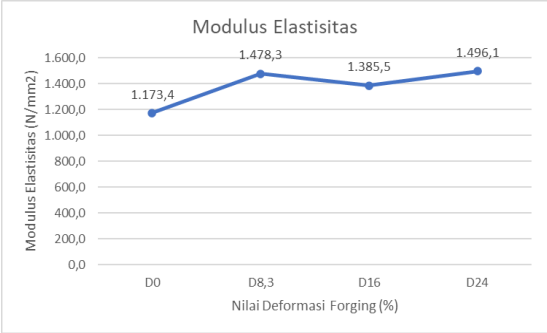


Figure 6. Average Value of Modulus Elastic

From the figure 6 above, it can be concluded that the specimen with a forging deformation of 24% (D24) achieved the highest average elastic modulus value of 1,496.1 N/mm², while the specimen that did not undergo the forging process obtained the lowest average elastic modulus value of 1,173.4 N/mm².

d. Impact Test Result

After each specimen underwent the forging process with a deformation of 8.3%, 16%, and 24% heated to a temperature of 300°C, the specimens were then subjected to Charpy impact testing. After conducting the Charpy impact tests, the results are presented in the form of a diagram to compare the results of one test with another. Below is the diagram along with its explanation:

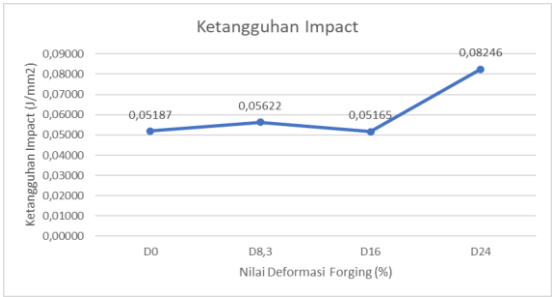


Figure 7. Average Impact Toughness Test Result

From the figure 7 above, it can be concluded that the specimen with a forging deformation of 24% (D24) achieved the highest average impact toughness value of 0.08246 J/mm², while the specimen with a deformation value of 16% (D16) obtained the lowest average impact toughness value of 0.05165 J/mm².

e. Vickers Hardness Test Result

After each specimen underwent the forging process with a deformation of 8.3%, 16%, and 24%, heated to a temperature of 300°C, the specimens were then subjected to Vickers hardness testing. After

conducting the Vickers hardness test, the results are presented in the form of a diagram to compare the results of one test with another. Below is the diagram along with its explanation:

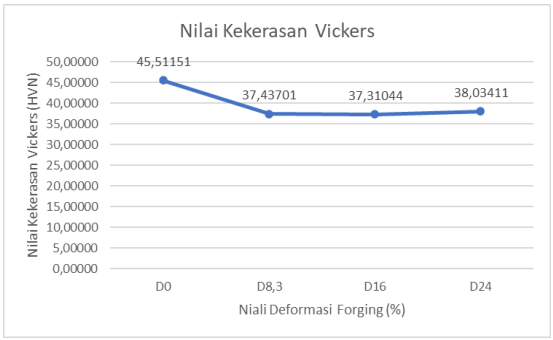


Figure 8. Vickers Hardness Test Result

From the figure 8 above, it can be concluded that the specimen that did not undergo the forging process (D0) achieved the highest average Vickers hardness value of 45.51151 HVN, while the specimen with a forging deformation of 16% (D16) obtained the lowest average Vickers hardness value of 37.31044 HVN.

f. Comparison Of Research Result

The test aims to compare the mechanical properties of Aluminum A356 after undergoing the forging process with heating and before the forging process with heating. The following is a table 1 of the test results from each specimen that has been conducted.

Table 1. Comparison of Test Result

Specimen	Maksimum Yiled (N/mm^2)	Value of impact Toughness (J/mm^2)	Vickers Hardness Value (HVN)
D0	166,6	0,05187	45,51151
D8,3	154,4	0,05622	37,43701
D16	151	0,05165	37,31044
D24	150,9	0,08245	38,03411

Based on the data from Table 1, the researcher argues that increasing the hardness of Aluminum A356 using forging treatment with a forging deformation of 8.3%, 16%, and 24% heated to a temperature of 300° is not very effective. According to the available data, the specimen that did not undergo the forging process with heating (D0) has an average maximum stress value of 166.6 N/mm^2, an average maximum strain value of 15.1%, and an average hardness value of 45.51151 HVN. The average values from these tests are greater than those of other specimens that underwent forging treatment with heating.

4. Conclusion

Based on the tests conducted on the A356 Aluminum specimens aimed at determining the most optimal level of deformation to enhance the mechanical properties of A356 aluminum, it can be concluded that:

a. After testing all the Aluminium A356 specimens that underwent the forging process, it was found that the specimens that did not go through the forging process, or specimen D0, achieved the highest tensile strength test value with an average maximum stress of 166.6 N/mm^2.
b. After conducting Vickers hardness testing on each A356 aluminum specimen that underwent the forging process, it was found that the specimen that did not go through the forging process, or specimen D0, achieved the highest average Vickers hardness value of 45.51151 HVN.
c. Following the impact toughness testing using the Charpy method on each A356 aluminum specimen that underwent the forging process, it was found that the specimen with a forging deformation of 24%, or D24, achieved the highest impact toughness value of 0.08246 J/mm^2.

d. To enhance the mechanical properties of A356 aluminum specimens through the forging process using deformations of 8.3%, 16%, and 24%, along with a heating process at a temperature of 300°, is not very effective. This is because the mechanical properties data before the objects underwent forging and heating are still superior compared to those that have already undergone forging and heating.

Acknowledgment

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Increasing Research Capacity through Bibliometric Technique Literature Review Training for Teaching Staff of STIE IEU Yogyakarta

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Abstract

Research is an integral part of higher education institutions. Research results can be used as basic materials for learning and as a study in solving a problem identified by academics. The publication is a mandatory output for research so that the results of a study can be used widely both in academia and in practice. The activities carried out seek to realize the needs of STIE IEU in increasing research and publication activities. Literature study training for teaching staff in this community service program is expected to provide understanding and also the ability of teaching staff to use programs in bibliometric techniques that will have an impact on increasing research productivity at STIE IEU Yogyakarta. The results of the literature study training for teaching staff were carried out well and smoothly according to plan, and participants were able to receive the material well. Participants understand literature-based research and its benefits. The literature review training program with bibliometric techniques can increase the interest or enthusiasm of participants to conduct bibliometric-based literature review research. This effect can be seen from the results of observations and the average understanding of literature studies. This program also succeeded in improving participants' abilities in processing metadata and interpreting data processing results.

Keywords: Research, Publication, Secondary data, Literature

1. Introduction

In the world of higher education, teaching staff are not only burdened with teaching aspects but also focused on research and community service aspects. These three things have been summarized in the term tri dharma. One of the tri-dharma of higher education is research. Research is an inseparable part of higher education institutions. Research results can be used as basic materials in learning and as studies in solving a problem identified by academics. The publication is a mandatory output for research so that the results of a study can be used widely both in academia and practice. Related to research, research data sources can be primary or secondary. Each data has its advantages and disadvantages. Based on considerations of time in data access, which is still limited, research that uses secondary data, such as published research results, is an alternative to collecting research data. One of the research techniques that can collect data quickly and accurately is the bibliometric technique. In Law No. Article (1) of Law No. 14 of 2005 states that lecturers are professional educators and scientists with the main task of transforming, developing, and disseminating science, technology, and art through education, research, and community service. In Permenristekdikti No. 44 of 2015 Article (28), it is also stated that the main activities of lecturers include (1) planning, implementing, and controlling the learning process, (2) implementing evaluation of learning outcomes, (3) guidance and training, (4) research, and (5) community service, as well as activities in the form of implementing additional tasks and supporting activities. Lecturers, as educators, have an important role; in addition to providing theory, lecturers can provide examples of work, especially in research. Law of the Republic of Indonesia No. 14 of 2005 concerning teachers and lecturers indicates the main task of transforming, developing, and disseminating science, technology, and art through education, research, and community service.

With work experience, especially in writing and research, lecturers as educators and researchers can understand field conditions and disseminate the results of their research in their teaching. The ability to research techniques and skills in data analysis is expected to increase lecturers' motivation in conducting research and publication. In order to meet the demand for training in secondary data collection and analysis techniques from higher education institutions, STIE IEU Yogyakarta, the PPM team of the management study program, tried to realize the request by submitting a PPM activity proposal funded by the UNY DIPA Fund. In addition to the request from STIE IEU, this PPM activity

is supported by the level of STIE IEU's need to improve research and publication. Based on the description above, it is considered necessary to carry out bibliometric technique training activities for STIE IEU Yogyakarta lecturers, which, due to limited time, funds, and manpower, are focused on increasing the understanding of bibliometric techniques and how to use the VosViewer program in bibliometric analysis. After the training, STIE IEU Yogyakarta lecturers will be more productive in producing research that is useful for teaching and publication. Based on the situation analysis, it can be concluded that the teaching staff at STIE IEU Yogyakarta experience problems conducting research studies, especially those based on literature reviews. These problems are caused by various factors, one of which is very important is not yet properly familiar with the literature review method and bibliometric programs. Thus, the problem can be formulated more operationally as follows.

1. How to improve the ability of teaching staff to understand literature reviews?
2. How to improve the ability of teaching staff to conduct literature reviews using bibliometric techniques?

Referring to the problems proposed to be solved, the objectives of this activity are:

1. Improve the ability of teaching staff to understand literature reviews:
2. Improve the ability of teaching staff to conduct literature reviews using bibliometric techniques

Literature study training for teaching staff in this community service program is expected to provide understanding and also the ability of teaching staff to use programs in bibliometric techniques that will have an impact on increasing research productivity at STIE IEU Yogyakarta. The benefits of activities for teaching staff are conducting analysis or literature studies to support research skills. The ability of teaching staff to conduct bibliometric studies is expected to be useful in increasing the number of research and publications.

Literature

Bibliometrics was introduced by Pritchard, Nalimov, and Mulchenko around 1969 (Haryani, 2019). Kristia et al. (2021) revealed that bibliometrics combines two words, Biblio and metrics, which mean books and measure. According to Haryani (2019), bibliometrics is a science that studies writing and uses mathematical analysis. Another definition of bibliometrics was conveyed by Nuryudi (2016). Bibliometrics is known as one of the fields of study that reveals the excellence and magnitude of a particular field of science from a particular educational or non-educational institution through the application of various theories such as authorship analysis, citation analysis, web-based bibliometrics, authorship collaboration, literature obsolescence, its factors and so on. Bibliometrics are divided into two important groups: specific graphic bibliometrics and conductive bibliometrics (Karim & Soebagyo, 2021). Illustrative investigations mostly describe the attributes or qualities of a piece of writing, while behavioral studies look at the relationships between parts of the writing (Kamariah, 2013).

Bibliometric analysis provides an accurate and objective method for measuring an article's contribution to the advancement of knowledge and is a tool often used to analyze trends and performance on a particular subject (Yang et al., 2013). Bibliometric analysis is used to better understand the evolution of the study of philosophy of education in the academic community, hoping to find research gaps and novelties as a basis for further research. Previous research mentioned that a bibliometric study was conducted by the NASA Astrobiology Institute in collaborative interdisciplinary astrobiology (Taşkın & Aydinoglu, 2015). A bibliometric literature review is used in green manufacturing (Setyaningsih et al., 2018). Bibliometric analysis has been conducted in international big data research (Ye, 2018). Research on sustainable development in Industry 4.0 with bibliometric analysis has been conducted by Sierra-Henao et al. (2020). In the field of management and organization, bibliometric methods were studied by Zupic and Čater (2015).

2. Methods

The implementation method of this activity is in the form of training for STIE IEU Yogyakarta teaching staff. Participants are guided to apply the training results to improve the teaching staff's ability to conduct research with literature reviews. The implementation of this PPM activity was carried out by all members of the community service team, and the main topics were presented: 1. Explanation of literature studies 2. Exploration of secondary data-based research (Google Scholar and Scopus) 3. Tutorial on searching data in journal databases 4. Tutorial on simulating the selection of collected data 5. Simulation of VosViewer data processing 6. Identification of bibliometric research opportunities.

The activity was carried out in stages, from the presentation of concepts to the practice of the concepts given. Participants participated enthusiastically in the activity, and their questions and responses regarding the material provided showed this. The participant questions were as follows: a. Functions and benefits of literature studies b. Differences between bibliometric studies and other research c. Easy ways to determine topics and keywords d. How to run VosViewer e. Interpretation of bibliometric data processing results.

3. Results

The literature study training for teaching staff in the community service program that has been implemented is expected to provide understanding and also the ability of STIE IEU Yogyakarta teaching staff in literature studies and their applications, which will have an impact on increasing research productivity and publications. The direct benefits of the activity for participants are that they are accustomed to finding research opportunities and analyzing data to support research, and indirectly, for those with the ability to analyze data assisted by statistical programs, it is useful for STIE IEU in increasing the quantity and quality of research based on literature studies.



Fig 1. Activity 1



Fig 2. Activity 2

4. Discussion

The results of the PPM activity of literature study training for teaching staff include several components: 1. Achievement of the objectives of the PPM activity 2. Achievement of the material provided 3. Participant ability in mastering the material 4. Participant enthusiasm in continuing the training on another day. The achievement of the objectives of the PPM activity has been good; this can be seen from the participants' understanding of knowledge about literature studies, understanding of

identifying and selecting data sources (databases), understanding of the benefits of bibliometrics in data analysis, the ability to run the VosViewer program, the ability to analyze data with VosViewer. The participants' ability to master the material was good, as indicated by their ability to complete the tasks the implementer gave well. Participants were also able to answer every question given by the implementer of the activity well. Overall, participants were satisfied with the PPM activity that had been carried out. Participants felt helped by this activity because they needed it as part of their competence in conducting literature study-based research. The activity evaluation results were shown by the average value of the pre-test and post-test activities, which showed an increase in the average understanding and ability after the training. The average value of understanding before training was 2.0667, and the average after training was 3.6476. The average value of the ability to run and analyze literature with VosViewer before training was 1.5286, increasing after training by 3.5143.

Table 1. Pra-Post

Aspect	Mean	Std. Deviation
Pra- Literature	2.0667	0.31102
Post-Literature	3.6476	0.25492
Pra- VosViewer	1.5286	0.40115
Post-VosViewer	3.5143	0.14781

Some participants were enthusiastic to follow the activity by giving suggestions to continue the activity on another day with a longer training time, as well as the continuation of the training program for finalizing articles and publications. It is hoped that the results of this training activity can be realized in the form of publications in various journals.

5. Conclusion

The PPM literature study training program for teaching staff was carried out well and smoothly according to plan, and participants received the material well. Participants understood literature-based research and its benefits. The literature review training program with bibliometric techniques increased participants' interest or enthusiasm in conducting bibliometric-based literature review research. This can be seen from the results of observations and the average understanding of literature studies. This program also succeeded in improving participants' ability to process metadata and interpret data processing results. Participants were enthusiastic about the activities, as indicated by their activeness during the training process. Participants were also assisted in exploring the Scopus Website. Participants actively asked questions, especially about collecting and processing meta-data.

Suggestion

Based on the evaluation of the activities that have been carried out, suggestions can be given, namely the continuation of the activity. This activity can be continued with further material according to the participants' enthusiasm, with the consequence of additional implementation time and costs that follow the activity. There is a need for further activities not limited to conducting research based on literature studies with bibliometrics but mentoring the finalization of research articles for publication.

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EMPOWERING THE MARSUDI LARAS COMMUNITY GROUP THROUGH DEVELOPING LOCAL POTENTIAL AND CULTURAL PRESERVATION IN PURBALINGGA, CENTRAL JAVA

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Abstract

This community service aims to empower the Marsudi Laras Community Group in Karangcegak Village, Kutasari District, Purbalingga Regency, Central Java, with a special focus on the younger generation. The millennial generation is expected to be an innovative and creative agent of change to improve the quality of life of the community through developing local potential and preserving culture. This activity was carried out with a participatory approach, involving all group members in various training and mentoring designed to increase their capacity and skills in leadership, tour guiding, as well as the development and revitalization of local culture such as wayang and Javanese gamelan. The methods used include lectures, questions and answers, demonstrations, as well as direct training and practice. The results of this service show significant improvements in leadership skills, abilities as tour guides, and the quality of group members' cultural performances. Apart from that, this program has also succeeded in optimizing village tourism and cultural activities, increasing tourist attraction, and contributing to improving the welfare of local communities. Regular evaluations ensure that the program is running effectively and on target. In conclusion, this empowerment program has succeeded in empowering the young generation of Karangcegak Village, increasing independence and prosperity, as well as preserving local culture. This program has the potential to be replicated in other areas with similar characteristics, as an effective social capital-based empowerment model.

Keywords: empowerment, local potential, cultural preservation

1. Introduction

The millennial generation is expected to be agents of change to improve the quality of life. With fresh ideas, as well as creative and innovative thinking, this generation is believed to be able to drive the world's transformation into a better direction through change and development. Generation Y, known as the millennial generation, was born between 1980 and 1995 and is characterized by the use of instant communication technology such as email, WhatsApp and social media. They are proficient in technology and have great opportunities to advance compared to previous generations. The great potential of the young generation has been recognized for a long time, even the first President of the Republic of Indonesia, Ir. Soekarno emphasized the important role of youth in creating significant change for the nation's progress.

The youth of Karangcegak Village, Kutasari, Purbalingga, are a potential group that has resources that need to be nurtured and empowered in order to become a locomotive for development, while at the same time avoiding the negative impacts of technological progress. As village youth who are far from the glitter of the city, they have not been able to develop their potential and achievements, so they are still engaged in traditional activities inherited from their parents and ancestors. Karangcegak is located at the foot of Mount Slamet, bordering several other villages, and most of its residents make their living as farmers and palm sugar producers. This village also has well-known tourist attractions, such as the natural bathing tour of the 7 Situ Tirta Marta springs managed by Pokdarwis, which succeeds in attracting tourists every year.

Apart from that, the youth group in Karangcegak also founded an association called "Marsudi Laras" which aims to preserve village arts and culture, such as wayang and Javanese gamelan. Community empowerment is a development approach that uses social aspects to improve economic aspects. Social capital, which consists of values, norms, beliefs and social networks, is an important element in this empowerment. Through this activity, the service team from Yogyakarta State University

initiated community empowerment with various programs aimed at guiding the community to be more empowered, independent and prosperous.

Community empowerment according to Tonnies (2007) can be categorized as a community, where the relationship pattern between members is very close and is the estuary of several activities at the village level. Youth associations are an important forum for development and social interaction for teenagers. Empowerment can also be seen as a series of activities to strengthen and optimize the empowerment of weak groups in society, as stated by Mardikanto and Soebiato (2012). This empowerment aims to increase participation abilities, access to resources and services needed to improve the quality of life. Putnam (2016) added that empowerment is a planned process that aims to increase the utility of the object being empowered, where community empowerment means organizing a community to solve social problems or meet social needs. Anwas (2019) states that empowerment is a development approach that places society as the main subject, by carrying out structural, cultural and personal transformations. The COVID-19 pandemic increases the urgency of concept-based empowerment from, by and for the community itself. Each region has potential that can be developed by the community to improve their welfare. Social capital is an important aspect of empowerment, with elements such as mutual trust, norms and networks that help solve problems together. Research by Utami (2020) and Nurami (2016) shows that elements of social capital play an important role in the success of community empowerment, especially in developing the local economy.

In efforts to empower the people of Karangcegak, Kutasari, Purbalingga, the main problem identified is that tourism and cultural activities are not yet optimal, so efforts are needed to improve community welfare and become an alternative youth activity. Effective leadership training, tour guide skills, and cultural development such as gamelan and wayang are some of the solutions implemented. Evaluations are carried out periodically to identify the advantages and disadvantages of training, so that follow-up actions can be taken to improve the quality of this activity.

The target audience for this community service activity is the Karangcegak community who are members of the Marsudi Laras community with a total of 124 people. They were chosen because they needed assistance in their activities and were willing to provide guidance to other groups, so that they could become actors driving community progress.

2. Method

The method for implementing this service activity includes several approaches designed to maximize the results of the empowerment program. First, lectures and questions and answers are carried out as a form of general introduction to the activities that will be carried out. The aim of this method is to provide basic knowledge to participants regarding the benefits they will obtain. Questions and answers are carried out to bring closer the relationship between service members and participants, as well as ensuring participants' understanding of the material presented. Second, demonstrations are carried out to show examples of organizational management that have been successfully implemented in various organizations. This demonstration aims to inspire participants by showing real results of good practices in organizational management. Third, training and practice are implemented to focus on financial management. This activity is designed to train young people to be able to keep good financial records, which is important for managing organizations and economic activities in general.

Implementation of Evaluation

Evaluation of activities is carried out in two stages. Evaluation in the middle of the activity is carried out by asking participants questions regarding the topics that have been presented. The purpose of this evaluation is to measure the extent to which participants understand the training material. Evaluation after the activity is carried out to assess changes that occur after training. This evaluation primarily assesses financial records made by participants and is carried out either immediately after the activity or one week after, to ensure the sustainability and effectiveness of the training provided.

3. Results and Discussion

The empowerment activities of the Marsudi Laras Community Group in Karangcegak Village, Kutasari District, Purbalingga Regency, Central Java, have achieved various significant results which are supported by the latest theories. This program focuses on developing the capacity of the younger generation and preserving local culture through training and mentoring.

Leadership Training in Organizations

Leadership training aims to improve participants' leadership skills, especially in the context of youth organizations. The material presented includes techniques for building trust, strategies for becoming an effective leader, and how to cultivate a leadership spirit. The updated transformational leadership theory by Northouse (2021) explains that effective leaders are able to inspire and motivate their followers to achieve higher goals through communicating a clear vision and developing deep relationships. The results of the training showed a significant increase in participants' ability to lead meetings and group activities. Techniques such as task delegation and joint decision making become more effective, in line with transformational leadership principles that emphasize team member empowerment and active participation.

Tour Guide Skills Training

Tourist guide skills training is designed to provide skills to the younger generation in tourist guiding, which is one of the village's main potentials. The material presented includes tour guiding techniques, how to interact with tourists, and preparing tour packages. Based on the latest tourism marketing theory from Kotler and Keller (2022), the quality of tourist experiences can be improved through providing interesting information and professional services. The results of the training showed an increase in participants' competence in compiling and managing attractive and professional tour packages as well as interacting with tourists in a more effective way. This increase is expected to support the development of the tourism sector in Karangcegak Village and increase the number of tourist visits.

Cultural Development Training

Cultural development training aims to preserve and develop local culture, especially in the form of Javanese wayang and gamelan performances. This activity involves technical training in playing the gamelan and portraying wayang characters as well as promoting cultural preservation to the younger generation. The updated theory of cultural preservation by Ghosh (2021) explains that cultural preservation involves not only collecting and protecting cultural artifacts but also actively involving communities in those cultural practices. The results of the training showed improvements in cultural performance techniques and presentations, which attracted the interest of local people and tourists. This success not only helps preserve local culture but also increases the village's tourist attraction, in accordance with theories that emphasize the importance of community involvement in cultural preservation.

Table 2. Results of PPM Activities

No.	Type of activity	Participant	Success Indicators	Results
1	Leadership Training	40 Youth	Leadership ability, initiative	Improved leadership skills, participants are able to lead meetings and activities well
2	Tour Guide Training	30 Youth	Guide skills, interaction	Able to arrange professional tour packages, increase interaction with tourists
3	Cultural Development	54 Youth	Quality of cultural performances	The quality of wayang and gamelan performances has increased, attracting the interest of the public and tourists

Discussion

The results of PPM activities show that a participatory approach involving all group members in training and mentoring has proven effective in increasing their capacity and skills. Leadership training has strengthened the ability of village youth to lead and manage organizations, which is an important asset in community development. This is in line with the empowerment theory according to Mardikanto and Soebiato (2012), which states that empowerment is a process that strengthens the ability of individuals and groups in society to participate actively in their social and economic life. The leadership training implemented showed encouraging results, with significant improvements in leadership skills among participants. According to Mardikanto and Soebiato (2012), empowerment as a process must be able to strengthen individual and group empowerment. In this context, leadership training helps participants to be more confident and able to take the initiative in group activities. This is in line with the concept of empowerment which views individual strength as basic capital in social development.

Tourist guide training has succeeded in optimizing the village's tourism potential, which is expected to improve the local economy. Social capital-based empowerment, as stated by Putnam (2016), emphasizes the importance of elements such as trust, norms and social networks in achieving successful empowerment. In this context, tourist guide training strengthens social networks and trust among village youth, enabling them to collaborate effectively in developing the tourism sector. Tour guide training activities have increased participants' competence in managing and compiling professional tour packages. This not only increases the economic potential of the village but also strengthens social networks among the youth. As participants increase their skills in tourism, they also build stronger relationships with tourists and other industry players, expanding their social networks.

Cultural development training not only preserves cultural heritage but also increases tourist attraction. Tonnies (in Soekanto, 2007) states that village youth groups can be categorized as communities where social relations are very close and important for cultural preservation. This activity shows that preserving local culture can be combined with economic development through tourism, which supports the community empowerment theory by Anwar (2007) that community empowerment must place them as the main subject in the development process. Cultural development training that focuses on Javanese wayang and gamelan performances shows that cultural preservation can go hand in hand with increasing economic prosperity. Tonnies (in Soekanto, 2007) states that close social relationships in community groups, such as those found in Karangcegak village, are very important for cultural preservation. By involving youth in cultural activities, this program not only preserves cultural heritage but also creates a strong sense of pride and identity among the younger generation. This contributes to their character building and social integrity.

The success of this program shows that social capital-based empowerment, which involves trust values, norms and social networks, can be an effective strategy in improving community welfare. This approach allows communities to make maximum use of their local potential and achieve independence and greater prosperity. It is hoped that this program can be replicated in other areas with similar characteristics, making a significant contribution to overall community development. By linking the results of PPM activities to theories of empowerment and social capital, we can see that this program not only succeeded in improving participants' skills and economic well-being, but also strengthened their social cohesion and cultural identity. Participatory and social capital-based approaches have proven effective in achieving sustainable and inclusive empowerment goals.

1. Planning and Preparation

Before implementing PPM activities, the service team from Yogyakarta State University carried out detailed planning and preparation. This activity involves an initial assessment of community needs, program planning, and coordination with related parties in Karangcegak Village. This preparation includes organizing training materials, scheduling activities, and procuring the necessary resources.

2. Implementation of Activities

PPM activities are carried out in several stages, as follows:

a. Leadership Training

1) Implementation Date: 10-12 June 2024

2) Location: Karangcegak Village Hall

3) Method: Lecture, question and answer, and group discussion

4) Description: This training aims to improve leadership skills among youth. The material provided includes techniques for building self-confidence, strategies for leading a team, and how to resolve conflicts in organizations. This activity was attended by 40 young people from the Marsudi Laras Community.

b. Tour Guide Skills Training

1) Implementation Date: 15-17 June 2024

2) Location: Situ Tirta Marta Tourist Attraction

3) Methods: Demonstration, direct practice, and simulation

4) Description: This training aims to improve tour guide skills, including how to welcome guests, provide relevant information about tourist attractions, and manage tourist experiences. This activity was attended by 30 participants who were members of a local tour guide group.

c. Cultural Development Training

1) Implementation Date: 20-22 June 2024

2) Location: Karangcegak Village Arts Building

3) Methods: Workshop, practical exercises, and performance evaluation

4) Description: This training aims to improve the quality of wayang and gamelan cultural performances. The material provided includes staging techniques, musical arrangement, and an introduction to cultural history. This training was attended by 54 members of Paguyuban Marsudi Laras.

3. Evaluation of activities

Evaluation is carried out in two stages to ensure the effectiveness and success of activities:

a. Mid-Activity Evaluation

1) Implementation Date: June 25, 2024

2) Method: Questionnaire and group discussion

3) Description: This evaluation is carried out to assess participants' understanding of the material that has been presented. The service team collects feedback from participants about their satisfaction with the training and identifies areas that require improvement.

b. Evaluation After the Activity

1) Implementation Date: July 5, 2024

2) Method: Observation and interviews

3) Description: This evaluation aims to assess changes that occur after training. The service team observed the application of the knowledge gained by participants in their daily activities, and conducted interviews to get feedback about the long-term impact of the training.

4. Documentation and Reporting

All activities are well documented through photos, videos and written notes. This documentation is used to create a final PPM activity report, which includes analysis of training results, impact evaluation, and recommendations for further activities.

5. Follow Up

After carrying out the activities, the service team carried out follow-up actions by providing suggestions and recommendations to the community. This includes assistance in the application of knowledge gained and the development of sustainable programs to ensure long-term benefits to society.

Monitoring and Evaluation of PPM Activities

1. Monitoring and Evaluation Objectives

Monitoring and evaluation (M&E) is carried out to ensure that PPM activities run according to plan, evaluate the effectiveness of training, and assess the impact of activities on the community. The main objective is to identify strengths and weaknesses in implementing activities, provide feedback for improvement, and ensure continued benefits for the community.

2. Monitoring Process

Monitoring is carried out periodically during the implementation of activities to ensure that each stage of the activity runs according to the established plan. This process includes:

a) Daily Supervision: The service team carries out direct supervision during the implementation of activities. This includes monitoring training activities, ensuring participant attendance, and evaluating the methods used.

b) Activity Recording: Documentation of activities is carried out through photos and videos to record progress and the training process. These notes are useful for later analysis and reporting.

c) Field Visits: The service team conducts field visits periodically to assess the application of training materials and interactions between participants and instructors.

3. Evaluation of activities

Evaluation of activities is carried out in two main stages:

a. Mid-Activity Evaluation

1) Implementation Date: June 25, 2024

2) Methods: Questionnaires, interviews, and group discussions

3) Description: This evaluation was carried out to assess the extent to which participants understood the training material that had been delivered. The service team collects feedback from participants regarding their satisfaction with the material, teaching methods, and relevance of the training. The results of this evaluation are used to make adjustments if necessary.

b. Evaluation After the Activity

1) Implementation Date: July 5, 2024

2) Methods: Observation, interviews, and assessment of work results

3) Description: This evaluation aims to assess the long-term impact of the training. The service team observed the application of the knowledge gained by participants in their daily activities and conducted interviews to get feedback about changes that occurred after the training. This evaluation also includes an assessment of the participant's performance in applying the new technique and achieving the expected results.

4. Monitoring and Evaluation Results

a. Findings from Mid-Activity Evaluation

1) Strengths: Participants demonstrate a good understanding of leadership and tour guiding concepts. Interactive and participatory teaching methods are highly valued.

2) Weaknesses: Some participants felt that the training time was too short to study the material in depth. There is a need for additional practical sessions.

b. Findings from Post-Activity Evaluation

1) Positive Impact: Participants have applied leadership skills in their daily activities, and tour guiding skills have improved the quality of the tourism experience in Karangcegak Village. An increase in cultural performances is also visible at local events.

2) Areas of Improvement: There is a need for further training in financial management and tourism promotion. Added resources such as training materials and technical support.

5. Recommendations and Follow-up

Based on the evaluation results, several recommendations and suggested follow-up actions are:

1) Advanced Training: Conduct further training to deepen skills learned and introduce new techniques in tourism management and promotion.

2) Material Reinforcement: Provide additional training materials and resources to support participants in the application of their skills.

3) Sustainable Programs: Develop sustainable programs to ensure that the benefits of training are felt over the long term and to facilitate continued support for the community.

Table 3. Monitoring Activities

No.	Monitoring Type	Implementation date	Method	Description
1	Daily Surveillance	During Activities	Direct observation, notes	Monitor the implementation of training activities, participant attendance, and interaction between participants and instructors.
2	Activity Records	During Activities	Photos and videos	Documentation of training activities via photos and videos for analysis and reporting.

3	Field Visit	June 11-12, 2024	Field observations	Assess the application of training materials and interactions between participants and instructors in the field.

Table 4. Activity Evaluation

No.	Evaluation Type	Implementation date	Method	Description
1	Mid-Activity Evaluation	June 25, 2024	Questionnaires, interviews, discussions	Assess participants' understanding of training materials, gather feedback, and make adjustments as necessary.
2	Evaluation After the Activity	July 5, 2024	Observations, interviews, assessment of work results	Assess the long-term impact of training, application of knowledge, and changes that occur after training.

Table 5. Evaluation & Follow-up Results

No.	Evaluation	Findings	Recommendations and Follow-up
1	Mid-Activity Evaluation	Strengths: Good understanding, interactive teaching methods. Weaknesses**:** Training time is too short.	Add practicum sessions, extend training time if necessary.
2	Evaluation After the Activity	Positive Impact: Application of skills in daily activities, increased cultural performance. Areas of Improvement: Technical advanced training needs.	Conduct follow-up training, provide additional materials, develop ongoing programs.

Questionnaire and Evaluation Results

1. Training Evaluation Questionnaire

The following table shows the results of the training evaluation questionnaire given to participants after the training activities were carried out. This questionnaire assesses various aspects of the training, including materials, methods, and application of skills.

Table *6. Results of Training Evaluation Questionnaire*

No.	Evaluation Aspect	Average Score	Information
1	Quality of Training Materials	4.2	The material is considered very relevant and useful
2	Teaching Methods	4.0	Effective and interactive teaching methods
3	Instructor Quality	4.5	The instructor is considered very competent and communicative
4	Application of Skills	3.8	Skills are applied well but there are several obstacles
5	General Satisfaction	4.3	Participants were very satisfied with the overall training

2. Evaluation of Application of Skills

The following table shows the results of the evaluation of skills application carried out after training. This evaluation assesses the extent to which the acquired skills are applied in daily activities.

Table *7. Evaluation Results of Skills Application*

No.	Skills Evaluated	Implementation Percentage	Information
1	Leadership in Organizations	75%	Leadership skills are applied in the management of activities
2	Tourist Guide	70%	The application of skills in tourist guiding is quite good
3	Cultural Management	65%	Cultural management skills are applied with several obstacles

4	Financial management	60%	The implementation of financial management still requires improvement
5	Tourism Promotion	55%	Tourism promotion skills are applied but not optimal

3. Evaluation of the Impact on Community Welfare

The following table shows the results of evaluating the impact of training on community welfare in Karangcegak Village.

Table 8. Results *of Impact Evaluation on Welfare*

No.	Impact Aspect	Average Score	Information
1	Increased Income	3.9	There has been an increase in income from tourism activities and sales of cultural products
2	Improved Quality of Life	4.0	The quality of life of the community improves through cultural and tourist activities
3	Increased Independence	3.7	Community independence is increasing but still requires support
4	Community Involvement	4.1	The community is increasingly actively involved in community & cultural activities

Based on the results of the questionnaire and evaluation:

1. Training Quality: Most participants found the training material to be very relevant and useful. Teaching methods are considered effective, and instructors are rated as highly competent. However, there are several obstacles in the application of skills that indicate the need for additional sessions or further mentoring.

2. Application of Skills: Leadership and tour guiding skills are applied well, while cultural management and financial management skills require more attention. Additional support and continued training in this area is needed.

3. Welfare Impact: Training has a positive impact on increasing people's income and quality of life. However, to increase community independence, ongoing programs and further technical support are needed.

With the results of this evaluation, the empowerment program can be further optimized by paying attention to aspects that require improvement, as well as continuing to support the sustainability and effectiveness of the program in the future. The results of the training evaluation questionnaire show

various aspects assessed by participants to assess the effectiveness and quality of the training. First, the quality of the training material received an average score of 4.2, which shows that the material presented was considered very relevant and useful by the majority of participants. This reflects that the material meets the participants' needs and provides useful information for their skill development. Second, the teaching method obtained an average score of 4.0, indicating that the method used in the training was considered effective and interactive. This teaching method helps participants understand and apply the material better, providing a more enjoyable and efficient learning experience.

The quality of the instructors received the highest score, namely 4.5, indicating that the instructors were considered very competent and communicative. This means that participants feel that the instructor not only has in-depth knowledge, but is also able to convey information clearly and support the learning process well. However, the application of skills received an average score of 3.8, which shows that even though the skills learned are implemented well, there are still several obstacles faced by participants in implementing these skills optimally. This may indicate a need for additional support or further practice to increase the participant's ability to apply acquired skills. Finally, participants' general satisfaction scored 4.3, indicating that overall, participants were very satisfied with the training. This satisfaction reflects the success of the training in meeting participants' expectations and providing significant added value for them. Overall, the results of this evaluation questionnaire show that the training has achieved a high level of success in several main aspects, especially in terms of the quality of the materials and instructors. However, there are areas that still need improvement, such as skills application, to ensure that all participants can make optimal use of the training.

4. Conclusion

Community Service Activities (PPM) carried out in Karangcegak Village, Kutasari, Purbalingga, aim to empower youth groups in the Marsudi Laras Community through leadership training, tour guiding and cultural development. Based on the monitoring and evaluation results, several conclusions can be drawn:

a. Skills Improvement: Training has been successful in improving leadership and tourist guiding skills among youth. Participants demonstrate a good understanding of the material and have applied these skills in daily activities as well as in village tourism management.
b. Positive Impact on Culture and Tourism: Training activities have had a positive impact on cultural performances, especially in terms of wayang and gamelan arts. Tourism in Karangcegak Village has also experienced an increase in service quality and attractiveness, thanks to newly acquired guiding skills.
c. Need for Improvement: Several deficiencies were identified during implementation, including training time that was felt to be too short and the need for additional support in terms of financial management and tourism promotion.
d. Involvement and Participation: The active participation of members of the Marsudi Laras Association shows that they have high motivation to advance the village and preserve its culture. However, there is a need for ongoing support for this initiative to be sustainable.

Suggestions

Based on the evaluation results and conclusions from PPM activities, several suggestions that can be given are:

a. Increased Training Duration**:** To ensure deeper understanding and skills, it is recommended that the training duration be extended. The addition of practical sessions and time for additional practice will help participants master the material better.
b. Advanced Training and Technical Support**:** Hold further training in the fields of financial management, tourism promotion and cultural development. Additional technical support such as providing training materials and promotional tools is also important to increase program effectiveness.
c. Sustainable Program Development**:** Establish a sustainable program involving regular training and long-term support to maintain and develop the skills acquired. This includes forming partnerships with related organizations and government institutions to support the continuity of activities.
d. Continuous Monitoring and Evaluation**:** Carry out ongoing monitoring and evaluation to periodically assess program developments and impacts. Feedback from participants should be used for continuous improvement and adaptation to community needs.

e. Strengthening Social Networks**:** Improve social networks among youth and local communities to facilitate collaboration on future projects. This will strengthen social capital and help in the further development of cultural and tourist activities. By implementing these suggestions, it is hoped that community empowerment in Karangcegak Village can develop further, provide greater benefits, and contribute to the welfare and independence of the local community.

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CONTENT ANALYSIS OF PEACE EDUCATION IN GRADE VII JUNIOR HIGH SCHOOL SOCIAL STUDIES TEXTBOOKS

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Abstract

Indonesia is a multicultural country with many and varied conflict experiences. This is enough to be the basis for the need for accommodative peace education in various lines of national life, one of which is in school learning. The integration of peace education in textbooks is one of the strategic ways, especially when done in social studies learning at the junior high school level. This research intends to examine the content of peace education in the seventh grade social studies textbooks that are commonly used in Indonesia. This research is a content analysis research, which was conducted on three seventh grade social studies textbooks. Qualitative approaches to content analysis are rooted in literary theory, social science, and critical theory. Often referred to as interpretive research. This research has the following characteristics: (1) Requires careful reading of a relatively small amount of text material. (2) Involves the interpretation of texts as expressed in new narratives (analytic, deconstructive, emancipatory, or critical) accepted within a particular scientific community that sometimes conflict with traditions of positivistic inquiry. (3) Analysts work within a hermeneutic scope where their own socio-cultural understanding influences their research (Krippendorff, 2004: 17). Data were collected and analyzed using the Miles and Huberman interactive method. The findings of this study are first, in the three books studied there are five values of peace education, namely 1) respect for differences; 2) cross-cultural understanding; 3) learning to live together; 4) non-violence; and 5) conflict resolution. Of the five values, the most common value found is learning to live together, where in the first book there are 25 components, in the second book there are 17 components, and in the third book there are 5 components. Second, the values of peace education are described in the textbooks in the introductory part of learning, materials, group activities, assignments, learning reflections, and evaluation questions.

Keywords: peace education, social studies, textbook

1. Introduction

The Indonesian nation has enormous potential for conflict. This is due to the diversity of cultural, religious, economic and welfare backgrounds. Diversity management that cannot be separated from social and cultural political dynamics has the potential to trigger conflict and violence on a wider scale. Conflict in Indonesia is caused by various factors that have accumulated over a long period of time and have received little serious attention. Several riots that have occurred in Kalimantan, for example in Sanggau-Ledo (1996-1997), Sambas (1999), and Pontianak (2000) have caused hundreds of deaths, thousands of houses burned down, and tens of thousands of people displaced. The conflict in Sambas in 1999 caused more than 24,000 people to flee (indonesia-p@indopubs.com). These conflicts are not simply due to differences in identity. Schulze (2017) in research on three conflict areas in Indonesia (Poso, Ambon and Sambas) concluded that behind ethnic and religious differences as part of the causes of conflict, social, economic and political factors were the most important content in the conflict.

Seeing the scale of the conflict and the large number of victims, various efforts are needed so that all components function optimally in minimizing the potential for conflict. One important element in efforts to overcome various forms of violence is to foster a culture of peace in education. As an effort to humanize humans (humanization), education has a big responsibility in seeking a harmonious life in Indonesia. Unfortunately, in educational practice dehumanization still occurs, such as violence, bullying, etc. Acts of violence in the world of education in Indonesia reflect the lack of teachings of love in every learning process.

Peace education is important because students are taught to understand strategies for facing and resolving conflict in their environment. Conflicts with oneself, oneself and others and between one community and another need to be understood by students. Peace education is designed to overcome problems related to this, as an effort to form a generation that values justice, respects others, and upholds humanitarian principles as a prerequisite for creating an atmosphere of peace and harmony.

Social studies subjects have a central position in peace education in schools, as one of the subjects that emphasizes the cultivation of main character values. Through social studies education, students are designed to be able to develop the abilities of a good citizen so that they can solve problems in their environment. Self-control skills (controlling anger, accepting other people's criticism, and obeying rules) (Lauritzen, 2016). The integration of peace education can be carried out in social studies learning. According to teachers, social studies subjects can foster cultural and social awareness, anti-violence, ethics, love and peace with others (Sariyatun, 2019:159).

This research looks at the content of peace education in social studies learning in schools, in terms of the content of the teaching materials. Research will be carried out on three social studies textbooks that are widely used nationally to get a complete picture of the content of peace education. This research is in line with the direction of UNY's research focus as a university that excels in developing character education in Indonesia, where peace education is a concept built from main character values which must be integrated into various aspects of education and teaching in schools.

One of the functions of education is to eliminate sources of human suffering which are rooted in ignorance and poverty and to create equality in a democratic society. National education functions to develop abilities and shape the character and civilization of a dignified nation in order to make the nation's life more intelligent (UU No. 2 of 2003). Education as a process of cultural transformation is an enculturation activity from one generation to the next, especially educating for living together. This is an experience that enriches imagination, enlightens and builds shared responsibility.

Peace education is based on universal peace principles which affirm: (1) humanity is one; (2) human unity in diversity; (3) humanity's greatest opportunity is to maintain its integrity and protect its diversity; (4) humanity's greatest challenge is the accomplishment of tasks through peaceful means, with a special focus on educating each new generation of children and youth according to these principles (Danesh, 2007: 137). In this context, Fountain (1999: 16) emphasized that the world of education should make schools a safe area (zone of peace) where children feel safe from the conflicts raging in society.

Peace education is an educational effort to create in schools that participate in activities to create a culture of peace through three cultural paths, namely: 1) a culture of creating peace, namely: an environment free of violence, intimidation, harmony and peace throughout the school community; 2) a culture of healing/recovery, namely: creating a conducive environment to help all members of the school community to gradually recover from the negative impacts of conflict and violence that they may experience in their lives; and 3) a culture of excellence, namely: creating an environment that is conducive to achieving excellence in all aspects of the lives of school community members: academic, behavioral, ethical, and relational (Jonhson & Jonhson, 2005).

Toh Swee Hin (1992:12-15) relies on four pedagogical principles for peace education, namely: 1) holism which describes the close relationship as a unity between the elements of peace education. Swee-Him (1992: 17), who developed peace education in the Southern Philippines, mentioned seven things that cannot be separated and always form a parallel framework in peace education, namely, personal peace, structural violence, human rights, cultural solidarity, militarization, and environmental care; 2) encourage the centrality of the formation of critical values to the peace education process. In the post-positivist paradigm of social science, all production and distribution of knowledge contains implicit or explicit values that need to be brought to light in critical pedagogy, and examining their possible consequences for the world; 3) is a dialogue that places students as educational subjects. Students do not just passively receive knowledge and "truth" from their teachers who act as "bankers". Instead, dialogue situations are created through participatory and active teaching and learning strategies, where learners' personal realities and understandings have the opportunity to emerge, and are shared for cooperative reflection; and 4) conscientization pedagogy, which borrows Freire's term that education is awareness. Instead, dialogue flows through the formation of an active critical consciousness that empowers each of us to change our reality.

Social Studies aims to develop the potential of students to be sensitive to social problems that occur in society, have a positive mental attitude towards correcting all existing inequalities, and be skilled in dealing with problems that occur every day, both those that happen to themselves and those that affect people's lives (Nursid: Mukminan , 2017: 3). In general, several opinions regarding the objectives of social studies education as described above are in accordance with the objectives of national education based on article 3 of Law no. 20 of 2003 concerning the National Education System, namely: national education functions to develop abilities and shape the character and civilization of a

dignified nation in order to educate the life of the nation, aimed at developing the potential of students so that they become human beings who believe and are devoted to God Almighty, have noble character, are healthy , knowledgeable, capable, creative, independent, and a democratic and responsible citizen (Gunawan, 2011: 21)

There are three dimensions of IPS, namely the dimensions of knowledge, skills, values and attitudes. Value is something valuable. Value is something that is interesting, something that is sought after, something that is enjoyable, something that is liked and desired, in short, something that is good (Bertens, 2011: 149). In essence, value is something that is valuable. The values in question are a set of beliefs or principles of behavior that have been internalized within a person or group of people which are manifested in their thoughts and actions (Sapriya, 2015: 53).

In social studies learning, teachers also instill peace values. Instilling character values is very important to be implemented both in the family, school and community environment in order to form a higher quality generation. Kurniasih and Sani (2017) conveyed the cultivation of character in learning planning and learning implementation. At this stage, social studies teaching materials and learning materials have a very central role, because the majority of students depend on the teaching materials discussed in class as one of their main learning sources. Haryati and Khoiriyah (2017) concluded that cultivating character in schools is the right strategy for building students' character. One strategy that can be implemented is through the integration of peace values in textbooks.

2. Method

The method used is content analysis. Qualitative approaches to content analysis are rooted in literary theory, social science, and critical theory. Often referred to as interpretive research. This research has the following characteristics: (1) Requires careful reading of a relatively small amount of text material. (2) Involves the interpretation of texts as expressed in new narratives (analytic, deconstructive, emancipatory, or critical) accepted within a particular scientific community that sometimes conflict with traditions of positivistic inquiry. (3) Analysts work within a hermeneutic scope where their own socio-cultural understanding influences their research (Krippendorff, 2004: 17).

This research carried out over six months, from March to September 2024. The data source for this research is the content of three textbooks used as teaching material for class VII social studies subjects in the Independent Curriculum. The books that will be used are: 1) Social Sciences for Class VII Middle Schools published by the Ministry of Education, Culture, Research and Technology; 2) Social Sciences Social Sciences for SMP/MTs Class VII published by Erlangga and 3) Bupena Merdeka Ilmu Pengetahuan Sosial for SMP/MTs Class VII (K-Merdeka) published by Erlangga.

Data collection carried out in accordance with the procedure developed by Krippendoff (2013: 120) where the researcher first copies the book content, then breaks it down into sentences, and does coding. Next, the researcher provides an explanation of the reasons why a sentence is considered to contain the value of peace, until it finds a general pattern in the sentences analyzed. The analysis stages include: 1) unitizing, namely providing information on sentences. The information in question includes chapters, subchapters, subchapters, pages, and so on. So a sentence that is examined will find out which chapter it comes from, which sub-chapter, which page it is on, and so on. Grouping data will make it easier for researchers to carry out the next steps. Grouping data is a very crucial first step so it must be done as carefully as possible; 2) Coding, at this stage the data (per sentence) is grouped whether it contains values or potential democratic values or not. If yes, then fill it in with information about what democratic values appear in the sentence; 3) Data reduction; 4) Data interpretation; and 5) Drawing conclusions.

3. Results and Discussion

Hilton (2016) said that textbooks are an educational component that cannot be separated from the learning process. The use of textbooks in the learning process can not only enrich students' knowledge, but also enrich students' experiences, which in turn can be shown to increase learning outcomes. Instilling noble values through textbooks has often been done, but it is necessary for Marinovic and Eric (2014) to say that instilling values in textbooks cannot be presented as a dogma. Work has shown key parameters for presenting values so that they can be an instrument for the socialization of children (Marincovic & Eric, 2014).

Research conducted by researchers on three class VII social studies textbooks shows that the three books studied bring out the values of peace education. Peace education is based on universal peace principles which emphasize: (1) humanity is one; (2) human unity in diversity; (3) humanity's greatest opportunity is to maintain its integrity and protect its diversity; (4) humanity's greatest challenge is the accomplishment of tasks through peaceful means, with a special focus on educating each new generation of children and youth according to these principles (Danesh, 2007: 137).

Peace education is an educational effort to create in schools that participate in activities to create a culture of peace through three cultural paths, namely: 1) a culture of creating peace, namely: an environment free of violence, intimidation, harmony and peace throughout the school community; 2) a culture of healing/recovery, namely: creating a conducive environment to help all members of the school community to gradually recover from the negative impacts of conflict and violence that they may experience in their lives; and 3) a culture of excellence, namely: creating an environment that is conducive to achieving perfection in all aspects of the lives of school community members: academic, behavioral, ethical, and relational (Jonhson & Jonhson, 2005).

The first textbook is a class VII social studies textbook published by the curriculum and book center. In this book, there are 70 components of the value of peace education which are spread both in the form of teaching materials, learning activities and group assignments. The second textbook is a class VII social studies textbook published by Erlangga Publisher which has 41 peace education components listed in the learning materials and activities. Meanwhile, in the third book, in the form of a companion book to the textbook published by Erlangga Publisher, 32 components of peace education were found which were accommodated in learning materials and activities. These components can be categorized into five expressions of the value of peace, namely: 1) respecting differences; 2) cross-cultural understanding; 3) learn to live together; 4) non-violence; and 5) conflict resolution.

First, appreciate differences. Peace education is based on living in harmony, tolerance and empathy for other people (Akbar, et al. 2018). A harmonious, tolerant and empathetic life requires tolerance that is internalized in society. So recognition and respect for differences is the first step in building tolerance and peace. In the first book published by the Center for Curriculum and Books, there are 10 components that express an expression of respect for differences. This component includes the concepts of individual differences, individual character differences, factors that cause individual differences, differences in the needs of each individual, and why there are differences in needs between individuals, differences between community groups, and differences between one region and another. These ten components consist of 7 components in the learning material, 1 component in group assignments, 1 component in reflection, and 1 component in enrichment assignments.

In the second book, the Class VII Social Sciences Textbook published by Erlangga Publishers, six components of the expression of respect for differences are found. These components include understanding that humans are different from each other, individuals have their own abilities and advantages, differences in needs between individuals, reflecting on why differences in needs occur, and why there are differences in society. The distribution of components is 2 components in teaching materials, 1 component in discussion activities, and 3 components in reflection.

In the third book, a companion book to the textbook published by Erlangga Publishers, it is known that there are 8 components of the expression of respect for differences, including differences in needs between individuals, differences in characteristics between individuals, and factors that cause differences in individual diversity. The distribution of components is one component in the assignment, one component in the reflection, and six components in the teaching material.

Second, cross-cultural understanding. Peace education in learning based on multicultural understanding is a process of instilling values and ways of life that are mutually respectful, sincerity and tolerant of diversity (Sujiono, et al. 2022). In the first book published by the Center for Curriculum and Books there are 18 components of the expression of cross-cultural understanding, these 18 components include the concepts of assimilation, acculturation, how culture is formed, dynamic culture following humans, culture is a valuable heritage, examining the elements and forms of local culture of indigenous peoples, as well as factors that cause cultural differences. The distribution of components in the first book is 13 components in the material, 3 components in the assignment, and 2 components in the reflection.

In the second book, the Class VII Social Sciences Textbook published by Gramedia, it is known that there are 5 components of the expression of cross-cultural understanding, namely the concept of accommodation in culture, why accommodation is needed, forms of societal diversity, factors that influence cultural differences, and forms of culture. The distribution of components is 4 components in the material and one component in the assignment.

In the third book, a companion book to the textbook published by Gramedia, it is known that there are 8 components for the expression of cross-cultural understanding, including the concept of acculturation, the concept of cultural formation, examples of local cultural forms of Indonesian society, and examining the value of multiculturalism. The distribution of components is 3 components in material, one component in assignments, and 4 components in group activities.

Third, learn to live together. Learning to live together is one of the pillars of education established by UNESCO (2009), this concept refers to developing an understanding of other people through dialogue that leads to empathy, respect and appreciation which are important for building a peaceful life. In the first book published by the Center for Curriculum and Books, there are 25 components of the expression of learning to live together. These components include awareness of humans as social creatures, understanding of differences, understanding of interactions between individuals, how to interact with other people who have different characters, acculturation, assimilation, examples of cases of the peaceful entry of Islam in the archipelago, what is the relationship between the unity of Maluku and Papua During the time of Sultan Nuku, folklore had values of harmony and cooperation, local Indonesian people were genius in responding to different cultures so that they did not become conflict. The distribution of components is 20 components in material, 3 components in assignments, and 2 components in reflection.

In the second book, the Class VII Social Sciences Textbook published by Gramedia, it is known that there are 17 components of the expression of learning to live together, namely humans as social creatures, respecting other people's privacy, the existence of values and norms as regulators of living together, cooperation, differences between regions which cause interaction, the value of unity, empowering communities in managing nature and increasing welfare. The distribution of components is 9 components in the material, 3 components in the evaluation, and 5 components in the assignment.

In the third book, a companion book to the textbook published by Gramedia, it is known that there are 5 components of the expression of learning to live together, with components about social interaction, acculturation, assimilation, and the role of community in achieving common goals. The component distribution is two components in the assignment and three components in the material.

Fourth, non-violence. Anti-violence is one of the values emphasized in peace education (Lauritzen, 2016). Even in general, peace education is defined as a process of teaching about peace strategies and non-violence (Harris, 2008). The finding of anti-violence expressions in the three books studied also shows that the value of anti-violence is promoted throughout the book material. In the first book published by the Center for Curriculum and Books, there are 8 components of anti-violence expression, namely: the importance of interacting well, interacting with people who have differences, how to interact in order to remain a human being with morals, criticizing folk tales about stories of feuds, building relationships friendship between students, examples of stories about humanist approaches to broadcasting Islamic religion in the past, examples of the destruction of the Singasari, Ancient Mataram and Majapahit kingdoms due to violent feuds, and reflecting on the conditions of violence in society today. The distribution of components in the material section is 3 components, in the assignment section there are 3 components, and in the reflection section there are 2 components.

In the second book, the Class VII Social Sciences Textbook published by Gramedia, it is known that there are 4 components of anti-violence expression, namely about juvenile delinquency and its impact, vandalism and its impact, brawls and their impact and the concept of dissociative social interaction. These four components are divided into two components in the material and two components in the assignment.

In the third book, a companion book to the textbook published by Gramedia, it is known that there are 4 components of anti-violence expression, namely examples and impacts of juvenile delinquency, examples and impacts of vandalism, examples and impacts of conflict during the Singasari period, and how to deal with vandalism without violence. Three of these components are in the material section, and one component is in the activities.

Fifth, conflict resolution. Conflict is an inseparable thing in the dynamics of society. Conflict occurs as a process that begins when one party perceives that the other party has been negatively affected, or that the other party will negatively affect something of concern or interest to the first party (Robbins & Judge, 2008). Many experts then explain conflict resolution as a quite important component in peace education. In the first book published by the Center for Curriculum and Books, there are 9 components of anti-violence expression, namely accommodation, contravention, dissociative interaction, examples of conflicts in everyday life, reflections on conflicts during the Sultan Ageng Tirtayasa and Sultan Haji, examples of conflicts between the Sultan of Nuku and the Sultan of Tidore in facing the Dutch, the need to minimize ethnocentrism, and steps to develop conflict prevention between students. The distribution of components is 7 components in the material and assignment of 2 components.

In the second book, the Class VII Social Sciences Textbook published by Gramedia, it is known that there are 7 components of expression of conflict resolution, including accommodation, contravention, examples of accommodation, examples of contravention, poverty and inequality as factors of conflict, gender inequality as a cause of conflict, and juvenile delinquency as one form of conflict. The seven components are in the teaching material.

In the third book, a companion book to the textbook published by Gramedia, it is known that there are 7 components of conflict resolution expression. These are examples of the impact of conflict that occurred on Sultan Ageng Tirtayasa and Sultan Haji, the impact of conflict on the Kingdom of Kediri and China, examples of conflict resolution, reflections on conflict in the present, and factors causing conflict. The distribution of components is 5 components in the material, one component in the assignment, and 1 component in the reflection.

The findings of the values of peace education in these three books can prove directly and indirectly that the social studies textbook for class VII teaches the value of peace education. Not only at the knowledge or conceptual level, but also includes more detailed peace values, such as understanding differences, unity, cooperation, helping each other, and awareness as social beings whose hopes can be internalized by students and teachers.

The knowledge presented is also more than just an illustration of events but is accommodated in social studies teaching materials. For example, in human needs material, students are given the insight that each individual has their own profile, so they have different needs. In another material study, regarding climate differences between regions in Indonesia which have an impact on differences in people's way of life. Material about the ethnic and racial differences of people living in Indonesia has an impact on differences in social systems, belief systems and other cultural results. These three materials have an important common thread in peace education, namely the various differences that live in society. Understanding this concept is easy to bring to understand the concept of "appreciating differences" and "understanding different cultures".

In other material, for example, material regarding the dynamics of life during the Hindu, Buddhist and Islamic kingdoms, which were often characterized by conflicts regarding territory and authority. There is also material about contemporary social conflicts such as student brawls and riots between community groups, where this material can easily become a way of knowledge about the impact of conflict if it is not managed well, as well as how conflict should be managed.

The value of peace education is also included in student assignments/learning activities. For example, in the component of drafting a solution to vandalism without conflict, students must carry out it in groups. The topic of questions that must be worked on includes a peace education component, and is carried out by working together in groups. If this design is actually implemented in class, then students discuss the value of peace while practicing the components of cooperation.

Placing the value of peace education in reflection activities shows that it is hoped that the value of peace is not only mastered at the level of knowledge, but must also be believed to be true, so that students can abstract the reflection of peace values in everyday life today. For example, in the activity of reflecting on the conflict in the Singasari kingdom in its current condition, students can see whether there are similarities with contemporary conflict conditions and estimate whether the impact of current conflict will be as destructive as the impact of conflict in the past.

Marinkovic and Eric (2014, 74) explain the parameters for presenting values in textbooks, which include definitions, illustrations, case examples, reflections, summaries and assessments. Based on these parameters, the textbooks studied in this research have met these parameters, although not all

expressions and values are integrated with all parameter components and are not presented in balanced proportions. Of the five expressions of the value of peace, the most expressed are expressions of cross-cultural understanding and learning to live together. Meanwhile, expressions of anti-violence received the smallest proportion in the three books studied.

Regarding the values of peace found in the three textbooks, all of them are in accordance with the values of peace in general. However, the peace values found are still very likely to be developed, for example the three textbooks show more expressions of understanding differences and awareness of harmony, and quantitatively fewer expressions of conflict resolution. As an example of a more contemporary society-breaking conflict. This is so that learning is more contextual, and more in line with existing needs in society. However, this is in accordance with the findings of Aftab & Sadaf (2023) that textbook content needs to be reviewed periodically to ensure that the books used always convey appropriate peace values.

4. Conclusion

Based on the results of the research and discussion that have been described in this research, it can be concluded that: First, the textbook for social studies students for class VII SMP published by the Center for Curriculum and Bookkeeping, the textbook for social studies students for class VII SMP published by Erlangga, and the companion book for the social studies textbook Class VII of Erlangga Public Middle School contains five values of peace education, namely 1) respecting differences; 2) cross-cultural understanding; 3) learn to live together; 4) non-violence; and 5) conflict resolution. Of the five values, the highest value found was learning to live together, where in the first book there were 25 components, in the second book there were 17 components, and in the third book there were 5 components. Second, the values of peace education are explained in the textbook in the introductory learning section, materials, group activities, assignments, learning reflections, and evaluation questions. The largest number of multicultural education components is found in the first book, namely the book for social studies students for class VII SMP published by the Center for Curriculum and Books.

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Market Exploration of MOOC Provider Companies in Indonesia Using Machine Learning

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Abstract

This research aims to explore the market of MOOC (Massive Open Online Course) platform providers in Indonesia using machine learning methods to analyse trends and user behaviour. MOOCs provide broad access to education, especially during the pandemic, where the need for learning flexibility increases. Although machine learning applications have been widely applied in the financial sector, its application in the exploration of the education market, particularly MOOCs, is still minimal. This research aims to address this gap by applying machine learning algorithms, such as clustering and decision tree, to understand user preferences and predict future needs. The study found that Duolingo leads the MOOC market in Indonesia with a 79.76% share. Although the market is dominated by a few big players, there are growth opportunities for new platforms through innovation and proper segmentation. This research also shows the importance of applying AI technology in processing big data to understand market dynamics more comprehensively.

1. Introduction

The development of digital technology cuts the boundaries of time and space. The presence of learning technologies such as MOOCs plays an extraordinary role in the dissemination of knowledge. Certified online education or training providers in the form of MOOCs are growing rapidly in Indonesia. The growth of Massive Open Online Course (MOOC) platform in Indonesia is influenced by the increasing access to digital technology and the need for more inclusive education. MOOCs allow anyone, from various social and economic backgrounds, to access educational content for free. The increasing use of MOOCs in Indonesia is also in line with the growing popularity of online learning due to the pandemic and the need for flexibility in the learning process. In this context, MOOC service providers face the challenge of understanding market needs as well as dynamic user behaviour.

Much of the research on the application of machine learning in Indonesia has focused on the financial sector, such as predicting stock prices or analysing company performance on the stock exchange. For example, research by Mistry reveals the use of modern Search Engine Optimisation using machine learning. 1. Another study by Ramadhan et al. (2017) used Artificial Neural Network (ANN) to predict the financial performance of companies on the Indonesia Stock Exchange. The research shows that machine learning has the ability to accurately predict market and financial behaviour. 2. Although the application of machine learning in the financial sector is growing rapidly, research related to its application for education market analysis, especially for MOOCs in Indonesia, is still very less explored.

A lot of MOOC research has been conducted. We found at least 200 scopus articles from 2014 to 2024 that generally discuss performance analysis, emotions and user experience, MOOC design and effectiveness, sentiment analysis, and linkages with new technologies. Most of the existing research still focuses on the pedagogical aspects of MOOCs, such as curriculum design and challenges faced by instructors, especially in Indonesia and Malaysia. 3. The research is generally more directed towards how MOOCs are designed, how participant engagement is enhanced, and how design challenges can be overcome. This shows that research in this area still focuses on the course design aspect, while market exploration and user data analysis using machine learning methods have not been widely discussed.

However, we have not found any market research on MOOCs that take the cyberspace community as users. We also highlight two things: firstly, the lack of machine learning integration in MOOC market exploration. While MOOCs are growing in popularity, there is still a gap in the application of AI and

machine learning technologies to understand the dynamics of this market in depth. 4. Secondly, most studies focus on MOOC infrastructure and adoption, without integrating advanced tools such as machine learning for market exploration and trend prediction. Absence of a holistic, data-driven approach: Most studies have not adopted a data-driven approach that utilises AI holistically to process big data from MOOC users. 5

This research will incorporate the use of AI and machine learning to analyse patterns and trends in MOOC usage across different global markets. This includes user segmentation based on learning preferences, analysis of user preferences, and prediction of future needs. The uniqueness of this research is the dynamic application of machine learning algorithms to explore how the MOOC market is developing in various countries, especially Indonesia.

Literature Review

A. Online Course Marketplace

MOOCs provide an additional resource for applicants in the job queue, although their labour market value is still modest and only equivalent to formal education qualifications. MOOCs are regarded as "soft credentials" that are accessible and flexible educational tools. Learners are aware of the low status of MOOC certificates and the lack of recognition, yet most of them have downloaded the free certificates issued at the end of the course, put them on their CVs, or linked them to their profiles on professional social networks. The authors argue that the increasing reliance on this type of training may contribute to a further transfer of responsibility from collective actors to individual workers. 6.

B. MOOC (Massive Open Online Courses)

MOOCs are a series of online courses with some key characteristics. Note that they are all delivered online through video chat forums or a combination of both. Courses are often developed by individuals in the field at large research institutions, however, anyone can upload a MOOC. There is no registration fee for participants and no company to sign up, even if users are eligible. McCauley says "MOOCs are social network integrations that facilitate the gathering of renowned experts in the learning field with free access to online resources." 7,8

MOOC is an open e-learning model with active user participation and the number of users can be very large. In general, the materials available in this service are 9 :

a. Video Learning This video contains documentary content that is approximately 5 minutes to 10 minutes long
b. Reading. The suggested readings are quite varied. Some are presented as e-books and others as ppts.
c. Question-scoring sheet. The questions are often in multiple-choice format so scores are automatically displayed on the web.
d. Video Conferencing. This feature allows users to communicate in real time with instructors through video calls.
e. Social networking. MOOC sites are often associated with social networks. So that it can support programme delivery.
f. Forum. The forum is a place for discussion with teachers and other MOOC users.

MOOCs have the potential to bring education to millions of people who might not otherwise have access to it. The combination of short video lectures regular comprehension tests and active participation in an online community can be an effective learning tool for some users.

2. Research Method

This research uses web analysis method with the help of web analysis tool (semrush). Semrush provides facilities for users to perform analysis on keywords. 10,11. In this research, we collected data from MOOC platforms in Indonesia. We included at least 30 MOOC domains among them:

Table 1. MOOC domains in Indonesia managed by companies

No.	MOOC Name	Link
1	Skill Academy	http://skillacademy.com
2	Qubisa	http://qubisa.com
3	Binar Academy	http://binaracademy.com
4	CodeI	http://codesaya.com
5	School Coding	http://sekolahkoding.com

6	Duolingo	http://duolingo.com
7	Digit Talent	http://kominfo.go.id
8	DQLab	http://dqlab.com
9	Revou	http://revou.co
10	Cakap	http://cakap.com
11	Open University	http://ut.ac.id
12	My Skill	http://myskill.id
13	Arkademi	http://arkademi.com
14	Eduwork	http://eduwork.id
15	Future Skills	http://futureskills.id
16	Idebiz	http://idebiz.id
17	Interskill	http://interskill.id
18	Innovative Teacher	http://guruinovatif.id
19	Eduparx	http://eduparx.id
20	Online Training	http://diklat.online
21	Digit Academy	http://digitademy.com
22	Kuncie	http://kuncie.com
23	Pilar Teknotama	http://pilarteknotama.co.id
24	Bright Share Class	http://kelasberbagicerah.com
25	Campus Digital	http://campusdigital.id
26	Al Hikmah Academy	http://alhikmahakademi.com
27	IT box	http://itbox.id
28	Mikkha	http://mikkha.com
29	E-Teacher	http://e-guru.id
30	Akupintar	http://akupintar.id

Based on this data, we conduct exportation with the Application of Machine Learning: Machine learning algorithms, such as clustering, decision trees, or neural networks, will be used to analyse market patterns and trends. 5. These algorithms can help in better prediction and segmentation of users.

3. Result and Discussion

We include data on at least 29 MOOC companies currently in Indonesia. Figure 1 provides an overview of the dominance of major players in the MOOC market in Indonesia, as well as information on market size and market traffic trends over the period.

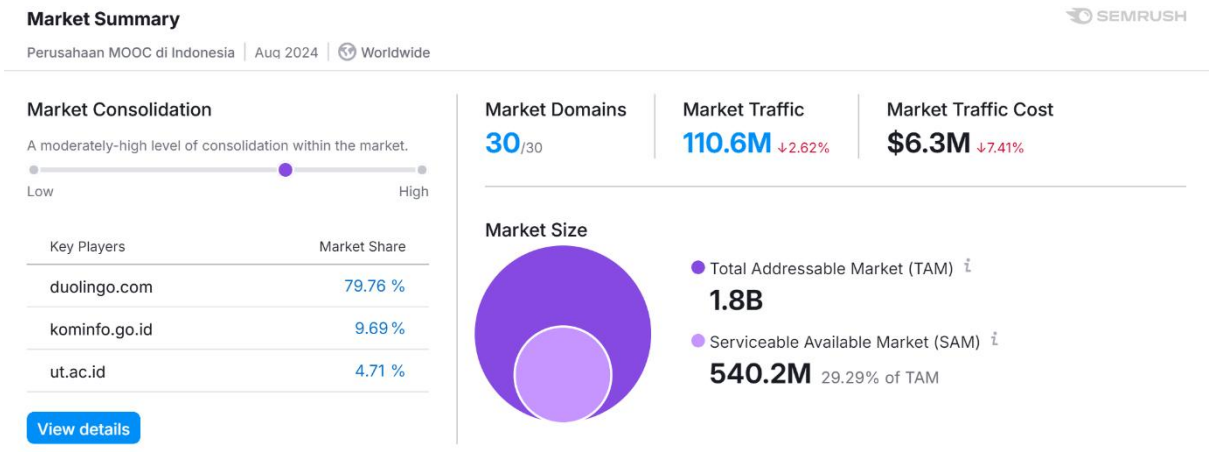


Figure 1. Market Summary of MOOC companies

The MOOC market in Indonesia shows a high degree of consolidation, which means that the market is dominated by a few large players. Key Players: Duolingo.com has the largest market share with 79.76%. Kominfo.go.id comes second with 9.69% market share. Ut.ac.id (Open University) comes in third with 4.71% market share. In terms of Market Domains, there are 30/30 market domains registered, indicating that there are 30 major players in the industry. Market traffic reached 110.6 million with a decrease of 2.62% compared to the previous period. Market Traffic Cost: The market traffic cost was $6.3 million, also a decrease of 7.41%. The market size from our search results showed

a Total Addressable Market (TAM) of 1.8 billion. The Serviceable Available Market (SAM), which is the portion of the TAM that is practically reachable, is 540.2 million, or 29.29% of the total addressable market.

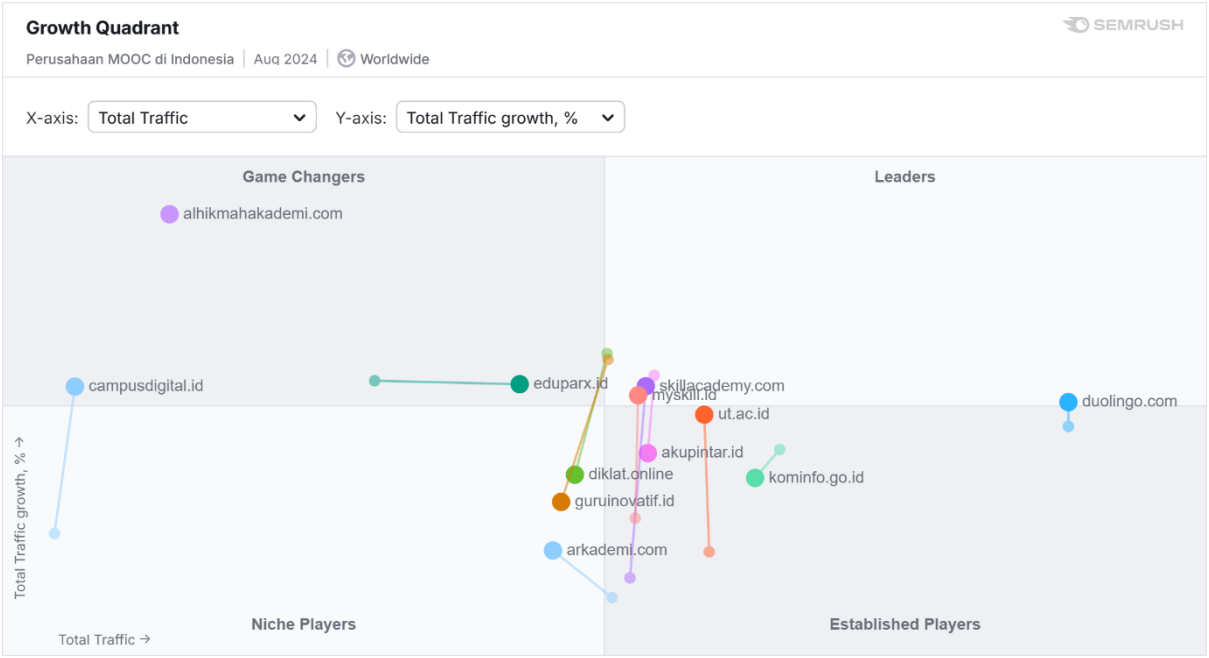


Figure 2. Growth Quadrant of MOOC companies

Figure 2 is divided into four main quadrants that show the company's position based on traffic growth (%) on the Y-axis and total traffic on the X-axis. A description and discussion of each section follows:

a. Leaders Quadrant

This quadrant features companies that have a large amount of total traffic and significant growth. In this quadrant is duolingo.com, which is deep in the bottom right corner. This shows that Duolingo is an established platform with very high traffic, despite relatively low growth. This reflects that Duolingo is a large, mature player in the MOOC market in Indonesia.

b. Established Players Quadrant

Companies in this quadrant have large total traffic but slow or almost stagnant growth. Here, we see sites like:

a. *ut.ac.id* (Open University) with large traffic but moderate growth.

myskill.id, *skillacademy.com*, and *akupintar.id* show a fairly competitive position with significant traffic but less aggressive growth. This reflects that these companies already have a strong market share, but face challenges in maintaining rapid growth.

c. Game Changers Quadrant

Companies in this quadrant have high traffic growth but their total traffic is still relatively small compared to established players. Here we have alhikmahakademi.com, which shows a high increase in traffic growth, although it is currently still at a lower level in terms of total traffic. This suggests that this company may still be in its early stages of growth but has great potential to expand in the future.

d. Niche Players Quadrant

Companies in this quadrant have low total traffic and growth. Examples of companies here are campusdigital.id, arkademi.com, diklat.online, and guruinovatif.id which show that they have a small user base and slower growth. These companies may focus on a more specific or niche market segment, and they have challenges scaling their operations.

In general, large platforms such as Duolingo and Open University continue to dominate in terms of user numbers, but new companies such as alhikmahakademi.com are emerging as promising competitors with high growth rates. Companies in the Established Players quadrant are likely to have

reached a point of stability in terms of traffic but may need to look for new strategies to increase their growth again. On the other hand, companies in Niche Players and Game Changers have the challenge of attracting more users to increase their visibility in this competitive market.



Figure 3. Top Keywords

In August 2024 (see figure 3), keywords related to MOOC companies in Indonesia showed interesting trends in user searches. The most dominant keyword is "English," reflecting the high demand for courses in this language. In addition, the keyword "certificate" stands out, indicating the importance of formal recognition of the courses attended.

Some other keywords of interest include "data analysis bootcamp," "Excel pivot tables," and "data analysis techniques," indicating a growing interest in analytics skills and technical tools relevant to the job market, especially in the field of big data. Searches on "CV examples" and "HR" show a focus on career development and creating job application documents. Keywords such as "quality assurance" and "software engineering" reflect a strong interest in technology, especially in software development. These trends indicate an urgent need for language skills, formal certifications, and technical skills that are relevant in the world of work. Overall, MOOC users in Indonesia are focused on developing skills that can enhance their competitiveness in an increasingly competitive global job market.

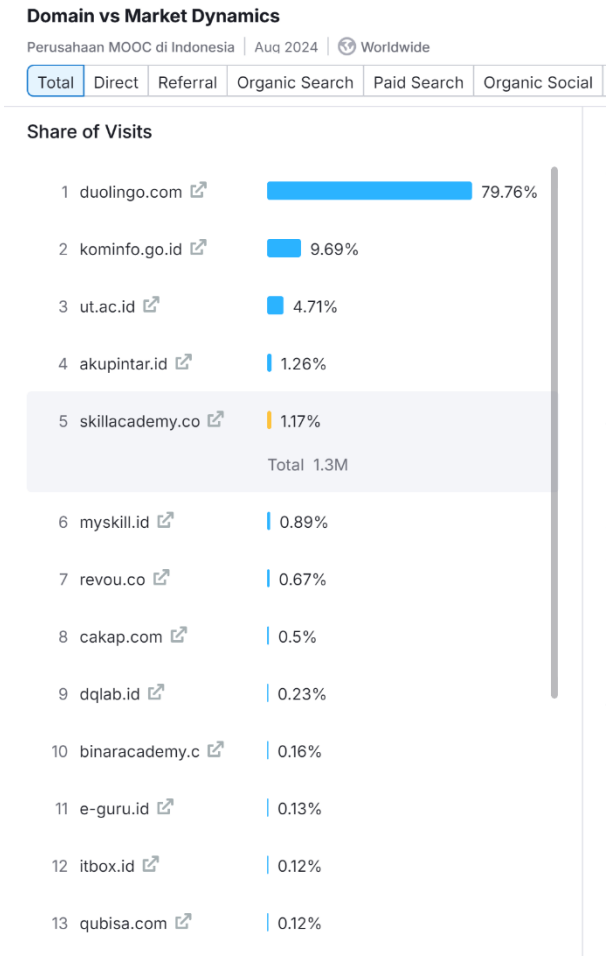


Figure 4. Domain vs Market Dynamics

As of August 2024, data shows 13 major domains dominating the MOOC (Massive Open Online Course) market in Indonesia with a total of 1.3 million visits. From this total, several important points can be drawn:

a. **Duolingo.com** dominated with a **79.76%** share of visits, making it the largest player in the MOOC ecosystem in Indonesia. This reflects the popularity of language learning platforms among Indonesians.
b. **Kominfo.go.id** came in second with **9.69%** of the total visits. This indicates the government's significant role in providing online learning content through programmes that focus on digitalisation and literacy.
c. **Ut.ac.id** (Open University) came in third with **4.71%**, which shows that formal education institutions remain relevant in the online education market.
d. **Akupintar.id** and **Skillacademy.co** gained **1.26%** and **1.17%** of the visit share respectively, indicating their important role, albeit relatively small compared to Duolingo.

Some other platforms, such as Myskill.id (0.89%), Revou.co (0.67%), and Cakap.com (0.5%), have smaller market shares but still contribute to providing online learning services in Indonesia.

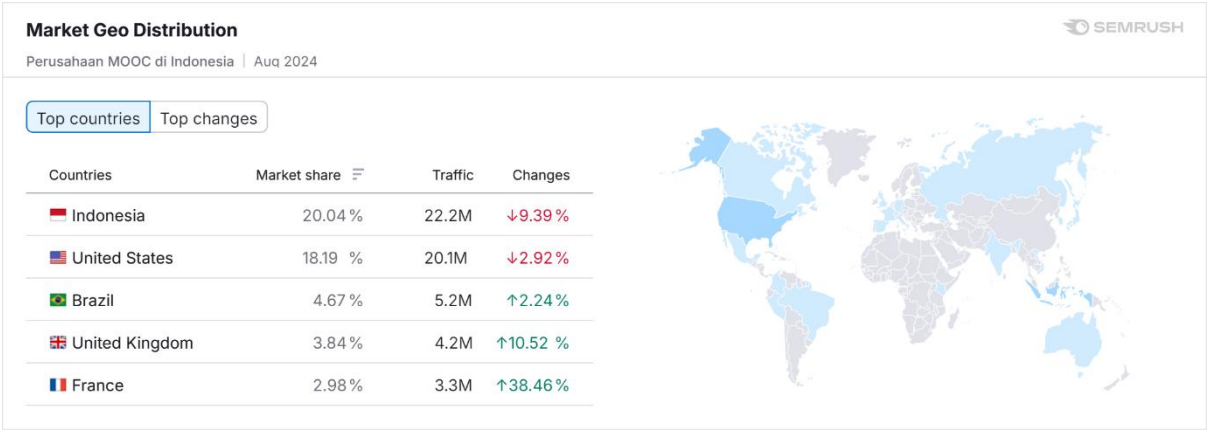


Figure 5. Market Geo Distribution

The 9.39% drop in traffic in the Indonesian local market indicates a decline in interest in MOOC platforms, which may be due to market saturation, switching to other platforms, or waning interest. Meanwhile, the second-placed United States also saw a 2.92% drop in traffic, signalling the challenge of retaining international users.

On the other hand, Brazil, the UK, and especially France showed a positive increase, with France experiencing a 38.46% increase in traffic, signalling great opportunities in the European market. Therefore, Indonesian MOOC companies are advised to focus more on this market. The growth in the UK, Brazil, and France also emphasises the importance of diversification through continuous innovation and customisation of content to suit local needs. Overall, despite the huge opportunities in the international market, new strategies are needed to maintain traction in the domestic market.

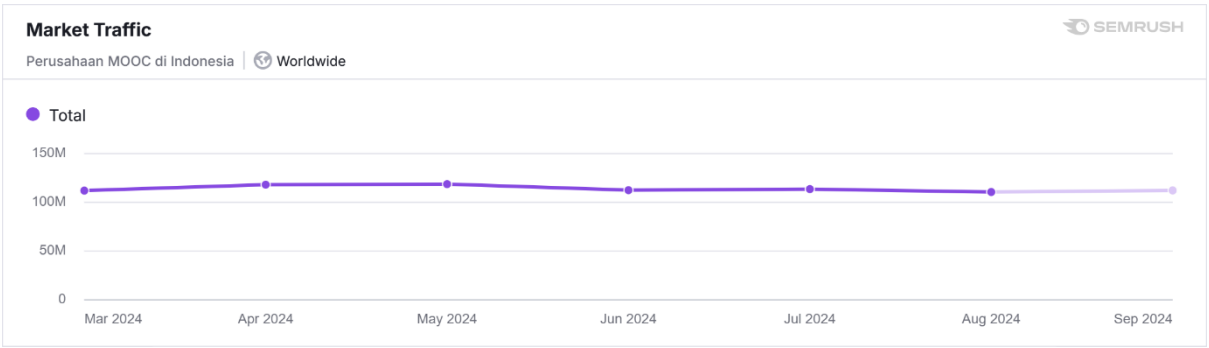


Figure 6. Market Traffic

The MOOC market traffic report in Indonesia for 2024 (see figure 6), from March to September, shows striking stability, with the number of users remaining around 100 million despite minor fluctuations, especially in July and August. The graph shows the purple line representing total traffic, signalling a balance in user growth during this period, despite a relatively minor dip in the middle of the year. The mild decline in July and August was likely due to seasonal factors, such as the holiday period. However, traffic stabilised again and even showed a slight increase towards the end of September. Although there was no drastic increase, the predictions for September show a small potential increase, which could be a sign of moderate growth. MOOC companies have the opportunity to expand their offerings, by adding new programmes or venturing into new regions to increase the number of users. In the context of traffic stability, it is important for MOOC companies to retain their existing user base as well as attract new users, through courses relevant to current industry needs and customisation of content for various markets.

From all the data we have presented there are several interesting points including first, Duolingo's dominance of almost 80% shows that this platform is very popular in Indonesia, especially in language learning. Duolingo attracts users with its interactive model and free access, which makes it a top choice

for people who want to improve their language skills. Language skills are indeed one of the most in-demand in both the global and Indonesian markets.

Second, the importance of the government's role. Kominfo.go.id, with almost 10% share of visits, confirms that the government plays a crucial role in the development of online education, especially those related to digital literacy. The training programmes provided by Kominfo help improve the digital skills of the general public, thus creating a good collaboration between the public and private sectors in education.

Third, Formal Education Institutions: The presence of the Open University in the third position shows that formal education institutions are able to adapt to online learning. With a share of 4.71%, UT is still the top choice for people seeking formal education online.

Fourth, Emerging Local Platforms: Platforms such as Akupintar.id and Skillacademy.co, although with a share of visits still below 2%, remain important players in providing specific skills courses. The focus on technical skills, data analytics, and career development gives them a solid position in the MOOC ecosystem in Indonesia. This shows the need for platforms that focus more on practical and professional skills.

Fifth, Service Diversification: Platforms outside the top five such as Revou.co, Cakap.com, and Binaracademy.co have a relatively small share, but they target a more niche market. For example, training in technology or language development with certain specifications. Despite their small market share, they make an important contribution in providing more specialised education options that the big platforms may not offer.

4. Conclusion

Overall, this data shows that the MOOC market in Indonesia and globally has entered a stable phase, with slight fluctuations that are not significant. Although rapid growth may not happen in a short period of time, MOOC companies should continue to innovate and adjust to the changing needs of the market in order to maintain and increase their user base in the future. The suggestion for new entrants is that they should prepare strong characteristics and fit the needs of users. At least the target of 5% of SAM (540 million users) can be your target when you develop MOOCs and enter the MOOC market.

Acknowledgments

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The Reception of High School Teachers Towards German Textbook in Indonesia

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Abstract

This research aims to describe how German language teachers in high schools perceive German language textbooks. The research employed a mixed method approach, including both quantitative and qualitative methods. The research population comprises all high school German language teachers in Indonesia. Respondents were randomly selected using purposive random sampling techniques. Data collection took place over a period of three months. The instrument was adapted from Rien T. Segers' (1978), in line with the research objectives. The questionnaire consisted of: (1) questions about demographic data, and (2) assessment using a Likert scale based on predefined textbook criteria. The research results indicate that (1) there are five German language textbooks most commonly used by teachers in Indonesia; (2) there are 13 criteria (expectations) that German language teachers use to evaluate German language textbooks in Indonesia. (3) *Deutsch echt einfach* and *Beste Freunde* are the top two German language textbooks that meet the expectations of teachers. German language teachers in Indonesia evaluate textbooks based on certain criteria, and it seems that linguistic aspects are the main factor considered. Another aspect expected by German language teachers is the presentation of Indonesian language and culture in the textbook, which emerged as one of the important criteria.

Keywords: *German language textbooks, reception theory, German language teachers, foreign language, DaF*

1. Introduction

Textbooks are an important component whose existence cannot be abandoned. In foreign language teaching and learning, textbook has significant role for both teacher and learner (Maijala & Tammenga-Helmantel, 2017:537). It serves to present the language and cultural phenomena of the target language and direct the learning process within a certain time span (Risager, 2020). Through textbooks, learners will get linguistic input and input to learn cultural aspects, both in the form of small C or Big C, and simultaneously develop communication skills and language awareness in learners (Grit, 2019; Maijala & Tammenga -Helmantel, 2017:537)

German language textbooks available in Indonesia today are mostly single-language textbooks (*einsprachige Lehrwerk*) made by German authors, which are global in nature and not aimed at specific language speakers (Rösler, 2012). This kind of textbook has a positive side, which can minimize communication errors between learners from different countries, because learners learn from the same source. However, the success of using such global textbooks is still debated (Hadley, 2014). One of the reasons is that the preparation of the book does not pay attention to the background aspects of readers (learners) outside Germany, including Indonesia. Rösler (2012) emphasized that learner factors as book users are important to consider in the preparation of textbooks. One of these factors is how the learners' reception of a textbook. This is important because the existence of textbooks will greatly depend on how readers (textbook users) perceive the book.

This aspect of reception has not been a concern for researchers who analyze textbooks. They mostly analyze the textual content in German textbooks. Vold (2020) examines contextual grammar in textbooks. Meanwhile, Neary- Sundquist (2015) examined vocabulary aspects in German textbooks used in universities in America. In Indonesia, studies on textbooks that have been carried out include a needs analysis for the development of teaching materials for speaking skills (Nurohmah et al., 2020) and an analysis of textbooks in German language learning (Karsam & Agustina, 2018). Santoso et al., (2022) examined the elements of proverbs in German language textbooks. Previously, Sudarmaji et al.

(2012) examined the intercultural aspects contained in German language textbooks in universities. Based on existing research, it can be seen that studies on the reception of German language textbook users that are global in nature in Indonesia have not been carried out. Even though according to Rösler and Schart (2016), analyzing the reception of textbooks is important.

In connection with the problems mentioned above, research on textbooks from the perspective of reader reception is important to do to see how the reception of German language teachers in high schools in Indonesia towards textbooks used in German language learning in Indonesia. This research focuses on the reception of German language teachers towards the German textbooks in Indonesia. Based on this research focus, there are three questions that need to be answered: (a) which books are used by German language teachers in Indonesia, (b) what criteria are used by German language teachers in Indonesia to respond to textbooks used in German language learning, (c) which textbook is the most suitable to the expectation of German language teachers in Indonesia.

2. Theoretical background

This research uses Rien T. Siegers' reception theory called experimental reception. Reception in a broad sense is defined as the processing of texts, the way of giving meaning to a work, so that a response to it emerges (Ratna, 2010). The argument of reception theory is that a work will be meaningful if it is read by its readers. Therefore, the reception of a work to readers is very important for the sustainability of a text. Based on these thoughts, this study seeks to see how the reception or acceptance of readers, in this case German language teachers, towards German textbooks. German textbooks are basically a work.

Segers developed a methodology as a basis for determining the rationalization of value judgments given by readers to a literary text, with reference to social science research methodology and psychological research methods. Segers sees the importance of the relationship between reception aesthetics and literary evaluation. According to Segers, the application of reception aesthetics to literary evaluation is very important because it implies a different view of the concept of literary value (Segers, 2000). Although Segers' research is based on literary texts, it can also be applied to other texts, such as German textbooks.

The response of the reader is manifested in the form of value. The value that the reader gives to a text appears in the value decision about the text (Segers, 2000). Rationalization referred to by Segers (2000) is an attempt to justify using reason. The subject in this case is a group of people who determine several criteria to create a system of norms. This system of norms is used to give a normative proposition to the object. Waldmann explains that a text presents only one particular value to the reader if the text is able to fulfill his needs (Segers, 2000). By adapting the literary value decision model proposed by Segers, the textbook text value decision model is as follows.

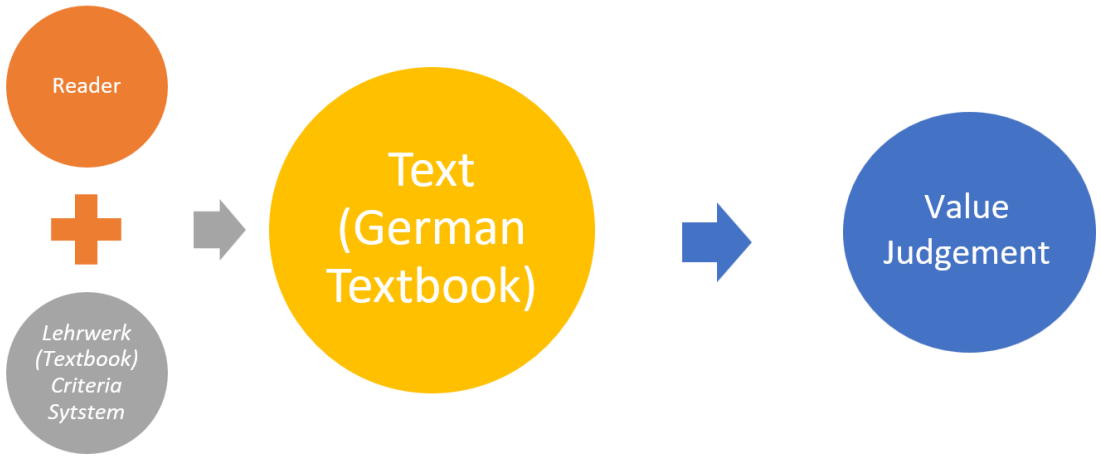


Figure 1. Textbook Value Judgment Model

This diagram shows the text evaluation process, in this case a German language textbook (*Lehrwerk*). This text assessment is intended to be able to find out the evaluative reactions of the readers, namely the users of the German textbook. The results of this study are expected to be useful as a guide for selecting and compiling German language textbooks in the future that refer to the acceptability of

Indonesian users and contribute to research on textbooks in Indonesia, especially by looking from a reception perspective.

3. Methodology

This research was conducted using mixed methods, namely quantitative and qualitative, in order to get an overview of how German language teachers' responses/receptions of German language textbooks. The research data was collected from a questionnaire on the responses of German language textbook users in Indonesia. This data was collected using an electronic questionnaire (google form). Data collection lasted for three months. The population of this study was all high school German language teachers in Indonesia. Furthermore, respondents were randomly selected using purposive random sampling technique. Data collection lasted for 3 months. The instrument used in this study was a questionnaire adapted from the instrument used by Rien T. Segers (1978). This questionnaire consists of two parts, namely (1) questions about demographic data and (2) assessment of textbooks with predetermined criteria. In this second part, the assessment used a Likert scale with an assessment score of 1 (very low) to 5 (very good).

There are two steps in obtaining the data for this research. The first questionnaire was made to find the most used German Textbooks in Indonesia and the criteria of a German textbook which are expected by Indonesian teachers. The next step is, based on the result of the first questionnaire, the second questionnaire is created to evaluate the textbook based on the expected criteria of German language teachers in Indonesia. After that, the data is analyzed and discussed.

4. Research Findings

Textbook used by most of German Teacher in Indonesia

From the first questionnaire distributed to German language teachers throughout Indonesia, a total of 224 people were successfully collected through questionnaires spread across various provinces in Indonesia. Based on the results of the questionnaire distributed, it is known that the majority of German language teachers think that textbooks have a very important role in learning German (80.8%), and 16.07% of respondents said that textbooks play an important role in the learning process. It shows the information about the textbooks that have been used by German language teachers. The data is presented in the following graph.

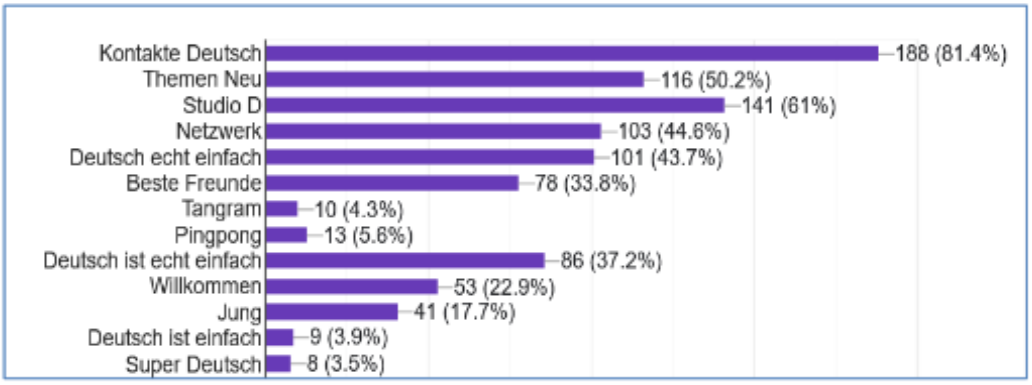


Figure 2. Title of textbooks that used by German language teachers

The graph above shows that the textbooks used by German language teachers are mostly textbooks written by German authors, namely *Kontakte Deutsch*, *Studio D, Themen Neu, Netzwerk, Deutsch echt einfach* and *Beste Freunde.* In addition, German books by Indonesian authors are also an option, including *Deutsch ist echt einfach*, *Willkommen,* and *Jung*. As an additional information, *Wilkommen* is a German language textbook which focused on tourism and usually used in Vocational High Schools. Therefore, the six books were mentioned the most, namely (1) *Kontakte Deutsch*, (2) *Studio D*, (3) *Themen Neu*, (4) *Netzwerk,* (5) *Deutsch echt einfach*, and (6) *Beste Freunde*.

In addition, the data suggests a conspicuous asymmetry in the presence of German textbook authored by Indonesians when juxtaposed with the abundance of the books authored by their German counterparts. This disproportionality underscores the relatively limited presence of teaching materials originating from Indonesian scholars compared to the textbook emanating from the German authors.

The extant textbook in question exhibits a global scope with a pronounced Western cultural orientation, notably grounded in German perspectives. However, a critical point arises as these materials notably lack the incorporation of Indonesian cultural backgrounds. It underscores the need for learning resources that not only possess a global resonance but also encapsulate the culture of Indonesia as the country of its learners. The importance of integrating Indonesian culture is to foster a more inclusive and culturally contextualized educational landscape by enhancing the relevance of the textbook for Indonesia learners and teachers.

The Expected Criteria of Textbook by German language teachers in Indonesia

This questionnaire asked about the roles of textbook in German teaching and learning. Based on the result, there are four roles that has been agreed by the respondents, namely: (a) used as a guide for learning activities, (b) as a key reference, (c) as an enrichment of learning materials, and (d) as a source of questions/exercises.

However, it is important to explore data regarding German language teachers' receptions of textbooks, is the expectations or desires of teachers regarding what content should be in a textbook. The expectations are (a) Interesting Theme, (b) Explanations are presented in detail, (c) Learning objectives are clear, (d) Match between exercises/tasks and learning objectives, (e) Grammatical presentation that is coherent and clear, (f) Vocabulary appropriate to learner level, (f) There are materials and exercises for four language skills, (g) Varied exercises/tasks, (h) Practical task, (i) Enrichment material available (j) Attractive Layout, (k) Use of language that is easy to understand (l) Clear instructions for using textbooks (*Lehrwerk)*, (m) Accommodate Indonesian culture and language (n) Presents the culture of German-speaking countries, (o) There are interesting and relevant images, (p) Others. The data on German teachers' expectations can be seen in Figure 2.

Based on the graph presented in Figure 2, it can be concluded that the majority of German language teachers (87.9%) expect a German textbook to contain materials and exercises to develop four language skills. Thus, German language teachers know that communicative skills can be obtained by their students if the textbooks used integrate exercises and materials for the four language skills. The second biggest expectation from German language teacher sis that textbooks should present vocabulary that is appropriate to the level of the learner and the suitability between the learning objectives and the exercises presented. This opinion was expressed by 84% of respondents. The next factors expected by German language teachers are interesting themes (78.4%), interesting pictures (78.8%), varied exercises and tasks (76.6%), providing information about the culture of German-speaking countries (75.3%), detailed explanations (71.9%), and the use of language that is easy to understand (72.3%). Interestingly, 51% of respondents would like to see more information on Indonesian culture and language.



Figure 3. German Language Teachers' Expectations for the Content of German Language Textbooks

The result of the questionnaire showed that there are 9 most mentioned criteria of textbook expected by German language teachers in Indonesia, namely: (a) integrates exercises and materials for the four

language skills, (b) presents vocabulary that is appropriate to the learners' level and the suitability of the learning objectives (c) presents attractive images, (d) presents an interesting theme, (e) presents varied tasks and exercises, (f) presents information about the culture of countries German-speaking, (g) provides detailed explanations, (h) uses language that is easy to understand, and (i) presents aspects of Indonesian culture and language.

Based on the data above, it can be concluded that there are 13 criteria that expected towards a textbook by the German language teachers in Indonesia. Four criteria showed the role of a textbook in teaching and learning process and other nine criteria were mentioned by most of German language teachers as the most expected aspect in a German textbook.

The Evaluation of German Textbook by High School Teachers in Indonesia

The results of the first questionnaire regarding the textbooks used by German language teachers in Indonesia became a reference for the preparation of the second stage of the questionnaire. Based on the results of the first questionnaire, six books were mentioned the most, namely (1) *Kontakte Deutsch*, (2) *Studio D*, (3) *Themen Neu*, (4) *Netzwerk*, (5) *Deutsch echt einfach*, and (6) *Beste Freunde*.

In the first section, German language teachers were asked to answer whether they had used these books. In the next section, the German teachers' responses to the six books are based on the 13 most mentioned criteria in the first stage of the questionnaire. The following are the thirteen criteria used in the second stage of the questionnaire.

Table 1. Criteria expected by German Language Teachers for the Text Book

No.	Criteria
1	This book can be used as a guide for learning activities
2	This book can be used as a key reference.
3	This book can be used as an enrichment of learning materials.
4	This book can be used as a source of questions/exercises.
5	This textbook contains materials and exercises to develop four language skills.
6	This textbook presents vocabulary that is appropriate to the learners' level and the suitability of the learning objectives.
7	This textbook presents attractive images.
8	This textbook presents an interesting theme.
9	This textbook presents varied tasks and exercises
10	This textbook presents information about the culture of countries German-speaking
11	This textbook has detailed explanations.
12	This textbook uses language that is easy to understand.
13	This textbook presents aspects of Indonesian culture and language.

These thirteen criteria can be grouped into two parts. In part (A) there are 4 questions, namely question numbers 1- 4 which aim to find out the responses of German language teachers about the role of textbooks in learning German. In part B, there are 9 criteria related to aspects that are considered important in a textbook for German language teachers in Indonesia.

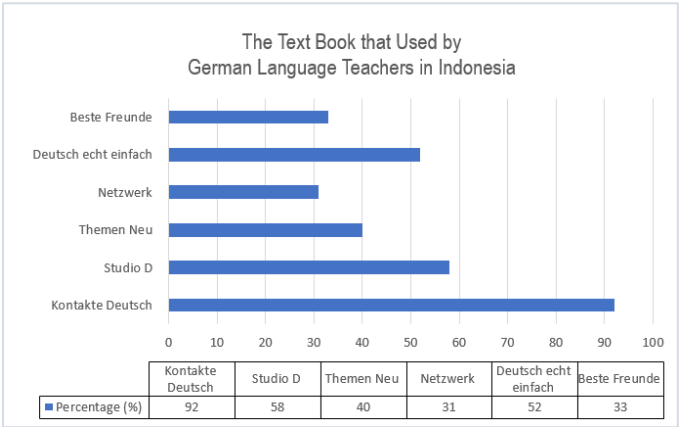


Figure 4. Comparison of the Number of German Textbook Users in Indonesia

Based on the results of the second questionnaire shown in the table and graph, it appears that the most widely used book by German language teachers in Indonesia is *Kontakte Deutsch* (93%). The next most widely used books are *Studio D* (58.6%), *Deutsch echt einfach* (51.5%), *Themen Neu* (40.4%), and *Beste Freunde* (33%). It shows that the most used textbook in Indonesia is *Kontakte Deutsch*.

The next section is about the criteria expected by German language teachers from a text book. The following table showed the comparison of the mean scores of the responses of German Language Teachers in Indonesia toward six German textbooks mentioned above.

Table 2. The Responses of German Language Teachers in Indonesia towards German Textbook

Group	No.	Criteria to be assessed	*Kontakte Deutsch*	*Studio D*	*Themen Neu*	*Netzwerk*	*Deutsch echt einfach*	*Beste Freunde*
A	1	This book can be used as a learning activity guide.	7,901	8,379	8,275	8,531	8,788	8,485
	2	This book can be used as the main reference material.	7,296	8,207	8,100	8,469	8,808	8,485
	3	This book can be used as an enrichment of learning materials.	7,593	8,414	8,250	8,469	8,712	8,515
	4	This book can be used as a source of questions/exercises.	7,568	8,276	8,075	8,563	8,788	8,424
B	5	This textbook contains materials and exercises to develop four language skills.	7,765	8,793	8,525	8,781	9,038	8,788
	6	This textbook presents vocabulary that is appropriate to the learner's level and aligns with the learning objectives.	7,975	8,397	8,275	8,563	8,904	8,636
	7	This textbook presents attractive images.	6,346	8,879	8,500	9,000	9,019	8,879
	8	This textbook presents an interesting theme.	7,235	8,724	8,275	8,781	8,865	8,848
	9	This textbook presents varied tasks and exercises	7,432	8,569	8,025	8,719	8,692	8,545
	10	This textbook provides information about the culture of German-speaking countries	7,296	8,483	8,200	8,625	8,692	8,485
	11	This textbook provides detailed explanations.	7,506	8,069	8,000	8,469	8,500	8,273
	12	This textbook uses language that is easy to understand.	8,358	8,121	7,975	8,125	8,635	8,364
	13	This textbook presents Indonesian culture and language.	7,790	5,603	6,825	5,938	6,269	5,424
Total average			7,543	8,224	8,100	8,387	8,593	8,319

From the comparison of German language teachers' responses to German textbooks in Indonesia, it can be observed every score given by each German language teacher on each book. By referring to the score, it can be seen which book gets the highest score and is considered to meet the criteria for textbooks expected by German language teachers.

First, from its role as a learning activity guide, *Deutsch echt einfach* scored the highest compared to the other five books (8.788). This score is slightly adrift of *Beste Freunde* (8.485), *Netzwerk* (8.531),

Studio D (8.79), and *Themen Neu* (8.275). This score also shows that *Deutsch echt einfach* is a textbook that is considered the best in fulfilling its role as a textbook that can be used as a guide for learning activities. The textbook with the lowest score in this aspect is *Kontakte Deutsch* with a score of 7.901.

Second, related to its role as the main reference material, *Deutsch echt einfach* is still the book with the highest score (8.088) in this aspect. The responses given were more or less the same as the fulfillment of the role of the previous textbook. In order, the book *Beste Freunde* (8,485), *Netzwerk* (8,469), *Studio D* (8,207) and *Themen Neu* book (8,100) is an excellent textbook as a main reference material. The *Kontakte Deutsch* book, despite getting the lowest score in this aspect (7.296), is still considered a good textbook to refer to.

Third, textbooks also have a role in enriching learning materials. No different from the two previous criteria, the *Deutsch echt einfach* book also ranks first in this aspect with a score of 8.712. The next position is followed by *Beste Freunde* (8.515), *Netzwerk* (8.469), *Studio D* (8.414), *Themen Neu* (8.250). Thus, these four books are considered very good to be a textbook used in the enrichment of learning materials. The *Kontakte Deutsch* book with a score of 7.569 occupies the last position and falls into the good category.

The last role of textbooks is as a source of questions and exercises. In this section Deustch echt einfach is also a book that gets very good responses compared to the other five books. This book received a score of 8.788. Furthermore, there is *Netzwerk* book (8,563) *Beste Freunde* (8,424), *Studio D* (8,276) and *Kontakte Deutsch* book (7,568).

Based on the explanation above, it appears that there is a pattern of responses given by German language teachers to the fulfillment of the role of textbooks. *Deutsch echt einfach* is the book that gets the highest score on the four expected textbook roles. *Beste Freunde* and *Netzwerk* alternately occupy the second position in this aspect. On the role as a guide to learning activities and as a source of questions/exercises, Netwerk outperformed Beste Freunde. However, on the aspect of the textbook's role as the main reference material and material enrichment, *Beste Freunde* received better responses than *Netzwerk* books. *Studio D* and *Themen Neu* consistently ranked fourth and fifth in each role. Meanwhile, Kontakte Deutsch, although this book still falls into the good category, is the book that gets the lowest response compared to the other five books.

Thus, in general, it appears that German language teachers in Indonesia respond more favorably to books produced by German authors and publishers. These books are considered to be more successful in fulfilling the expected role of textbooks compared to books produced by Indonesian authors.

The responses of German language teachers in Indonesia to the role of textbooks are important to uncover, because although learning has gradually shifted to the use of digital resources and the internet, textbooks still play an important role in foreign language learning (Khachaturyan & Ghalchyan, 2023). This is undeniable because textbooks are the most concrete way of presenting content in the classroom and they also show what and how a theory or linguistic explanation can be practiced.

Based on table 13, it can be seen that in order the criteria that are rated very well by German language teachers in Indonesia are (1) the availability of materials and exercises that can be used to develop the four language skills, (2) the presentation of interesting pictures, (3) the suitability of the presentation of vocabulary with the learning level and learning objectives, (4) the presentation of interesting themes, (5) the presentation of varied tasks and exercises, (6) the availability of information about German-speaking countries, (7) the use of language that is easy to understand, (8) the availability of detailed explanations, and (9) the presentation of Indonesian culture and language.

Of these nine criteria, *Deutsch echt einfach* is the textbook that gets the highest score in almost all categories, except in the aspects of variety of tasks/exercises and the availability of Indonesian language and culture. In these two aspects, *Deutsch echt einfach* book ranks second after *Netzwerk* in the aspect of task/exercise variety and third after *Kontakte Deutsch* and *Themen Neu* in the aspect of Indonesian language and culture presentation.

Furthermore, the *Beste Freunde* book and the *Netzwerk* book alternately occupy the second position as books that are considered very good in fulfilling the teaching book criteria expected by German language teachers. However, *Beste Freunde* managed to outperform *Netzwerk* on four criteria, namely the presentation of material and exercises to develop four language skills, the presentation of vocabulary that is appropriate to the level of the learner, the presentation of interesting themes and the use of language that is easy to understand. Meanwhile, on three other criteria, *Netzwerk* received higher responses than Beste Freunde, namely from the aspect of presenting interesting images, the availability of cultural information on German-speaking countries, and presenting detailed explanations.

The *Studio D* book also received very good responses, but its position is consistently fourth after Deutsch echt Einfach, *Beste Freunde* and Netzwerk. Furthermore, this order is followed by *Themen Neu* and Kontakte Deutsch. However, on the aspect of presenting interesting pictures, *Studio D* shares

the third position with *Netzwerk*. In addition, for the aspect of presenting three and varied exercises, *Studio D* book is in third place after *Netzwerk* and *Deutsch echt einfach.*

Overall, the *Kontakte Deutsch* book received the lowest response score compared to the other five books. Only in the aspect of presenting Indonesian culture and language, this book got the highest score. This can be understood because the book was produced by Indonesian authors, namely Ariento Sukotjo and Nainggolan, and the revised edition by Tini Hardjono and Sartati. Eva Maria Marbun, a native German speaker who was also involved in writing this book, is married to an Indonesian, so it is not surprising that the presentation of Indonesian language and culture in *Kontakte Deutsch* is more prominent than in the other five books.

The Reception of High School Teachers towards the German Textbooks in Indonesia

Based on these specific criteria, it appears that the linguistic aspect is the main factor considered by German language teachers in giving their responses to textbooks. This is evident from the aspect with the first highest score, namely the content of the material and exercises in developing the four aspects of language skills. This can be understood because foreign language proficiency is defined as the ability to use language to communicate in a variety of situations and contexts (OECD, 2021). Therefore, textbooks should have material components and exercises that can develop listening, speaking, reading and writing skills.

The second criterion that received the highest response was the presentation of interesting images. The pictures shown in *Deutsch echt einfach, Netzwerk*, *Beste Freunde* and *Studio D* are mostly photos that illustrate the context and situation in Germany. The use of authentic images is very useful in vocabulary acquisition (Tahiri, 2020). Pictures can also stimulate the thinking process and help recall vocabulary and sentences that have been learned (Sinatra, 1981).

The next criterion that is considered important for German language teachers in Indonesia is the presentation of vocabulary that is appropriate to the learner's ability level. Vocabulary learning should follow the learner's developmental trajectory because this vocabulary mastery supports increased self-efficacy (Garden, 2022; Manigandan & Dinesh, 2015). Low vocabulary mastery can be seen as a serious limitation in language skills, especially reading, which also has an impact on learners' mental lexicon (Alijany et al., 2015). In addition, German is a language that uses the CEFR level, so the vocabulary in a textbook should be presented systematically considering the level of the learner.

After the presentation of vocabulary, the next criterion that received high responses from German language teachers in Indonesia was the presentation of interesting themes. German textbooks are not organized by grammatical level, but are presented in a variety of themes that are closely related to everyday life. The use of this theme is more appropriate so that foreign language learning can focus on improving language skills based on communicative goals, not on mastery of grammar alone. In addition, themes are a form of holistic approach in foreign language learning that emphasizes learner participation in the authentic use of foreign languages (Cameron, 2001). Thus, language skills can be used in an integrated manner when learning is done thematically.

The emergence of the aspect of presenting Indonesian language and culture in a textbook in German language learning as one of the criteria expected by German language teachers in Indonesia is an interesting topic for further discussion. This criterion is the lowest scoring criterion in the section of Indonesian language teachers' responses to textbooks based on specific criteria. Thus, two things can be concluded from the data: (1) German language teachers in Indonesia realize that the presentation of Indonesian culture and language in the textbooks used in Indonesia is inadequate and (2) German language teachers in Indonesia focus more on learner understanding of the target language and culture, namely German.

The fifth criterion is the presentation of varied tasks or exercises. With various types of tasks and exercises available, learners can measure their achievements. The variety of tasks and exercises also helps students in understanding concepts or skills from various perspectives. In addition, this variation is also a form of effort in facilitating the diversity of characters, learning methods and learning method tendencies of the learners. Presentation of tasks or exercises that tend to be the same and monotonous can lead to boredom and limit learners' creativity.

Next is the criteria for using language in a textbook. German language teachers in Indonesia expect that a textbook uses language that is easy to understand. This is related to the previous aspect, namely the presentation of vocabulary that is appropriate to the level of the learner. In addition to the language used in the linguistic content used as material, this language clarity also includes the language used in the instruction sentences in the activity and assignment sections. With the use of language that is not wordy and straightforward, foreign language learning is expected to run effectively because teachers are not confused in understanding the activity guidelines listed in the jar.

The next criterion that received responses from German language teachers in Indonesia was the availability of detailed explanations. Although this criterion falls into the very good category, it is in the bottom two of the nine criteria that German language teachers expect from a textbook. Thus, it can be said that detailed explanations are not very important in a textbook. Usually, these German textbooks are accompanied by a *Lehrhandbuch* or guidebook which is indeed presented separately. This teacher's manual serves to guide teachers in the preparation stage before using the textbook in the classroom.

In the last order there are criteria for the presentation of Indonesian culture and language with an average score of 6.001 from the six books. This score is included in the sufficient category. Nevertheless, this criterion is an interesting part that needs to be criticized again. Is the presentation of Indonesian culture and language necessary in German textbooks? The lack of availability of source language and culture in this textbook turns out to be one of the points that can be criticized from German textbooks in Indonesia.

As we all know, language and culture are closely related and intertwined (James & Aziz, 2020). In foreign language learning itself, there are at least three components offered to learners, namely the opportunity to (1) understand the relationship between language and cultural phenomena, (2) compare foreign languages with native languages in terms of similarities and differences and (3) understand their own culture to be able to pay attention to how the language dimension plays a role in the process of understanding foreign cultures (Mazari & Derraz, 2015).

Based on the explanation above, it can be observed that when a learner learns a foreign language, he or she is not only carrying out the process of understanding the culture and country of the language being learned, but also understanding his or her own culture and country. Foreign language learners who only focus on understanding the target language and culture are not always successful in avoiding misunderstandings in daily interactions. This requires intercultural insight, which is the ability to understand the differences and similarities between the source and target cultures. This role has not been explicitly presented in the textbooks used in Indonesia, as five of the six books used are produced by German authors and publishers.

Therefore, the presentation of a comparison of Indonesian culture and German culture presented explicitly in a textbook can be an interesting input in the development of further German language textbooks in Indonesia. This should be considered because a person should learn a foreign language not to replace his identity, but to enrich his identity in order to successfully become a global citizen.

5. Conclusions

Based on the criteria expected by German language teachers in Indonesia, the assessment of German teaching books used in Indonesia shows that *Deutsch echt einfach* is the book that best meets these criteria, except in terms of the variety of tasks/exercises and the presence of Indonesian language and culture content. Then, *Beste Freunde* and *Netzwerk* alternately ranked second as books that were considered very good at meeting these criteria. *Beste Freunde* excelled in four aspects, namely the presentation of materials and exercises to develop the four language skills, the presentation of vocabulary appropriate to the learning level, the presentation of interesting themes, and the use of language that is easy to understand. *Studio D* books also received good ratings but consistently ranked fourth after *Deutsch echt einfach, Beste Freunde*, and *Netzwerk*. Furthermore, *Themen Neu* and *Kontakte Deutsch* were ranked lower. *Kontakte Deutsch* only received the highest rating in terms of presenting Indonesian culture and language. This book is written by Indonesian authors such as Ariento Sukotjo, Nainggolan, Tini Hardjono, and Sartati. Thus, the Indonesian cultural background is inserted by them.

German language teachers in Indonesia evaluate textbooks based on certain criteria, and it seems that linguistic aspects are the main factor considered. The first highest criterion is the content and exercises to develop the four language skills. The second criterion that received high ratings was the presentation of interesting pictures, especially authentic pictures depicting situations in Germany. Furthermore, German language teachers in Indonesia consider it important to present vocabulary that is appropriate to the learner's ability level, followed by the presentation of interesting themes. Another aspect expected by German language teachers is the presentation of Indonesian language and culture in the textbook, which emerged as one of the important criteria. Furthermore, they want the use of language that is easy to understand in the textbook. Finally, the criterion of presenting Indonesian culture and language received the lowest rank in German teachers' assessment of the six German textbooks used in Indonesia.

Based on the results of the study, the urgency of raising the awareness of German language teachers in choosing which textbook to be used in the classroom needs to be done. By using the criteria which

found in this study, it is hoped that the teacher could find the most suitable textbook. *Beste Freunde* is a textbook that is considered superior according to the criteria of German language teachers in Indonesia, but the book has not been widely recognized by German language teachers in Indonesia. Therefore, it is necessary to socialize the *Beste Freunde* book so that it is better known and more people use the book. This study also suggests that there should be it is known that German language teachers want German language books that include elements of Indonesian culture. Therefore, it is recommended to develop German language textbooks that integrate Indonesian and German culture in a balanced proportion through development research.

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THE ROLE OF DIGITAL LITERACY SKILLS AND SOCIAL SKILLS ON ENTREPRENEURIAL INTENTIONS IN VOCATIONAL HIGH SCHOOL STUDENTS

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Abstract

Entrepreneurship is currently the main strategy to support the achievement of the 2030 SDGs program in terms of poverty alleviation, social inequality, and increasing economic growth. Vocational schools as one of the providers of formal vocational education play a role in facilitating students with entrepreneurship so that students can have wider career opportunities through entrepreneurship. The choice of entrepreneurial career is determined by the entrepreneurial intention of students where entrepreneurial activities can be carried out digitally. This study aims to determine the role of digital literacy skills and social skills on the entrepreneurial intention of vocational school students in Yogyakarta. The population used in this study were 125 students of vocational high school tourism expertise in the Special Region of Yogyakarta. The sample determination used convenience sampling techniques of 125 vocational high school students. The data collection technique for this study used a questionnaire. The data analysis technique used descriptive statistical analysis and linear regression analysis. The results of the study showed that digital literacy skills and social skills partially and simultaneously together had a significant influence on the entrepreneurial intention of vocational high school students. The results of this study recommend improving the digital literacy skills and social skills of vocational high school students in the curriculum and student learning activities, thereby increasing students' intentions towards entrepreneurship.

Keywords: digital literacy skills, social skills, entrepreneurship

1. Introduction

Indonesia is currently facing a demographic opportunity in 2045 where the population will be dominated by the productive age group. On the other hand, employment problems and limited availability of jobs are still the main problems that cause poverty, social inequality, and hampered economic growth. Entrepreneurship is claimed to be one of the main strategies in supporting the 2030 SDGs program on a national and global scale in terms of poverty alleviation, social inequality, and increasing economic growth. However, BPS data shows that the unemployment rate for vocational high school graduates in 2023 is 9.42% of the total population of Indonesia [1].

Meanwhile, the Global Entrepreneurship Monitor (GEM) report results show that Indonesia is ranked 40th out of 43 countries in terms of Fear of Failure (Opportunity) which leads to low involvement in entrepreneurial activities among young people (Kemenkopmk, 2023). The data shows that the level of independence of the younger generation, especially vocational school students, regarding the availability of employment opportunities is still high, while their intensity towards entrepreneurship is still low. This is an important concern considering that this young age group will dominate Indonesia's demographics in 2045, so it will have an impact on Indonesia's economy and welfare in the future.

The advancement of technology and the digital world today affects all aspects of human life today, where all information can be accessed easily and is abundantly available. The results of a survey conducted by the Indonesian Internet Service Providers Association found that the number of internet users in Indonesia in 2023 reached 79.5% and was dominated by the Generation Z age group at 34.4% and the millennial generation at 30.62% [2]. The data shows that the intensity of digital information

access by young age groups in Indonesia is very high. The rapid development of information digitally also affects the world of entrepreneurship where various information developments in terms of technology, marketing strategies, and innovations in the production process and production creation are increasing rapidly and leading to an increasingly competitive business situation [3]. Therefore, digital literacy skills are currently needed to face the rapid development of the business world due to the development of digital technology[5]. Digital literacy skills are a person's ability to understand, process, and use information obtained digitally effectively and efficiently in various life contexts[4]. Digital literacy skills support students in obtaining digital information that is relevant to their needs so that they gain insights that support their creativity and innovation that lead to entrepreneurship.

Digital literacy is defined as an individual's ability to access, understand, listen to, and use information presented in digital form [5]. This theory helps individuals understand today's complex digital world, allowing one to benefit from the technology that is available while respecting and appreciating the laws and ethics of social interaction.[5]. Digital literacy includes the knowledge, skills, and abilities that enable individuals to think critically, creatively, intelligently, and safely when engaging in digital technology interactions [6]. Digital literacy skills include components of creativity, creative and evaluative thinking, collaboration, effective communication, the ability to find and select information, functional skills, and digital security [16]. Digital literacy skill attributes include (1) internet operational skills; (2) creativity skills; (3) internet informational skills; and (4) social skills [7].

Entrepreneurial activities always involve interactions between individuals with other individuals or groups to meet their needs in the smooth running of the business. The results of the study found that social skills have a significant effect on the context of entrepreneurship [8]. Several other studies have found that entrepreneurial activities carried out by teams tend to be more effective and successful than entrepreneurship carried out individually [9]. This confirms that social skills are needed to increase the chances of entrepreneurial success so that the intention toward entrepreneurship also increases. Individuals with high social skills tend to have wider contacts compared to individuals with low skills [10]. Wide access to contacts through social skills can become social capital for prospective entrepreneurs to obtain various access facilities in running a business [9], [11].

Social skills are defined as a person's specific ability to interact effectively with other people [11]. This is depicted through a person's activities to initiate interactions and respond to other people's behavior [11]. Successful interactions depend on both individuals interacting and communicating within a social context and the overall social circumstances [8]. Furthermore, social skills are important for individuals to have to provide important support to those interested in promoting entrepreneurship and developing policies, as well as consultation with friends and family of entrepreneurs [8]. Social skills are also interpreted as typical behaviors that refer to a person's personality and produce a person's self-perception[7]. Social skills influence entrepreneurial success by increasing effectiveness in obtaining important information and resources [9]. Thus, a person with good social skills allows easier interaction and cooperation and reaches the formation of new business opportunity ideas.[18]. The social skills measurement scale uses a two-factor model, namely skills that refer to (1) social competence; and (2) the absence of behavioral problems. Social competence refers to the extent to which individuals assess their skills and behavior in socializing and being well-received by other individuals [12] [13].

Intention is one of the factors that influences a person's behavior in acting to achieve a certain goal. Entrepreneurial intention is a person's intention to act more specifically which leads to entrepreneurial readiness [14]. Vocational High Schools (SMK) play an important role in facilitating students, special expertise competencies that can be used to work or create jobs independently through entrepreneurship. The intensity of entrepreneurship of vocational high school students can be influenced by various factors. This study aims to determine whether digital literacy skills and social skills partially and jointly affect the intensity of entrepreneurship of vocational high school students. The findings of this study can be used to listen to the curriculum and improve learning to increase the intensity of entrepreneurship among vocational high school students.

Intention is defined by Fishbein & Ajzen (1975) as a person's intention to act in a specific way to achieve a certain readiness [5]. Therefore, entrepreneurial intensity is the intention or determination of an individual to engage in entrepreneurial activities. Several factors that influence entrepreneurial intensity include internal factors (psychological, social), and external factors (social, cultural) [5]. Intensity directs individuals to tend to like and be interested in the field or thing, thus leading to bold risk-taking actions to achieve success [15] [16]. Some experts argue that intensity directs a person's mental orientation, thus influencing career choice expectations[15]. The characteristics of intensity

include (1) existance of intentions; (2) willingness; and (3) effort to run the business. These characteristics direct [the individual's courage to face any risks that occur, and always learn to accept from experience failures [15].

Based on the description explained above, the research hypothesis is presented as follows.

H1 : Digital literacy skills and social skills simultaneously influence the intensity of entrepreneurship of vocational school students.

H2 : Digital literacy skills have a significant influence on the intensity of entrepreneurship of vocational school

students.

H3 : Social skills have a significant influence on the intensity of entrepreneurship of vocational school students.

2. Method

This research approach uses a quantitative approach with a non-experimental explanatory research type. This study aims to analyze the effect of digital literacy skills and social skills on the entrepreneurial intentions of vocational high school students. Data collection for this study used a questionnaire with a five-scale Likert. The dimensions used in the digital literacy skills variable are internet operational skills, formal internet skills, internet informational skills, internet communication skills; and social skills. While the social skills variable includes the dimensions of social competence and the absence of new problems. Furthermore, the entrepreneurial intention variable contains three dimensions, namely the availability of intention, willingness, and efforts made to run a business.

The population of this study used 125 vocational high school students majoring in tourism in the Special Region of Yogyakarta. The sample determination was carried out using a random sampling technique by adopting the Slovin formula so that a sample of 125 vocational high school students was obtained. The instrument validity test was carried out on 30 to test the validity and reliability of the instrument and was tested on 30 students outside the research sample. Furthermore, the data analysis technique was carried out using descriptive and inferential statistical analysis using multiple regression analysis.

3. Results and Discussion

Validity Test Results

The validity test of the research variable indicator instrument was carried out to meet the data validity requirements. As described in Table 1.

Table 1. Validity Test Results

		Validity Test		
Varible	Dimentions	Indicators	r	Information
Digital Lireracy skills (X1)	Internet operational skills (X1.1)	$X_{1.1.1}$	0.757	Valid
		$X_{1.1.2}$	0.748	Valid
		$X_{1.1.3}$	0.650	Valid
		$X_{1.1.4}$	0.677	Valid
		$X_{1.1.5}$	0.868	Valid
	Internet informational skills (X1.2)	$X_{1.2.1}$	0.634	Valid
		$X_{1.2.2}$	0.605	Valid
		$X_{1.2.3}$	0.406	Valid
		$X_{1.2.4}$	0.436	Valid
		$X_{1.2.5}$	0.749	Valid
	Social skills (X1.3)	$X_{1.3.1}$	0.701	Valid
		$X_{1.3.2}$	0.670	Valid
		$X_{1.3.3}$	0.800	Valid
		$X_{1.3.4}$	0.606	Valid
		$X_{1.3.5}$	0.813	Valid

	Creativity skills (X1.4)	$X_{1.4.1}$	0.803	Valid
		$X_{1.4.2}$	0.681	Valid
		$X_{1.4.3}$	0.737	Valid
		$X_{1.4.4}$	0.661	Valid
Social Skills (X2)	Social competence (X2.1)	$X_{2.1.1}$	0,754	Valid
		$X_{2.1.2}$	0,804	Valid
		$X_{2.1.3}$	0,462	Valid
		$X_{2.1.4}$	0,796	Valid
	the absence of behavioral problems (X2.2)	$X_{2.2.1}$	0,647	Valid
		$X_{2.2.2}$	0,519	Valid
		$X_{2.2.3}$	0,563	Valid
Entrepreneurial Intentions (Y)	existance of intentions (Y1)	$Y_{3.1.1}$	0,591	Valid
		$Y_{3.1.2}$	0,751	Valid
		$Y_{3.1.3}$	0,471	Valid
	Willingness (Y2)	$Y_{3.2.1}$	0,632	Valid
		$Y_{3.2.2}$	0,770	Valid
		$Y_{3.2.3}$	0,751	Valid
		$Y_{3.2.4}$	0,473	Valid
	effort to run the business(Y3)	$Y_{3.3.1}$	0,589	Valid
		$Y_{3.3.2}$	0,868	Valid
		$Y_{3.3.3}$	0,549	Valid

Table 1 shows that the obtained correlation coefficient value is greater than 0.3 for all indicators on the digital literacy skills, social skills, and entrepreneurial intention variables. Furthermore, the reliability test results can be seen in Table 2.

Table 2. Reliability Test Results

Reliability Test			
Variable	Cronbach Alpha	r-critical	Information
Digital literacy skills	0,935	0,600	Reliable
Social skills	0,769	0,600	Reliable
Entrepreneurial intention	0,822	0,600	Reliable

Table 2, it can be seen that all items claimed to represent variables, both the dependent variable and the independent variable are all determined by the Cronbach Alpha value greater than the critical r value of 0.600

Hypothesis Test Results

This study proposes the following hypothesis:

H1: Digital literacy skills and social skills simultaneously influence the entrepreneurial intentions of vocational high school students.

The information on the analysis results in Table 3 shows that the decision that H0 is rejected and H1 is accepted. This can be seen from the calculated F value of 19,858 while the significance value produced is <0.001. X1 (Digital Literacy Skills) and X2 (Social Skills) simultaneously influence Y (Entrepreneurial Intention). Therefore, it can be concluded that this multiple regression model is feasible to use, where the independent variables of digital literacy and social competence have a simultaneous influence on the dependent variable of entrepreneurial intention.

Table 3. F Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	548.528	2	274.264	19.858	<.001[b]
Residual	1684.944	122	13.811		
Total	2233.472	124			

a. Dependent Variable: Entreprenuerial Intentions
b. Predictors: (Constant), Social Skills, Digital Literacy Skills, N =125

Furthermore, the results of partial multiple linear analysis are used to prove Hypothesis 2 (H2) and Hypothesis 3 (H3). The information in Table 2 shows the multiple linear regression equation Y = 21.360 + 0.262X1 - 0.041X2, the p-value for digital literacy is significant (< 0.001) while for social competence it is not significant (p = 0,722; p> 0.05). Hypothesis 2 testing includes H0: β1=0 (Variable X1 partially has no significant effect on Y); H2: β1 ≠ 0 (Variable X1 partially has a significant effect on Y). The partial multiple regression analysis test proves that hypothesis H2 is accepted. Digital literacy has a positive and significant partial effect on the entrepreneurial intentions of vocational high school students. The results of this study are in line with previous findings that digital literacy has a positive and significant effect on entrepreneurial intentions [17]. Especially involving the use of social media as a means of promoting products and services. The ability to master technology including marketing builds the interest of vocational high school students to become entrepreneurs[18].

Hypothesis test 3 involves H0: β2=0 (Variable X2 partially has no significant effect on Y); H3: β2≠0 (Variable X2 partially has a significant effect on Y). A partial multiple regression analysis test proves that H0: β2=0 is accepted. Social competence does not affect the intensity of entrepreneurship of vocational high school students. Although psychosocial factors obtained by students from the school environment affect the intensity of entrepreneurship[19]. Our study did not find any evidence of a relationship between the social competence of vocational high school students affecting their intention to become entrepreneurs. Another study in the context of university students in Tehran, which also contrasts with the present findings, stated that there should be a positive and significant relationship between specific social competencies (such as collaborative competence, empathy competence, persuasion, and impression management) and entrepreneurial intention[20]. Knowledge about entrepreneurship (Entrepreneurship Knowledge) may need to be involved as an initial predictor of entrepreneurial intensity[19] before involving social competence factors because researchers also need to examine intrapersonal social factors (such as self-efficacy) which are also closely related to entrepreneurial intensity.

Table 4. Multiple Linear Analysis of Digital Literacy Skills and Social Skills on Entrepreneurial Intention

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	21.360	3.164		6.751	<,001
Digital Literacy Skills	.262	.042	.501	6.214	<,001
Social Skills	-.041	.115	-.029	-.357	.722

a.Dependent Variable: Entrepreneurial Intentions

The R^2 value (Tabel 5) of 0.246 means that 24.6% of the predictor variables can explain the variation in entrepreneurial intention, while the other 75.4% is influenced by other factors outside the predictor variables studied. Although several previous studies found findings similar to the current findings [17][21][22], which prove the effect of digital literacy on entrepreneurial intention, the findings of Suseno and colleagues did not find the same evidence [22]. Compared to digital literacy and social competence, self-efficacy is also considered a strong predictor of entrepreneurial intention [1][19][23].

Table 7. The effective contribution of digital literacy and social competence simultaneously to entrepreneurial intensity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Digital Literacy Skills Social Skills	.496[a]	.246	.233	3.71632	1.927

This study contributes to providing evidence that digital literacy predicts its influence on the entrepreneurial intensity of vocational high school students. Because the design of this study uses survey data collection, the results of this study do not explain the causal relationship between the two focus variables of the study. The generalization of the results only applies to the participants of this study.

4. Conclusion

This study provides evidence that digital literacy positively and significantly influences entrepreneurial intention. Although we assume that there is an influence of social competence factors in predicting entrepreneurial intention, there is no empirical evidence to support this study. Young people are expected to optimize their digital literacy skills to increase their interest in entrepreneurship. The interest of vocational high school students in entrepreneurship needs to be continuously encouraged by policymakers in schools and outside schools. Vocational education needs to pay attention to the entrepreneurial interest of high school students to produce graduates who are ready to become entrepreneurs and have financial independence. Further research is important to involve the environment in vocational schools in shaping students' entrepreneurial interests. Schools need to ensure the quality of entrepreneurship learning. Schools can focus on integrating comprehensive entrepreneurship education into the curriculum and creating a supportive entrepreneurship ecosystem to increase student independence and align their expectations with realistic career outcomes.

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EXPLORING STUDENTS NEED IN EXTENSIVE READING

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Abstract

Extensive Reading has been widely used in English language teaching since it has numerous advantages in fostering English proficiency. One of the primary benefits is to improve the English language text reading ability of English Language Education study program students. As prospective educators, they must have a superior level of English literacy, considering their future role as role models for their students. Therefore, reading skills must be built intensively and continuously. This research aims at finding out the students' need in developing the Extensive Reading learning model for EFL university students. To collect the data, two kinds of questionnaires were distributed to English Language Education students from 3 universities in Central Java. The result shows that the students need an effective learning model to develop their reading skill as well positive reading habit.

Keywords: students need, extensive reading learning model.

Content

Content should consist of an introduction (background and formulation of problems), method, results, discussion, conclusion, acknowledgment, and references. The detail of the content is presented in the following passage.

1. Introduction

Reading is very essential to develop as learners need abundant language input in learning a foreign language. Written words and sentences in texts functions to provide vocabularies that will be used in productive skills in written or spoken language (Pigada & Schmitt, 2006). In other words, this receptive skill has a very important role to build English proficiency.

The crucial position of reading skill is not in line with the fact. Many Indonesian students have low reading habit. As investigated by Aisah et al., (2019) and Al Nazhari et al. (2016), many EFL students are poor reading habit. Similar phenomenon occurs to high school students. They have low reading interest and reading frequency (Maharsi et al., 2019).

The failure of reading achievement and reading habit could be solved by developing the learning model that the lecturer and the students employed. An effective learning model is developed based on students' and lecturers' need. In conclusion, a need analysis is necessary to describe the students' and lecturers' expectation with the real condition of existing learning model to find out the gap.

In conclusion, there are some reasons for the need of developing a learning model of extensive reading. The first is the need of renewing the learning model. As the students now live in digital era, the learning model should be adapted with information technology. Furthermore, it is necessary to match the teaching materials with students' need. The learning activities does too. The appropriate learning model will greatly help students to mastering all subjects they learned. Therefore, this paper was written to describe how the EFL students' need in learning extensive reading in three universities in Indonesia is.

Reading is generally classified into intensive and extensive reading. They both have different purposes but equally important to practice. Extensive reading and intensive reading have different characteristics. Extensive reading is reading for pleasure of easy abundant books, or we can say that extensive reading is reading widely and in large quantities to get pleasure, while intensive reading is the reading that is only limited to the short text. The indicators are reading a large number of books, easy, and interesting (Jacobs & Renandya, 2015; Nakanishi, 2015; Ng et al., 2019). Those indicators differentiate between extensive reading from intensive reading.

Since extensive reading is crucial for acquiring language skills, several academics have studied its function. Bell (2020) pointed out the many advantages of extensive reading. Its primary purpose is to provide "comprehensible language input." Students can obtain comprehensible linguistic input from books, texts, or graded readers. Additionally, reading a lot is practiced in an enjoyable method to help

with information retention (Fatimah et al., 2022). Second, reading widely can help pupils become more proficient in language overall. Gradually, students' language proficiency can be raised by extended reading. Reading widely also increases the exposure that students have to the language.

Extensive Reading (ER) has been well-acknowledged as a prominent way in developing a language capability. Many scholars have studied ER and proved that it is very advantageous for learning English. Renandya and Jacobs (2002) and Renandya and Jacobs (2016) mentioned at least there are eight advantages of ER, i.e.: 1) ER is beneficial to improve students' vocabulary mastery, 2) Students that participate in ER learn the target language's grammar more comprehensively, 3) ER enhances students' reading speed, 4) As students read a number of texts, they increase their understanding of a wide range of subjects, 5) Participating in ER program facilitates students to become more motivated and confident, 6) ER aids pupils in fostering more positive reading attitudes, and 7) There is a high probability that pupils can form a good reading habit over time. The last point is the final benefit of ER that most researchers have showed through their studies.

Day and Bamford (2002) claims the principles of ER cover simple-attainable texts, various topics from wide range of source, freedom of choosing the text, reading a lot, reading for pleasure, getting information and reading for understanding as the objectives, reading for reading, fast reading, silent reading, teachers' guidance and reader modeling.

2. Method

This research employed qualitative method. It was conducted in 3 universities in Central Java. There were 105 English Foreign Language learners who had joined Extensive Reading Subject in each university. They were students of first semester in University A, and second semester students of University B and C. To collect the data, the writers distributed two kinds of questionnaires, a structured and semi structured questionnaire to the participants. The the structured questionnaire consists of 28 items, which was adapted from Shen (2008) and Anandari & Iswandari (2019) and used four options of Likert scale with the aspects of enjoyment, reading frequency, length of reading, number of books, mode of texts, cultural text and fast reading deriving from the Bamford's principle of Extensive Reading. Meanwhile the other questionnaire was used to gather data about the students' expectation and problems in learning the subject. After the data were collected, they were analyzed thematically using percentage.

3. Results and Discussion

After the data were gathered, the research finding can be seen in the following tables.

a. Student Enjoyment

The first data is student enjoyment. There are five items asking about student enjoyment. Based on the data from the questionnaire, the result shows that most students choose Agree for the options. The complete description is presented in the following table.

Table 1. Students' enjoyment

No	Statement	Response			
		AS	A	D	SD
1.	I enjoy and feel happy reading extensively continuously	20% (21)	75.2% (79)	4.8% (5)	0% (0)
2.	I have good time in reading extensively	10.5% (11)	79% (83)	68.6% (9)	1.9% (2)
3.	I have good time in reading extensively	27.6% (29)	64.8% (68)	6.7% (7)	0.9% (1)
4.	I feel happy if the topic matches my interest	58.1% (61)	39.05% (41)	0.95% (1)	1.9% (2)
5.	Reading books extensively gives enjoyment	12.4% (13)	71.4% (75)	8.6% (9)	7.6% (8)

The findings above reveal that most students got enjoyment and felt happy doing extensive reading. When it was crosschecked with the other questionnaire, it reported the same fact. Student A said: "I feel happy because extensive reading class makes me read English book/texts". Another student, student B confirmed that after taking the extensive reading class, she felt more interested in reading various types of reading and genres. However, student C said," To be honest, I'm a little bored." This statement represents those who did not enjoy their class. They got bored when reading English books. In addition, student D said, "I'm happy, but sometimes I have a little trouble analyzing or reading texts that I don't know the meaning of." This data shows that some students have difficulty comprehending the text they read. It can be concluded that most students feel happy joining the ER class, but few don't due to some reasons. One of them is their boredom and low comprehension ability and they failed to understand the texts.

This finding reveals that enjoyment occurs when the topic of reading text satisfies their interest. It is relevant to Renandya et al. (2018) who state that students will keep reading when the books they read satisfy their interest. This implied that the university should provide sufficient various reading resources to make the students enjoy the extensive reading class.

b. The Students' Frequency of Reading

The second point is reading frequency, and 3 items are asking for the student's response. Table 2 presents the result.

Table 2. The result of students' reading frequency

No	Statement	Response			
		AS	A	D	SD
1.	I read books/ texts regularly and continuously	5.7% (6)	67.6% (71)	23.8% (25)	2.9% (3)
2.	I rarely read English books/texts	2.85% (3)	54.3% (57)	41.9% (44)	0.95% (1)
3.	Regular reading makes me read more	14.3% (15)	67.6% (71)	15.2% (16)	2.9% (3)

Table 2 shows that the students did regular reading, but not reading English text. It means that they have not had positive English reading habits. They may read Bahasa Indonesia texts regularly but they less frequently read English texts.

The finding above also reveals that the students have not built their English reading habits. Reading English texts regularly could be challenging for EFL students when they are not supported by their ability to comprehend English texts. Their low reading skill may influence their reading interest. Another factor is the availability of English books that match their interest and reading level. If they can easily access them, it possibly raises their English reading habit.

c. Length of Reading

How long students read can be seen in the table 3.

Table 3. The result of reading length

No	Statement	Response			
		AS	A	D	SD
1.	I spend few hours of reading a week	5.7 % (6)	43.8 % (46)	47.6 % (50)	2.9 % (3)

Based on the questionnaire result, the number of students who spend few hours in a week and those who don't is quite similar. It means there are many students who do not read. They may have other activities that take more time and are more interesting for them.

Spending less time to read English text indicates that they have less interest of reading English text. In contrast, they will spend longer time to read if they like it. In addition, the more time to spend for reading normally relates with the higher number of books they read (Willy A. Renandya, 2007).

d. Number of Books

The next data is number of books students read. The result of the questionnaire shows that most students give positive response to both of the statements. The percentage can be seen in Table 4 below.

Table 4. The result of book number

No	Statement	Response			
		AS	A	D	SD
1.	I read a book every week.	6.7% (7)	60% (63)	31.4% (33)	1.9% (2)
2.	I should read more books in a week	17.1% (18)	62% (65)	19% (20)	1.9% (2)

The finding reveals that most students read a book every week. It means that the students still have very limited number of books to read. The book number they read is associated with the level of reading habit (Iftanti, 2012). The more books students read, the more positive reading habit they have. Ideally, a student read at least 15 books per level (Kredátusová, 2007). The fact shows that their reading habit is low. However, they are aware of improving it. It indicates that they need a guidance and facility. Through the model of web and cultural text-based extensive reading instruction, they will be facilitated to build their good habit of reading.

e. Book/Text Selection

How books/texts are selected can be chosen by the lecturers or the students themselves. There are two items about text selection. The obtained data is presented in the following table.

Table 5. The result of text selection way

No	Statement	Response			
		AS	A	D	SD
1.	I choose the books that I want to read by myself.	47.6% (50)	50.4% (53)	0.95% (1)	0.95% (1)
2.	I feel free to choose the book I like.	38.1% (40)	61.9% (65)	0% (0)	0% (0)

The result of the questionnaire shows that almost all students reported that they chose the book to read by themselves. It means that the lecturers of ER gave freedom to their students to choose the books/texts they like.

The finding reveals that the students choose the text to read by themselves as the implementation of one of the ten ER principles by Day & Bamford (2002) that is book selection autonomy. When they have choices, they will feel free and it can encourage them to read (Forster, 2013).

f. Mode of Text

Dealing with mode of text, the result of the questionnaire is described in Table 6.

Table 6. The result of text mode

No	Statement	Response			
		AS	A	D	SD
1.	I usually read printed books/texts	17.1% (18)	55.2% (58)	27.7% (29)	0% (0)
2.	I prefer reading online texts	28.6% (30)	46.7% (49)	22.8% (24)	1.9% (3)

The finding reveals that most students usually read printed books/texts. In their daily classes, printed books are commonly used. It is confirmed with the result of the interview with student L who said that during his English learning experience, he used to have a hard copy to study. After he was in

college, he often accessed the internet to find learning resources. Therefore, many students confirm that they prefer reading online texts. This data was verified with open-ended questions to find out whether they have experienced web-based learning. Some students stated they have experienced it, but some others said they have not experienced it yet. Few stated they once did it. This indicates that the students have not maximized web-based learning for English learning. Therefore, the lecturers are suggested to tell them some free online ER resources that they can visit, such as http://er-central.org., http://learningenglish.news voa.com, http://letsreadasia.com, http://literacy cloud.org, http://english-e-reader.net, etc.

g. Kinds of Text

The next item is kind of text. There are two items of the need of text variety and its availability in universities. The detailed description is presented in table 7 below.

Table 7. The result of text type

No	Statement	Response			
		AS	A	D	SD
1.	I need to read many kinds of text	28.6% (30)	62.9% (66)	7.6% (8)	0.9% (1)
2.	I can easily find many kinds of text in my university	16.2% (17)	61.9% (65)	19% (20)	2.9% (3)
3.	What kind of text I want to read:				
	Romance/ story/ fiction	40%			
	Culture	19.6%			
	Food	14.3%			
	Music/ entertain-ment	11.4%			
	Biography	6.7%			
	Sport	5.7%			
	Motivation	2.3%			

Based on the questionnaire result, most of the students confirm that they need to read many kinds of text (genre) and their university has the facility to support them reading them. The good facility will strongly motivate them to sustain their reading habit. When it is triangulated with the data from open questionnaire, many students said that most collections are novels and short stories. It means that there should be more various genres that can be chosen by students. More alternatives may help students get the appropriate books for them.

The writer gave a question related to the text the students want to read in a semi structure questionnaire. The topics that they want to read are stories, culture, entertainment, food, sport, biography and self-improvement/motivation. The findings reveal that the kind of text students consciously need to read many kinds of texts. The topics they want to read are stories, culture, entertainment, food, sport, biography and self-improvement/motivation. It indicates that stories or fiction is not the only genre that they are interested in, but various genres. Book variety choice can lead to students' personal reading enjoyment. When they find a book they like to read, it will stimulate them to read and read more (Jacobs & Renandya, 2015). The more genres, the wider changes they have to meet their reading desire.

h. Cultural Text

The next data is about cultural text. There are 4 items about cultural texts, and they were put in the questionnaire to determine whether the students knew cultural texts. Based on the questionnaire result, most respondents choose Agree to the statements. The description is in the following.

Table 8. The result of cultural text

No	Statement	Response			
		AS	A	D	SD
1.	I have never read English texts about culture before	3.8% (4)	47.6% (50)	45.7% (48)	2.9% (3)

No	Statement	Response			
2.	I think text about culture is interesting	16.2% (17)	73.33% (77)	9.52% (10)	0.95% (1)
3.	Cultural texts are easy to understand	7.62% (8)	55.24% (58)	35.24% (37)	1.9% (2)
4.	We should know and appreciate our local culture	47.62% (50)	51.43% (54)	0.95% (1)	0% (0)

Table 8 shows that many students have not read English cultural texts before, but they have interest to read it. Based on the findings above, cultural text can be an alternative to attract the students to read as they perceive that it is interesting, and it is easy to understand. In addition, they are aware of the necessity to know and appreciate their local culture. In the previous finding, cultural text is included in the favorite topics that they want to read.

Since cultural text has not been familiar for students in ER class, it can be an alternative to attract the students to read as they perceive that it is interesting, and it is easy to understand. In addition, they are aware of the necessity to know and appreciate their local culture. Culture is closely related to our daily life. Therefore, it is assumed the familiarity will help students to comprehend the texts easily. In conclusion, it is necessary to put it as teaching materials in ER class since culture and language teaching cannot be separated. In addition, Texts across cultures facilitate students to sharpen their identity and respect others as Shemshadsara (2012) said that a greater understanding of other cultures fosters tolerance, empathy, and sensitivity across cultural divides.

i. Reading Fluency

Fast reading is considered crucial to acquire because with the skill, students can do their job more quickly and accurately. This part asks the students' opinion about the skill of fast reading. It has 2 items to get the data. It can be seen from the questionnaire result as the following.

Table 9. The result of reading fluency

No	Statement	Response			
		AS	A	D	SD
1.	Reading widely can build fast reading	21.9% (23)	73.3% (77)	4.8% (5)	0% (0)
2.	I should become a fluent reader	27.6% (29)	64.8% (68)	7.6% (8)	0% (0)

From those results stated above, it can be concluded that the students dominantly have awareness to become fluent readers and the way to do it is by reading widely. It means that they should read a lot regularly. They should spend more time to read and do in regular schedule. Through the proposed model, they can be facilitated and guided to improve their fluency in reading because extensive reading program is regarded as an effective strategy to develop students' reading speed (Holsworth, 2020).

j. Learning Activities

Another aspect of the questionnaire is learning activities. There are 3 items of the statements describing the students' expectation of learning activities in ER class, consisting of discussion, peer cooperation, and lecturing. The detailed description is presented in the table as follows.

Table 11. The result of learning activities

No	Statement	Response			
		AS	A	D	SD
1.	Reading widely can build fast reading	21.9% (23)	73.3% (77)	4.8% (5)	0% (0)
2.	I should become a fluent reader	27.6% (29)	64.8% (68)	7.6% (8)	0% (0)

No	Statement	Response			
3.	I think lecturing is still needed in ER class	17.14% (18)	81.91% (86)	0.95% (0)	0% (0)
4.	I expect to have this activity before starting reading:				
	a. Listening to song	44.8% (47)			
	b. Watching some interesting pictures	20% (21)			
	c. Playing a game	14.3% (15)			
	d. Having a provoking question	20.9% (22)			
5.	My favorite post-reading activity is ….				
	a. Retelling the story /text to peers	31.4% (33)			
	b. Writing caption	14.3% (15)			
	c. Summari-zing the text/book	11.4% (12)			
	d. Making quotes	19% (20)			
	e. Writing a poem or song lyric	14.3% (15)			
	f. Book talk	9.5% (10)			

From the findings above, it can be summed that the expected kinds of learning activities in ER class are discussion, peer collaboration and lecturing. It means that the learning model of student-centered learning is more emphasized although lecturing method is sometimes needed to explain concepts.

In addition, the yielded data from the semi structure questionnaire reveals some pre-reading activities that the students expected. They listed that listening to songs, watching interesting pictures and playing a game could be a warming up in the learning process.

From the findings above, it can be summed that the expected kinds of learning activities in ER class are discussion, peer collaboration and lecturing. It means that the learning model of student-centered learning is more emphasized although lecturing method is sometimes needed to explain concepts. Discussion and peer collaboration are social interaction form of learning, in which students can share their ideas about the books they read. Thus, these activity facilitate students to improve English reading skills in terms of knowledge construction and peer learning (Pongsatornpipat, 2021). In addition, social sharing activity in ER give an impact to stimulate students to read more (Kirchhoff, 2015).

In the other side, some favorite post-reading activities according to the students are including retelling the story/text to peers, making quotes, writing a poem or song lyric, writing a caption, summarizing texts/books and book talk.

k. Type of Work

The last part is the type of work. The objective is to get data about the work the students expected. Based on the obtained data, most respondents choose Agree to the statements. The data description can be seen in the following table.

Table 11. Type of work

No	Statement	Response			
		AS	A	D	SD
1.	In ER class, I have individual work	11.42% (12)	76.2% (80)	11.43% (12)	0.95% (1)
2.	I prefer having group work in ER	21.9% (23)	62.8% (66)	15.3% (16)	0% (0)

The finding shows that most students confirmed the type of task is individual work, but they prefer group work. It means that they like another type of work better than individual work. Both task type can be used in ER class but group work should have bigger portion.

l. Students' Contraints in ER Class

Based on the questionnaire result, the students reported having problems in learning ER. It mainly deals with texts, students and the learning environment. Text factor includes difficulty level of texts and uninteresting texts. Students factor means their comprehension, reading habit and retelling ability as post-reading activity. There is an external factor that students encounter that is noise of their surrounding that destroys their concentration in reading.

Table 12 Problems in learning ER of students' view

Question	Response	Number of Response
What problem do you find in joining Extensive Reading class? Please elaborate your answer.	Difficult texts/ text level	35
	Comprehension	34
	Uninteresting text	15
	Reading habit	5
	Noise	4
	Re-telling story	3
	I haven't encountered any problems	9
Total		105

Based on the questionnaire result, there are three main problems in learning ER, they are texts, students and learning environment. Text factor includes difficulty level of texts and uninteresting texts. Students factor means their comprehension, reading habit and retelling ability as post reading activity. There is an external factor that students encounter that is noise of their surrounding that destroys their concentration in reading. As the first principle of ER says, the texts used in ER must be easy (Day & Bamford, 2002b). When the chosen passage is higher than the students' level, it is very possible to fail in understanding it. Therefore, students should select the one matching their reading skill. It is necessary for lecturers to make them aware of their reading level. In addition, the availability of the texts/books plays a very important role in succeeding reading activity.

4. Conclusion

Based on the result of need analysis, it is revealed that the students need an effective learning model to develop their positive reading habit. It can be seen from their frequency of reading, the time spent for reading and the book number they read. The low reading frequency, less time to read and the small number of the books they read become a primary data that they should develop their reading habit. In addition, they admit that they need to explore various genres to improve their reading skill. Cultural texts could be an alternative and enrich their knowledge as well as grow their reading interest. In addition, they offer both various text types and numerous themes. Huge number of available texts open wider chances for students to meet suitable text which match their level and their interest. Furthermore, many of them have not maximized the use of web-based learning to search and read online graded readers that can be freely accessed anytime anywhere. Furthermore, ER lecturers should modify the learning strategy, especially the learning activities, type of work, the media used, and the assessment. The students expected to have more interesting pre-reading activity, such as the use of song, games and having a provoking question. In addition, they wanted to do post-reading activity including retelling stories to their peer, writing poem or song, making quote, writing captions and book talk. Variety in both pre- and post-reading activity could minimize students' boredom and encourage them to improve their reading proficiency through a positive reading habit.

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Transformation of High-Quality Human Resource Development in Leading Schools Through Strengthening School Resilience

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Abstract

Strengthening human resource resilience is crucial for navigating the challenges and changes of the Industry 4.0 era. Strategies to address issues in the education sector require enhanced resilience to achieve educational system goals. The transformation aimed at developing quality human resources necessitates resilient teachers. The community service program, a beacon of hope, seeks to provide practical information and support for high school teachers, enabling them to design interventions that enhance student resilience within their schools. The aspects developed for teacher resilience encompass seven key dimensions: emotional regulation, impulse control, empathy, optimism, causal analysis, self-efficacy, and reaching out. The resilience enhancement is structured using interactive and innovative media, particularly experiential learning. The results indicate that the resilience profile of teachers falls within the resilient category, with impulse control as the highest-scoring aspect and causal analysis as the lowest. The resilience-strengthening initiatives were implemented for teachers at leading schools in Gunung Kidul, comprising seven schools. The learning transformation program involved a workshop on strengthening school resilience, resilience programs for teachers and students, implementing resilience programs within the Merdeka curriculum at leading schools, and a poster competition themed around school resilience. The success of these initiatives is a testament to the potential of resilience in shaping the future of education.

Keywords: high-quality human resource, school resilience, experiential learning, educational transformation

1. Introduction

Schools face significant challenges in enhancing human resources (HR) quality amid the 4.0 industrial revolution. They must proactively address disruptive innovations by generating new solutions. In this context, it is crucial to foster a mindset within the community regarding enhancing competencies related to the development of science and technology (STEM) to support industrial advancement. Schools should be capable of producing human resources equipped with the competencies necessary for research-based progress that can lead to a more prosperous society.

The 4.0 industrial revolution necessitates both organizational and personal adaptability. Organizational adaptation is determined by superior human resources that can drive the organization toward its core objectives. In contrast, personal adaptation relies on individuals with solid resilience to thrive in competitive environments. According to Stephen Covey, the criteria for superior human resources include the desire to learn, the need to love and be loved, the necessity of survival, and the ability to offer something valuable.

The capacity of schools to produce resilient students is a crucial determinant of superior human resources. The strength of a school's graduates depends on the ability of teachers to develop applicable, accountable knowledge that is beneficial to human life. As the competitiveness of human resources increases, the role of teachers becomes strategic in enhancing their effectiveness as educators. Moreover, government support, particularly from the Department of Education, is essential to motivate all teachers to develop their academic capacities, particularly in technology literacy, and to strengthen essential soft skills to foster innovation among students.

Additionally, schools must be prepared for challenges related to disruptive phenomena, behavioral changes, competition, and the ongoing societal shifts characterized by volatility, uncertainty, complexity, and ambiguity. Strengthening resilience has emerged as one of the most effective strategies

for cultivating competitive human resources capable of facing diverse challenges and demands for change.

Educational policies to enhance human resources should serve as guidelines and frameworks for conducting activities and directing behavior toward more precise and targeted outcomes. Such policies support achieving educational objectives and influencing educational quality [1]. Educational quality can be managed based on agreed-upon policies, creating interconnections that impact the functioning of the educational system. Educational policies, designed to be proactive and problem-solving in nature, reassure us about the direction of the education system and its ability to facilitate the achievement of educational goals [2].

Thus, educational policies encompass regulations related to the education sector, outlining the vision and mission to attain educational objectives through strategic implementation. Implementing educational policies includes all activities conducted by individuals or groups of stakeholders to achieve educational goals, which require resilience. A robust behavioral approach is essential for effectively transforming education to enhance human resources.

Sekolah Penggerak is an institution focused on the holistic development of student learning outcomes to realize the Pancasila Student Profile. This profile encompasses competencies and character, beginning with cultivating outstanding human resources, including school leaders and teachers. Overall, Sekolah Penggerak has yet to optimize the preparation of resilient teachers capable of adapting to changes in educational policy, even as the number of such schools has significantly increased. Schools face more significant challenges in delivering education, necessitating comprehensive support during learning [3]. The changing social realities demand that teachers be prepared to adapt positively to difficult situations. This adaptability is crucial for teachers, as it assists in overcoming obstacles and achieving optimal academic performance.

Schools face increasingly significant challenges in delivering education, necessitating comprehensive support during learning [4]. The changing social landscape demands that teachers be ready to adapt positively to difficult situations. This adaptability is crucial for educators as it enables them to address challenges and obstacles, facilitating optimal academic outcomes effectively. Resilience is essential for teachers in the digital age [5][6][7], helping them maintain stability in pressuring or complex conditions. Such resilience fosters a positive response and greater adaptability when confronting various issues, allowing educators to endure and recover. The community service program for teachers aims to motivate educators as professionals to enhance their knowledge and improve resilience and digital literacy through educational games. Teachers play a vital role in instruction and education, necessitating training to bolster resilience and cultivate a proactive, assertive, and responsible approach to problem-solving within their environments [2].

However, school teachers still need to possess the ability to adapt to learning during the 4.0 industrial revolution. This adaptability is contingent upon their level of resilience. Currently, the resilience of high school students, assessed across seven aspects—emotional regulation, impulse control, empathy, optimism, causal analysis, self-efficacy, and reaching out—has not yet reached high levels.

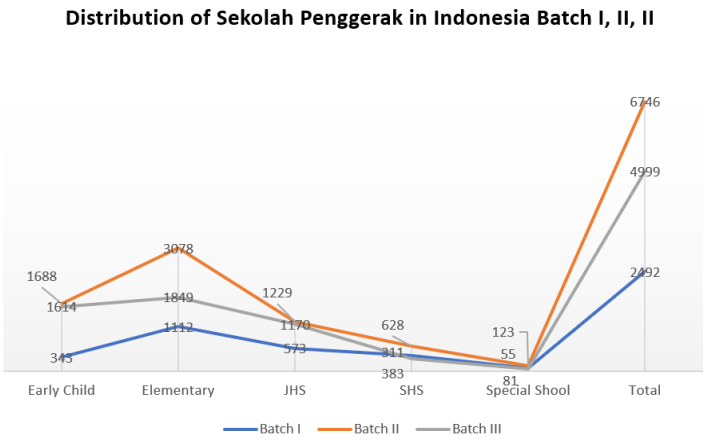


Figure 1. Distribution of Sekolah Penggerak

2. Method

The learning media in the community service program focuses on transferring knowledge and experience through practical and enjoyable strategies, particularly enhancing resilience. The implementation method for this assistance involves a participatory action research (PAR) approach, where the service team engages subjects directly in activities designed to support teachers in building resilience. The goal is to empower teachers to cultivate their resilience in response to increasingly frequent environment changes.

Support is provided through face-to-face activities, including lectures and problem-solving discussions. Lectures are oral communication within the teaching and learning process [8]. This method allows for interactive engagement between participants and speakers, facilitating discussions around issues or cases that pose challenges to developing literacy and strengthening resilience. Individual resilience among teachers can be enhanced through experiential learning, such as exchanging thoughts about life experiences.

Additionally, the program includes practical activities focused on creating simple educational games. The community service initiative aims to reinforce resilience and design resilient school programs using innovative and enjoyable learning media.

3. Results and Discussion

Resilience is essential for Sekolah Penggerak to face the challenges of the Fourth Industrial Revolution. Resilience refers to the ability to adapt to difficult situations in life, serving as a means to maintain and positively adapt as an effective strategy for overcoming challenges [9]. Resilience encompasses various dimensions built upon social contexts and dynamic constructs. Initially, resilience was understood as a personality trait that minimizes the negative impact of stress and demonstrates adaptability [10].

Resilience is the potential capacity of a dynamic system to successfully adapt to disturbances that threaten its functionality [11], survival, or development. Institutional resilience refers to the dynamic condition of an organization characterized by resilience and tenacity, enabling it to develop its potential to confront threats, challenges, obstacles, and disruptions, whether from within or outside the institution, that may jeopardize its existence [12].

The objectives of resilience in higher education are to rejuvenate the competencies of faculty, staff, and students, ensuring student success and preventing them from becoming trapped by the problems they face; to enhance collaboration through community engagement, where effective communities facilitate the exchange of messages between parties; to identify risk factors and protective factors. Moreover, resilience is closely linked to emotional regulation [13] and mental toughness [14]

Teacher Resilience Profile

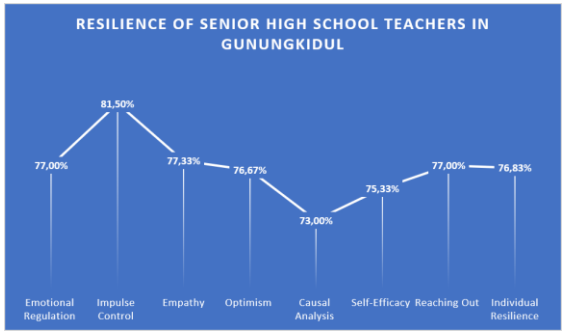


Figure 2. Individual Resilience Profile of Teachers in Sekolah Penggerak in Gunung Kidul

Figure 2 illustrates the resilience profile of teachers from Sekolah Penggerak during the resilience enhancement workshop to support the transformation towards high-quality human resources. The overall resilience score is 76.83%, categorizing the group as resilient. The highest scoring aspect is impulse control, with a score of 81.50%. The second highest aspect is empathy, which received a score of 77.33%, followed closely by emotional regulation and reaching out at 77.00%. The next aspect is

optimism, with a score of 76.67%, followed by self-efficacy at 75.33%. The lowest score is for causal analysis, which stands at 73.00%.

These findings are supported by narratives shared during the resilience enhancement sessions, where teachers recounted their journeys into the profession, starting with obtaining parental permission for their schooling, differing opinions with parents regarding education, and contemplating school expenses for themselves and their siblings. Additionally, some teachers reported experiences of bullying during their secondary school years. These stories underscore the strength that has helped these teachers persevere, resulting in a comparatively high resilience score. However, it is noteworthy that causal analysis remains the lowest-scoring aspect among the evaluated dimensions.

Workshop on Enhancing Teacher Resilience in Sekolah Penggerak to Support the Transformation of High-Quality Human Resources

The workshop was held on Tuesday, July 9, 2024, at the partner school, SMA N 1 Patuk, Yogyakarta (Figure 3). Participants included two representatives from each Sekolah Penggerak in Gunung Kidul: SMA N 1 Patuk, SMA N 1 Wonosari, SMA N 2 Wonosari, SMA N 2 Playen, SMA N 1 Karangmojo, SMA N 1 Semin, SMA PGRI Playen, SMA Muhammadiyah Ngawen, and SMA Muhammadiyah Almujahidin Wonosari. On this occasion, nearly all invited participants could attend, except for two schools from the Muhammadiyah Foundation, which could not join due to a simultaneous workshop organized by their school and foundation. The event commenced promptly at 09:00 AM with introductory remarks from the head of the organizing committee, followed by a welcome address and the official opening by the Principal of SMA N 1 Patuk, Gunung Kidul.



Figure 3. Flyer for the Workshop on Strengthening Resilience among Sekolah Penggerak Teachers

4. Conclusion

Based on the Community Service activities conducted, it has been determined that the resilience of teachers at Sekolah Penggerak falls within the resilient category, with the highest aspect being impulse control and the lowest being causal analysis. The resilience profile of teachers still requires strengthening in certain aspects through various programs. Schools have designed a range of initiatives to enhance the resilience of the school community, including that of teachers and students.

Moreover, teachers have identified challenges in implementing the Merdeka Belajar curriculum at Sekolah Penggerak, particularly the need for appropriately tailored subjects that align with students' interests. Under the Merdeka Belajar curriculum, there are no specific tracks for Science, Social Sciences, or Languages; instead, students can choose subjects that interest them. Sekolah Penggerak can implement the Merdeka Belajar curriculum due to support from various stakeholders, a willingness to experiment with new approaches, and a supportive social environment within the school.

It is essential to provide professional support (from the service team) in strengthening student resilience at Sekolah Penggerak to facilitate the transformation towards superior human resources, ensuring excellence extends to the students, not just to the teachers or school leaders. Additionally, guidance is needed to develop, design, and customize subjects that align with students' interests.

Acknowledgment

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Strengthening Teacher Resilience through Mentoring to Build Quality Schools

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Abstract

In the context of Industry 4.0, schools must proactively adapt to disruptive innovations while enhancing the competencies of educators to better prepare students for societal demands. This study evaluates the resilience profiles of high school students and teachers at the Indonesian School in Kota Kinabalu, revealing overall low resilience levels, particularly in emotional regulation, impulse control, and causal analysis. A community service program was implemented to address these challenges, employing a participatory action research approach to foster resilience among educators and students. The program encompassed interactive lectures, experiential learning, and practical activities designed to build resilience by developing self-potential, effective communication, and sociocultural adaptation skills. Results indicate that while resilience levels remain suboptimal, targeted interventions can significantly enhance adaptive capacities among teachers and students. Educational policies prioritizing resilience-building initiatives are crucial for improving educational quality and producing high-achieving graduates. This study underscores the necessity of comprehensive support systems in educational settings to navigate the complexities of modern society and foster resilience in educators and students. Future research should explore practical strategies for enhancing resilience in diverse educational contexts. The community service initiative is fully supported by Universitas Negeri Yogyakarta, highlighting the importance of institutional collaboration in educational development.

Keywords: community service, school quality, teacher resilience

1. Introduction

Schools must proactively address disruptive innovations by generating innovations themselves. The challenges they face in the era of Industry 4.0 are complex. Enhancing teachers' competencies is essential for producing graduates equipped with the skills needed by society. The advent of Industry 4.0 demands both organizational and personal adaptation capabilities. Organizational adaptation is determined by high-quality human resources that can drive schools toward their core objectives. In contrast, personal adaptation relies on outstanding teachers and students with strong resilience to thrive in a competitive environment. According to Stephen Covey, the criteria for superior human resources include the desire to learn, the need to be loved and to love, the necessity for survival, and the drive to offer something of value.

The caliber of human resources is fundamentally influenced by a school's ability to produce students with strong resilience. The strength of a school in generating high-achieving graduates hinges on teachers' capacity to develop applicable and accountable knowledge that benefits human life. With increasingly competitive human resources, the role of teachers becomes strategic in enhancing their presence as educators. Additionally, government support, particularly from the Ministry of Education, must motivate all teachers to develop their academic capacities, ensuring they possess competencies in technological literacy and the ability to foster essential soft skills in students and fellow educators for innovation.

Schools must be prepared to meet challenges related to disruption phenomena, behavioral changes, competition, and ongoing societal shifts characterized by volatility, uncertainty, complexity, and ambiguity (VUCA). Strengthening resilience is one effective strategy for cultivating competitive human resources capable of facing various challenges and demands for change.

Educational policies that enhance resources serve as guidelines for conducting activities and regulating behavior, making objectives more transparent and more directed. These policies are designed to support the achievement of educational goals and significantly impact educational quality [1].

Educational quality can be managed based on mutually agreed-upon policies, creating interconnections that affect the functioning of the educational system. Educational policies are expected to be proactive and problem-solving in pursuit of educational objectives [2].

Therefore, educational policies pertain to the education sector's vision and mission, aimed at achieving educational goals through strategic implementation steps. The implementation of educational policies encompasses all activities carried out by individuals or groups of stakeholders to achieve educational objectives, necessitating resilience in the process. A robust understanding of human behavior is required for successful educational transformation and effective improvement of human resources.

Schools should implement adaptive learning strategies in the era of Industry 4.0.

The level of resilience determines the ability to adapt. However, several previous studies indicate that the resilience of high school students, assessed across seven aspects—emotional regulation, impulse control, empathy, optimism, causal analysis, self-efficacy, and reaching out—has not reached a high category.

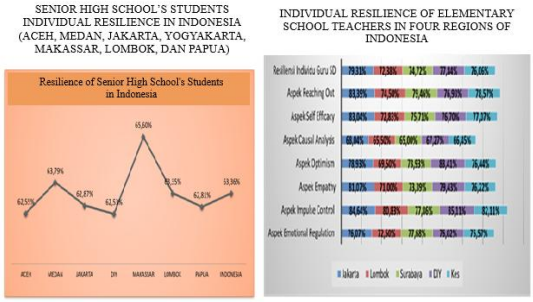


Figure 1. Resilience Profile of High School Students

The data presented above outlines the relative resilience levels of high school students and elementary school teachers across several regions in Indonesia, serving as preliminary evidence that students' resilience still needs to be improved. It underscores the ongoing need for support in strengthening resilience. This reality forms the foundation for the 2024 community service program, particularly at Johor School, to enhance resilience, based on the assumption that the resilience levels of both teachers and students at the Consulate General School in Kota Kinabalu are suboptimal.

Schools in the era of Industry 4.0 face more significant challenges, necessitating comprehensive support during the learning process [3]. The changing social realities demand that teachers be prepared to adapt positively to difficult situations. This phase is crucial for teachers as it helps them navigate problems, obstacles, and difficulties while maintaining a positive adaptation to achieve optimal reporting outcomes. Resilience is essential for teachers in the digital era [4][5][6], enabling them to remain stable in stressful or challenging conditions. It fosters a more adaptive and positive response to various issues, allowing them to endure and recover.

The Community Service program for teachers at the Consulate General School in Kota Kinabalu aims to motivate educators as professionals to expand their knowledge and enhance resilience. Teachers play a vital role in teaching and education, and training them to bolster their resilience is essential, fostering a proactive, decisive, and responsible approach to resolving challenges in their environment [7].

2. Method

The learning media in the community service program involves transferring knowledge and experience through practical and enjoyable strategies to enhance resilience. Implementing this support utilized a participatory action research (PAR) approach, where the service team actively involved participants in the mentoring activities designed to foster teachers' resilience. The goal was to equip teachers with the skills necessary to cultivate a resilient mindset in rapidly changing circumstances [8].

The mentoring was conducted in person through lectures and problem-solving discussions. Lectures served as a verbal communication tool within the teaching and learning process. This

interactive lecture method encouraged engagement between participants and the facilitator while facilitating discussions on challenges or cases that hinder the development of literacy and resilience.

Teachers' resilience can be strengthened through experiential learning, in which participants reflect on life experiences in a shared environment. It included practical activities, such as creating simple educational games. The overarching aim of the community service program was to enhance resilience and design resilient school programs utilizing innovative and enjoyable learning media.

3. Finding And Discussion

a. Resilience Profile of Respondents

Data on the resilience profiles of students in Kinabalu examines overall resilience and each component that contributes to resilience (Figure 2). Overall, students' resilience at the Indonesian School in Kinabalu is rated at 65.80%, categorizing it as relatively low. Additionally, nearly all components of resilience fall within a similarly low category, with each component scoring below 71% but above 56%.

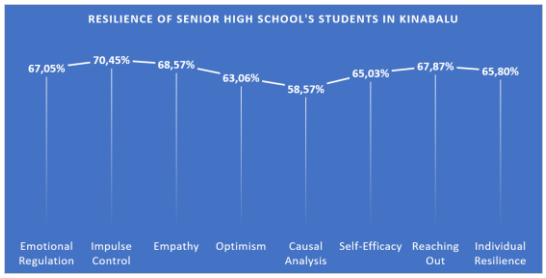


Figure 2. Individual Resilience Profile of Students in Kinabalu

The first component, emotional regulation, received a score of 67.05%. This aspect refers to the ability to remain calm under pressure. Based on this score, it can be concluded that students at the Indonesian School in Kinabalu demonstrate a relatively low level of emotional regulation, indicating that they may struggle to maintain composure in stressful or unpleasant situations, often experiencing panic or similar reactions.

The next component, impulse control, scored 70.45%, placing it in the low category, though it is close to the higher range, with a gap of only 0.55%. Impulse control reflects the ability to manage desires, and students at the Indonesian School in Kinabalu appear to have some capacity for self-control, likely due to the constraints they have experienced, which have fostered self-discipline from a young age.

Empathy, another critical aspect, received a score of 68.57%, also categorized as relatively low. Empathy involves the ability to respond to the psychological and emotional states of others. The optimism component scored 63.05%, placing it in the low category. Optimism refers to the belief in the possibility of positive change; the Indonesian dictionary defines it as a perspective that maintains hope in the face of challenges.

Causal analysis, which assesses the ability to identify the causes of problems accurately, scored the lowest among all resilience components at 58.57%. This low score is not only observed among students at the Indonesian School in Kinabalu but is also the lowest across resilience profiles throughout Indonesia.

The self-efficacy component scored 65.03%, indicating a low confidence in one's ability to solve problems and achieve success. Finally, the reaching-out component received a score of 67.87%, categorizing it as relatively low. Reaching out refers to the ability to attain success and to enhance positive aspects of life by embracing challenges and fostering connections with others.

Strengthening Resilience for Students at the Indonesian School in Kota Kinabalu

The strengthening of student resilience was conducted in the indoor facility of the Indonesian School in Kota Kinabalu, involving all students enrolled at the institution. The resilience training included an introduction to the concept of resilience, successful vital games, and positive feedback.

During the introduction to resilience, students learned about self-potential through the factors that shape personal potential, the importance of cultivating a growth mindset, and strategies for developing their abilities. They were also introduced to the characteristics of a resilient and well-rounded individual, which included enhancing self-confidence, fostering effective and empathetic communication, and planning for future skills and careers.

Additionally, students received instruction on sociocultural adaptation and resilience, focusing on building sociocultural relationships, exploring social capital for resilience, and strategies for strengthening sociocultural adaptation.



Figure 3. Strengthening Resilience for Students at the Indonesian School in Kota Kinabalu

Strengthening Resilience for Teachers at the Indonesian School in Kota Kinabalu

Teachers were strengthened in resilience at the Indonesian School in Kota Kinabalu. This initiative involved various forms of support, including introducing resilience concepts. Teachers were familiarized with self-potential through the factors that shape personal abilities, the importance of fostering a growth mindset, and strategies for self-development. They were also introduced to the characteristics of a resilient and principled individual, which included enhancing self-confidence, building effective and empathetic communication, and planning for future skills and careers.

Additionally, teachers received training on sociocultural adaptation and resilience, focusing on building sociocultural relationships, exploring social capital for resilience, and strategies for enhancing sociocultural adaptation. Before these activities, teachers were provided foundational training in academic writing for journal publication.



Figure 4. Strengthening Resilience for Teachers at the Indonesian School in Kota Kinabalu

4. Conclusion

The resilience profile of students at the Indonesian School in Kota Kinabalu tends to be low in overall measures and across each component contributing to resilience. Therefore, strengthening resilience for students and teachers at the school is essential. The community service program indicates that further initiatives are needed for both educators and students. School policies aimed at building institutional and personal resilience for teachers and students can serve as a flagship program to produce outstanding and high-achieving students.

Acknowledgment

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Resilience Map of Emotional Regulation Aspects for High School Students in Disaster-Prone Areas

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Abstract

Resilience is a crucial factor in disaster mitigation. It is an essential attribute that individuals must possess to effectively adapt to and address the challenges posed by the dynamic changes in life; however, this awareness is not yet fully recognized among the Indonesian population. There is a tendency for resilience levels to remain suboptimal. Research on resilience, particularly at the school level, is highly compelling. This study aims to visually depict the distribution of resilience profiles among high school students. The research employed a descriptive approach that integrated quantitative and qualitative methods, specifically a sequential mixed-methods design. The quantitative approach served as the primary method to quantify the personal resilience of high school students. In contrast, the qualitative approach was used to explore the application of ArcGIS version 10.8 for creating maps that illustrated the distribution of personal resilience among high school students in disaster-prone areas of Indonesia. The research location was selected using purposive sampling, targeting disaster-prone regions, including Aceh, Medan, Jakarta, Yogyakarta, Lombok, Makassar, and Papua. The primary subjects of this study were high school students across all grades (Year 1, Year 2, and Year 3), who served as key informants. Samples and respondents were determined through purposive sampling techniques. The findings of this research generate a visualization of resilience maps for students in Indonesia, mainly focusing on the aspect of emotional regulation.

Keywords: resilience map, emotional regulation, disaster-prone area

1. Introduction

Schools play a strategic role in building resilience, particularly in disaster mitigation, as outlined in the Sendai Framework for Disaster Risk Reduction 2015-2030[1]. Therefore, developing school resilience policies is essential as a guideline for effective disaster mitigation. Such policies must consider various aspects, one of which is the geographical location of each region. By considering the geographic context in disaster mitigation strategies, evacuation can be expedited, reducing the risk of casualties.

Indonesia faces significant challenges, as it is one of the most disaster-prone countries in Southeast Asia. The National Disaster Management Agency (BNPB) reports that approximately 148.4 million people reside in earthquake-prone areas, 3.8 million in tsunami-risk zones, 1.2 million in regions susceptible to volcanic eruptions, 63.7 million in flood-prone areas, and 40.9 million in risk of landslides. Additionally, 11.1 million individuals are threatened by high waves and coastal erosion. Three hundred eighty-six districts and cities are located in moderate to high earthquake risk; 233 in tsunami-prone regions; 75 threatened by volcanic eruptions; and 315 at moderate to high flood risk.

However, risk management has yet to be implemented by all disaster-prone schools to support government programs to reduce disaster impacts. Thus, collaboration between the government and educational institutions is crucial in mitigating disaster risks. Strengthening resilience as part of disaster mitigation has yet to become a priority policy in schools aimed at fostering a resilient community. The role of schools as educational institutions, especially in disaster mitigation, can synergize with local knowledge to enhance community resilience. Data on the resilience mapping of students in disaster-prone areas is vital for providing an informative overview of each school's resilience capacity, serving as foundational data for developing tailored school resilience policies across Indonesia. The findings of

this research can significantly influence policy-making in the education sector, leading to the development of effective resilience-building programs.

2. Method

The research employed a descriptive approach that integrated quantitative and qualitative methods, specifically a sequential mixed-methods design. This approach aimed to accurately describe the individual resilience of high school students at the time of the study. The quantitative method served as the primary approach for quantifying students' resilience, while the qualitative method, equally important, explored the use of ArcGIS version 10.8 in creating maps that illustrate the distribution of personal resilience among high school students in disaster-prone areas of Indonesia.

ArcGIS also facilitates effective and efficient spatial analysis, modeling, and management. By combining these approaches, the study sought to gather comprehensive data. The research locations were selected using purposive sampling, targeting disaster-prone regions in Indonesia, including Aceh and Yogyakarta.

3. Results And Discussion

This paper will discuss one aspect of the personal resilience of high school students in Indonesia: Emotional Regulation. This aspect of resilience pertains to the ability to remain calm under pressure and is a crucial determinant of an individual's resilience in navigating life's challenges. The following section presents the profile of emotional regulation among high school students across seven regions in Indonesia: Aceh, North Sumatra, Jakarta, Yogyakarta, South Sulawesi, West Nusa Tenggara, and Papua.

The findings of this research provide a comprehensive understanding of the emotional regulation of high school students in these regions, which is crucial for designing targeted interventions and enhancing resilience.

Emotional regulation, a crucial component of personal resilience, is vital for high school students to maintain composure in stressful situations. The data illustrated in Figure 1 indicates that the overall emotional regulation of high school students across these seven regions falls within a moderate category, with a resilience percentage of 65.0%. The map further reveals that Papua exhibits the lowest levels of emotional regulation compared to other regions. In contrast, Lombok and Jakarta score above the average for this aspect. Nevertheless, the emotional regulation of high school students in these seven areas reflects a reasonably good standard overall. However, the data also highlights the need for urgent and targeted interventions to enhance emotional regulation among high school students, particularly in Papua, to foster more excellent composure when facing challenges at school, home, or elsewhere.

Resilience is a complex, interactive process involving various individual, familial, and societal characteristics [3]. It is coping with and growing through adverse situations, challenges, and adversity. Resilience reflects an individual's capacity to function competently in the face of stressors and navigate high-risk environments [4]. Rutter [5] posits that resilience is primarily a result of efforts to positively manage diverse types of challenges that could lead to crises [6]. Schools play a pivotal role in fostering resilience. According to Hosseini and Izadkhah [7], students are the future assets of a nation, making the role of schools as formal educational institutions vital in nurturing children's character.

Additionally, schools are tasked with cultivating resilient youth capable of adapting to changes and challenges in the era of Industry 4.0. However, building resilience is a challenging endeavor. As Bakkensen [8] explains, understanding school resilience is a global policy priority that education and education institutions have not proactively addressed. Resilience and vulnerability underpin every decision-making process considering various aspects of life, including human and social capital, infrastructure, economic capital, and institutions.

Moreover, school policies can enhance disaster mitigation by strengthening six key elements that constitute school resilience. School resilience is a social process constructed around two main principles: "mitigate risk factors in the environment" and "build resilience in the environment" [9]. The subsequent stages of developing school resilience are determined by six variables: “Increase bonding” (enhancing connections within the school); “Set clear and consistent boundaries” (establishing clear and consistent rules); “Teach life skills” (imparting essential life skills); “Provide caring and support” (offering care and support); “Set and communicate high expectations” (articulating and communicating high expectations); and “Provide opportunities for meaningful participation” (creating avenues for

meaningful engagement). In fostering school resilience, teachers play a crucial role in activating all aspects necessary for students to become more resilient, as illustrated below [9][10].

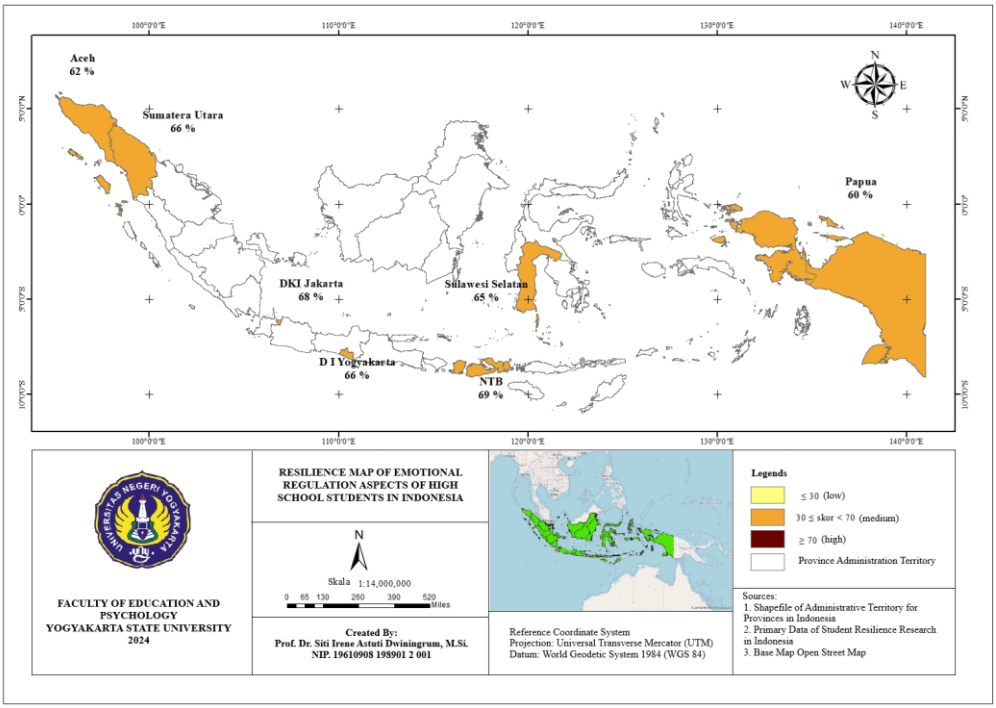


Figure 1. Map of Emotional Regulation Aspects Among High School Students in Indonesia

4. Conclusion

Students in Indonesia exhibit moderate resilience, with individual aspects categorized as moderate and high in certain areas. Specifically, the Emotional Regulation aspect of students across all regions falls within the moderate category. There is a pressing need for further profiling of student resilience to identify the specific aspects that require strengthening in each school. This information is essential for policymakers when designing programs to enhance student resilience throughout Indonesia.

Acknowledgement

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THE EFFECT OF PNF COMBINATION TRAINING THERAPY ON SHIN SPLINT INJURY POST HALF-MARATHON RUNNING IN THE YOGYAKARTA RUNNING COMMUNITY

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Abstract

This study aims to determine the effect of a combination of shin splint injury therapy after a half-marathon run in the Yogyakarta running community. The method used is an experiment with a "One groups pre-test-post-test design" design. The population in this study was a running community in Yogyakarta totaling 120 people. The sampling technique used a purposive sampling technique. The criteria for research subjects must be members of the RIOT Yogyakarta running club, aged 25-30 years. Based on this, 20 people were eligible as research samples. The research instrument was a ROM goniometer, pain using a numerical application assessment. Data analysis used a t-test with a significance level of 5%. The results showed that there was an effect of shin splint injury exercise therapy after a half-marathon run in the Yogyakarta running community. This study found that the combination of PNF in shin splint injury after a half-marathon run in the Yogyakarta running community got significant results. So it can be concluded that the existence of this activity is proven real .

Keywords : PNF, exercise therapy, muscle disorders, joints, shin splints

1. Introduction

Sport run is one of popular sport in the world including in Indonesia. Popularity This proven by the many race marathon running in various parts of the world such as in the American continent there is the Chicago Marathon, in the American continent there is the Europe precisely in Germany there is the Berlin Marathon, and in the Asian continent there is the Tokyo Marathon. In Indonesia there is a number of race marathons are regularly held every he knows including Borobudur Marathon, Prambanan Marathon, Jakarta Marathon, Makassar Marathon and many more Lots others . This indicates that running sports with a running race called a marathon are the attraction for every runner to take part in the event. Many trained runners to recreational runners are competing to hunt for tickets to become participants, it is no wonder that each runner is willing to spend quite a lot of money for one event. The benefits that runners usually get are attractive jerseys, goody bags containing sponsor products, finisher medals, refreshments, photo spots and photos from the organizers, prizes for the winners and attractive door prizes.

A good runner is a runner who has prepared physically, mentally and economically. One of the physical preparations that runners must have for half marathon to marathon events is a training program that must have been carried out some time before the race begins. The goal is clear so that every runner avoids injury. Injury is a specter that is greatly feared by athletes, injuries can arise due to lack of physical training, over training, excessive load, and others. Knowledge about sports injuries for athletes is very useful to minimize the occurrence of injuries in sports. The warm-up phase is not optimal, stretching is not right, the higher the intensity of the exercise and the longer the duration of the exercise will certainly cause fatigue and decreased physical condition can lead to sports injuries [1].

Sports injuries that often occur are injuries that attack soft tissue, especially muscles, bones, tendons and ligaments [2]. If this injury is not treated properly, in the long term it can reduce the athlete's performance. Sports injuries are a condition that occurs as a result of activities that exceed the body's ability threshold when exercising [1]. The most common injuries experienced by runners are inferior extremity injuries, namely injuries to the ankles, knees and shins [3]. Every runner who takes part in a half marathon to marathon race is required to have the right preparation time and training program. Choosing a training program is very important for achieving the runner's target, namely finishing safely and being able to break the personal best time. Even though the right training program sometimes still causes sports injuries. One factor in the occurrence of sports injuries is due to the runner's carelessness after taking part in the race. Many runners forget to do the cooling and stretching phases. Muscles that

are already hot are then forced to work as far as 21 km to 42 km and forget to stretch. Even though it is clear that the cooling phase is very important to return to its original condition [4].

Shin splints injury is one of the injuries that is often experienced by runners. Medial Tibial Stress Syndrome (MTSS) or often referred to as "shin splints" is one of the common injuries that occurs in the lower extremities that affects most athletes, especially runners.[5] [6]. Previous research stated that 28 out of 55 runners in Jogjakarta experienced shin splint injuries. Shin splint injuries often occur in long-distance runners, especially in the half marathon to full marathon categories. Runners who experience shin splint injuries are usually due to increased running intensity, increasingly long running distances with increasing speed, uncomfortable shoes and a less than optimal cooling/stretching phase. Choosing the right training program, maximum stretching phase and choosing comfortable shoes and choosing the right exercise therapy need to be considered by every runner to avoid this injury.

Exercise therapy is one form of rehabilitation to restore athletes from the injury phase. Choosing the right exercise therapy will speed up the healing process of the injury. Exercise therapy usually begins with a physical examination of the injured part then continued with a loosening exercise program, after that continued with exercises using internal weights and the last is exercises using external weights [7]. Exercise therapy that is carried out sequentially and carefully will speed up the injury recovery process so that athletes can return to their best performance.

On this occasion, researchers will seek broader information, namely the risk of muscle fatigue, injury and rehabilitation therapy carried out by runners after running a half marathon. The urgency of this study is to produce a mapping of the risk of muscle fatigue and injury that occurs after running, and the selection of rehabilitation therapy chosen after running a half marathon. The purpose of this study is to map the risk of muscle fatigue and injury that occurs after running, and the selection of rehabilitation therapy chosen after running a half marathon. From these results, it is hoped that each runner can prepare themselves better before the race and be able to choose the appropriate rehabilitation therapy.

Based on the identification above, a problem formulation can be formulated in this study, namely whether there is an effect of PNF combination exercise therapy on *shin splint injuries* after the Yogyakarta running community half-marathon.

2. Method

Types of research

This study is a quasi-experimental study *with* a *One Group Pretest-Posttest Design* [8], which consists of one group without a control group. The sample group will be given a combination of PNF exercise therapy treatment on the lower legs. The sample will be measured before the treatment is given so that it will produce *pretest data* . Then after getting the *pretest results,* the sample will be given treatment, after the treatment the sample will be measured again to get the *posttest results* . *Pretest* and *posttest data* are used to determine the effect of PNF combination exercise therapy treatment on reducing pain and increasing *Range Of Motion* (ROM). The research design to be carried out is as follows:

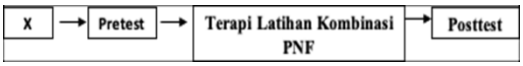


Figure 1. Research Flow

Population and Sample

The population of this study were members of the Yogyakarta running community who complained of lower leg pain after running a half marathon. While the sample in this study were members of the Yogyakarta running community who were selected based on inclusion and exclusion criteria.

This study uses a purposive sampling technique, namely determining the sample with certain considerations. In this study, the population was 120 people and 20 people met the sample criteria.

Data Collection Techniques and Instruments

The data collection technique in this study is data obtained using VAS (*Visual Analogue Scale*) measurements to measure pain levels and goniometers to measure joint range of motion (ROM). The

measurement data will then be processed to determine the differences in *pretest* and *posttest data* through t-test statistical tests using the SPSS data processing application.

3. Results and Discussion

Results

1) Description of Research Subject

The subjects of the study were athletes who participated in the Yogyakarta Running Community Members who experienced leg injuries. The gender of the research subjects as a whole was a mixture of women and men totaling 20 people. With an average age of 20-30 years. The following is a histogram related to the sustainability of the research subjects' professions.

Table 1. Sustainability of the Profession

Sustainability of the Profession	Amount	Percentage (%)
20-24 years	10	50
25-28 years	8	40
28-30 years	2	10
Total	20	100

The data in this study showed that the most complaints were experienced by the 20-30 year old age group because some of the research subjects were active runners. Someone who does work such as running, lack of warm-up and excessive running *(overuse)* can cause disorders.

2) Statistical Description Analysis

The data results of this study are pretest and posttest data. The pretest and posttest data obtained are each variable related to this study. This study was conducted at the UNY Football Stadium. The research subjects were 20 people with an age range of 25-30 years. Descriptive statistics of the pretest and posttest on the Yogyakarta Running Community Members, the data are presented as follows:

Table 2. Descriptive Statistics

Group	Statistics	Pretest	Posttest
PNF Combined Exercise Therapy	ROM	42.25	19.07
	Painful	44.07	21.73

The results of the table above show that with the combination of PNF exercise therapy, the initial ROM value of 42.25 became 19.07, meaning that the ROM in the shin splint section increased as seen from the increased value. While in the assessment of the pain scale at the beginning of 44.07 to 21.73, it means that the pain has decreased significantly.

3) Normality Test Data

The results of this research data are pretest and posttest data on average and standard deviation of the results of PNF Combination Exercise therapy measurements can reduce shin splint injuries after half-marathon running in the Yogyakarta running community. This research was conducted at the UNY stadium. The subjects of the study were 20 people with an age range of 20-30 years. The data normality test in this study used the Shapiro-Wilk test. The results of the data normality test from different groups were carried out using the SPSS version 20.0 for Windows software program with a significance level of 5% or 0.05. The following are the results obtained:

Table 3. Normality Test

Group	p	Sig.	Information
Pretest	0.324	0.05	Normal
Posttest	0.927	0.05	Normal

From the results of the table above, it can be seen that all data has a p value (Sig.) > 0.05, so the variables are normally distributed.

4) Hypothesis Testing

Paired t-test was used to test the hypothesis that states "There is an Effect of PNF Combination Exercise Therapy on shin splint injuries after half-marathon running in the Yogyakarta running community" based on the results of the pretest and posttest. The conclusion of the study is stated as significant if the calculated t value> t table and the sig value is less than 0.05 (Sig <0.05). Based on the results of the analysis, the following data were obtained:

Table 4. Hypothesis Testing

Group	Mean	t-test for Equality of Means				
		t ht	t tb	Sig.	Difference	%
Pretest	132, 32					
Posttest	79, 00	10, 342	3, 002	0,0 00	12, 24	10, 32

The t-test results can be seen that the t count is 132.32 and the t table is 3.002 (df 19) with a significance value of p of 0.000. Therefore, the t count is 10.342> t table 3.002, and the significance value is 0.000 <0.05, these results indicate that there is a significant difference. Thus, the alternative hypothesis (Ha) which reads "There is an Effect of PNF Combination Exercise Therapy on shin splints after running the Yogyakarta running community half-marathon," is accepted. This means that PNF Combination Exercise Therapy on shin splints after running the Yogyakarta running community half-marathon has been proven to be significant. From the pretest data, the average was 79.00, then at the posttest the average reached 79.00. The magnitude of the effect of the combination of massage and exercise therapy can be seen from the difference in average values, which is 12.24, with an effectiveness of 10.32%.

Discussion

Proprioceptive Neuromuscular Facilitation (PNF) exercises on good and correct subjects will increase shoulder joint ROM. Based on data analysis, it is known that post-shoulder injury PNF exercises have an effect on reducing shin splint injuries after half-marathon running [9]. The results can be seen in the explanation above. This occurs because exercise therapy treatment has a physiological effect of increasing joint mobility and strengthening the muscles that support and protect joints, pain, and joint stiffness. [10].

The application of PNF exercises on shin splints can stretch and strengthen the muscles in the groin joint. Giving exercise therapy to injuries after receiving massage therapy and rest for three (3) days and receiving exercise therapy for six (6) times will increase stretching of the joint and strengthen the muscles in the joint.[11] [12]. PNF stretching mechanism, the movement is with passive stretching. After the muscle is stretched to the point of maximum flexibility (pain limit), then the actor holds it with isometric contraction.

The therapist who gives the push continues to increase the force of the push, while the practitioner also continues to resist by increasing the isometric force. The increasing isometric force will cause an increase in the stretch on the tendon, therefore the golgi tendon organ gets a harder stimulus. This causes the stimulation of the golgi tendon organ to reach its threshold. The stronger the muscle is stretched, the stronger the contraction. If the muscle tension becomes greater, the contraction suddenly stops and the muscle relaxes, then there is a sudden muscle relaxation.

Relaxation in response to a strong stretch is called the inhibition effect or autogenic inhibition reflex. As a result of this relaxation, the friend who pushed suddenly lost resistance, so that it can cause a further stretch of the muscle that was originally performing isometric contraction so that it can exceed the maximum flexibility point (pain limit). This is what causes the PNF stretching method to make muscle elongation more possible compared to other stretching methods [12].

4. Conclusion

The application of PNF exercises on shin splints can stretch and strengthen the muscles in the groin joint. The mechanism of PNF stretching, the movement is with passive stretching. After the

muscles are stretched to the point of maximum flexibility (pain limit), the practitioner holds with isometric contraction. thus can reduce pain and reduce shin splint injuries.

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Enhancing Digital Competence of Vocational School Teachers through Virtual Reality-Based Learning Media

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Abstract

This Community Service Program aims to enhance the digital competence of Vocational High School (SMK) teachers through the use of Virtual Reality (VR)-based learning media. In this digital era, technology plays a crucial role in education, and SMK teachers need to have the skills to use technology to improve the quality of teaching. This program involves training and mentoring SMK teachers in Yogyakarta to use VR as a learning medium. The results of this initiative are expected to improve teachers' ability to present learning materials in a more interactive and engaging way, as well as prepare students for an increasingly digital workplace.

Keywords: Digital Competence, VR Learning Media, SMK Teacher Training, Digital Education.

1. Introduction

In the digital era, the role of technology in education has become more critical than ever before. As industries and society at large continue to evolve in response to technological advancements, education must keep pace by integrating digital tools into teaching and learning processes. The quality of education in the 21st century is no longer solely dependent on the knowledge and skills imparted by educators but also on how effectively they can utilize technology to enhance the learning experience. This reality holds true across various educational levels and types, particularly in vocational education, where the focus is on preparing students for specific careers that increasingly rely on technology.

Vocational high schools, or Sekolah Menengah Kejuruan (SMK) in Indonesia, play a pivotal role in equipping students with the practical skills and knowledge required to thrive in specific industries. These schools are essential in shaping the future workforce, especially in sectors such as manufacturing, automotive, engineering, and information technology. With the rise of Industry 4.0 and the increasing digitization of the workforce, the demands on vocational education have grown exponentially. SMK teachers are now tasked with not only imparting technical knowledge but also ensuring that students are well-prepared for a workplace where digital literacy and competence are fundamental requirements.

To meet these demands, SMK teachers must themselves be proficient in digital tools and technologies. Digital competence is no longer a luxury but a necessity for teachers to stay relevant and effective in their roles. Teachers who lack these skills may struggle to engage students or to provide instruction that aligns with the realities of today's industries. Digital competence encompasses a range of abilities, from basic computer literacy to more advanced skills such as coding, digital content creation, and the use of sophisticated educational technologies like Virtual Reality (VR). For vocational teachers, these skills are crucial for preparing students to enter a workforce that increasingly values digital proficiency.

One of the most promising technological innovations in education is Virtual Reality (VR). VR technology offers immersive learning experiences that can simulate real-world environments, making it particularly useful in vocational education where practical, hands-on learning is essential. By using VR, students can experience simulations of industrial settings, technical procedures, or complex systems that would otherwise be difficult, expensive, or dangerous to replicate in a traditional classroom environment. For example, automotive students can use VR to explore and assemble engine components in a virtual space, while engineering students can practice operating heavy machinery or conducting electrical repairs without the risk of injury. These immersive experiences not only make learning more engaging but also help students develop the practical skills they will need in their careers.

Despite the clear benefits of VR and other digital technologies in education, many SMK teachers face challenges in adopting these tools. These challenges range from limited access to technology and insufficient training to a lack of confidence in using digital tools effectively. For teachers who are already overburdened with administrative duties and traditional teaching responsibilities, learning how

to integrate VR into their classrooms can seem daunting. Additionally, vocational teachers often come from industry backgrounds and may have limited formal training in pedagogy, let alone in the use of advanced educational technologies. As a result, even though they recognize the value of digital tools, they may be unsure of how to use them effectively in their teaching.

This is where targeted professional development programs become essential. By providing structured training and support, educators can be empowered to adopt and integrate digital tools like VR into their teaching practices. Professional development programs that focus on digital competence not only enhance teachers' technical skills but also help them understand how to use these tools to create more interactive and engaging learning experiences. In the context of vocational education, this means that teachers can use VR to simulate real-world tasks, making abstract concepts more tangible and helping students develop the practical skills they will need in the workplace.

In Yogyakarta, a region known for its rich educational traditions, there is a growing recognition of the need to enhance the digital competence of SMK teachers. As the region continues to develop its industries and technological infrastructure, there is increasing pressure on educational institutions to produce graduates who are not only skilled in their trade but also digitally literate. In response to this need, various initiatives have been launched to provide SMK teachers with the training and resources they need to integrate digital technologies into their teaching. One such initiative is a Community Service Program designed to enhance the digital competence of SMK teachers through the use of VR-based learning media.

This Community Service Program is an important step toward addressing the digital skills gap among vocational teachers in Yogyakarta. The program aims to provide comprehensive training to SMK teachers, focusing on how to effectively use VR as a teaching tool. By the end of the program, teachers are expected to have the skills and confidence needed to integrate VR into their classrooms, thereby improving the quality of education they provide to their students. The program also seeks to foster a mindset of continuous learning among teachers, encouraging them to stay updated on the latest technological developments and to continually seek out new ways to enhance their teaching practices.

The use of VR in vocational education has the potential to revolutionize the way practical skills are taught. Traditional methods of teaching vocational subjects often rely on hands-on activities in workshops or laboratories, which can be expensive, time-consuming, and limited in scope. VR, on the other hand, offers a cost-effective and scalable alternative. With VR, teachers can create a wide range of simulated environments that replicate real-world conditions, allowing students to practice their skills in a safe and controlled setting. Moreover, VR can make learning more inclusive, as students with physical disabilities or other limitations can participate in virtual simulations that they might not be able to engage with in a traditional workshop setting.

The immersive nature of VR also helps to address some of the motivational challenges that vocational students often face. Many students are more engaged when they can see the practical application of what they are learning, and VR allows them to do just that. By providing students with a realistic and interactive learning environment, VR can help to increase their motivation and interest in their studies. This is particularly important in vocational education, where the focus is on preparing students for specific careers, and where the relevance of what they are learning to their future jobs is crucial.

In conclusion, the integration of VR-based learning media into vocational education has the potential to significantly enhance the quality of teaching and learning. For SMK teachers, gaining competence in digital tools like VR is essential for staying relevant in today's rapidly changing educational landscape. This Community Service Program represents a vital step toward equipping SMK teachers in Yogyakarta with the skills they need to succeed in the digital era. By empowering teachers to use VR in their classrooms, the program not only improves the quality of education but also helps to prepare students for the increasingly digital workplace. As the program progresses, it is expected to serve as a model for similar initiatives across Indonesia, contributing to the overall enhancement of vocational education nationwide.

2. Method

The program involved a series of training sessions and mentoring activities for SMK teachers in Yogyakarta. A group of teachers was selected based on their interest in improving their digital skills and their willingness to incorporate VR into their teaching. The training focused on the use of VR as a

learning medium, covering both theoretical aspects and practical applications. Teachers were introduced to various VR tools and platforms and were guided on how to integrate these tools into their subject areas. The mentoring phase allowed teachers to practice using VR in their classrooms, with continuous support and feedback provided to ensure successful implementation.

3. Results and Discussion

Expanding on the results and discussion of the program's implementation reveals a deeper understanding of how Virtual Reality (VR) technology influences teaching practices and contributes to enhancing the digital competence of Vocational High School (SMK) teachers. This section provides a more comprehensive analysis of the outcomes, the teachers' experiences, and the challenges encountered throughout the initiative, drawing connections to broader implications for education in the digital era.

Improvements in Digital Competence

The core objective of this program was to enhance the digital competence of SMK teachers, focusing on the integration of VR technology in their classrooms. Digital competence, in this context, refers to the ability of teachers to effectively use and apply digital tools to improve the learning experience. The implementation of VR as a learning medium pushed the boundaries of traditional teaching, offering a more engaging and interactive platform for both teachers and students.

Through training sessions and hands-on workshops, the teachers developed a better understanding of how to operate VR systems and integrate them into their lesson plans. Prior to the program, many of the teachers had minimal exposure to VR, with some only having a theoretical understanding of its potential in education. By the end of the program, teachers reported a significant boost in their confidence and competence in using this technology. This was evident in their ability to design lessons that leveraged VR's immersive qualities, offering students an experiential learning process.

The improvement in digital competence was not limited to VR usage alone but extended to the broader framework of integrating technology into education. Teachers became more adept at navigating digital platforms, managing software, and troubleshooting technical issues, which contributed to their overall digital literacy. This shift marks a critical development for SMK teachers who are responsible for preparing students for a workforce that increasingly demands digital proficiency. The program also highlighted the importance of continuous digital learning for teachers, as it is an evolving field with constant advancements.

VR's Impact on Learning Engagement

One of the most notable outcomes of the program was the increased level of student engagement when VR was incorporated into classroom activities. Teachers reported that students were more enthusiastic and actively involved in the lessons that utilized VR compared to traditional methods. This was particularly evident in subjects that involve technical or practical knowledge, such as engineering, design, or vocational skills, where students could visualize complex processes and theories in an interactive and three-dimensional space.

The use of VR in education fosters a more active learning environment, encouraging students to participate rather than passively receive information. For instance, in vocational subjects, students could virtually explore machinery, tools, or environments that they would otherwise only encounter through textbook images or limited hands-on activities. This experiential learning opportunity allows for deeper understanding, retention, and practical application of knowledge, which is crucial in vocational education where skills are paramount.

Teachers observed that VR helped bridge the gap between theory and practice, making abstract concepts more tangible. In fields such as architecture or automotive engineering, VR allowed students to manipulate models, understand spatial relationships, and simulate real-world tasks. This not only enhanced their comprehension but also provided a platform for developing problem-solving skills in a risk-free environment. The immersive nature of VR, by placing students at the center of the learning experience, proved to be a valuable tool for fostering curiosity and a proactive approach to learning.

The novelty of VR also played a role in increasing engagement. Many students were excited to explore a new form of technology, which in turn made them more motivated to participate in class. This shift from passive consumption to active involvement aligns with modern pedagogical theories

that emphasize student-centered learning. By creating a more dynamic and engaging classroom environment, teachers were able to capture the attention of students who might have been disengaged or uninterested in traditional lecture-based formats.

Overcoming Initial Apprehensions

Although the program was successful in enhancing teachers' digital competence, it is important to acknowledge the initial apprehensions many teachers faced regarding the use of VR technology. For some, the introduction of VR represented a significant departure from their established teaching practices, and there was a degree of skepticism about its effectiveness and feasibility in an educational setting. Concerns were raised about the complexity of the technology, the time required to learn and implement it, and whether it would truly enhance the learning experience or merely serve as a gimmick.

The hands-on nature of the training helped alleviate many of these concerns. By providing a structured environment where teachers could experiment with VR technology under the guidance of experts, the program allowed teachers to gradually build their confidence and competence. As they became more familiar with the tools, their initial resistance gave way to a willingness to explore the potential of VR in their classrooms.

One of the key factors that helped overcome this apprehension was the realization that VR could be seamlessly integrated into existing curricula without requiring a complete overhaul of lesson plans. Teachers learned that VR could be used as a supplementary tool to enhance specific aspects of their teaching, such as demonstrating complex processes, providing virtual field trips, or creating simulations for skill development. This flexibility reassured teachers that VR was not intended to replace traditional teaching methods but to augment and enrich the learning experience.

Moreover, the program emphasized the importance of collaboration and peer support. Teachers were encouraged to share their experiences, challenges, and successes with one another, creating a community of practice where they could learn from each other's insights. This collective approach helped reduce the sense of isolation that some teachers initially felt and fostered a culture of innovation and experimentation within the school community.

Challenges Encountered

While the program yielded positive results, several challenges were encountered that need to be addressed for the sustained and widespread adoption of VR technology in SMK classrooms. One of the most significant challenges was the limited access to VR devices. The high cost of VR hardware and the need for compatible software and infrastructure posed a barrier for many schools, especially those with limited budgets. Although the program provided the necessary equipment during the training phase, many teachers expressed concerns about the feasibility of continuing to use VR once the program concluded.

To address this issue, it is essential for educational institutions and policymakers to explore solutions that make VR technology more accessible to schools. This could involve partnerships with technology companies, government funding for educational technology initiatives, or the development of cost-effective VR solutions tailored to the needs of schools. Without such support, the potential of VR as a transformative educational tool may remain unrealized in many settings.

Another challenge was the need for ongoing technical support. While the program provided initial training, some teachers felt that they lacked the technical expertise to troubleshoot problems or fully utilize the capabilities of the VR systems. This highlights the importance of providing continuous professional development and access to technical assistance for teachers who are integrating new technologies into their classrooms. Establishing a support system, such as an IT helpdesk or a network of tech-savvy teachers, could help alleviate this issue and ensure that teachers have the resources they need to succeed.

Additionally, there were concerns about the time investment required to develop VR-based lesson plans. Teachers noted that creating VR content or adapting existing materials to fit the VR format took significantly more time than traditional lesson planning. This was particularly challenging for teachers who already had heavy workloads and limited time for curriculum development. To mitigate this, the program could consider providing pre-designed VR lesson templates or collaborating with educational content developers to create ready-to-use VR modules for specific subjects.

The Need for Continued Training and Resources

The success of the program underscores the importance of continued training and support for teachers as they integrate digital technologies into their teaching practices. While the initial training provided a solid foundation, many teachers expressed the need for ongoing professional development to keep up with advancements in VR technology and explore new ways to apply it in their classrooms.

In addition to technical training, there is also a need for pedagogical training that focuses on how to effectively incorporate VR into different teaching strategies. Teachers need to understand not only how to operate the technology but also how to align its use with learning objectives, assess student outcomes, and create an inclusive learning environment where all students can benefit from VR. This requires a shift in teaching practices that moves beyond traditional lecture-based methods and embraces more interactive and student-centered approaches.

Furthermore, the availability of resources is critical for the sustained use of VR in education. Teachers need access to VR equipment, software, and instructional materials that are tailored to the needs of their students and subject areas. Educational institutions should consider investing in VR labs or mobile VR units that can be shared among different schools or departments, allowing more teachers to incorporate VR into their lessons. Collaborative efforts between schools, technology providers, and policymakers are essential to ensure that the necessary infrastructure and support systems are in place.

Implications for Education in the Digital Era

The integration of VR technology in SMK classrooms has broader implications for education in the digital era. As technology continues to evolve, the role of teachers is shifting from being the sole source of knowledge to becoming facilitators of learning who guide students in exploring and interacting with digital tools. This requires teachers to continuously adapt to new technologies and rethink traditional teaching methods to create more dynamic and engaging learning experiences.

The program highlights the potential of VR to transform vocational education by providing students with hands-on, experiential learning opportunities that closely mimic real-world scenarios. In fields such as engineering, healthcare, and architecture, where practical skills are essential, VR offers a safe and controlled environment for students to practice and refine their skills without the constraints of physical resources or safety concerns.

Moreover, the use of VR in education aligns with the growing demand for digital literacy in the workforce. As industries become more reliant on technology, students need to develop not only technical skills but also the ability to navigate and interact with digital environments. By incorporating VR into their teaching practices, SMK teachers are helping to prepare students for the digital economy and equipping them with the skills they will need to succeed in the future workplace.

The implementation of the VR-based learning program for SMK teachers has demonstrated significant potential in enhancing digital competence and transforming teaching practices. Through hands-on training and ongoing support, teachers have been able to overcome initial apprehensions and successfully integrate VR into their classrooms, creating more interactive and engaging learning environments. However, challenges such as limited access to VR devices, the need for technical support, and the time investment required for lesson planning highlight the importance of providing continued training, resources, and support for teachers.

This initiative represents an important step toward preparing students for the digital era and fostering a culture of innovation in vocational education. By embracing digital technologies such as VR, SMK teachers are not only enhancing their own teaching practices but also empowering students to thrive in a rapidly changing world.

4. Conclusion

This Community Service Program successfully enhanced the digital competence of SMK teachers in Yogyakarta by introducing them to the use of VR as a learning medium. The training and mentoring sessions empowered teachers to deliver more engaging and interactive lessons, contributing to the overall quality of education. While the results were positive, further support and resources are needed to sustain the integration of VR technology in SMK classrooms. This initiative highlights the importance of continuous professional development for teachers in the digital era, especially as they prepare students for the future workplace.

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The Potential of Chitosan/ZnO Nanoparticle Composites as Adsorbents for Remazol Brilliant Blue Dyes

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Abstract

This research aims to synthesize and characterize ZnO nanoparticles through a green chemistry method and chitosan/nanoparticle composites, as well as to analyze the capacity of chitosan/ZnO nanoparticle composites as adsorbents for the synthetic dyes Remazol Brilliant Blue.

ZnO nanoparticles were synthesized by green chemistry using a ZnSO4.7H2O precursor with breadfruit leaf extract by heating for 4 hours at 600 °C, then the results were precipitated with a NaOH solution at pH 12 and calcined at 550 °C for 3 hours. We then composited the formed ZnO nanoparticles with chitosan powder using a blending method. Characterization of ZnO nanoparticles and chitosan/ZnO nanoparticle composites was carried out using a UV-Vis spectrophotometer, X-ray Diffraction (XRD), and Scanning Electron Microscopy -Energy dispersive X-ray Spectroscopy (SEM-EDX). The adsorption process was carried out using a batch method with an adsorbent: adsorbate ratio of 1: 1000 (m/v) with contact time variations of 10, 20, 30, 40, 50, 60, and 90 minutes and variations in the initial dye concentration of 25, 50, 75, 100, 150, 200, 250, and 300 ppm. The concentration of Remazol brilliant blue dye before and after adsorption was measured using a UV-Vis spectrophotometer.

Based on the results of the analysis using solid UV-Vis, XRD, and SEM-EDX, ZnO nanoparticles showed wavelength data of 354 nm, the XRD results had a crystalline structure and showed a particle size of 12.78 nm with peaks of 2θ = 31.8760; 34.5520; 36.6320; 47.6100; 56.6760; 62.9540; 66.460; 68.0270; and 77.020; and SEM results showed heterogeneous particles with spherical shapes from the smallest 3 nm to the largest 140.64 nm. Based on the analysis results using XRD and SEM-EDX, the chitosan/ZnO composite showed no shift in the 2θ peak, and have the amorph peak at 20° as chitosan; SEM results showed heterogeneous particles from the smallest 9 nm to the largest 190 nm. The optimum contact time for adsorption occurred at 50 minutes with an adsorption capacity of 4.28 mg/g, and the maximum adsorption capacity is achieved at an initial concentration of remazol of 300 ppm, which is 11,9 ppm/ g adsorbent.

Keywords: Adsorption, breadfruit leaf (Artocarpus altilis), remazol brilliant blue R, reactive blue-19, ZnO nanoparticles, chitosan

1. Introduction

The growth of the Indonesian population has resulted in an increase in the use of synthetic dyes in various ways [1]. The use of synthetic dyes has a negative impact on health and the environment, namely the waste produced by textile-based factories. The dye waste produced from the dyeing process is an environmental pollutant that has non-biodegradable properties. Synthetic dyes are generally made from azo and anthraquinone compounds and benzene groups as derivatives [2]. Therefore, a way is needed to process dyeing waste. One way is by using a simple, fast, and effective adsorption method. The results of the adsorption method do not produce side effects or other pollutants [3].

Chitosan is a natural polysaccharide, which is the largest biomaterial after cellulose [4]. Chitosan is also an efficient and effective biosorbent of pollutants. Chitosan is also an efficient and effective biosorbent for pollutants. Chitosan has a high degree of deacetylation and contains free amino groups. Chitosan has cationic properties. Due to this property, chitosan is capable of binding metals, proteins, and dyes [5]. The modification of chitosan into a composite by utilizing ZnO nanoparticles as active sites can be used as an adsorbent [6]. Nanoparticles are synthesized through green chemistry because they offer many advantages, such as easier processes, lower costs, scalability, and of course, they do not require high temperatures, high pressures, or hazardous chemicals [7]. Several flavonoid compounds can chelate metal ions by forming stable complexes through hydroxyl (-OH) groups and carbonyl groups. For example, quercetin has three potential bidentate binding sites: α-hydroxy-carbonyl, β-hydroxy-carbonyl, or catechol, which has two -OH groups in the ortho position and can form stable complexes with cationic metals [8]. The plant extract used is breadfruit leaf extract, which

contains alkaloids, flavonoids, tannins, phenols, and saponins. The phenolic components in jackfruit leaves will act as free radical scavengers during the synthesis with ZnO [9,10]. The aim of this research is to determine the optimum contact time of the adsorbent in adsorbing Remazol Brilliant Blue R dye, as well as to establish the reaction order of the adsorbent with respect to Remazol Brilliant Blue R dye. Characterization was carried out using UV-Vis spectrophotometry, XRD, and SEM-EDX.

2. Methods

Materials

$ZnSO4.7H_2O$ (p.a, merck), *deionized water*, bread fruit leaves extract, *remazol brilliant blue R* dyes, chitosan (technical), sodium hydroxyde (p.a, merck)

Procedure

ZnO nanoparticles synthesis was made by green chemistry using breadfruit leaf extract with ZnSO4 precursor. As much as 20 ml of breadfruit leaf extract (200g/L aquadeionized) was refluxed with Zn SO4 solution (40 g/L) at a constant temperature of 60 and stirred for 4 hours. To obtain ZnO nanoparticle deposits, the refluxed solution is added with 1 M NaOH until its pH reaches 12 [11]. The formed precipitate is first washed using deionized water until a neutral pH is achieved, filtered using Whatman 42 filter paper, and dried in an oven at 100°C for 22 to 24 hours. The dried precipitate is then calcined at 550°C for 3 hours and ground to a fine powder. Zinc oxide nanoparticle powder was dispersed into chitosan powder in a ratio of 6 grams to 20 grams. The mixture was blended for 1 hour and sonicated for 1 hour to ensure thorough mixing, then dried in an oven at 60°C for 3 hours. The formed deposit is dried using an oven and characterized using UV- Vis solid, XRD, and SEM-EDX. The adsorption process is carried out with a ratio of adsorbent to adsorbate of 1:1000. For the variation in contact time, the sonication mixture is treated for 2 minutes and then allowed to stand according to the contact time variation, while for the variation in the initial dye concentration, it is allowed to stand according to the optimum time that has been previously obtained.

3. Result And Discussion

Synthesis and Characterization ZnO Nanoparticles and Chitosan/ ZnO Composites

The UV-Vis spectrum results of ZnO nanoparticles show a peak at a wavelength of 354.0 nm. Based on Soosen's research [12], the UV-Vis absorption spectrum indicates a peak wavelength for ZnO nanoparticles at 364 nm. From the research, it can be concluded that ZnO nanoparticles have been formed and are consistent with previous studies. The XRD test results of the ZnO nanoparticles show sharp peaks with high intensity, indicating that the ZnO nanoparticles have a crystalline structure with peaks at 2θ values of 31.8760; 34.5520; 36.6320; 47.6100; 56.6760; 62.9540; 66.460; 68.0270 and 77.020, corresponding to the diffraction patterns of (100), (002), (101), (102), (110), (103), (200), (112), (201) and (002) with a wurtzite structure of ZnO [13]. The size of the ZnO nanoparticles was calculated using the Scherrer equation, resulting in a size of 12.78 nm.

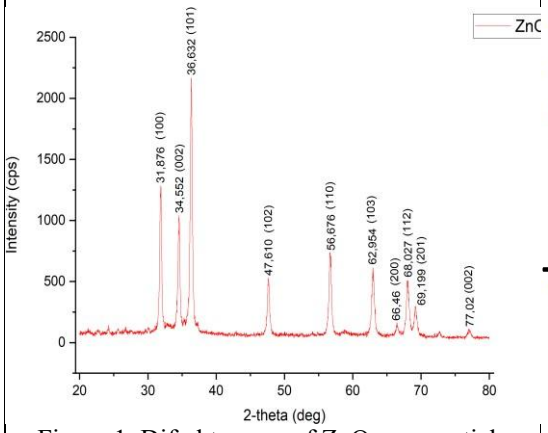


Figure 1. Difraktogram of ZnO nanoparticle

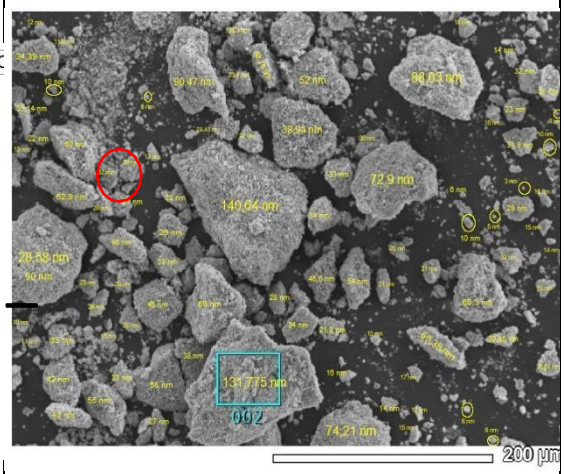


Figure 2. SEM Image of ZnOnanoparticle

The results of the SEM analysis show that ZnO nanoparticles have a spherical shape with varying gaps between particles, with sizes ranging from 3 to 140 nm, of which 75% are nanoparticle-sized. Meanwhile, the EDX analysis results indicate the components that make up the ZnO nanoparticles, namely Zn with a mass percentage of 82.41% and O with a mass percentage of 17.59%.

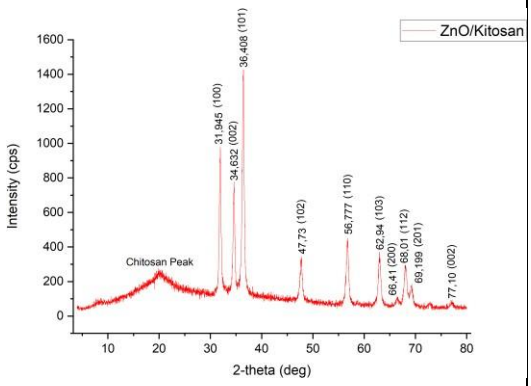


Figure 3. Difraktogram of chitosan/ZnO composites

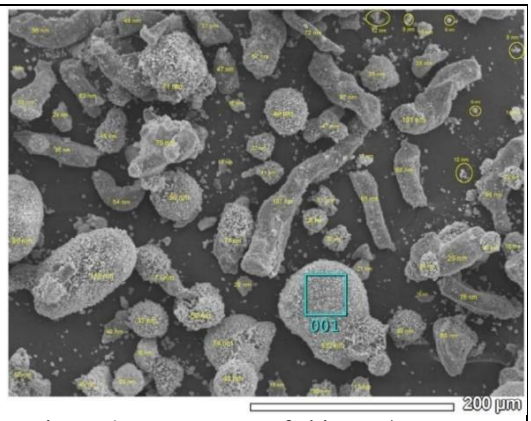


Figure 4. SEM Image of chitosan/ ZnO composites

The Chitosan/ZnO composite diffractogram shows 2 peaks, namely a broad peak at a 2 theta value of 20, which is interpreted as the amorphous region of chitosan, and a sharp peak from 2 theta 30° to 77° that is specific to hexagonal wurtzite-type ZnO. The ZnO peak for the composite is relatively unchanged compared to the ZnO nanoparticle peak. The peaks that appear in the test pattern indicate the successful immobilization of hexagonal wurtzite phase ZnO on chitosan [14].

The SEM analysis results show the presence of spherical shapes indicating ZnO nanoparticles that have been encapsulated by chitosan, as well as cylindrical shapes indicating chitosan, with a heterogeneous particle size ranging from 6 to 190 nm. Meanwhile, the EDX analysis results indicate that the components constituting the ZnO/chitosan composite consist of 31.37% Zn, 39.08% O, and 11.52% C.

Analysis of Chitosan/ZnO nanoparticle composites as an adsorbent of dye

The adsorption process begins with the creation of λ max and the standard curve for Remazol Brilliant Blue R, obtained by measuring a dye solution with a concentration of 20 ppm using a UV-Vis spectrophotometer. The maximum wavelength of the standard solution was found to be 663 nm. The standard curve was created to produce the regression equation $y = 0.0126x + 0.0262$ with $R^2 = 0.9997$.

The results of the adsorption test with varying contact times can be seen in Figure 5, with the optimum contact time obtained being 50 minutes. The effect of contact time on the adsorption capacity by the adsorbent is known through the graph of qt (concentration at each time t minutes) against time. The graph showing the adsorption capacity of the chitosan/ ZnO composite adsorbent with varying contact times is illustrated in Figure 5.

Based on Figure 5, it can be observed that at the 60th minute, the adsorption capacity experiences a significant decrease, indicating that the amount of Remazol Brilliant Blue R dye absorbed by the adsorbent begins to decline because the active sites have been fully occupied by the dye solution, thus no longer able to adsorb the dye (it has reached saturation), along with the desorption process causing the absorbed dye to be released again. The adsorption capacity increases with time and reaches a constant value when no more dye is adsorbed by the adsorbent. At the constant point, the amount of dye absorbed into the adsorbent is in a dynamic equilibrium with the amount of dye desorbed from the adsorbent.

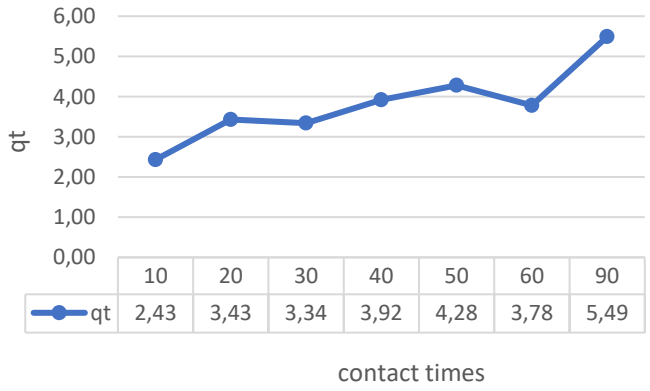


Figure 5. Adsorption capacity of Composite through Remazol brilliant blue R at various contact times

The effect of the initial dye concentration on the adsorption capacity of the ZnO/chitosan composite was obtained through a graph showing the relationship between the concentration of the Remazol Brilliant Blue R dye and the adsorption capacity of the Remazol Brilliant Blue R dye at equilibrium. (qe). Figure 6 shows a comparison of the adsorption capacity between ZnO nanoparticles (red) and ZnO/chitosan composites (blue). It is evident that the adsorption ability of ZnO/chitosan for Remazol Brilliant Blue R is lower for all initial dye concentrations.

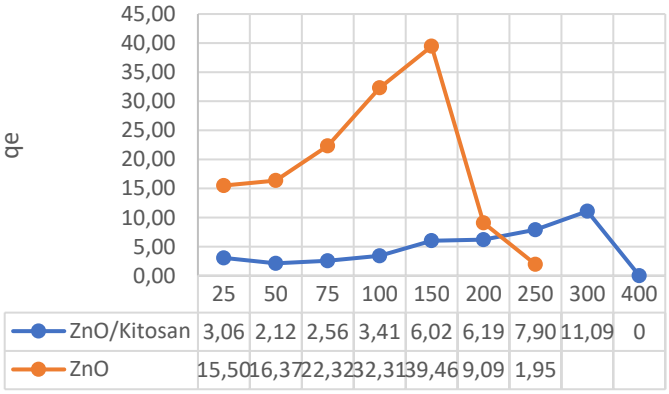


Figure 6. Graph of adsorption capacity of ZnO nanparticles and chitosan/ ZnO np composites through Remazol brilliant blue R dyes.

At an initial concentration of RBBR 300 ppm, the adsorption capacity of the ZnO/chitosan composite is at its maximum, as there is an increase from 25 ppm to 300 ppm. It can be concluded that as the concentration of the dye increases, the number of molecules adsorbed by the ZnO/chitosan composite also increases because there are still active sites available on the adsorbent that can be occupied by the dye [15].
Similarly, the graph for ZnO nanoparticles shows that at concentrations of 200 – 250 ppm, the adsorption capacity of the dye remazol brilliant blue R indicates a decrease in the value of qe. This signifies that there are no longer any active sites on the adsorbent that can adsorb the remazol brilliant blue dye.
In this study, it can be seen that the adsorption capacity of ZnO nanoparticles alone, without chitosan, is indeed higher than that of the composite. This may be due to several factors, such as the following:

a. The surface area and the level of accessibility of the active site in the adsorption process. It is possible that some of the active sites of ZnO are covered by the amorphous polymer matrix of chitosan, thus hindering the access of adsorbate molecules to adsorb onto the active sites of the composite [16].
b. The amount of ZnO incorporated in the chitosan composite. Chitosan contains many rings and forms hydrogen bonds through the –OH and –NH2 groups, which makes the

chitosan molecular chains difficult to move as they are bound to each other. When ZnO is combined with chitosan, the molecular chains will weaken and its tensile strength will increase. However, if too much ZnO is added, it will cause the chitosan to become brittle, thus reducing its adsorption capacity [17].

4. Conclusion

ZnO nanoparticles have been successfully synthesized using green chemistry, utilizing bread fruit leaf extract. Using XRD results, the produced ZnO nanoparticles have a size of 12.78 nm with specific peaks of hexagonal wurtzite-type ZnO. Meanwhile, analysis with SEM-EDX shows that the surface morphology of ZnO appears heterogeneous with particle sizes ranging from 3 to 140.64 nm.

The Chitosan/ZnO composite shows 2 peaks, namely a broad peak at a 2 theta value of 20, which is interpreted as the amorphous region of chitosan, and a sharp peak specific to hexagonal wurtzite-type ZnO. The SEM image shows that the surface morphology of the heterogeneous composite has particle sizes ranging from 3 nm to 190 nm.

The adsorption test of Remazol dye using Chitosan/ZnO composite adsorbent shows an optimal contact time of 50 minutes for an initial dye concentration of 50 ppm, while for variations in initial dye concentration, the maximum adsorption capacity of the Chitosan/ZnO adsorbent is at an initial concentration of 300 ppm, which is 11,9 ppm/ g adsorbent.

Acknoledgment

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Development of Graph Representation Test Instrument for Linear Motion in High School Physics Student

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Abstract

The aim of this study is to develop a graph representation test instrument for linear motion for high school physics students. This research follows a development framework that employs the ADDIE model as the method for creating the test instrument. Respondents of this test are 280 students from three different high school in Yogyakarta. Data were analyzed using Aiken's V and the Partial Credit Model with a 1-parameter logistic approach, utilizing the QUEST and Parscale programs for analysis. The results of this research led to the creation of an 11-item two-tier multiple-choice test. This test is valid in terms of content and construct, reliable, and features a good level of difficulty. It is best suited for students who possess average skills in graph representation.

1. Introduction

With the growing discussion around Programme for International Student Assessment (PISA) scores and strategies to enhance them, developing science literacy has become a crucial goal for the education system. Science literacy could be describe as the ability to engange with science related issues and with the ideas of science, as a reflective citizen (1). Abilities that people should have to achieve science literacy are understanding how science produced and it means to broader society (civic science literacy), understanding how science information spread in media (digital media science literacy) and understanding how people interpret science information when they see one (cognitive science literacy) (2). Someone could be considered as science literate if they are competent in what they are doing while respecting science (3). Achieving this ability is now seen as essential for preparing students to meet global standards because it's connection to economic well-being, science enhancement, health issue and people expectation of science (4). Evenfurther, having this ability also increase confidence in science and technology related matters. Therefore, improving science literacy is not only about academic success but also about fostering informed citizens capable of navigating complex scientific and technological challenges in the real world.

To effectively engage with science-related issues, people need skills that enable them to understand data. Scientists use multiple representations to explain science to the general public. The main purposes of multiple representations in a learning environment are to support complementary processes and information, limit misinterpretation, and encourage students to develop a deeper understanding of the subject (5). In physics, multiple representations include photos, diagrams, tables, graphs, concept maps, or even notes taken during learning (6). Improving science literacy, therefore, requires an understanding of multiple representations.

The importance of understanding multiple representations has already been recognized by policymakers in Indonesia, as reflected in the Kurikulum Merdeka. It emphasizes communicating results through process skills. Students are expected to present experimental results in tables, graphs, flowcharts, or concept maps using appropriate media (7). A test is needed to assess students' proficiency in multiple representations, to determine whether they can use these skills effectively when required. Therefore, this research focuses on developing a test instrument to assess students' understanding of graph representations.

2. Method

Procedures

This study was done by developing a test using ADDIE methods for research and development. ADDIE stands for Analyze, Design, Develop, Implement and Evaluate (8). For analyze we synthesize indicators of graph representation and analyze physics topics to choose. For design we made test instrument based on analyze results. For develop we validate our instrument using 7 experts, 5 from physics teachers in high school and 2 lecturers in university. For implement we give instrument to participants. For evaluation we analyze the result and make final revision. The result of this study is a graph representation test instrument that is valid and reliable.

Participants

Respondents for this study were 280 students from three schools, SMAN 2 Yogyakarta, SMAN 4 Yogyakarta and SMAN 5 Yogyakarta from odd semester 2024 - 2025. Criteria for respondents are students who already learn about kinematics of linear motion.

3. DATA analysis

In general, this study used Rasch model as data analysis. Test instrument that is develop has 4 possible response categories, so it is considered as polytomous data. Hence, Partial Credit Model (PCM) is used. This study only focused on item difficulty so we used PCM 1-parameter logistic (PL).

There are 4 types of validity in developing test: content validity, construct validity, criterion validity and face validity (9). In this study, content validity determined by analyzing expert's evaluation results using Aikens' V. There are 4 category used in test instrument for 7 experts so test instrument considered as valid if $V \geq 0.81$ (10). Validity values is analyze using Aikens' formula a).

$$V = \frac{\Sigma s}{[n(c-1)]} \qquad \text{i)}$$

where:
S = r – lo
lo = lowest validity score (in this case 1)
c = highest validity score (in this case 4)
r = the value given by experts.

While construct validity, reliability, item difficulty and fit statistics all analyze using QUEST.

4. Result and discussion

Analyze

The result of synthesizing from earlier research about graph representation (11)(12)(13) and analyzing physics topics that suitable for graph representation are presented in table 1.

Table 1. Graph representation and physics topics analysis results

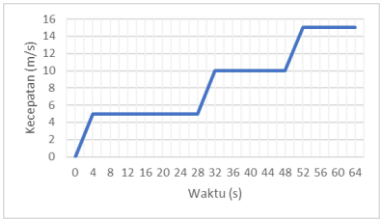
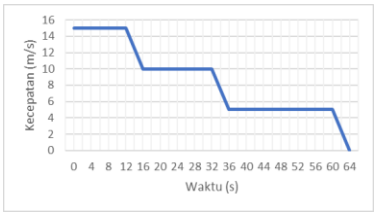
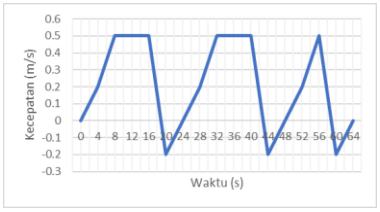
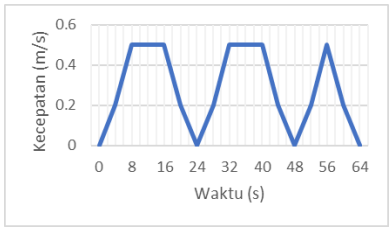
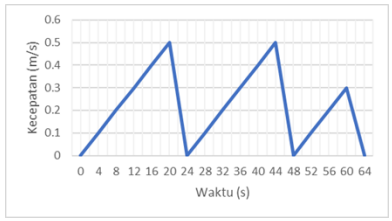
Graph Representation Skills Indicator	Physics Topics		Total Test Items
	Quantities in Linear Motion	Uniform / Non-Uniform Linear Motion	
Identifying information in a graph	1a, 1b	2a, 2b	4
Representing between graphs	3a, 3b	4a, 4b	4
Creating a graph from given information	5a, 5b	6*	3
Total	6	5	11

Note: *anchor item

Design

Data from table 1 then expanded into 11 two-tier multiple-choice test instruments. Table 2 is one of test that have been created. Question was made into contextual test because earlier study suggest higher score when question is well contextualized (14).

Table 2. Example of Developed Two-Tier Multiple-Choice Test Instrument

No	Question
6	Rena, Tika, and Sasa got into an elevator that moves from the basement floor. Tika got off on the 2nd floor, Sasa got off on the 4th floor, and Rena got off on the 5th floor. Choose from the following graphs that represent the movement of the elevator. a.  b.  c.  d.  e.  Reason a. The acceleration of the elevator is represented by a downward-sloping line approaching zero. b. The acceleration of the elevator going upward is represented by a graph that slopes upward. c. The acceleration of the elevator going downward is represented by a graph that slopes downward. d. The change in acceleration to deceleration is represented by a horizontal line. e. The change in acceleration to deceleration is represented by a sharp graph.

Answer	Score
Question: C Reason: E	4
Question: C Reason: A/B/C/D	3
Question: A/B/D/E Reason: E	2
Question: A/B/D/E Reason: A/B/C/D	1

Develop

Test instrument from design phase then given to expert to check the validity using Aikens' V. Table 3 shows the result of content validation. Means of validity coefficient is 0.98 which is considered as valid because it's more than 0.81.

Table 3. Content Validity Analysis

Item No.	Validity Score							S= r-Io							∑s	c-1	n(c-1)	Validity Coef. (V)	Category
	1	2	3	4	5	6	7	1	2	3	4	5	6	7					
1a	4	4	3	3	4	4	4	3	3	2	2	3	3	3	19	3	21	0.90	Valid
1b	4	4	3	3	4	4	4	3	3	2	2	3	3	3	19	3	21	0.90	Valid
2a	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
2b	4	4	4	3	4	4	4	3	3	3	2	3	3	3	20	3	21	0.95	Valid
3a	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
3b	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
4a	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
4b	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
5a	4	4	3	4	4	4	4	3	3	2	3	3	3	3	20	3	21	0.95	Valid
5b	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
6*	4	4	4	4	4	4	4	3	3	3	3	3	3	3	21	3	21	1.00	Valid
								Mean										0.98	Valid

Implement

Test instrument that has been valid in content then implement to 280 respondents. Data then analyze using QUEST program. This program let us see 3 types of data: Item fit for PCM, reliability and difficulty level. After that we use PARSCALE program to found out test information function (TIF) and standard error measurement (SEM). Data from this graph will give us additional information about reliability of a test.

Data from Picture 1 shows INFIT MNSQ values of every item are in range of 0.77 to 1.33 (15). This indicates every item is fit for analyzed using PCM. Table 4 also shows information whether item fit to analyze using PCM based on item estimates and case estimates. If mean and standard deviation of INFIT MNSQ is around 1.00 ± 0.00 or when mean and standard deviation of INFIT t is around 0.00 ± 1.00, then overall test fit with Rasch model PCM 1-PL. Based on table 4, it shows test developed is fit to use PCM 1-PL. This also shows that test developed is constructually valid.

Reliability is considered really good if it's higher than 0.8 (16). Table 4 shows that this study reliability is 0.86 which considered as really good. Figure 2 also tells us about test reliability. The blue line represents TIF. The curve in TIF line shows the amount of information test provide in each ability level. Figure 2 shows peak of the curve around 0. This suggest the test is most precise to measure average ability. The red dotted line represents SEM. The dips of this line show the most precise estimates. Figure 2 shows dips of the curve around 0.4, meaning the most precise estimates are around average level. Intersection between two lines happens around -1.4 and +2.2. This means the test is the most reliable and provide precise measurements for respondents with average level abilities (around -1.4 to +2.2).

Difficulty level shows quality of a test. Test considered good if the difficulty level around -2.00 to +2.00 (17). Figure 3 shows difficulty of graph representation test are around -0.63 to +1.00 which in range of a good test.

```
QUEST: The Interactive Test Analysis System
-------------------------------------------------------------------------------------------------------------------
Item Fit                                                                                          24/ 9/24 11: 6
all on all (N = 283 L = 11 Probability Level= .50)
-------------------------------------------------------------------------------------------------------------------
INFIT
 MNSQ          .56       .63       .71       .83      1.00      1.20      1.40      1.60      1.80
----------------+---------+---------+---------+---------+---------+---------+---------+---------+---------
  1 item 1                                    .          |  *        .
  2 item 2                                    .          |   *       .
  3 item 3                                    .          |   *       .
  4 item 4                                    .          |    *      .
  5 item 5                                    .          |  *        .
  6 item 6                                    .         *|           .
  7 item 7                                    .       *  |           .
  8 item 8                                    .        * |           .
  9 item 9                                    .      *   |           .
 10 item 10                                   .       *  |           .
 11 item 11                                   .      *   |           .
===================================================================================================================
```

Figure 1. Distribution map of MNSQ infit values for each item

Table 4. Summary of Item Estimation Results from QUEST program

No	Aspect	Item Estimates	Case Estimates
1	Reliability	0.86	0.00
2	Mean and standard deviation of INFIT MNSQ	1.00 ± 0.07	1.00 ± 0.20
3	Mean and standard deviation of OUTFIT MNSQ	1.00 ± 0.07	1.00 ± 0.27
4	Mean and standard deviation of INFIT T	0.02 ± 2.20	0.06 ± 1.14
5	Mean and standard deviation of OUTFIT MNSQ	0.02 ± 1.04	0.08 ± 0.62

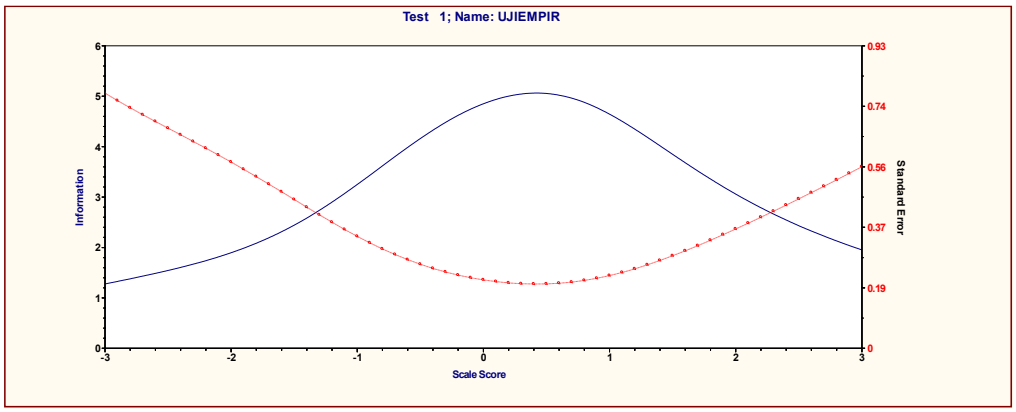


Figure 2. TIF and SEM of Graph Representation Test

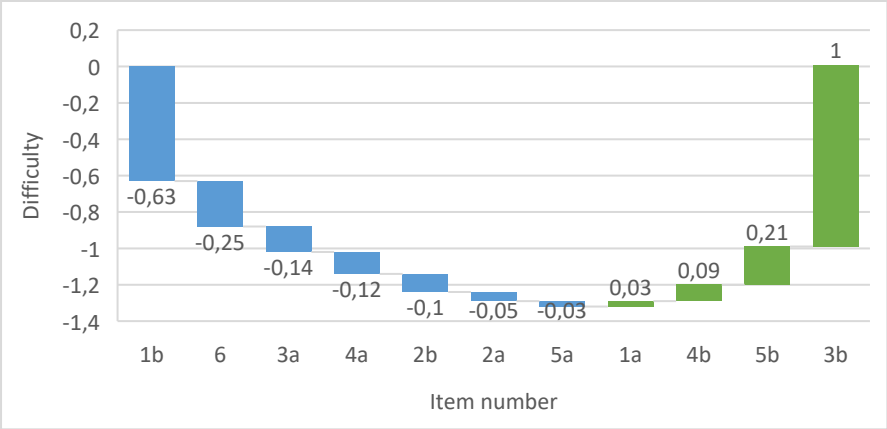


Figure 3. Items Difficulty Level

Evaluate

This data was collected using Google Forms via email. This created minor difficulties, such as respondents being unable to access the test and having trouble focusing while taking it. Future researchers should consider these issues when developing tests to ensure better accessibility and engagement for respondents.

5. Conclusion

The graph representation test that developed was valid, in content and construct, and reliable. This test best used for students that have average ability in graph representation.

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SUSTAINABLE UNIVERSITIES: ANTECEDENTS AND OUTCOMES OF ETHICAL ENERGY CONSUMPTION

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Abstract

This study highlights the need for universities to serve as models of ethical behavior in energy use, recognizing their unique position as both large-scale consumers and educators of future leaders. The research explores the factors influencing ethical energy behavior at individual, institutional, social, and external levels. A quantitative approach, utilizing a cross-sectional survey design, was employed, with 281 respondents from various higher education institutions in Indonesia. The sample included students, academic staff, and faculty members, selected through purposive sampling to capture diverse perspectives. The findings reveal that environmental awareness and education, along with regulatory compliance, significantly influence ethical energy consumption behaviors. Surprisingly, other factors such as cultural norms, institutional policies, and technological infrastructure showed no significant effect in this context. Ethical energy consumption leads to important outcomes, including resource conservation, cost savings, enhanced institutional reputation, and preparation of environmentally responsible graduates. The findings offer valuable insights for policymakers and educators aiming to develop effective energy management strategies in higher education.

Keyword: Ethical Energy Consumption, Sustainability in Academia, Environmental Awareness

1. Introduction

The growing necessity to address climate change and promote sustainable development has positioned academic institutions as critical actors in environmental management (Roos et al., 2020). Ali et al. (2021) argue that a university's function in the modern world goes beyond the fundamental duty of producing and disseminating information. Although considerable study has been undertaken regarding energy usage and sustainability measures in corporate contexts (Ikram et al., 2020; Khaled et al., 2021; L. Li et al., 2020) these investigations have frequently neglected the academic sector. This neglect is especially troubling considering educational institutions' substantial energy use and capacity to affect broader societal practices. In contrast to corporations, which are predominantly motivated by profit, academic institutions possess distinct traits that necessitate focused examination in energy consumption studies. Universities have various stakeholders, such as students, teachers, and administrators, each possessing distinct levels of involvement and accountability regarding energy consumption (Berchin et al., 2021; Okai-Ugbaje et al., 2020). Furthermore, the cyclical structure of academic calendars, the existence of energy-intensive research facilities, and the dual role of universities as consumers and instructors regarding sustainability establish a complex ecosystem that markedly contrasts with corporate settings (Bugallo-Rodríguez & Vega-Marcote, 2020).

Universities, as centres of information generation and distribution, bear an exclusive need to demonstrate ethical behaviour in energy usage and promote sustainable practices (Leal Filho, Coronado-Marín, et al., 2022). Understanding the causes and consequences of ethical conduct in academic environments has become progressively essential as the global society confronts the issues of shortages of resources and the destruction of the environment. Recent studies highlight educational institutions' substantial influence in mitigating carbon emissions and fostering sustainable practices on their campuses and throughout the wider society (Aghamolaei & Fallahpour, 2023; Pereira Ribeiro et al., 2021; Sen et al., 2022). The findings of this research could have significant implications for society,

informing policy and practice in sustainability and environmental stewardship. The ethical conduct of energy usage in academic settings has thus become a significant research focus (Meseguer-Sánchez et al., 2020), highlighting the increasing recognition of higher education institutions' responsibility in fostering sustainability and environmental stewardship (Berchin et al., 2021).

The emphasis on corporations in energy consumption research has created an important gap in our understanding of how academic institutions can efficiently manage and mitigate their energy usage. This bias toward business environments neglects the capacity of universities to function as living laboratories for sustainable practices and their distinctive role in educating future leaders on responsible energy consumption (Leal Filho, Coronado-Marín, et al., 2022). Moreover, the oversight of academic settings in energy research disregards the significant cumulative influence of higher education institutions on global energy use and carbon emissions. Recent research has commenced to address this deficiency, emphasizing the necessity for customized energy management strategies inside universities that consider their teaching objectives in conjunction with their operational requirements (Brundiers et al., 2021). With increasing recognition of academia's vital role in fostering sustainable futures, there is an imperative to broaden energy consumption research to adequately address the distinct difficulties and opportunities inherent in academic settings (Alam et al., 2024).

This research is urgent due to the swift transformations in global energy dynamics and the increasing demand for institutions that promote sustainable practices. This study analyzes the determinants of ethical energy consumption behaviour and its diverse outcomes. It offers essential insights for policymakers, administrators, and educators aiming to develop effective sustainability policies in higher education (Alam et al., 2024). Furthermore, as universities are vital in developing future leaders and decision-makers, recognizing how to foster ethical energy consumption practices can significantly influence social change towards sustainability (Khan et al., 2021; Vanegas Cantarero, 2020). This research tackles a significant gap in our comprehension of sustainability in academia. It provides a framework for institutions to improve their environmental performance, decrease expenses, and prepare graduates to confront the urgent environmental concerns of our era.

Environmental awareness has faced challenge from a multifaceted concept (Aikowe & Mazancova, 2023). This research examines the factors influencing and the outcomes of ethical energy consumption behavior, offering a detailed framework for how academic institutions might promote a culture of sustainability that transcends their immediate environment. In exploring the factors influencing ethical energy consumption behavior in academic settings, this study adopts a multi-level approach, drawing from several established theoretical frameworks. This approach recognizes that human behavior, particularly in complex institutional environments like universities, is shaped by factors operating at various levels of social organization. Specifically, we propose a classification of antecedents into four distinct levels: individual, institutional, social, and external.

At the individual level, we consider environmental awareness and education as key factors, aligning with Social Cognitive Theory's emphasis on personal cognitive factors (Bandura, 1987; Locke & Bandura, 1987). The institutional level encompasses elements controlled by the academic organization, including institutional policies and leadership, technological infrastructure, educational program integration, and financial incentives. This level draws from Institutional Theory, which posits that organizational structures and practices significantly influence behavior within institutional contexts (Peters, 2022). The social level captures interpersonal and group dynamics, including faculty and student engagement, student-led initiatives, and cultural norms, reflecting the importance of social interactions in shaping behavior as highlighted in Ecological Systems Theory (Bronfenbrenner, 1979). Finally, the external level accounts for influences beyond the immediate academic environment, such as regulatory compliance and community partnerships, acknowledging the broader societal context in which institutions operate (Hallinger & Heck, 2010).

The remaining parts of the paper are outlined: The second section examines the existing literature, explores the theoretical foundations, and formulates the research hypotheses. The third section outlines the data sources, samples, and analysis techniques employed in the study. The fourth section presents the estimated results, and the final section concisely discusses the findings. The conclusion and implications of the paper are provided in the final section.

2. Literature Review

This study divides the antecedents of ethical behavior on energy consumption into several levels. The classification of antecedents into individual, institutional, social, and external levels is grounded in

a systems approach to understanding complex behaviors within organizational contexts. This multi-level framework acknowledges that ethical energy consumption behavior in academic settings is influenced by a diverse array of factors operating at different scales of social organization. The individual level focuses on personal characteristics and knowledge, recognizing the role of human agency in decision-making. The institutional level captures the formal structures, policies, and resources that shape the immediate environment in which individuals operate. The social level addresses the interpersonal dynamics and cultural factors that emerge from collective interactions within the academic community. Finally, the external level accounts for broader societal influences that extend beyond the institution's boundaries. This classification allows for a comprehensive analysis of how various factors influence energy consumption behavior, reflecting the complex reality of decision-making in academic environments. By adopting this multi-level approach, we can better understand the relative impact of different interventions and develop more effective strategies for promoting ethical energy use in higher education settings. Moreover, this classification aligns with established theoretical frameworks as mention above, providing a solid theoretical foundation for the research.

3. Method

This study employs a quantitative approach to address the research objectives, utilizing a cross-sectional survey design. This methodology allows for the systematic examination of the relationships between multiple antecedents and ethical energy consumption behavior, as conceptualized in our multi-level framework. The study population comprises students, academic staff and faculty members from various higher education institutions across Indonesia. A purposive sampling technique was employed to ensure representation from diverse academic disciplines, institution types, and geographical locations within the country. This sampling approach allows for capturing a wide range of perspectives and experiences related to energy consumption behaviors in academic settings. The selection of students, academic staff and faculty members as the primary respondents is based on their significant role in shaping campus culture and their potential as future decision-makers in energy-related matters. Data was collected through a structured questionnaire, developed based on established scales from the literature and adapted to the Indonesian context. The collected data was analyzed using advanced statistical techniques to test the proposed hypotheses. Descriptive statistics was employed to summarize the characteristics of the sample and provide an overview of the variables. Structural equation modelling (SEM) using PLS will be used to examine the relationships between the antecedents and outcomes of ethical energy consumption behaviour.

4. Result

There were 281 responders in the research sample. There were 65.1% female (n=183) and 34.9% male (n=98) in the sample. Based on age, 50.90% (n=143) were 20-25 years old, 6% (n=17) were 25-30 years old, 19.9% (n=56) were 30-35 years old, and 23.1% (n=65) were above 35 years old. Finally, the status indicates that 53.7% (n=151) were students, 12.1% (n=34) were academic staff, and 34.2% (n=96) were faculty members. The demographic data of the respondents is shown in Table 1.

Table 1. Demographics of the Respondents

	Category	Frequency	Percentage (%)
Gender	Male	183	65.1
	Female	98	34.9
	Total	281	100
Age	20-25 Years Old	143	50.9
	25-30 Years Old	17	6.0
	31-35 Years Old	56	19.9
	>35 Years Old	65	23.1
	Total	281	100
Status	Student	151	53.7
	Academic Staff	34	12.1
	Faculty Member	96	34.2
	Total	281	100

Measurement Model

In this study, every latent variable has a composite reliability value greater than 0.7 and a Cronbach's alpha. Some question items do not match the basic requirements, according to the results of the instrument testing. Moreover, items that don't fit these requirements are not included in the next step. The average variance extraction value and outer loading for this investigation satisfied the requirements. Consequently, the study's latent variables can be represented and highlighted by the used indicators. Table 2 displays the excellent reliability and internal consistency of the indicators for each construct based on the findings.

Table 2. Reliability Testing and AVE

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Community Impact	0,959	0,961	0,965	0,754
Cultural Norms And Value	0,936	0,938	0,947	0,691
Community Partnership	0,964	0,965	0,969	0,776
Cost Saving	0,960	0,962	0,966	0,758
Environmental Awarness And Education	0,829	0,830	0,879	0,593
Ethical Behavior On Energy Consumption	0,978	0,978	0,979	0,661
Educational Impact	0,959	0,962	0,965	0,755
Environmental Impact Reduction	0,959	0,960	0,965	0,752
Enhanced Institutional Reputation	0,959	0,960	0,965	0,754
Educational Program And Curricula Integration	0,961	0,964	0,967	0,763
Financial Incentives And Recognition	0,958	0,961	0,964	0,748
Faculty And Student Engagement	0,942	0,945	0,951	0,683
Institutional Policies And Leadership	0,925	0,930	0,938	0,626
Innovation And Research Opportunities	0,962	0,964	0,967	0,765
Longterm Sustainabilities	0,965	0,966	0,970	0,782
Preparation Of Responsible Graduates	0,964	0,965	0,969	0,776
Resource Conservation	0,959	0,960	0,965	0,753
Regulatory Compliance	0,951	0,954	0,958	0,719
Student Engagement And Awarness	0,928	0,932	0,940	0,635
Student-Led Initiatives	0,958	0,958	0,964	0,747
Technological Infrastucture	0,942	0,947	0,951	0,684

Hypothesis Testing Result

More than half of hypotheses are supported, according to the results of the partial least squares (PLS) analysis (see Table 3). The degree to which the independent variable influences the dependent variable is demonstrated by the original sample of the influence as opposed to how much of an impact

it has. As shown in Table 3, more than half of the hypotheses have a value of sig. < 0.05 and a positive impact magnitude, indicating a positive effect.

Table 3. Total Effect Result

Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CNV -> EBEC	0,081	0,082	0,118	0,685	0,494
CP -> EBEC	-0,039	-0,031	0,135	0,288	0,773
EAE -> EBEC	0,388	0,382	0,062	6,233	0,000
EBEC -> CI	0,615	0,618	0,065	9,394	0,000
EBEC -> CS	0,583	0,586	0,063	9,213	0,000
EBEC -> EI	0,581	0,585	0,065	8,980	0,000
EBEC -> EIR	0,563	0,566	0,065	8,667	0,000
EBEC -> ENIR	0,593	0,598	0,059	10,002	0,000
EBEC -> IRO	0,569	0,573	0,059	9,656	0,000
EBEC -> LS	0,610	0,612	0,063	9,615	0,000
EBEC -> PRG	0,568	0,572	0,065	8,668	0,000
EBEC -> RC	0,578	0,580	0,065	8,936	0,000
EBEC -> SEA	0,716	0,717	0,044	16,379	0,000
EPCI -> EBEC	0,198	0,187	0,129	1,538	0,124
FIR -> EBEC	-0,069	-0,081	0,125	0,550	0,582
FSE -> EBEC	0,051	0,051	0,111	0,457	0,648
IPL -> EBEC	-0,002	0,003	0,088	0,024	0,981
RCOM -> EBEC	0,317	0,321	0,106	2,990	0,003
SI -> EBEC	-0,006	0,003	0,121	0,047	0,963
TI -> EBEC	-0,082	-0,080	0,110	0,748	0,454

5. Conclusion

This research fills a significant gap in the understanding of ethical energy usage in academic settings and establishes a basis for transformative activities that can foster more sustainable and responsible higher education institutions. The importance of this study cannot be overstated. Academic institutions, as centers of knowledge and innovation, have a unique responsibility to lead by example in addressing global challenges such as climate change and resource depletion. By examining both the antecedents and outcomes of ethical energy consumption behavior, this research provides a comprehensive understanding of how universities can foster a culture of sustainability that extends beyond their campuses.

On the antecedent side, factors such as environmental awareness and education and regulatory compliane play crucial roles in shaping ethical behavior. These elements form the foundation for building and maintaining sustainable practices within academic communities. The outcomes of such behavior are equally significant and far-reaching. From resource conservation and environmental impact reduction to cost savings and enhanced institutional reputation, the benefits of ethical energy consumption extend across economic, environmental, and social domains. Moreover, the educational impact and preparation of responsible graduates underscore the long-term societal benefits of instilling sustainable practices in academic settings.

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Evaluating the Performance of Electric Motorcycles Converted from Conventional Internal Combustion Engine Motorcycles

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Abstract

This study focuses on an appraisal of the performance carried out on electric motorbike conversions, concerning distances and acceleration performance at various road conditions and different rider loads, in view of increasing awareness about climate change, reduction of greenhouse gas emission, and the need for e-motorbikes to be converted from oil-fueled motorbikes-a promising alternative toward more ecologically friendly mobility. The methodology used is development research, where testing in operation modes is done, Mode 1 and Mode 2 on flat and straight roads and on winding uphill and downhill. The maximum acceleration in Mode 2 goes to 80km/h in case of one driver on a straight road and up to 70km/h in the case of a winding uphill and downhill. With the load for one person, on flat and straight roads, the distance is at its maximum-29 km-but it decreases to 23 km on more difficult road conditions. This study concludes that electrically converted motorbikes can give a good performance in the context of sustainable mobility, while further technology improvements in both batteries and the other parts of the vehicle will yield even better efficiency and performance.

Key Words.Electric motorbike conversion, performance, energy efficiency, environmentally friendly vehicles, combustion motorbikes, conversion technology

1. Introduction

Background

In the last few decades, the world has passed through serious crises in regard to climate change, air quality, and dependence on fossil fuel [1]. It is one of the most important sources of greenhouse gas emissions; transportation is presently undergoing an in-depth changeover toward greener solutions [2]. The emergence of electric vehicles is a major alternative that promises to reduce the negative impacts of oil-fueled conventional vehicles, Internal Combustion Engine ICE or ICE [3]. Motorbikes play a very important role in ensuring people's mobility, especially in developing countries, amidst development, since they are comparably affordable and efficient in the use of space and energy.

Oil-fueled motorbikes are in general use all over the world, especially in Asia, Africa, and South America. However, these combustion engine motorbikes emit dangerous pollutants like carbon monoxide, nitrogen oxides, and unburned hydrocarbons, contributing to air pollution and different health problems [4]. Therefore, electric transformation of oil-fueled motorbikes may turn out to be one of the solutions to reduce the carbon footprint and improve air quality in urban cities [5]. This will also enable resource-poor countries to accept the new, more expensive electric motorbikes as a middle ground [6].

In addition, conversion of oil-fueled motorbikes into electric motorbikes allows the re-utilization of an already existing vehicle infrastructure, reduces costs for new production, thereby extending the life of the vehicle. Such conversions comprise replacing a few of the major components of the internal combustion engine, such as the ignition system, with electrical components like the electric motor, battery, and controller [7]. Although this concept is gaining momentum, more technical and economic issues, such as conversion costs, energy efficiency, and post-conversion vehicle performance, are still yet to be debated.

Purpose of Study

This research work shall dwell on the detailed performance appraisal of electric motorbikes converted from oil-fueled motorbikes. The aspects to be covered in the appraisal include energy efficiency, acceleration, maximum speed, and distance per battery charge. It is hoped that the results of this study will shed new light on the possibility of converting conventional vehicles to electric with a view toward supporting global efforts in the transition toward sustainable transportation.

2. Literatur Review

Electric Vehicles and Technological Developments

Over the last decade, in concert with a globally growing concern over climate change and increasing greenhouse gas emissions, electric vehicles have seen high growth. Wang et al. also claim that, due to their increased energy efficiency, EVs are able to have higher energy conversion capability when compared against fossil fuel vehicles [8]; it has been suggested that electric motors will turn over 90 % of the energy within a battery into moving the vehicle, whereas the best results expected out of an ICE vehicle would stand at only about 25-30 %. The development of lithium-ion batteries has greatly increased the driving range of electric vehicles and reduced their cost of production [9][10].

Several studies have discussed the impact that electric vehicle adoption might bring to the environment [11]. Hawkins et al. [12] and Peng et al. [13] illustrate that CO2 emissions from using EVs are lower compared to conventional vehicles, especially when the energy source used is sourced from renewable energy sources. However, the outstanding challenges are the availability of EV charging infrastructures and high initial costs at the purchase of a new EV, which even makes alternatives such as vehicle conversion important in developing countries [14].

Conversion of Oil Fueled Motorcycles into Electric Motorcycles

The conversion of oil-fueled motorbikes to electric motorcycles is an economically viable solution and, at the same time, environmentally friendly, especially for developing countries [15]. Research has shown by Abdel-Hafez et al. that converting ICE motorbikes can reduce carbon emissions up to 50% and reduce energy consumption by about 60% compared with ICEs[16]. This also greatly reduces operational cost in terms of charging electricity, which is cheaper than fuel oil [17].

Jain et al. assessed the performance of the converted motorbikes [18]. While energy efficiency was improved, some challenges were realized in performance aspects like acceleration and maximum speed [19]. The electric motors used in the converted motorbikes are mostly less powerful than the traditional combustion motors [20]. Consequently, the converted motorbikes have been found suitable for usage within low-speed cities but not so ideal for usage on highways [21]. The electric motor to be selected shall be characterized by appropriate specifications that balance performance with energy efficiency [22].

Challenges in Energy Conversion and Efficiency

The paper of Kim et al. emphasized that while environmental benefits are being gained with the conversion of ICE to EV, its integration process does pose a huge challenge in the systems [23]. It is important that careful installation of electric motor, battery, and power control should be performed to equitably distribute the load because the weight of the batteries has impacts on vehicle stability. Cheng et al. [24] have also established that energy efficiency upon conversion of an electric motorbike is highly influenced by the size and type of the battery applied. Large capacity batteries provide longer life to a battery; however, this adds to extra weight of the vehicle, which can reduce the performance of the vehicle. Another important role in the efficiency of sustaining electric vehicles is played by the energy management system, which is also known as the Battery Management System, BMS. According to Li et al. [25], poor management of a battery could cause faster degradation and hence affect performance and range in electric motorbikes. This is, therefore, one essential determinant in the life span of converted electric vehicles.

Social and Economic Impact of Motorcycle Conversion

Motorbikes represent one of the most important modes of transport in the world, especially in developing countries; for instance, in those countries where over 80% of their people depend on motorbikes for transportation [26]. Electric motorbike conversions, estimated that have positive impacts on both social and economic parameters. The decrease in operational costs and spending toward fuel would increase the purchasing power of people. This conversion also creates opportunities to render new services by local workshops, thereby providing employment.

However, in the study conducted by Michael [27], it was seen that the adoption of electric motorbikes into developing countries is still being impeded through "inadequate charging infrastructure and low levels of public awareness of the advantages of conversion." In this regard, mass conversion will need to be stimulated through education campaigns and supportive government policies.

Conclusions from the Literature

From the literature carried out, it is evident that the conversion of oil-fueled motorbikes to electric has great potential in improving energy efficiency, hence reducing environmental impacts emanating from the transportation sector. While there have been lots of studies, especially on technological benefits that guarantee environmental and economic advantages, technical challenges and infrastructure limitations remain considerable barriers to large-scale implementation. The current research hence tries to fill the lacuna in the literature by further assessing performance issues of converted electric motorbikes in urban areas and detailing how this technology could be more widely and effectively implemented.

3. Methodology

Research Design

This research is a type of R&D approach whose objective is to create an efficient and feasible model technically, economically, and environmentally for oil-fueled motorbikes transformed into electric motorbikes. The manufacturing process is performed in various stages, ranging from planning, the development of a prototype, testing, up to performance evaluation based on main parameters.

Research and Development Model

This research model adapts the development model in ADDIE that consists of five major stages: analysis, design, development, implementation, and evaluation. In particular, the stages are as follows:

1. Analysis: The analysis of the requirement of technology, component specification, and study of related literature.
2. Design: Designing the system of conversion including the selection of main components: electric motor, battery, and drive.
3. Development: The development of an electric motor bike that has been converted.
4. Implementation: Actual implementation and performance testing of the converted motorcycles in the field.
5. Evaluation: Performance evaluation, improvement based on the test results.

Research Stages

Analysis Stage

Feasibility study and needs analysis are done at this stage. The essence is to understand the nature of specifications both technically and in field conditions in terms of what is actually needed to carry out the conversion process. Steps taken include:

1. Energy Requirement Analysis: The ideal power and battery capacity requirement of an electric motorbike should be analyzed according to the vehicle's weight and desired mileage.
2. Identification of primary components: Describe the specification of the electric motor, battery, control system, and other supporting components suitable for conversion motorcycle.
3. Literature Review: study of literature on Vehicle Conversion Technology, Energy Management Systems, and Technical-Environmental Aspects of Electric Vehicles.

Design Stage

The next stage is to design a prototype of the converted electric motorbike. Designing the prototype takes two aspects:

1. Design engineering: Electric drive system design, component layout, electric motor mount, battery location, and optimal weight distribution.
2. Component specification: The components to be used have to be chosen, such as the electric motor, batteries, BMS, and motor controller.

Development Stage

In this stage, the final prototype of an electric motorbike, derived from previous design results in former steps, was developed. The major works include:

1. Conversion of the engine: This involves removing the internal combustion engine and replacing it with an electric motor.
2. Battery Installation: The power source shall be a lithium-ion battery installation, and the electrical system shall be operational.
3. Integration with the control system: It connects the motor controller and the battery and the motor together for effective regulation of electricity.

Changes in Vehicle Physical Adjustment: Putting the motorcycle physically to concur with the new configuration in the electrical system for the weight distribution and positioning of the components for stability.

Implementation Stage

The implementation phase is the field testing of performance after prototype development. Tests are conducted to measure:

1. Perform acceleration and maximum speed: Tests will be conducted on a closed track to establish the time taken by the converted electric motorbike to accelerate from 0 to 60 km/h and its maximum speed.
2. Range per charge: The motorcycles were taken under standard conditions in the urban environment to measure how far it can go on a single full charge.
3. Battery cycle life test: The test was conducted to determine the duration of charging of the battery and the capacity loss after hundreds of charge cycles.

3.3.5 Evaluation Stage

The evaluation stage has the aim to establish whether or not the prototype electric motorbike was successful concerning technical performance and energy efficiency. Evaluation is done through the following:

1. Performance analysis: The performance of electric motorbikes against oil-fueled motorbikes is determined and analyzed using data obtained during the implementation testing.
2. Component testing: Assess if the utilized components/motor, battery, and control system are behaving within specifications as anticipated.

3. Revisions and improvement: This may be improved and enhanced because in testing, deficiencies are identified; hence, improvements are made to the design or elements that result in better performances.

Data Collection Technique

Data obtained by direct measurement of technical parameters of the motorcycle such as acceleration, maximum speed, distance travelled and energy consumption.

Data Analysis Techniques

Data analysis was done using descriptive statistical techniques. Data is presented in tabular and graphical form to illustrate various performance parameters for the converted electric motorbike on different aspects such as acceleration, maximum speed, and energy efficiency in traveling a distance.

Validaty and Reliability

Standardized testing methods ensure the validity of the research using calibrated measurement tools. Tests for every parameter were carried out several times-minimum threefold-and obtained results were compared to ensure the reliability of data.

Research Limitations

There are a number of limitations to the present research that must be noted. This would involve the following:

1. Component specifications: Specific components are used herein in the prototype, which may not represent all the conversion technologies available on the market.
2. Controlled test environment: Testing had been done on a closed track and may differ from actual performance on the road.
3. The conversion cost: This conversion cost factor is not discussed in detail in the current research, and it focuses more on technical performance.

4. Results and Discussion

Acceleration Test Results

Acceleration tests were conducted on the converted electric motorbike performance under two operation modes, Mode 1 and Mode 2, on straight and curved roads uphill and downhill. The vehicle load has also been taken into consideration in this test when driven by 1 and 2 people. The results of the acceleration test are given in Table 1 below.

Tabel 1. Electric Motorcycle Acceleration Test Results Conversion Results (km/hour)

Road Conditions	Mode	Load 1 Person	Load 2 Persons
Flat and Straight Road	Mode 1	70 km/h	66 km/h
Curved, Uphill, Downhill Road	Mode 1	60 km/h	55 km/h
Stright and Flat Road	Mode 2	80 km/h	75 km/h
Curved, Uphill, Downhill Road	Mode 2	70 km/h	65 km/h

Discussion of Acceleration Results

Based on the results of the acceleration test, there is a large difference in maximum speed between Mode 1 and Mode 2, and also between different conditions of the road-straight and curved, uphill and downhill. The following are the key findings:

Differences in Acceleration Based on Operation Mode

1. In Mode 1, on a flat and straight road acceleration reaches 70 km/hour when driven by 1 person but decreases to 66 km/hour when it is driven by 2 people. On curved, uphill, and downhill roads, the acceleration is lower: 60 km/hour and 55 km/hour, for 1 or 2 persons respectively.
2. Mode 2: larger acceleration, maximal speed on a straight road is 80 km/hour in the case of 1 person and 75 km/hour in the case of 2 persons, while on curved, uphill, and downhill roads the maximal speed is higher as in Mode 1 and reaches 70 km/hour for 1 person and 65 km/hour for 2 persons.

Impact of Vehicle Load on Acceleration

A lager load, which is 2 persons, gives a smaller acceleration in every kind of road and mode. For Mode 1, the average increase when the motorbike is ridden by 2 people is in the order of 4-5 km/hour. It is more accentuated on winding uphill and winding downhill roads. For Mode 2, with higher total accelerations, a drop in the same fashion is observed. With a difference of 5 km/h on the same conditions of the road.

Differences in Acceleration Based on Road Conditions

Curved, uphill and downhill road conditions result in a significant decrease in acceleration compared to flat and straight roads. This is further emphasized by Mode 1, where the average decline is approximately 10 km/h. For Mode 2, the decline is more moderate, at about 5-10 km/hour. This therefore means that Mode 2 can provide even more stable acceleration when passing more difficult road conditions.

In general, Mode 2 demonstrates better performance compared to Mode 1 in acceleration, especially on straight roads. However, vehicle load and winding, uphill, and downhill road conditions remain crucial factors that affect the performance of acceleration.

4.2 Mileage Test Results

The mileage testing was done under two important factors, namely road conditions and vehicle load, in assessing the energy efficiency of the converted electric motorbikes. The results from mileage testing are summarized in the following Table 2.

Tabel 2. Electric Motorcycle Mileage Test Results Conversion Results (km)

Road Condition	Load 1 Person	Load 2 Person
Flat and Straight Road	29 km	27 km
Curved, Uphill, Downhill Road	23 km	22 km

Discussion of Mileage Results

Effect of Road Conditions on Travel Distance

The test results show that the distance traveled by electric motorbikes is influenced by two main factors, namely vehicle load and road conditions. Following are some findings from the mileage test results:

1. Riding on a straight road, an electric motorbike can travel 29 km when ridden by a single person and 27 km when ridden by two people. It is now clear that flat roads promise better energy efficiency.
2. In curved, uphill, and downhill roads, the distance was considerably reduced to 23 km when it had one person on it and 22 km when two people were on it. The main reason for this reduced mileage is because of the increase in energy use to overcome adverse terrains, such as slopes and other constant changes of direction on a winding road.

Effect of Vehicle Load on Mileage

1. The additional 2 people increase the load factor, which lowers the mileage on both straight and curved uphill downhill roads. On the straight roads, the decrease was 2 km-from 29 to 27-while that on curved roads was 1 km-from 23 to 22.
2. Though the decrease in mileage is not that significant, this just goes to say that the bigger load a vehicle has, it requires more energy in sustaining its speed and performance, especially when the road conditions are not flat.

Battery Efficiency

1. The test results can also give an idea about the energy efficiency of the battery by the reduction in battery voltage used to cover a certain distance. Motorbikes will be most energy efficient on straight roads with a voltage drop from 83 Volts (100%) to 70 Volts (27%) to cover 29 km (with a load of 1 person). In turn, the energy consumption rises when driving along winding and uphill roads, a distance of 23 km from the voltage drop of 82.9 Volts (99%) up to 69 Volts (22%) is shown.
2. In difficult road conditions, with 2 persons of load, battery voltage decreased more significantly-from 82.5 Volts at 97% to 67 Volts at 11% showing that energy consumed in carrying a heavier load on difficult ground is greater.

Overall Discussion

The test results of the acceleration and mileage confirm that with such a conversion, the electric motorbike has quite good performance on different road conditions-although it is influenced by the vehicle load and terrain. Operating mode, rider load, and road conditions are major factors for any electric motorbike to determine its efficiency and performance.

Performance on a Straight Road

Mode 2 provides the best acceleration performance, particularly on a straight road, where the maximum attained speed by the motorcycle was 80 km/h in the case of one person and 75 km/h in the case of two persons. The distance travelled on a straight road is quite efficient at about 29 km when loaded with 1 person.

Performances on Curved, Uphill and Downhill Roads

Although for more difficult road conditions the performance is lower, Mode 2 still provides relatively stable acceleration, with a speed difference of about 10 km/h compared to straight roads. In these conditions, mileage is, however, smaller, which indicates higher energy consumption. Overall, Mode 2 would be more advisable for conditions that require faster and more stable acceleration, although Mode 1 is at least energy-efficient, especially for flatter conditions.

5. Conclusion

This research aims to study the performance of electric motorbikes converted from oil-fueled motorbikes by conducting an acceleration and mileage test in various road conditions and rider loads. From this testing, the following conclusion can be drawn:

a. The converted electric motorbike showed a good performance in terms of acceleration, while Mode 2 generated a higher maximum speed in all conditions compared to Mode 1. The maximum acceleration in the case of the straight road is 80 km/hour for one person and 75 km/hour in case of two persons in Mode 2, while in Mode 1, the same reached 70 km/hour for one person and 66 km/hour for two persons.
b. The state of the road and the load it carries also influences the mileage. For example, on a straight road, a motorbike is able to run up to 29 km with the load of 1 person and up to 27 km with the load of 2 persons. In conditions when roads were curved uphill and downhill, these distances were reduced to 23 km for 1 person and 22 km for 2 persons, which clearly shows that on rougher terrain, energy consumption increases.

c. The discharge of battery voltage during the test is a very good pointer at energy efficiency, especially on straight roads where energy consumption will be lower compared to curved, uphill and downhill roads.

Implications

These results have a number of key implications for the findings of the present research:

a. Improved Performance of Electric Vehicles: This is evidenced by the research undertaken that converted electric motorbikes could easily stand shoulder to shoulder with oil-fueled motorbikes, especially for everyday use within urban centres.
b. Infrastructure Planning: The results can also provide useful insights to developers and planners of transport infrastructure with regard to enhancing the electric motorbike lanes, including how to negotiate curved roads and inclines.
c. Energy and Environmental Policy: The adoption of converted electric motorbikes is bound to reduce carbon emissions and dependence on fossil fuels, hence complementing government efforts in creating a clean environment.

Suggestion

Based on the findings and conclusions derived from this research, the suggestions that can be given are as follows:

a. Further studies should be made to find a better combination of components that will enhance the efficiency and performance of the converted electric motorbikes, including the most recent battery technology.
b. Tests on the performance of electric motorcycles should include different types of roads and different climatic conditions to allow more comprehensive data regarding durability and reliability tests.
c. Increasing public awareness of the benefits derived from the use of converted electric motorbikes is necessary for wider diffusion to take place, and it has to be combined with providing information on the environmental benefits accrued and cost efficiency.

Hence, it is expected that this study will contribute to the development and application of the technology of electric vehicles and become a reference for further study in this area.

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Gender Representation in Deutsch echt einfach A1.2: A Content Analysis

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Abstract

This study investigates gender representation in Deutsch echt einfach A1.2 as a German textbook in Indonesia. Using the content analysis method, this study investigates gender representation in daily activities, focusing on how gender equality is portrayed in daily activities, both domestically and professionally. The object of this study is the Deutsch echt einfach A1.2 textbook published in Indonesia under the license of Ernst Klett Sprachen GmbH, which consists of 136 pages and is intended for adolescent learners without basic knowledge of German. The analysis was conducted qualitatively in two stages: first, identifying their characteristics and activities, and second, analyzing the patterns of gender representation that emerged. In the first stage, the characters that emerged were categorized based on their gender and the activities they performed, both in domestic and professional contexts. Data was recorded to determine the frequency of involvement of each gender. In the second stage, in-depth analysis was conducted to identify gender representations, focusing on whether the roles reflected equality or still contained gender stereotypes. The results show that the Deutsch echt einfach A1.2 textbook clearly depicts gender equality, with both men and women being involved in various activities without any clear separation of jobs based on gender. Overall, the study concludes that although the textbook attempts to deconstruct gender stereotypes, further attention is needed to ensure a more fair and balanced representation in the characterizations and roles played by each gender. The results of this study are expected to contribute to the development of teaching materials that are more sensitive to gender equality issues in language learning.

1. Introduction

Gender issues are an important aspect of education. Aside from being a fundamental part of human rights, gender equality can affect students' learning experiences and their identity development. Gender roles influence individuals' thoughts, attitudes and behaviors in everyday life, including choosing professions, dressing and interacting in personal relationships [1]. Promoting gender equality is important for creating equitable societies that contribute to poverty reduction and improvements in the health, education and well-being of girls and boys [2,3].

Despite many efforts to promote gender equality, the fifth goal of the Sustainable Development Goals (SDG 5) on gender equality is not expected to be achieved by 2030 [4]. This shows that there are still challenges in embedding gender equality in various aspects of life, including in education. One way to promote gender equality is through equitable representation in textbooks, which are a key resource in student learning [5].

Textbooks play an important part in molding students' perceptions of gender, as gender representations in these books are often influenced by cultural and social norms [6]. Previous research suggests that textbooks can strengthen or challenge existing gender stereotypes [7,8]. However, many textbooks still reinforce stereotypes by separating domestic and professional roles based on gender, where men are more often depicted in dominant roles [9,10]. Meanwhile, women are portrayed as more passive and generally associated with domestic roles [11,12]. These gender stereotypes and gender inequalities are represented in books through gender discriminatory language, images, content and illustrations in school textbooks [13]. In fact, the representation of both genders in textbooks should be equal. This equality is reflected in the balanced appearance of both genders, the non-association of the abilities and opportunities of both genders based on stereotypes, and the equal opportunities of both genders, both in the domestic and professional spheres and public spaces [14]. Therefore, it is important to analyze how textbooks represent gender to ensure that educational materials support equality values.

In Indonesia, German as one of foreign languages is taught in many high schools, and one of the most frequently used books is Deutsch echt einfach A1.2. This book is designed to help students understand German in an interesting and relevant way. Although it has been claimed suitable to be used as an enrichment book by the Curriculum and Book Center, Ministry of Education and Culture of Indonesia (*Pusat Kurikulum dan Perbukuan Kementerian Pendidikan dan Kebudayaan Indonesia*), it is important to evaluate the extent to which this book reflects gender equality in the portrayal of characters and daily activities. The Deutsch echt einfach A1.2 book was chosen as the focus of this study for several reasons, which are (1) it is one of the most recent and widely used textbooks in Indonesia; (2) it includes gender themes in texts, visuals, and narratives; (3) its content comes from various credible sources, both print and online; and (4) it was compiled by professionals in the field of language education.

Research on gender representation in foreign language textbooks in Indonesia is still very limited, especially in the context of German. Although research in other countries shows that textbooks have a significant impact on students' views on gender roles [15], similar studies are still rare in Indonesia. Considering the importance of foreign languages in shaping students' insights and attitudes, the analysis of gender representation in Deutsch echt einfach A1.2 books is intended to fill this void.

This study aims to explore gender representation in Deutsch echt einfach A1.2 book, by formulating the main question, which are, how is gender representation in daily activities in Deutsch echt einfach A1.2 book? and is there gender equality in the depiction of domestic and professional activities? Thus, this research is expected to provide insight into how this book depicts gender equality in daily activities.

Given the important role of textbooks in shaping students' views and identities, especially regarding gender representation, an analysis of the Deutsch echt einfach A1.2 book can provide insight into textbook analysis and gender representation in it. This book, as one of the main sources of German language learning in Indonesia, needs to be evaluated whether it is able to reflect gender equality fairly in depicting the roles of men and women, both in domestic and professional activities. The research is expected to contribute to filling the gap in the study of gender representation in foreign language textbooks in Indonesia, with a focus on the Deutsch echt einfach A1.2 book. By identifying and evaluating how gender is represented, this research is expected to make an important contribution to the development of more inclusive textbooks, while supporting the achievement of gender equality goals in education.

2. research method

This study uses a qualitative content analysis method to see how gender is portrayed in the Deutsch echt einfach A1.2 book. This method was chosen to help investigate the social context behind the content in the textbook, how both genders are represented in daily activities, rather than just counting the number or percentage of gender representation [16].

The object of this study is the book Deutsch echt einfach A1.2[17], which is used for learning German as foreign language at beginner level in Indonesia. The book is published in Indonesia under the license of Ernst Klett Sprachen GmbH, one of the publishers in Germany, located in Stuttgart. The book consists of 136 pages and is aimed at teenage learners who do not have a basic knowledge of German.

In this study, the analysis was conducted in two stages adapted from Para's (2024) research consisting of 1) character gender identification and 2) gender representation. In the first stage, the book was analyzed thoroughly to identify the characters that appear in each chapter. Each character was categorized based on gender as well as the activities they performed, both in domestic and professional or work contexts. Furthermore, the data was recorded to determine the frequency of each gender's involvement. In the second stage, after the character data was collected, an in-depth analysis was conducted to identify the patterns of gender representation that emerged. In other words, how men and women are portrayed in various activities to determine whether there is equality in the roles in which they are involved. The purpose of this stage is to assess whether the book shows gender equality or whether there are still strong stereotypes.

Data coding will be done based on the information found in the text book. The coding process includes 1) character and activity, each character identified will be coded based on the activity they perform, whether it is in the domestic realm (such as cooking or taking care of the house) or in the

professional realm (such as working in an office or teaching) and 2) gender representation, analyzing how male and female characters are portrayed. Do they engage in traditional gendered activities, or are there more balanced roles between the two?

The data analysis focused more qualitatively than quantitatively, to dig deeper into how home and work activities portray gender equality, as well as identifying whether there are still visible stereotypes. This is in line with Richardson (1983) cited in Para's (2024) research, who emphasizes that although men and women may appear balanced in numbers, their characterization often still follows traditional patterns. Therefore, a qualitative analysis was applied to get a fuller depiction.

3. result and discussion

The result shows that Deutsch echt einfach A1.2 textbook describes gender equality in daily activities, both domestically and professionally, quite clearly. The gender equality is seen in the representation of men and women involved in various activities without a clear separation of work based on gender.

Table 1 shows the findings in 'Lektion 8' (chapter 8) of Deutsch echt einfach A1.2 book. In 'Lektion 8: Wo denn?' there are pictures that show various activities carried out by male and female characters.

Table 1. Gender Portrayal of Men and Women in Activities in 'Lektion 8: Wo denn?'

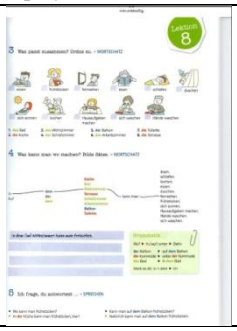
Display in the Text Book	Page	Description
	35	The display in the text book shows the activities done by men are: eating, watching TV, sleeping, cooking, washing hands, while women have breakfast, reading, bathing, sunbathing, making homework, and washing their faces.

Based on Table 1, it can be seen that the activities performed by men include eating, watching TV, sleeping, cooking, and washing hands. On the other hand, women's activities include breakfast, reading, bathing, sunbathing, making homework, and washing their faces. From this data, it can be seen that men are also involved in domestic activities such as cooking, which has often been associated with women. This shows that the book tries to present a more balanced view of the division of tasks in the household, where there is no strong stereotyping of the sexes in doing certain activities.

Table 2 shows the findings in 'Lektion 10: Wie läuft dein Tag ab?' (chapter 10) of Deutsch echt einfach A1.2 book located on page 64. In 'Lektion 10', there are 9 pictures that show various activities performed by male and female characters in their daily activities and schedules.

Based on Table 2, furthermore, in 'Lektion 10: Wie läuft dein Tag ab?', the activities depicted show the roles of men and women in the professional environment. The male gender is represented by the characters Herr Neumann (Mr. Neumann) and Jakob, while the female gender is represented by the character Frau Schulz (Mrs. Schulz). Herr Neumann's activities include going to work, sleeping, showering, reading the newspaper, eating dinner, and working, while Frau Schulz's activities include waking up, getting dressed, going to the office, working, eating lunch, calling the boss, preparing food, and showering. In this representation, it can be seen that both genders engage in equal activities in the work environment.

Table 2. Gender Portrayal of Men and Women in Activities in 'Lektion 10: Wie läuft dein Tag ab?'

Display in the Text Book	Page	Description
	64	Herr Neumann's activities are going to work, sleeping, showering, reading the newspaper, eating dinner and working. Frau Schulz's activities are getting up, getting dressed, going to the office, working, having lunch, calling the boss, preparing meals and showering. Jakob's activities are breakfast, going to school by bus, arriving at school, doing math homework, arriving home, watching TV, meeting Facebook friends, and sleeping.

Based on Table 2, furthermore, in 'Lektion 10: Wie läuft dein Tag ab?', the activities depicted show the roles of men and women in the professional environment. The male gender is represented by the characters Herr Neumann (Mr. Neumann) and Jakob, while the female gender is represented by the character Frau Schulz (Mrs. Schulz). Herr Neumann's activities include going to work, sleeping, showering, reading the newspaper, eating dinner, and working, while Frau Schulz's activities include waking up, getting dressed, going to the office, working, eating lunch, calling the boss, preparing food, and showering. In this representation, it can be seen that both genders engage in equal activities in the work environment.

The result of this analysis shows that the text book Deutsch echt einfach A1.2 has tried to present the depiction of gender equality. The depiction of gender equality is reflected in each character representing gender involved in both domestic and professional activities. In the analysis, the character Frau Schulz, who represents women, is described as having activities such as going to work and communicating with the leadership. Frau Schulz's activity orientation is not limited to domestic activities such as cooking, cleaning, and preparing food. Women are not always associated with domestic roles only. The female gender is shown to have the same opportunities as the male gender in making contributions such as working outside the home, and taking part in following the professional world. Meanwhile, the male character as shown in 'Lektion 8' of Deutsch echt einfach A1.2 is shown as a figure who is not like a stereotype, dominating to work and play a role in the public sphere, but is depicted as a figure who can play an active role in the domestic sphere, such as cooking and taking care of the house. There is no visible dominance of the male gender in professional activities and outside the home. This finding confirms that the portrayal of women and men in Deutsch echt einfach A1.2 textbooks is equal and contradicts previous findings which suggest that men are more often portrayed in dominant roles [9,10]. In contrast, previous research indicates that women are often portrayed as more passive and generally associated with domestic roles [11,12]. These gender stereotypes and inequalities can be evident in various aspects of books, including language, images, content, and illustrations that contain gender discrimination in school textbooks [13]. Thus, Deutsch echt einfach A1.2 can be considered to have made efforts to present a more balanced and fair picture of gender, which can contribute to the reduction of harmful stereotypes in language learning. The depiction of women's and men's activities in textbooks is often influenced by bias and stereotypes, as expressed by Michael (1986) in a quote submitted by Nisak et al. (2020). However, Deutsch echt einfach A1.2 textbook has shown equality in the representation of both genders, where their appearances are balanced and not tied to stereotypes that associate abilities and opportunities based on gender. This equality is reflected not only in the activities depicted, but also in the opportunities given to both genders to contribute in the professional world, for example as depicted in Deutsch echt einfach A1.2 where Frau Schulz works and is in charge of communicating with her boss.

Although there is equality in activity involvement between women and men, there are indications that Frau Schulz has an additional role as a food provider. In 'Lektion 10', Frau Schulz is depicted not only working, but also preparing meals at home. It is feared that this depiction may reflect stereotypical expectations of domestic work that are often associated with women. The results of this analysis show that, although the textbook attempts to portray gender equality in everyday activities, there are still elements that indicate attachment to traditional roles. This is in line with the findings of Richardson (1983), as cited by Para (2024), who emphasizes that although men and women may appear to be balanced in numbers, their characterization often still follows existing traditional patterns. On the other

hand, the book also presents male characters in 'Lektion 8' who are involved in domestic activities, such as cooking, thus creating a balance. Thus, the Deutsch echt einfach A1.2 book reflects an attempt to deconstruct gender stereotypes, but still requires further attention to ensure that the representation is not just balanced in numbers, but also in the characterization and roles played by each gender.

4. Conclusion

This study has explored gender representation in Deutsch echt einfach A1.2 with a focus on the main question of how gender equality is portrayed in daily activities and the roles played by men and women in domestic and professional contexts. The analysis shows that the book has attempted to present a balanced gender representation, where both men and women are involved in various activities without any compartmentalization based on gender stereotypes.

Overall, Deutsch echt einfach A1.2 has attempted to present a fairer picture of gender. Although the book successfully deconstructs some gender stereotypes, it is important to continue to pay attention to the representation of characters and roles played by each gender. Further efforts are needed to ensure that gender equality is not only seen in numbers, but also in characterizations that are free from harmful stereotypes. This research is expected to contribute to the understanding of how language textbooks can influence students' views on gender and social roles as well as to recommendations for producing gender-equitable educational materials from publishers in Indonesia.

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EVALUATION OF ONLINE TUTORIAL LEARNING ASSISTANCE SERVICES: ACCESSIBILITY AND FLEXIBILITY

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Abstract

Universitas Terbuka is a higher education institution in Indonesia that implements a distance learning system to meet the needs of flexible and accessible education for students. The quality of online tutorials in the previous semester received a lot of input from students, starting from the quality of tutorial materials and the speed of tutors in providing feedback. This study aims to analyze student responses while participating in online tutorials. The data collection technique used is a questionnaire. The data analysis used is descriptive statistics. The sample in this study is students who take courses in the Educational Technology Area. The results of the study show that online tutorials get good responses from students because they can be accessed easily and can help students learn flexibly.

Keywords: Learning assistance, distance education, online tutorials

1. Introduction

Online tutorials are a learning assistance service provided by the Universitas Terbuka to students to help students learn independently. This service has the highest number of students when compared to other learning support services such as Course Assignments and Face-to-Face Tutorials. [1]. Online tutorials have an assessment weight that has a 30% contribution to the final grade of the course, this is the reason why online tutorials are most in demand by students. The final score of the course was obtained from the online tutorial score of 30% and the final semester exam score of 70%. Considering the large number of students who choose this tutorial service, tutors and study program managers need to pay special attention to preparing online tutorial classes. Tutors who create tutorial classes need to follow up on the results of the evaluation of tutorial activities that contain student feedback during the tutorial activities.

In this digital era, online tutorials are learning assistance services provided by universities to maintain the quality of education and help students in learning. [2]. Online tutorials are very helpful for learners to learn independently. The results of the research conducted by [3] States that people who are used to face-to-face learning say online tutorials can help them achieve their learning goals. Online tutorials are packaged in the form of electronic learning known as e-learning. The success of online tutorial learning depends on many factors such as ease of access, materials, assessments, and learning methods used. [4], [5].

Learning through online tutorials aims to provide learning flexibility to peserta didik. Melalui Online tutorials, students learn flexibly. This is suitable for students at distance universities where many of them work. Students who study at distance universities are required to have high motivation and discipline to successfully achieve the expected learning goals [6], [7]. Online tutorial learning is the same as face-to-face learning, where students are required to attend each meeting and get assignments such as face-to-face learning. However, attendance in online tutorials is done online and given a certain time span so that students can attend all the time is still available.

Online tutorial classes contain learning components such as face-to-face, where there are classes, tutors, tutorial materials, and assessments. Students can also communicate with tutors if they experience difficulties through the chat feature provided in the tutorial class. Students can also collaborate with their peers in one class. The mandatory requirement needed to access online tutorials is to have a device such as a cellphone or laptop that is connected to the internet. Students who learn through online tutorials are advised to master and have the ability to use the technology and online learning platforms used [8]. The use of this technology and platform will greatly determine the success of learning.

The results of the research conducted by [9] stated that blended learning is more effective than traditional learning that only learns face-to-face. Other research also recommends online learning because it can provide a good learning experience. Online learning is also recommended [10]. Hybrid

learning can also improve students' critical thinking skills [11]. However, research on fully online learning is rarely found, especially in jenjang open and long-range high spaces. Therefore, this research is important to contribute thinking in distance education. This study aims to analyze the responses of Universitas Terbuka students in participating in online tutorials.

2. Method

This type of research is a quantitative research that aims to provide an overview of online tutorial activities. The sample of this study is 37 students of the S-1 Educational Technology study program who take courses in the Educational Technology Area in the even semester of 2024. The data collection technique is carried out by asking students to fill out a questionnaire, this questionnaire is given during an online tutorial. This questionnaire contains student responses to online tutorial activities using the Likert scale. The students' responses were analyzed using descriptive statistics. The instruments used in this study can be seen in Table 1.

Table 1. Student response instrument to online tutorial activities

No	Statement	Number of items
1	Clarity of learning objectives in the tutorial	1
2	Use of videos in tutorials	3
3	Tutorial discussion activities can motivate students	2
4	Tutor activity in tutorials	4
5	Tutor responsibilities in conducting assessments	3

3. Results and Discussion

The response of Universitas Terbuka students to online tutorial services needs to receive serious attention from tutors and study program managers. Every student who takes part in the online tutorial activity is required to fill out the online tutorial activity evaluation questionnaire given at the seventh meeting. The aspects asked to students are as seen in Table 1. Student responses to online tutorial activities can be seen in Table 2.

Table 2 shows that the implementation of the online tutorial is well done. The clarity of the tutor in conveying the learning objectives received a good response by students. The delivery of learning objectives is important because (1) can increase learning focus, (2) encourage students to learn independently, (3) increase motivation, and so on. This is in line with research conducted by [12] that clear learning objectives will provide a message of what needs to be achieved by students in learning. The results of this study illustrate that learning objectives are very important, because the selection of learning materials, learning methods must be designed based on the learning objectives that have been formulated. Tutors can communicate learning objectives at the beginning of the session or by including them in the material shared in the tutorial.

Table 2. Student responses to online tutorials

No	Statement	Average	Conclusion
1	Clarity of learning objectives in the tutorial	85,75	Good
2	Use of videos in tutorials	85,50	Good
3	Tutorial discussion activities can motivate students	84,75	Good
4	Tutor activity in tutorials	86,25	Good
5	Tutor responsibilities in conducting assessments	85,75	Good

The selection of material in online tutorials plays a very important role in the success of learning. The results of this study show that the use of learning videos is very popular with students. This is in line with research conducted by [13], [14] which states that the use of videos can make the learning process more dynamic and interesting, so that learning does not feel monotonous. The use of learning videos is suitable for students who study remotely, because learning videos can be accessed anytime and anywhere by students [15]. Learning videos need to be made in accordance with the learning objectives that have been formulated.

In addition to learning objectives and the selection of learning materials, the speed of tutors in providing feedback is very important in online tutorial activities, this is to aim to increase students'

enthusiasm in learning. The results of this study are different from the research conducted by [16] shows that tutors have not been optimal in providing online tutorials. This difference is caused by the difference in the subject of the course and study program studied. In contrast, another study by [17] stated that students are satisfied with the online tutorial service at the Universitas Terbuka, and online tutorials are the right medium for distance education because they can be accessed flexibly. These findings are in line with research [18] which revealed that the discussion activities in the online tutorial went quite well.

Online tutorials are effective for distance learning when they are designed with the right and complete learning principles. Starting from the content, ease of access, clarity of instructions for working on questions, and the speed of tutors in responding to student questions. Since the Covid 19 pandemic began to be implemented in Indonesia, there are many media that educators can use to carry out distance learning, one of which is online tutorials. The online tutorials used by the Universitas Terbuka are appropriate because the results of research conducted [19], [20] show that students are more adaptable to distance learning compared to students at the primary and secondary education levels. This is because of the ability of higher education students to be able to manage time independently, master technology, and utilize digital resources in the learning process.

4. Conclusion

Based on the results of the research and discussion that has been presented, it can be concluded that the use of videos, discussion topics, the activeness of tutors, and the speed of tutors in conducting assessments get good responses from students. Therefore, online tutorials can be said to be the right learning support service to help students because they can be easily accessed that can help students learn flexibly.

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Overcoming Barriers in Teacher Professional Education: Analyzing the Challenges of in-Service Training

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Abstract

This study aims to analyze the difficulty levels in the implementation of learning in the in-service Teacher Professional Education Programme (PPG Daljab) at Universitas Negeri Yogyakarta for the academic year 2023/2024. The research explores aspects such as material deepening, development of learning tools, practical field experiences, comprehensive tests, performance evaluations, and knowledge assessments. The subjects of this study were 2,078 PPG Daljab Class III Category I students, of which 1,135 were randomly sampled using a mixed-method approach. Data was collected through online surveys, and a combination of quantitative and qualitative methods was used for analysis. The study reveals that while the majority of respondents found material deepening relatively easy, around 28% faced difficulties, particularly in integrating technology into teaching (TPACK). The biggest challenges identified were designing accurate assessment instruments and reflecting critically. Practical fieldwork was deemed straightforward by 62.83% of respondents, though 28% reported difficulties, especially in creating learning video recordings. Comprehensive, performance, and knowledge tests posed significant challenges to about 30% of respondents. The study suggests that addressing these difficulties will require improved teacher training programs, particularly in integrating pedagogy, technology, and content, as well as more robust support from experienced mentors.

Keywords: PPG Daljab, difficulty levels, teacher training, TPACK, assessment, learning tools, field experience.

1. Introduction

The rapid evolution of various aspects of life, including the education sector, poses a significant challenge to the quality of education provided. In Indonesia, the Teacher Professional Education Programme (Pendidikan Profesi Guru or PPG) is a critical initiative aimed at improving the proficiency and quality of teachers to meet these growing demands. The government, through legislation such as the 2005 Teacher and Lecturer Law and the 2008 Teacher Certification Regulation, has laid the foundation for a national effort to enhance teacher competencies, requiring teachers to obtain a bachelor's degree and pass a certification program.

Professional teachers, as envisioned in Indonesian regulations, must possess a combination of academic qualifications, teaching certificates, physical and mental health, and the ability to achieve national educational goals. The government's effort to foster this professionalism has been facilitated through the PPG, which consists of both pre-service and in-service teacher training programs. The in-service program (PPG Dalam Jabatan or PPG Daljab) is designed to further develop the skills of teachers who are already active in their teaching roles. This program, offered by accredited institutions, aims to elevate teaching standards and ensure that teachers are not only knowledgeable but also capable of applying pedagogical skills in real classroom settings. PPG includes both offline and online components. Initially conducted offline, it has transitioned to online formats using Moodle-based e-learning platforms and SPADA Brightspace, which have been positively received by participants for their effectiveness and flexibility (Arifudin & Abidin, 2020, Yuniawatika, 2022).

As the education system adapts to technological advancements and new learning methodologies, PPG Daljab has incorporated online learning into its curriculum. The online mode of delivery offers flexibility in terms of time and place, making it accessible to teachers across Indonesia. However, the transition to online learning also introduces a new set of challenges, particularly for those in remote areas with limited access to stable internet connections or technology. The complexities of navigating digital platforms, coupled with the existing teaching workloads, further complicate the learning experience for many in-service teachers.

The PPG Daljab curriculum covers key areas of teaching practice, including the deepening of subject matter knowledge, the development of learning tools, and field-based teaching practice (Praktik Pengalaman Lapangan or PPL). The PPG curriculum focuses on Pedagogical Knowledge (PK), Content

Knowledge (CK), and Technological Knowledge (TK. However, there is a need for improvement in CK and TK, as indicated by the relatively low scores in these areas (Suyanto &Wibowo, 2018). Additionally, participants must undergo comprehensive testing that includes performance evaluations and knowledge assessments. Teachers participating in PPG must pass the UKMPPG, which includes the Knowledge Test (UP) and Performance Test (UKIN. The UKIN test covers eight subjects, and the passing rate in 2021-2022 was 99.56% (Mulyana et. al. (2023). These components are designed to test not only the theoretical knowledge of the participants but also their practical teaching abilities, particularly their competence in integrating modern pedagogical techniques with subject content and technology (as encapsulated by the TPACK framework—Technology, Pedagogy, and Content Knowledge).

Despite the benefits of the PPG Daljab program, there are numerous reports of teachers encountering significant challenges during the course. Teachers face obstacles such as scheduling conflicts, high costs, and lack of employer support. Despite these challenges, teachers remain committed to continuous professional learning (Mu'in et. al, 2018). A key issue identified is the difficulty in balancing teaching responsibilities with the demands of the PPG program. Teachers often find it hard to allocate sufficient time to engage with the learning materials, particularly those related to technological integration, which many are unfamiliar with. Furthermore, the program's heavy reliance on online platforms exacerbates difficulties for teachers from rural areas where internet infrastructure is inadequate.

In March 2024, Universitas Negeri Yogyakarta conducted an evaluation of the PPG Daljab Class III Category I students. The results highlighted several obstacles faced by the participants, including insufficient mastery of basic IT skills, unstable internet connectivity, and difficulty in understanding certain course materials. The challenges were most pronounced in the areas of material deepening, developing learning tools, and practical field experience. Moreover, similar situation was found the result of Wiradimadja et al study (2021) that the students are not familiar with the LMS used, which cause most of them to experience technical problems in the process of the digital learning. This condition requires the class administrators to guide them in using the LMS. This indicates a need for more targeted interventions, particularly in providing technical support and revising course materials to better accommodate the varying levels of technological proficiency among the teachers.

Another significant challenge identified was the pressure of meeting the demands of comprehensive and performance-based testing. Teachers reported that while they had a solid grasp of subject content, they struggled with the practical application of this knowledge in teaching scenarios, especially when required to integrate TPACK elements. For example, the process of creating and editing learning videos posed a significant challenge for many participants. This not only indicates a gap in technical skills but also highlights the broader issue of limited practical experience in applying theoretical knowledge to real-world classroom settings.

Given the complexity of these challenges, this research aims to provide a comprehensive analysis of the difficulties faced by PPG Daljab students at Universitas Negeri Yogyakarta. By understanding the specific areas where teachers encounter obstacles, this study hopes to inform the development of more effective support systems and training programs. Enhanced mentoring, more focused technical training, and revisions to the curriculum that take into account the realities of online learning in a diverse and geographically dispersed teacher population are critical for the success of PPG Daljab.

The findings of this research are expected to contribute to ongoing discussions about the best strategies for improving teacher training in Indonesia. Moreover, they will provide valuable insights into how online education can be effectively integrated into teacher professional development programs, particularly in contexts where access to technology and the internet remains uneven. Ultimately, addressing these challenges will not only improve the quality of teacher training but will also contribute to the broader goal of elevating educational standards across Indonesia.

2. Method

This study employs a mixed-method approach, combining both quantitative and qualitative data to analyze the difficulties faced by students of the in-service Teacher Professional Education Programme (PPG Daljab) at Universitas Negeri Yogyakarta. The subjects of this research were 2,078 PPG Daljab Class III Category I students for the academic year 2023/2024. From this population, 1,135 students were selected using simple random sampling. Data collection was conducted through online

surveys, distributed via Google Forms to participant groups on WhatsApp. The survey included closed and open-ended questions, allowing for both statistical analysis and thematic exploration.

Quantitative data were analyzed using descriptive statistics, with the results presented in percentage distributions to highlight the levels of difficulty experienced in various aspects of the program. Thematic analysis was applied to qualitative responses to identify recurring challenges and themes related to the implementation of learning.

The primary areas of focus for the survey included the deepening of subject matter knowledge, the development of learning tools, practical field experiences, comprehensive testing, performance evaluations, and knowledge assessments. This combination of methods provided a comprehensive understanding of the difficulties encountered by PPG Daljab students, enabling the researchers to make informed recommendations for program improvements.

3. Findings And Discussions

Challenges Faced in the PPG Daljab Program

This study evaluates the difficulties encountered by in-service teachers enrolled in the Professional Teacher Education Program (PPG Daljab) at Universitas Negeri Yogyakarta for the academic year 2023/2024. The research focuses on three key areas: material deepening, development of teaching tools, and practical field experiences, with additional emphasis on comprehensive tests, performance evaluations, and knowledge assessments. Each of these components revealed unique challenges for the participants, some of which were exacerbated by technological constraints and the demands of online learning.

Material Deepening

In the material deepening aspect, 28% of the respondents reported difficulties, particularly in mastering advanced concepts and integrating Technology, Pedagogy, and Content Knowledge (TPACK) into their lessons. The study shows that while the majority of participants felt confident in their subject knowledge, challenges arose when they had to apply this knowledge within modern pedagogical frameworks. Specifically, the integration of technology into lesson plans, which requires a solid understanding of TPACK, was highlighted as a major issue. This indicates that although many teachers are comfortable with their subject matter, they struggle to incorporate digital tools into their teaching in a meaningful way.

One of the most cited difficulties in the material deepening phase is time management. Many participants indicated that they were overwhelmed by having to study advanced material while also balancing their teaching responsibilities. This issue was particularly prevalent among teachers from rural areas, where technological infrastructure was insufficient to support online learning. As such, unstable internet connections and limited access to digital resources further complicated the learning process for these educators.

Development of Learning Tools

The development of learning tools presented another significant challenge, with over 23% of the participants experiencing difficulties. Teachers found it particularly hard to design innovative learning tools that aligned with the curriculum and addressed the specific needs of their students. Creating accurate assessment instruments and implementing critical reflection were two areas where many teachers struggled. These aspects require not only theoretical knowledge but also practical skills in instructional design, which some participants lacked.

Teachers also reported that developing tools for assessing student learning—both formative and summative—was a complex process. More than 40% of the respondents noted difficulties in designing assessment instruments that could measure higher-order thinking skills, such as critical thinking and problem-solving, which are crucial in the modern classroom. This finding suggests a gap in the practical training provided to teachers, particularly in the areas of assessment design and instructional planning.

Practical Field Experience

For the practical field experience (PPL), 62.83% of the participants found the process manageable, though 28% still reported challenges. One of the main issues involved the recording and editing of teaching sessions. Participants were required to create 20-30 minute videos demonstrating their teaching methods, which many found difficult. Although recording the lessons was relatively easy for most, the technical aspects of editing these videos proved to be a significant barrier.

This challenge highlights a broader issue with the technological proficiency of many in-service teachers. While most participants were comfortable delivering content in a classroom setting, they struggled with the technical skills required for digital education, such as video editing and the use of learning management systems (LMS). These skills are increasingly important in the modern education landscape, particularly as remote and hybrid learning models become more prevalent.

Comprehensive Testing, Performance, and Knowledge Assessments

Approximately 30% of the participants reported difficulties with comprehensive testing, performance evaluations, and knowledge assessments. These components are designed to measure both theoretical knowledge and practical teaching ability, which together form a holistic evaluation of teacher competency. However, the high failure rate in these tests suggests that many teachers lack the necessary skills to perform effectively under these assessment conditions.

For example, the performance evaluation requires teachers to demonstrate their ability to integrate pedagogy, content, and technology in a real-world teaching scenario. Many participants found this challenging, particularly when asked to reflect critically on their teaching practices and make adjustments based on student feedback. The study found that 42.6% of the participants struggled with this aspect, especially in the practical implementation of reflective teaching.

The knowledge assessment, while focused on theoretical understanding, also posed challenges for about 30% of the participants. This highlights the need for more comprehensive support systems that can help teachers better prepare for these evaluations, particularly through targeted training and mentorship programs.

Technological Barriers and Online Learning

Technological issues were a recurring theme throughout the study. Many participants from rural areas reported problems with internet connectivity, which hindered their ability to engage fully with the online components of the PPG Daljab program. Moreover, a lack of digital literacy among some teachers compounded these difficulties. These technological challenges not only affected the participants' ability to complete their coursework but also limited their interaction with instructors and peers, thereby reducing the overall quality of their learning experience.

The shift to online learning in the PPG Daljab program was intended to make the program more accessible, particularly for teachers in remote areas. However, the results of this study suggest that the transition to online education has been far from seamless. Many teachers lack the necessary infrastructure and skills to engage effectively with digital learning platforms. This suggests a need for more robust training in digital literacy, as well as greater investment in internet infrastructure, particularly in underserved areas.

Recommendations for Improvement

Based on the findings of this study, several recommendations can be made to improve the implementation of the PPG Daljab program:

Enhanced Training on TPACK: Given the significant challenges related to the integration of technology in teaching, it is recommended that the program includes more comprehensive training on TPACK. This would help teachers feel more confident in using digital tools to enhance their teaching.

Practical Workshops on Instructional Design: Many teachers expressed difficulties in creating innovative learning tools and assessment instruments. Providing workshops that focus on practical skills in instructional design would help address these challenges.

Improved Technological Support: Given the widespread issues with digital literacy and internet access, it is crucial to offer more technical support to teachers, particularly those in rural areas. This could include both infrastructural improvements (e.g., better internet access) and training in digital tools and platforms.

Mentorship Programs: Establishing a mentorship program where more experienced teachers can guide less experienced participants through the complexities of the PPG Daljab program would be highly beneficial. This would provide participants with practical insights and support as they navigate the challenges of the program.

4. Conclusion

The PPG Daljab program plays a crucial role in improving the quality of education in Indonesia by enhancing the skills and competencies of in-service teachers. However, as this study shows, the program is not without its challenges. Participants face significant difficulties in areas such as technological integration, instructional design, and practical fieldwork, many of which are exacerbated by the limitations of online learning.

Addressing these challenges will require a multifaceted approach, including better technological support, enhanced training, and more robust mentorship programs. By making these improvements, the PPG Daljab program can more effectively equip teachers with the skills they need to succeed in the modern classroom, ultimately contributing to the broader goal of improving education across Indonesia.

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Implementation of integrated STEAM (Science, Technology, Engeering, Art and Mathematics) Approach in Science Learning: *A Literature Review*

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Abstract

Twenty-first century skills can be established by STEAM (Science, Technology, Engineering, Art and Mathematics) approach. This paper aims to identify and review research result that implementation the STEAM education in science learning. This study is a systematic literature review by analyzing study results in articles form that have been published in the last 5 years (2019-2024) with the technique of identifying and analyzing articles. The results of review study are that experiment method research dominates with subjects of research used at primary school levels. The research variables that are widely measured are critical thinking skill, learning outcomes and students' creativity and variables research that have not been measured are analytical thinking and problem-solving aspect, so it can be used as recommendations for further research on implementing STEAM in science learning. For further research, it can cover more aspects and articles to be analyzed and can utilize a longer period in conducting literature studies in the future.

Keywords: science learning, STEAM, literature review

1. Introduction

The advancement of science and technology necessitates that educational activities prepare students for the needs of the twenty-first century and allow them to compete in it [1]. In the current era of digitalization, the use of technology in learning as a medium is often used as a utilization in learning activities [2]. Integration of five disciplines correlated to Science, Technology, Engineering, Art, and Mathematics (STEAM) [3].

STEAM education is combination of science, technology, engineering, art and mathematics that develops students' skills during learning activities. Collaboration learning model and STEAM approach be able to optimizes students' concept understanding [4]. Teachers as facilitators so that students can explore their skills in class and apply concepts understanding by STEAM and to develop students' 21st century skills [5].

Using technology advancements, implementing STEAM to train students' soft skills related to science learning. Engineering, art, and mathematics are integrated through learning activity experiences. Soft skills that can be trained are creative thinking skills [6], critical thinking [7], high-level thinking, science process skills [8], and many other 21st century skills [9]. STEAM is development science from the Science, Technology, Engineering, and Mathematics (STEM) educationArt mining, which has a broad definition in the realm of art, is a supplement to STEM [10]. STEAM presents phenomena in daily or problems that are contextual in nature that can develop students' skills through works produced in the art phase [11]. STEAM learning can also train students' skills in Collaboration, Cooperation, and communication because the projects given to students are worked on in groups so that students have a sense of responsibility for themselves and their teams [12]. In addition, students can also go through the phase of constructing conceptual understanding to solve problems presented by the teacher [13].

The purpose of implementing STEAM is to reflect classroom learning that focuses on educational theory into practices supported by STEAM aspects [14]. Lack of information concerning procedures implementation of STEAM and STEAM integration in learning so that it is still minimally applied to science learning in Indonesia [15].

Merdeka Curriculum answer to struggle for human resources globally in the 21st century, which emphasizes freedom and creative thinking [16]. This is needed to plan learning strategies with a learning

approach to achieve certain instructional objectives [17] which refers to philosophical ideas and instructional techniques associated with teaching and learning strategies [18].

Implementation of Merdeka Curriculum which is integrated with the STEAM be able to develop collaboration skills, communication skills, critical thinking skills and students' creativity [19]. Integration concepts, mathematics and developing and optimizing soft skills and learning activities are meaningful in STEAM education [20]. In addition, STEAM has been applied to science learning and can also motivate students to understand concepts and integrate them into a creation in project learning.

Several research results related to STEAM in science learning can construct students' spatial intelligence [21], develop students' creative skills, students are actively involved in learning activities and prepare students for the next level of education [22]. However, currently some teachers have difficulty in implementing STEAM because teachers do not understand integrating STEAM procedure into science learning and teachers need more information related to STEAM [23]. Therefore, it is important to conduct study on STEAM education to provide information to teachers that STEAM approach has a positive impact on education, especially student progress [24]. The benefits of implementing STEAM in science learning can promote soft skills, participation, motivation, and creativity, as well as readiness for future challenges and the improvement of memory and comprehension [25].

The purpose of this study is to identify and review research result that implementation the STEAM education in science learning. This study examines the types of research, research subjects and measured variables.

2. Method

This study utilized qualitative with a focus on collection documentary studies and writing analysis, image, and electronic documents in accordance with the objectives and focus on the problem [26,27]. A qualitative approach in a systematic review is used to summarize the results of descriptive studies [28].

The subjects of this study were the results of research on STEAM implementing in science learning that has been published in journals over the past 5 years (2019-2024). The procedures in this study: (1) identification of purpose, (2) literature review, (3) screening, (4) literature mapping, (5) quality assessment, (6) synthesis of findings, and (7) conclusions [29].

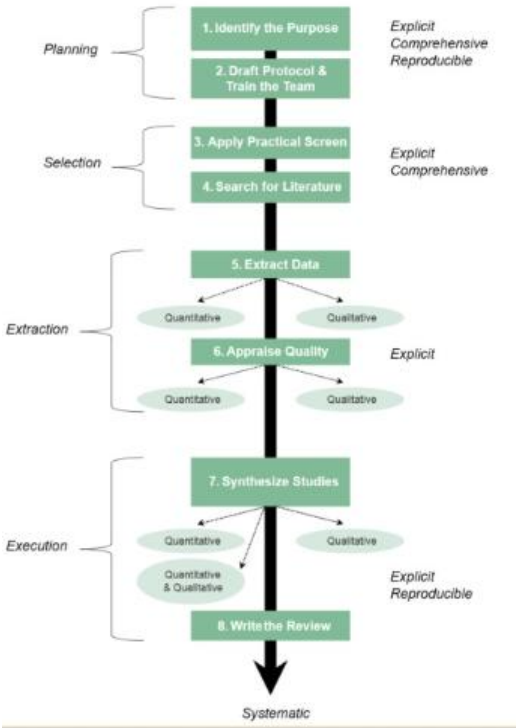


Figure 1. Research Flow

3. Results and Discussion

From a systematic literature review related to implementation of STEAM in science learning, researchers found 29 empirical studies that met the criteria in this study.

Table 1. literature review method

Research Method	Frequency
Experiment	12
Research and development	8
Classroom Action Research	4
Mix method	1
descriptive qualitative	4

Table 1 shows the results of review for research results related to the implementation of STEAM in science learning, obtaining 29 articles both nationally and internationally. Research that applied STEAM education, for research type that dominates experiments by testing the effectiveness and implementation of STEAM on students [30].

The research variables measured are very diverse, students' learning outcomes and affective [31], science process skills and scientific attitudes [32], critical thinking skills (Bradley S. Hughes, 2022); student creativity [33] and other skills. Thus, the implementation of STEAM can have a positive impact on students according to the variables measured in the study.

Table 2. Research Variable

Research Variable	Percentage (%)
Learning achievement	1
Science process skills	12
Critical thinking	18
Communication skill	12
Collaboration	9
Problem solving	1
Creative skills	16
Learning Outcomes	16
Science Literacy	12
Students' Interest in Science	1
Scientific Attitude	1
Students' imagination	1

Research variables that have not been measured using STEAM are students' representation skills and high-level thinking skills in the problem-solving aspect. Science learning requires students to have good problem-solving skills, because they are needed in analyzing contextual science problems in daily. High-level skills can also represent higher educational values, therefore fostering high-level thinking skills in science learning is focus on technology [34]. Students' representation skills in interpreting abstract concepts contextually and Representations in science learning are mathematical, graphic, diagram, verbal and visual representations [35].

The STEAM approach can be integrated with learning models, as in Table 3.

Table 3. learning model analysis results

Learning Model	Percentage (%)
Project Based Learning	34
Ethnoscience	7
Guided Inquiry	10

Table 3 shows various learning models collaboration with STEAM in science learning. The most widely applied learning model is the project-based learning (PjBL) model, with percentage 34%, namely 9 articles. because STEAM contains elements of art, one of art assessments is creativity and

can produce projects that have been assigned to students [36] and STEAM integration with learning models into innovative learning that can be one of references for science learning models. There are 11 articles that do not mention learning model applied and development research.

The collaboration PjBL model with STEAM can promote students' process skills improve students' scientific attitudes, critical thinking skills and students' creativity which influences students' science learning understanding [37].

Based on the results of the studies that have been conducted, STEAM implementation which has an art aspect, namely to train creativity to solve problems and construct concepts that have been understood and create creative and innovative ideas [38]. Integration of art in the STEAM inquires students to design projects and solve problems presented in learning process and combine mathematical equations [39]. The results of another study in integration art in STEAM in making a simple guitar project with the aim of analyzing the relationship between string tension and frequency [40].

Through projects carried out with STEAM, science aspect lies in the process of making projects that apply science concepts [41]. The resources and instruments students utilize to create their projects are the technology component, and the completed projects' outcomes are the engineering component [42]. The results of the project in the engineering aspect are in the form of applied products that have economic value. The art aspect lies in the art of student creativity in making projects [43]. The mathematical component then resides in applying science principles through projects that are balanced with mathematical analysis, enabling students to comprehend and represent mathematical equations in science topics [44].

Findings study, which were based on research subjects in college, high school, junior high school, and elementary school, varied from 20–45 utilizing a single study class to 50–75 samples using experimental and control classes. In the event that the study is a literature review, the samples used are not mentioned.

Four stages of STEAM technique are: inquiring (identifying issues and potential answers), envisioning (imagining things), planning (planning products), and finally creating and testing solutions. The first step in STEAM is to identify problems and simultaneously discover solutions for them. Creating process and refining products of STEAM methodology. According to the study's guiding principles, STEAM method emphasizes process-based learning, collaborative learning environments, problem-solving skills development, and problem-solving through innovation and design. Thus, the idea of student-centered learning remains a part of STEAM method. Nonetheless, a number of factors work together creatively to make learning more focused and purposeful.

STEAM is a 21st century learning model that aims to develop students' soft skills developing technology, engineering, art, and mathematics that are developed holistically through 21st century learning experiences. STEAM is contextual learning, where children are invited to understand in daily life so students are able to explore their skill that students have and produce some creation. Because STEAM is taught in groups to foster the ability to be responsible and solve problems both personally and interpersonally toward learning and are able to construct conceptual understanding, collaboration, cooperation, and communication are applied in learning proces.Conclusion

According to the findings of literature review, experimental research on scientific education primary school levels dominates when it comes to STEAM implementation in science learning. Students' learning outcomes and scientific process skills and attitudes, critical thinking skills, and creativity are the research variables that are measured.

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THEORETICAL CONSTRUCTION OF PERSONAL SOCIAL RESPONSIBILITY IN ECOLOGICAL CITIZENSHIP: AN INTERDISCIPLINARY APPROACH TO SUSTAINABILITY

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Abstract

Responsibility for the environment is part of personal social responsibility, which emphasizes the importance of acting positively to provide benefits to society, including the environment. Responsibility is one of the values that influences ecological citizenship so that individuals can prioritize environmental issues and realize the importance of living sustainably. This research aims to develop a theoretical construct of personal social responsibility in ecological citizenship. The research method used in this study was a literature study by collecting various references in which it is related and relevant to personal social responsibility in ecological citizenship. The research results show that the theoretical construction of personal social responsibility in ecological citizenship includes: Based on several dimensions of the personal social responsibility construct and dimensions of the ecological citizenship construct, the theoretical construction of personal social responsibility in ecological citizenship formulated in this research are as follows: 1) Have an interest in considering environmental issues ; 2) Have an interest in address environmental issues; 3) Have an interest in sustainable behavior in protecting the environment; 4) Have an interest in preserving the environment; 5) Behavioral awareness in considering environmental issues; 6) Behavioral awareness in addressing environmental issues; 7) Awareness of sustainable behavior in protecting the environment; 8) Behavioral awareness in preserving the environment; 9) Taking collective action in considering environmental issues; 10) Taking collective action to address environmental issues; 11) Taking collective action towards sustainable behavior in protecting the environment; 12) Taking collective action to preserve the environment

Keywords: *personal social responsibility, ecological citizenship, theoretical construction*

1. Introduction

Environmental problems must become a global trend that receives intensive attention by every country because it causes high costs in obtaining clean water and dramatic deforestation due to illegal logging [1]. The increasing world population is accompanied by the emergence of environmental problems [2]. In line with the opinion of Titus [3] that world complexity has given rise to a series of problems, one of which is global environmental pollution. Environmental problems are problems that occur in various countries, including Indonesia. Environmental problems cause several changes in conditions and damage such as landslides, coastal erosion, flooding, climate change, air pollution, loss of biodiversity, deforestation, water and waste pollution, depletion of the ozone layer, excessive use of chemicals, inappropriate waste management , water crisis, and unsustainable urbanization [4]; [5]; [6]. Various issues related to the environment can be analyzed from various perspectives, one of which is the individual perspective. Several factors cause environmental problems from an individual perspective, including: 1) low education related to the environment due to a lack of role models and leaders who care about the environment. If education about the environment is not a priority in the educational curriculum, individuals may lack adequate knowledge about the importance of protecting the environment and the impact of human activities on the environment [7]; 2) low public knowledge and awareness in realizing daily actions such as littering or using dangerous materials that can damage the environment [8];[9]; 3) excessive consumerism, which causes waste and environmental pollution to increase [10]; [11]; [12]; [13]; 3) low level of individual responsibility. Environmental damage is the result of irresponsible human actions in utilizing natural resources [14]; [15] stated that low

environmental awareness causes individuals not to pay attention to the impacts that occur from action decisions taken, such as not paying attention to environmental cleanliness, not maintaining environmental security, and not maintaining environmental order.

Environmental responsibility includes personal actions driven by the desire to have a more positive impact on the environment [16]; [17]. Responsibility for the environment is part of personal social responsibility. Personal social responsibility emphasizes the importance of individuals taking action to benefit other people or society as a whole in everyday life [18];[19];[20]. Personal social responsibility towards the environment is a form of citizen involvement which includes individual actions to participate in the public sphere as an effort to provide social benefits to society. One of the values that influences ecological citizenship is responsibility, because by being responsible individuals can prioritize environmental issues and realize the importance of sustainable living [21]; [22]. Research conducted shows that feelings of responsibility can accurately predict ecological behavior coupled with knowledge about the environment and environmental values [23]. Research conducted by developing a scale to measure personal social responsibility (social responsibility for individuals) from economic, legal, ethical, philanthropic and environmental aspects [24]. Based on this urgency, the aim of this research is to develop a theoretical construction of personal social responsibility in ecological citizenship. It is hoped that this theoretical construct can be used to identify tendencies in individual behavior that is environmentally friendly or not, as well as assisting in understanding the factors that influence changes in individual behavior towards environmental awareness.

2. Method

The method used in this study was literature study. Literature study research according is research carried out by researchers by collecting a number of books, magazines related to the problem and research objectives [25] . This study was used to develop a theoretical construct of personal social responsibility in ecological citizenship. The data sources in this study were literature such as journal articles, books and other documents that existed before the researcher conducted the research, which can provide information related to the theoretical construction of personal social responsibility in ecological citizenship.

3. Results and Discussion

Dimensions of the Social Responsibility Construct as an Individual

Personal social responsibility is an individual's daily behavior as a member of society based on the principle of minimizing negative impacts on the social, environmental and economic environment in the long term [26]. Personal social responsibility has long-term effects on the community environment because the actions of the current generation have consequences for future generations [27]. Personal social responsibility is related to the way individuals treat other people, so as members of society each individual is able to shape and influence the dynamics of global society, including the environment [28]. Social responsibility is defined as a "feeling, duty, or obligation" to contribute to the greater good, can be driven by "a duty to act based on moral and prosocial reasons" [29]. Social responsibility can lead to civic engagement that is sometimes focused broadly on contributing to society or more narrowly focused on helping individuals [30]; [31]. Social responsibility is a prosocial orientation rooted in morality and ethical considerations [32]. Social responsibility in caring for other people, so that being sympathetic or being kind is based on an attitude of caring about the feelings and needs of other people [33].

Personal social responsibility refers to an individual's perception of an obligation to help society and communities that are not within their work area [34]; [35];[36]. Individuals who have social responsibility shows interest in the challenges faced by society and takes an active and proactive attitude in solving them [37]. Personal social responsibility is a characteristic of society where individuals know their rights and responsibilities and act in the interests of others and in the spirit of personal independence [38]. Personal social responsibility has two dimensions: individual moral identity and individual symbolic moral identity. The first dimension emphasizes the individual's perception of his role in society and the promotion of social welfare, while the second dimension is an external expression of social responsibility from mere altruism, as identification of oneself with others, an attitude that produces behavior that is in favor of the common good [39]. This argument is strengthened that this behavior is not always the result of intrinsic altruism, it is often the result of intrinsic altruism carried out due to social pressure or the desire to appear generous [40];[41].

Personal social responsibility also refers to each person's commitment to the community in their neighborhood through active participation in finding solutions to local issues [42];[43] . Personal social responsibility can be successful if individuals are able to go beyond their own interests and support goals that will benefit many people [44]. Personal social responsibility also refers to supporting efforts through volunteerism in preventing and overcoming several problems [45]; [46];[47];[48]. Babutau [38] defines a socially responsible person as follows: 1) Trust and loyalty to others; 2) Interest and sensitivity to group/community needs; 3) A sense of responsibility for problems that have a general social impact; 4) Positive and constructive participation in social life (volunteering); 5) Openness to cooperation/negotiation; and 6) community spirit and solidarity in actions of public interest.

Borba [33] suggests that the characteristics of social responsibility include: 1) They are controlled by moral guidelines within themselves which direct them to do good towards others; 2) In doing anything they do not expect anything in return; 4) They are afraid of being punished if they don't do good or not; 5) environmentally acceptable; 6) They are sympathetic and kind because they care about other people's feelings and needs. Martinek, Schilling, & Johnson [49] added that social responsibility has the following criteria: (1) self-control and respect for the rights of others (self-control and respect for the rights of others); (2) effort and participation (effort and participation); (3) self-direction (self-direction); and (4) helping others (helping others). Surahman & Mukminan [50] explain the indicators of social responsibility, namely: accepting the consequences of every action and decision taken, carrying out individual duties well, not blaming other people, returning borrowed items, being true to promises, and being consistent with your words. Davis, et.al [20] identified action dimensions in the personal social responsibility model including idealism and relativism, and perceptions of consumer effectiveness, all of which are related to individual values and beliefs. On the other hand, the social context of behavior is also influenced by cultural patterns, namely collectivism and social norms [51]. Thus, the construct dimensions of personal social responsibility can be described in the table as follows.

Table 1. Dimensions of the Construct of Social Responsibility as an Individual

No	Author (Year)	Characteristics
1.	Martinek, Schilling, & Johnson (2001)	1) self-control and respect for the rights of others; 2) effort and participation; 3) self-direction; 4) helping others.
2.	Gallay (2006)	attitudes that result in behavior that favors the common good
3.	Isworld (2008)	everyone's commitment to the community in which they live through active participation in finding solutions to local issues
4.	Borba (2008)	1) Attitudes that are controlled by moral guidelines within themselves that direct them to do good to others; 2) Doing whatever they do not expect a reward; 3) Attitudes that are afraid of being punished if they do not do good or not; 4) being accepted by the environment; 5) being sympathetic, being kind and caring about the feelings and needs of others.
5.	Ecimovic et.al (2009)	Individual perceptions of obligations in helping society and communities
6.	Ghemes (2012)	Having an interest in the challenges faced by society and then taking an active and proactive stance in resolving them
7.	Ecimovic et al (2013).	everyone's commitment to the community in which they live through active participation in finding solutions to local issues
8.	Babutau (2014)	1) Trust and loyalty to others; 2) Interest and sensitivity to the needs of the group/community; 3) Sense of responsibility for problems that have a general social impact; 4) Positive and constructive participation in community life (volunteering); 5) Openness to cooperation/negotiation; 6) community spirit and solidarity in actions of public interest.
9.	Babutau (2014)	acting in the interests of others and in a spirit of personal independence

No	Author (Year)	Characteristics
10.	Hatch & Stephen, 2015).	Individual perceptions of obligations to help people and communities outside their area of work
11.	Surahman & Mukminan (2017)	1) accept the consequences of every action and decision taken; 2) carry out individual tasks well; 3) do not blame others; 4) return borrowed items, keep promises; 5) be consistent with words.
12.	Davis, et.al (2017)	1. idealism and relativism 2. consumer effectiveness perception 3. Collectivity 4. Subjective norms
13.	Pacesila (2018)	support goals that will benefit many people.
14.	Michaela (2018)	1) Behavior is carried out individually, ethically and philanthropically, 2) Behavior of activists/volunteers/lobbyists who are always connected to community problems and care about solving them.
15.	Golob & Matej (2021) [52]	1) Individual actions to achieve collective goals 2) Actions that provide long-term stability, social welfare, 3) Contributing to the sustainability of the social and natural environment

Regarding to several dimensions of the construct of personal social responsibility, personal social responsibility is formulated in this research as follows: 1) have an interest; 2) awareness in behavior; 3) participate actively; and 4) taking collective action.

Dimensions of the Ecological Citizenship Construct

Ecological citizenship is a concept that emphasizes individual responsibility towards the environment and encourages pro-environmental behavior. Ecological citizenship encourages individuals, communities, and organizations to consider environmental issues and take action to promote sustainability [22]. Ecological citizenship is not solely determined by individual actions but is also influenced by policies and regulations. Governments and institutions can promote ecological citizenship by implementing policies that support sustainability, such as carbon pricing, renewable energy incentives, and waste reduction targets [53]. Ecological citizenship requires individuals to see moral identity as part of a shared community, and ecological citizenship places enormous demands on humans towards the environment [54].

Rights and responsibilities are basic attributes of ecological citizenship, so that "responsibility" is one of the important dimensions of ecological citizenship [55]. Ecological citizenship is non-territorial and non-contractual and relates to the responsibility and impact of individual actions on the environment and other people far away [56] . Horton [57] revealed that environmental rights play an important role in ecological citizenship. Ecological citizens know that they have a responsibility towards generations the unborn and current behavior will have an impact on society in the future so that ecological citizens must become global citizens as well as sustainable citizens [58]. Globalization and sustainability are driving the emergence of ecological citizenship as a new type of citizenship [59]. Many environmental problems are rooted in the consequences of people's lifestyles that are not environmentally friendly [60]. Ecological citizenship is practiced in public spaces as a form of political activity [61; 62;]. Ecological citizenship provides an understanding of human obligations in protecting the environment such as animals, trees, mountains, biotic communities, animal ecosystems [63]. Ecological citizenship emphasizes responsibility for the common good and an ethic of care for fellow humans and non-humans and nature in general [64]. Another dimension of ecological citizenship is participation, ecological citizenship should be seen as a mechanism for political participation in environmental decision-making processes [65]; [66]. Thus, the dimensions of the ecological citizenship construct can be described in the following table.

Table 2. Dimensions of the Ecological Citizenship Construct

No	Author (Year)	Indicators
1.	Karatekin & Uysal (2018).	1) pro-environmental behavior 2) considering environmental issues 3) taking action to promote sustainability 4) responsibility for environmental impacts

No	Author (Year)	Indicators
2.	Smith & Pangsapa (2008).	understanding of human obligations in protecting the environment such as animals, trees, mountains, biotic communities, animal ecosystems,
3.	Martinho, et.al (2010).	political participation in environmental decision-making processes
4.	Gebbels et al., (2011) [67]	1) responsibility in environmental management 2) overcoming environmental problems, 3) promoting positive and sustainable human life with the environment
7.	Sari, dkk., (2020) [68]	concern and awareness manifested in the form of environmental-based behavior and activities.
8.	Berkowitz, et. al., (2005) [69]	1) understanding of ecological issues, 2) awareness of personal values towards the environment 3) practical wisdom to make decisions and act in relation to the environment 4) having the capacity to learn and act in relation to personal values and interests in the environment
9.	Deane Curtin [55]	citizen awareness in forming whole human beings in involvement in preserving the environment

Based on several dimensions of the ecological citizenship construct, the dimensions of ecological citizenship formulated in this research are as follows: 1) considering environmental problems; 2) address environmental problems; 3) sustainable behavior in protecting the environment; and 4) maintaining environmental preservation.

Theoretical Construction of Personal social responsibility in Ecological Citizenship

Responsibility is one of the values that influences ecological citizenship so that individuals can prioritize environmental issues and realize the importance of sustainable living [21]; [22]. responsibility can accurately predict ecological behavior coupled with knowledge about the environment and environmental values [23] . On the other hand, ecological citizenship is often associated with the concept of global citizenship because environmental problems have spread into global issues [22]. Research shows that personal social responsibility plays an important role in promoting ecological citizenship, through various means including: First, having awareness in acting by considering environmental impacts. Second, implementing sustainable behavior to take responsibility for the environmental impacts that arise [70]; [71].

Third, Advocacy and collective action on environmental issues and encouraging other parties to adopt sustainable practices through active involvement in discussions, supporting environmental initiatives so as to inspire collective action and encourage positive change; Fourth, providing pressure for systemic change, individuals can use their collective voice to hold governments, companies, and institutions accountable for their environmental impacts by demanding policy changes, supporting sustainable businesses, and participating in environmental movements so as to contribute to large-scale transformation . Thus, based on the dimensions of the construct of personal social responsibility which include: 1) having an interest; 2) awareness in behavior; 3) participate actively; and 4) carrying out collective action and dimensions of ecological citizenship which include 1) considering environmental problems; 2) address environmental problems; 3) sustainable behavior in protecting the environment; and 4) maintaining environmental sustainability, a theoretical construction of personal social responsibility in ecological citizenship is drawn up, which is described in the following matrix. (Figure table 3). It is hoped that this theoretical construct can be used to identify tendencies in individual behavior that is environmentally friendly or not, as well as assisting in understanding the factors that influence changes in individual behavior towards environmental awareness.

Table 3. Theoretical Construction Matrix of Personal Social Responsibility in Ecological Citizenship

No	Ecological Citizenship Personal Social Responsibility	Considering environmental issues	Address environmental issues	Sustainable behavior in protecting the environment	Maintain environmental preservation
1.	have an interest	Have an interest in considering environmental issues	Have an interest in address environmental issues	Have an interest in sustainable behavior in protecting the environment	Have an interest in preserving the environment
2.	awareness in behavior	Behavioral awareness in considering environmental issues	Behavioral awareness in addressing environmental issues	Awareness of sustainable behavior in protecting the environment	Behavioral awareness in preserving the environment
3.	participate actively	Actively participate in considering environmental issues	Actively participate in address environmental issues	Actively participate in sustainable behavior in protecting the environment	Actively participate in preserving the environment
4.	taking collective action	Taking collective action in considering environmental issues	Taking collective action to address environmental issues	Taking collective action towards sustainable behavior in protecting the environment	Taking collective action to preserve the environment

Based on several dimensions of the personal social responsibility construct and dimensions of the ecological citizenship construct, the theoretical construction of personal social responsibility in ecological citizenship formulated in this research are as follows: 1) Have an interest in considering environmental issues ; 2) Have an interest in address environmental issues; 3) Have an interest in sustainable behavior in protecting the environment; 4) Have an interest in preserving the environment; 5) Behavioral awareness in considering environmental issues; 6) Behavioral awareness in addressing environmental issues; 7) Awareness of sustainable behavior in protecting the environment; 8) Behavioral awareness in preserving the environment; 9) Taking collective action in considering environmental issues; 10) Taking collective action to address environmental issues; 11) Taking collective action towards sustainable behavior in protecting the environment; 12) Taking collective action to preserve the environment

4. Conclusion

Environmental damage is the result of irresponsible human actions in utilizing natural resources, such as not paying attention to environmental cleanliness, not maintaining environmental security, and not maintaining environmental order. Responsibility for the environment is part of personal social responsibility, which emphasizes the importance of acting positively to provide benefits to society, including the environment. Responsibility is one of the values that influences ecological citizenship so that individuals can prioritize environmental issues and realize the importance of sustainable living. The theoretical construction of personal social responsibility in ecological citizenship includes Based on several dimensions of the personal social responsibility construct and dimensions of the ecological citizenship construct, the theoretical construction of personal social

responsibility in ecological citizenship formulated in this research are as follows: 1) Have an interest in considering environmental issues ; 2) Have an interest in address environmental issues; 3) Have an interest in sustainable behavior in protecting the environment; 4) Have an interest in preserving the environment; 5) Behavioral awareness in considering environmental issues; 6) Behavioral awareness in addressing environmental issues; 7) Awareness of sustainable behavior in protecting the environment; 8) Behavioral awareness in preserving the environment; 9) Taking collective action in considering environmental issues; 10) Taking collective action to address environmental issues; 11) Taking collective action towards sustainable behavior in protecting the environment; 12) Taking collective action to preserve the environment. It is hoped that this theoretical construct can be used to identify tendencies in individual behavior that is environmentally friendly or not, and also assisting in understanding the factors that affect changes in individual behavior towards environmental awareness.

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IMPLEMENTATION OF THE ETHNOSCIENCE ENVIRONMENTAL TECHNOLOGY AND SOCIETY BATIK TO IMPROVE CULTURAL LITERACY

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Abstract

Batik is an Indonesian cultural heritage that must be preserved. Efforts to preserve batik are also needed in higher education. This is because the level of batik cultural literacy of students is still low. The purpose of this study was to imply Ethno-SETS batik to improve batik cultural literacy in the Heat material. The research method used was a quasi-experimental one group pretest posttest design. Data were collected using observations of student activities and batik cultural literacy tests. Based on the results of the study, it was found that the implementation of Ethno-SETS batik learning in the Kalor material can improve students' batik cultural literacy in the moderate category with an N Gain score of 0.4653. The implemented Ethno-SETS batik learning is still less effective with an N Gain percentage of 46.53%. In order for the implementation of Ethno-SETS batik learning to be more effective, better preparation efforts are needed at each stage of the learning syntax, especially regarding time and the active role of lecturers in learning.

Keywords: ethno-SETS, ethnoscience, SETS, cultural literacy, batik

1. Introduction

Batik is an icon of Indonesian culture. Batik has received an award as a cultural heritage from UNESCO on October 2, 2009 [1]. As an effort to continue preserving batik, the government has carried out various promotions and development of the batik industry including in the province of the Special Region of Yogyakarta. Development of the batik industry, promotion of batik shops, and batik exhibitions are some of the steps taken to develop batik [2] [3]. However, the interest of the younger generation in preserving batik is still lacking, especially in terms of skills in making batik [4]. The batik cultural literacy of students at the tertiary level is still low. In fact, this cultural literacy is very important for students to adopt their own culture and to develop respect for different cultures [5]. Efforts need to be made to preserve culture in the world of education [6] [7]. One way is by integrating batik culture into the learning material. Students will learn learning material that is related to the batik making process. Thus, students can learn contextually, namely learning that encourages students to make connections between the knowledge they have and its application in everyday life [8]. One aspect that can be developed for contextual learning innovation is local culture, for example batik.

There are several science/physics concepts related to the batik making process. Among them are the concepts of Heat, Force, Energy, and Fluids. The easiest concept to observe is the concept of Heat, especially in the topic of Phase Change and Heat Transfer. Phase Change can occur in the process of heating wax, where the wax changes form from solid to liquid. This liquid wax is what will be painted on the cloth. Meanwhile, heat transfer can occur when heat flows by conduction from the pan to the wax, by convection throughout the heated wax, and by radiation during the drying process of the cloth. Currently, learning has been implemented that tries to integrate batik with subject matter. The patterns in traditional batik or the batik making process are studied from a scientific perspective [9] [10]. However, from several studies that have been conducted, most of them have only revealed where the integration of batik with the concept of science and the development of learning media lies [11]. The impact of integrated batik learning is measured from the aspect of improving critical thinking skills, creative thinking, and scientific literacy of students [12] [13] [14]. There has been no research that reveals an increase in students' cultural literacy after implementing integrated batik learning. In addition, there has been no educational research that integrates batik with the concept of science, environmental issues, technology, and society. Therefore, it is necessary to implement integrated batik science/physics learning which is expected to increase students' knowledge and experience of batik culture.

Ethno-SETS is a learning that unites ethnoscience with science, environmental, technology, society (SETS). Ethnoscience is an activity that transforms indigenous science into scientific science. Indigenous science is reflected in local wisdom as an understanding of nature and culture that develops among the community [10]. Ethnoscience can be integrated with learning innovations and can also improve students' thinking skills [15]. In addition, the implementation of ethnoscience in learning can also improve students' responses, especially their activeness [16]. SETS is a learning approach that connects science, environmental issues, technology and society [17]. Through SETS, students will be guided to utilize science as a productive concept in creating and developing technology, while minimizing negative impacts on the environment and society [18]. SETS is very effective in encouraging students' ability to innovate in solving environmental problems and stimulating high-level thinking skills [19]. In addition, the implementation of SETS can also increase student motivation in learning [20]. Through SETS learning, students are expected to be motivated to solve batik problems using the concepts of science, environmental issues, technology, and society. Although the batik industry in society has developed well, there are still several problems that still need to be solved. Among the problems of batik is the management of liquid waste from the batik industry [21] [22], the need for technology to develop batik motifs [23], and technology to speed up the batik making process.

Based on its characteristics, ethno-SETS batik learning is learning that presents batik cultural problems in society into the classroom. Students will learn batik culture while linking it to the concept of the subject matter being studied. Using the concepts of science, environmental issues, technology, and society, students can contribute to helping solve batik problems faced by the community. Through ethno-SETS batik learning, it is hoped that students will not only improve their understanding of scientific concepts but also increase their batik cultural literacy. Therefore, it is necessary to implement ethno-SETS batik learning to improve students' batik cultural literacy, especially in the material of Heat.

2. Method

This research method is quasi-experimental with one group pretest posttest design. In this research design, the class was selected randomly and no class stability test was conducted before being given treatment. The class used as a trial consisted of 28 students from the Science study program at Sarjanawiyata Tamansiswa University. The research design is shown in Figure 1.

O_1	X	O_2

Figure 1. One group pretest posttest design

Information:
0_1 = initial cultural literacy test
0_2 = final cultural literacy test
X = Ethno-SETS batik learning

Ethno-SETS batik learning is implemented to the Heat material with the topic of Phase Change and Heat Transfer. The stages of Ethno-SETS batik learning and their explanations are given in Table 1.

Table 1. Stages of Ethno-SETS batik learning

No.	Stages	Fill in the stages
1.	Invitation	The teacher gives batik problems, usually in the form of questions.
2.	Exploration	Students study batik problems through references.
3.	Solution	Students analyze problems with group members
4.	Application	Students determine solutions based on the SETS concept with group members.
5.	Concept	Students reinforce the concepts they have learned through discussions with classmates.

Ethno-SETS batik learning consists of five stages. Learning is done face-to-face for two meetings. The first meeting is in the form of invitation, exploration, and solution activities. The second meeting is in the form of application activities and concept consolidation. Learning is done in groups, where each group consists of four to five students. Students carry out learning assisted by media in the form of textbooks and Student Worksheets.

Data collection techniques were carried out using tests and observation sheets. The batik cultural literacy test was in the form of thirty multiple-choice questions. The validity and reliability test of the questions was carried out using the SPSS program before the questions were used. Based on the product moment validity test on a sample of 126 people, ten questions were declared invalid, because the calculated r value (Pearson Correlation value) < r table (0.173). The results of the Alpha Cronbach's reliability test stated that the calculated r of all questions was> r table (0.173) so that all questions were declared reliable.

The student activity observation sheet is used to ensure that all student activities in learning are in accordance with the Ethno-SETS batik learning syntax. The observed activities are shown in Table 2.

Table 2. Indicators of student activity observation

No.	Fill in the stages
1.	Students read and understand questions in the form of batik problems.
2.	Students study batik problems using textbooks and other references.
3.	Students discuss in groups to solve batik problems.
4.	Students discuss in groups to determine solutions to batik problems using the SETS concept.
5.	Students discuss with classmates to further strengthen lesson concepts.

The technique of analyzing the research results was carried out using the normalized Gain test with its effectiveness to determine the increase in batik cultural literacy. The formula used to determine the increase in batik cultural literacy is:

$$N\ gain = \frac{\bar{x}_{postest} - \bar{x}_{pretest}}{x - \bar{x}_{pretest}} \quad (1)$$

Description:

$\bar{x}_{postest}$= average post-test result

$\bar{x}_{pretest}$= average pretest result

x= maximum score

The normalized Gain score results are interpreted in Table 3.

Table 3. Interpretation of normalized gain scores

N Gain score	Category
N Gain > 0.7	High
0.3 ≤ N Gain ≤ 0.7	Moderate
N Gain < 0.3	Low

The literacy of batik culture of students can be said to have increased with a high category if the N Gain score is more than 0.7. If the N Gain score is between 0.3 and 0.7 then it is categorized as moderate. While if the N Gain score is less than 0.3 then it is categorized as low. The interpretation category of N Gain effectiveness is shown in Table 4.

Table 4. Categories of N Gain effectiveness

Percentage (%)	Category
< 40	Ineffective
40 – 55	Less effective
56 – 75	Quite effective
> 76	Very effective

Ethno-SETS batik learning is said to be very effective only if the N Gain percentage score is more than 76%.

3. Results and Discussion

Based on the results of observations of student activities, it was found that 92% of students carried out the entire Ethno-SETS batik learning syntax. Therefore, it can be stated that the Ethno-SETS batik learning syntax on the Heat material can be applied well. The response of students was also very good when participating in learning, because so far they had never done learning that was integrated with

batik. Students gained new experiences during the learning process. When conducting Ethno-SETS batik learning, students solved the problems on the Student Activity Sheet in groups. Examples of these problems are:

1. How do you paint batik so it doesn't take a long time?
2. How to dye batik without using dyes that pollute the environment?
3. How to heat wax so that the wax heat is stable?

The results of the problem solving are then presented and discussed with classmates and receive input from the lecturer. Furthermore, the lecturer assesses the results of the problem solving.

The assessment of batik cultural literacy was conducted before learning (pre-test) and after learning (post-test). The results of the pre-test and post-test are given in Table 5.

Table 5. Result of batik cultural literacy assessment

	Min score	Max score	Average score
Pre test	15	75	57.5
Post test	55	95	76.5

Based on the research results presented in Table 5, it can be stated that the average post-test score is higher than the average pre-test score. The category of increasing batik cultural literacy and learning effectiveness was obtained through the normalized Gain test, the results of which are shown in Table 6.

Table 6. Normalized gain test results

	N	Min	Max	Mean	Std. Deviation
N Gain	28	0.14	0.83	0.465	0.211
N Gain percent	28	14.29	83.3	46.53	21.14
Valid N	28				

Based on Table 6, it is obtained that the N Gain score is 0.465. When compared with Table 3, the N Gain score is in the moderate category. Thus, the batik cultural literacy of students after carrying out Ethno-SETS batik learning on the Heat material increased to the moderate category. The N Gain percentage is 46.53%. When compared with Table 4, the implementation of ethno-SETS batik learning on the Heat material is less effective in increasing the batik cultural literacy of students.

The results of the observation of student activities stated that the ethno-SETS batik learning syntax had not been 100% implemented, which was only 92%. Of the five stages of learning syntax as shown in Table 1, the activities that did not run optimally were stage 2, namely exploration (studying batik problems) and stage 5, namely concept consolidation (feedback). The exploration stage is a stage that is carried out independently by each student. In this case, the lecturer only acts as a facilitator, namely providing references in the form of textbooks that can be studied by students. Furthermore, students are free to study the concept of batik through other references that they can get via the internet. Due to time constraints and the breadth of batik material, some students have difficulty in carrying out this exploration activity, so it does not run optimally. Meanwhile, the concept consolidation stage is carried out at the end of learning. This activity is carried out through class discussions with discussion materials listed on the Student Worksheet. In practice, not all students are actively involved in discussions. Discussions are only carried out by a few students who are classified as active.

The suboptimal implementation of ethno-SETS batik learning has an impact on the results of the post-test of students' batik cultural literacy. On average, the post-test scores increased compared to the pre-test in the moderate category, but ethno-SETS batik learning is still categorized as less effective in improving students' batik cultural literacy. This is thought to be because during the implementation of the exploration and concept consolidation stages, not all students actively did it. In fact, these stages are the most important activities to improve students' batik cultural literacy. In addition to this, the conditions of students in the trial class were also very heterogeneous. The backgrounds of students were some who were completely unfamiliar with batik and some were very familiar with batik because there was a batik industry in their home environment. Students who were completely unfamiliar with batik came from outside Java (Nusa Tenggara). These students certainly had great difficulty when they first

learned batik. However, even though their literacy scores were still low, they were very happy to be able to learn batik.

Ethno-SETS batik learning, although not yet fully effective, can still be used as an alternative learning to improve students' cultural literacy. This is in accordance with a literature study conducted by Iskandar [24] which states that it is necessary to teach culture in school. In addition, it is also in accordance with the statement by Pujiatna [25] that local wisdom can be used as a support for cultural literacy education. In order to be more optimal, in the implementation of ethno-SETS batik learning, a more mature syntax learning stage planning process needs to be carried out. The planning process includes effective time management at each stage, especially the exploration stage. Lecturers need to ensure that all students carry out all stages of the learning syntax properly. Lecturers need to guide students who find it difficult to carry out the learning stages. Although this learning emphasizes more on student activity, lecturers must also be actively involved in all stages of learning. If necessary, lecturers can also deliver material in front of the class or play learning videos to explore and strengthen student concepts. This learning is more recommended to be done offline, but if it will be done online or blended, preparation must be done better.

4. Conclusion

The implementation of Ethno-SETS batik learning on the Heat material can improve students' batik cultural literacy in the moderate category with an N Gain score of 0.4653. Ethno-SETS batik learning on the Heat material that is implemented is still less effective in improving students' batik cultural literacy with an N Gain percentage of 46.53%. Better preparation efforts are needed at each stage of the Ethno-SETS batik learning syntax, especially the time and active role of lecturers in learning so that learning is more effective.

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Character Education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta

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Abstract

This research aims to (1) describe character education, (2) explore the impact of character education, and (3) identify the supporting and inhibiting factors of character education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. This study employs a qualitative method with an ethnographic approach that focuses on character education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. The subjects of this research are the school principal, the vice principal for curriculum, the dormitory caretaker, teachers, dormitory supervisors, and students involved in educational and learning activities at Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. Data collection was carried out through interviews, observations, and document studies. Data analysis was conducted using the interactive analysis techniques of Miles, Huberman, and Saldana, which include data collection, data condensation, data presentation, and conclusion drawing. The results of this research show that (1) character education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta are 24-hour monitoring, embedded in daily routines, such as morning wake-up calls, cleanliness duties, halaqa and discipline in attending prayers, provide community and social interaction, and supportive environment, (2) impacted positive character development such as independence and responsibility, social skills enhancement, preparedness for challenges, and academic and non-academic achievement, (3) supporting factors are structured environment, comprehensive curriculum, active involvement of educators, community engagement, daily routines and activities. Meanwhile the inhibiting factors are diverse backgrounds of students, external influences, and resistance to change.

Keywords: character education, Islamic boarding school, madrasah

1. Introduction

Education is expected to be character development for students so that they become quality individuals with integrity. However, in practice, there are still many cases that show a lack of understanding and application of character education values both in school and outside of school. Lickona [1] explains that a nation is heading towards the brink of destruction if it exhibits ten signs: an increase in youth violence; the normalisation of dishonesty; the rise of group fanaticism; a decline in respect for parents and teachers; a blurring of moral distinctions between good and evil; a deterioration in language use; self-destructive behaviours such as drug use, alcohol abuse, and promiscuity; a low sense of responsibility as individuals and citizens; a decline in work ethic; and a pervasive sense of suspicion and indifference towards one another.

Several signs mentioned above can be seen from the reports of school-age children's delinquency that have occurred in recent years, such as: bullying [2], [3], [4], [5]; hazing [2], [6]; brawls [7]; drug abuse [8], [9]; promiscuity [10]; and klitih [11].

FSGI found that educational institutions under the Ministry of Education and Culture experienced the highest bullying case rate at 80%, while educational institutions under the Ministry of Religious Affairs encountered bullying cases at a rate of 20%, as shown in Fig. 1 below [12].

The Research and Development Centre for Religious Education's student character survey produced an average index score in 2021 that was lower than the index results from 2020. In 2021, the character index of secondary education students was at 69.52, down two points from the indicative score of 71.41 in 2020, as shown in Fig. 2 below [13].

Considering this phenomenon, the implementation and strengthening of character education in the student environment is very important [14]. Education is the key factor in the development of human resources. The quality of human resource development is expected to realise a just and prosperous Indonesia Gold 2045, progressively and comprehensively safe and peaceful. Education determines the future of a nation, shaping it into a great, civilised, intelligent society that is ready to face the changes of the times, or conversely, into a nation that does not develop and becomes trapped in its own various problems [15], [16].

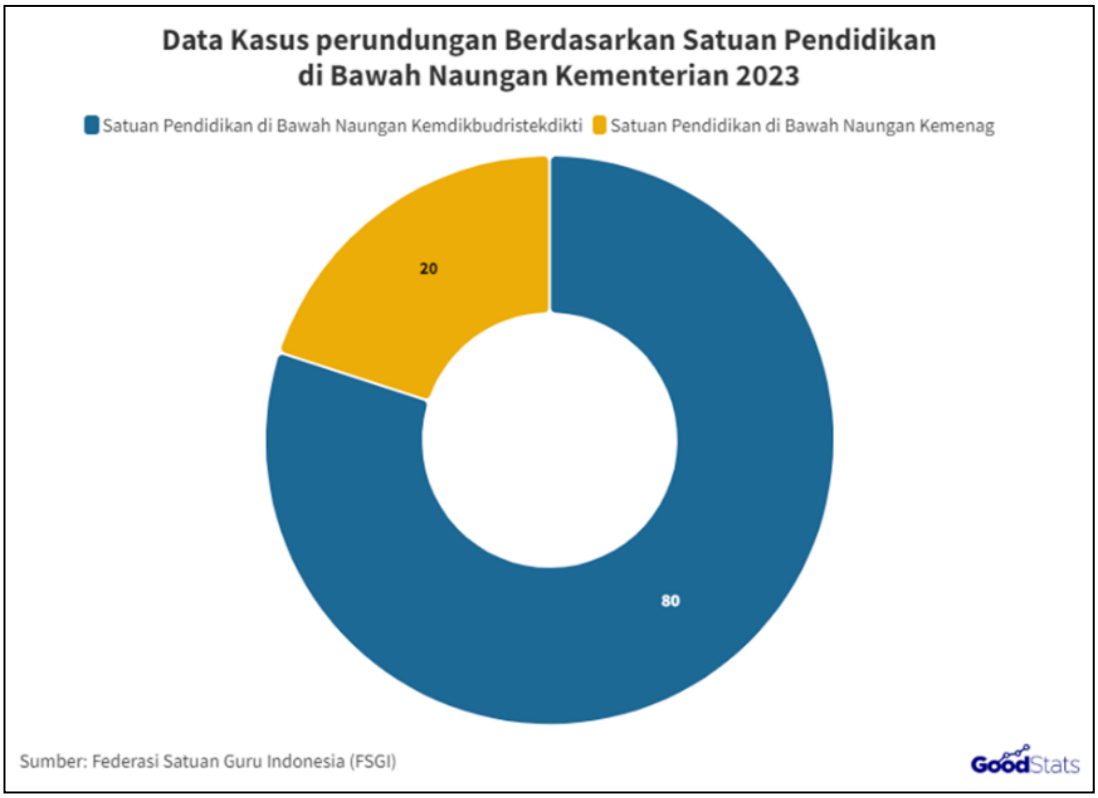


Figure 1. Data on Bullying Cases Based on Educational Units Under the Ministry's Authority 2023

Education is not merely a process of imparting knowledge but also a process of instilling character values. The balance between the value of knowledge and character will produce scientists and experts who embody goodness in every task they undertake. Therefore, character education is very important in the implementation of the educational process in formal schools [17].

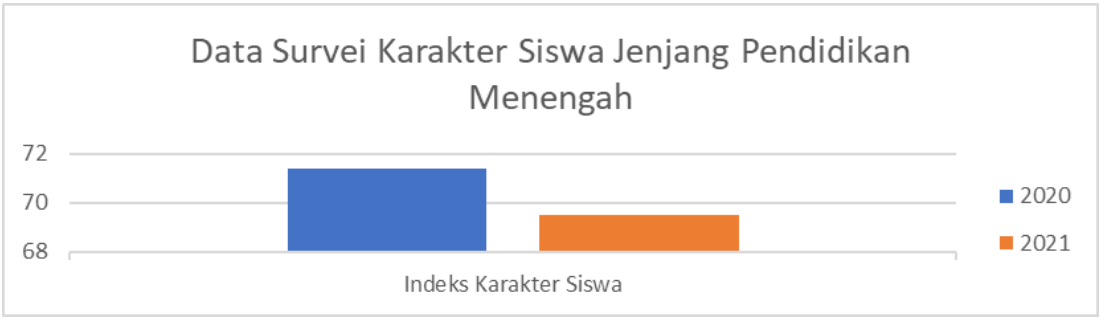


Figure 2. Survey Data on Student Character at the Secondary Education Level

The implementation of character education in Indonesia refers to dynamic educational policies that evolve alongside curriculum developments over time. Presidential Regulation Number 87 of 2017 concerning the Strengthening of Character Education [18] has regulated character education in schools. This regulation was then updated with the issuance of Minister of Education and Culture Regulation Number 20 of 2018 regarding the Strengthening of Character Education in Formal Education Units [19]. However, in 2020, a new regulation was introduced, namely Minister of Education and Culture Regulation Number 22 of 2020 concerning the Strategic Plan of the Ministry of Education and Culture for the Years 2020–2024 [20]. This regulation directs the transition from the 2013 Curriculum to the Independent Learning Curriculum, which impacts various strategies that have been implemented, including one of them being the strengthening of student character through the Pancasila Student Profile. The Minister of Education, Culture, Research, and Technology Decree No. 56/M/2022 [21] and

the Head of the Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology Decree No. 009/H/KR/2022 [22] both talk about how to implement the Pancasila Student Profile Strengthening Project (P5) in the curriculum scheme. These decrees explain the guidelines for curriculum implementation in the context of learning recovery and the specifics of the Pancasila Student Profile in the independent curriculum. This regulation establishes the dimensions, elements, and sub-elements of the Pancasila student profile for learning in educational units implementing the Independent Curriculum. The dimensions, elements, and sub-elements of the Pancasila student profile are utilised in the Pancasila Student Profile Strengthening Project in educational units implementing the Independent Curriculum. The Pancasila Student Profile aims to shape Indonesian students as lifelong learners who behave in accordance with the values of Pancasila, namely being faithful and devoted to God Almighty, possessing noble character, embracing global diversity, thinking critically, collaborating, being independent, and being creative [23]. Both the PPK and P5 policies, which are related to strengthening student character, are still in effect today [24]. The Project for Strengthening the Pancasila Student Profile in Educational Units, conducted by the Standards, Curriculum, and Educational Assessment Agency of the Ministry of Education, Culture, and Research of the Republic of Indonesia, was further developed into the Project for Strengthening the Pancasila Student Profile and the Rahmatan lil Alamin Student Profile (P5 PPRA) in madrasahs [25]. A madrasah is a public school with Islamic teachings. The madrasah follows the guidelines from the Ministry of Education, Culture, Research, and Technology, but with some modifications tailored to the characteristics, uniqueness, and needs of the madrasah. To cultivate the identity and uniqueness of the madrasah, the principles of Islam are incorporated into the curriculum. Therefore, religious principles influence the way we think, behave, and act in relation to policies and practices in madrasah education.

The addition of the value of Rahmatan lil Alamin is one of the unique features expressed in this policy. The value of Rahmatan lil Alamin lies in its attitude and perspective guidelines for practicing religion. These guidelines make sure that religious patterns work as they should in the context of nationhood and statehood, protecting humanity and the common good in religious practice. As part of the Rahmatan lil Alamin Student Profile, which is integrated with the Pancasila Student Profile, the aim is to ensure that the way of practicing religion among students graduating from madrasahs is moderate (tawassuṭ).

A madrasah is an Islamic educational institution aimed at combining values of goodness with modern knowledge and technology, thereby producing an education that encompasses both religious and general lessons beneficial for human life [26]. The madrasah includes materials according to the applicable curriculum. In general, the curriculum in madrasas is similar to that of pesantren, supplemented with general knowledge [27] The school is categorised as an educational institution based on Islamic characteristics. Although the madrasah does not allow its students to engage in negative behaviours that contradict Islamic teachings, there are still some students who continue to practice negative behaviours both at school and outside of school [28]. Therefore, madrasahs, as one of the religious-based educational institutions, are expected to play an important role in shaping morals by providing students with an understanding of the negative impacts of negative behaviours influenced by mass media and their surrounding environment. Studies show that mass media, both print and electronic, can influence students' behaviour [29].

The high interest of parents in enrolling their children in boarding schools is attributed to the increase in juvenile delinquency that occurs between school hours and their time at home. They want their children to not only receive part-time education but also have access to good supervision [30]. Therefore, there are two types of educational programs offered at the madrasah: the educational program conducted at the school and the educational program conducted at the boarding school. Students can choose the educational program that suits their needs, whether it is just at school or living in the boarding while also receiving education at school. Not all madrasahs provide boardings as facilities to shape students' character, especially state madrasahs. The madrasahs that provide boardings are usually facilitated for students coming from outside the city where the madrasah and boarding are located. One of the madrasahs that has a boarding school is MAN 2 Yogyakarta.

With a boarding system, the madrasah can design character education as one of the main missions that must be implemented. The madrasah also recognises that the development of the digital technology era is something that cannot be avoided, so it needs to adapt to this digital technology to integrate it into the learning process and character development of students. The madrasah, as one of the formal educational institutions, is responsible for shaping students' character to achieve the expected educational goals, which are to develop a well-rounded individual encompassing spiritual and moral intelligence, emotional and aesthetic intelligence, intellectual and professional intelligence, as well as social and functional intelligence [27]. Activities in the boarding school are closely related to the

development process of students, not only in terms of cognitive, affective, and psychomotor aspects or various other life skills, but also in integrating the dimension of faith into all aspects of human life as a whole [27].

Findings from the study "Strengthening the Disciplinary Character Education of Santri through Discipline Development in Islamic Boarding Schools" by Anirah, Naima, Retoliah, Nursyam, and Erniati [31]. This research found that strengthening character education in discipline and developing disciplined character are two important activities at the Modern Islamic Boarding School Al-Istiqamah in Ngatabaru, South Sulawesi. Through these two activities, the students' discipline character can be realised to support various religious activities at the Islamic boarding school. From this disciplined character in participating in religious activities, students become individuals who possess a wealth of religious knowledge and consistently behave well in their daily lives.

Similar to the study by Setianingrum and Fauzan [32] titled "Strengthening Character Education Through the Prophetic Management Model in the Raudlatul Ulum Sukowono Jember Islamic Boarding School." The findings of this research indicate that the prophetic management model is effective in strengthening character education at the Raudlatul Ulum Islamic boarding school through four programs: 1) a curriculum based on Islamic values, 2) leadership development, and 3) the application of manners and ethics as well as spiritual guidance.

The research conducted by Ramli, Dhahri, Solehuddin, Rahmah, Haris, and Lubis [33] is titled "The Importance of Islamic Character Education in Addressing Bullying Behavior in Boarding Schools." The findings from this research clearly indicate the urgency for the implementation of Islamic character education in predicting bullying behaviour in boarding schools. Islamic character education not only shapes students' behaviour to be polite, tolerant, and respectful of differences but also enhances their empathy, concern, and courage to combat bullying.

The study by Aziz, Setyawan, Purwowidodo, and Yasin [34] titled "Islamic Integrated Curriculum Model to Strengthen Santri's Religious Character: A Case Study at Islamic Boarding School in Blitar" also demonstrates the improvement of character education in boarding schools. This study discovered that each Islamic boarding school creates a hidden curriculum in addition to the national curriculum to implement the integrated Islamic curriculum system. This curriculum is tailored to the vision, mission, and form of the Islamic boarding school. Applying an integrated Islamic curriculum model effectively enhances the religious character of students. In addition, the parent/guardian satisfaction index shows 89.6%. This research supports the integrated Islamic curriculum model in the religious character of students in Blitar, East Java, Indonesia.

Based on several research findings above, the researcher is interested in studying character education in madrasas with a boarding system. The hope of this research is to serve as one way to address the character issues of students through state boarding madrasas.

2. Method

This study uses a qualitative research design with an ethnographic approach to study the experiences of students in Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. The ethnographic method is used to understand the unique characteristics of the students and their experiences in the boarding school system. The research aims to collect data on the students' perceptions of their education in the boarding school, using a descriptive approach. The study was conducted from June to August 2024. The subjects of this research are principal, vice principal for curriculum, boarding supervisor, teacher, musyrifah, and students. Data collection was carried out through in-depth interviews, observations, and document studies from various sources, including books, journals, and photographs. Data analysis was conducted using the interactive analysis techniques of Miles, Huberman, and Saldana [35], which include data collection, data condensation, data presentation, and conclusion drawing. To ensure that the data retrieved is reliable, triangulation of sources and techniques is used.

3. Results and Discussion

a. Character Education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta

Character education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta is designed to be comprehensive and continuous, leveraging the unique environment of a boarding school. 24-hour monitoring setting at the boarding school allows for character education to be integrated into daily life, with educators able to monitor and guide students around the clock. This constant supervision

helps reinforce the values being taught, making it easier to identify and correct any behavioural issues as they arise.

The boarding school provides a structured routine that includes morning wake-up calls, cleanliness duties, discipline in attending prayers, halaqa, and study activities. These activities are designed to instill a sense of responsibility and self-discipline in students. The holistic approach to education at 'Ihyaul Ulum' MAN 2 Yogyakarta ensures that students are not only academically successful but also morally upright individuals. The core values taught include akhlak (morality), budi pekerti (good character), and religious knowledge. The curriculum focusses on the relationship with God and interpersonal relationships, aiming to prepare students for both worldly and spiritual success. By incorporating character education into everyday tasks, students are able to practice and internalise these values in a practical way. This hands-on approach helps students develop important life skills that will benefit them beyond their time at the boarding school. Students are encouraged to apply these values in their interactions with their peers and the broader community, which helps them develop social skills and the ability to adapt to various social environments. This interaction is crucial for fostering a sense of belonging and acceptance in society. The school environment is described as supportive, with teachers and staff actively involved in the character development of students. This supportive atmosphere contributes to students feeling comfortable and motivated to improve themselves.

The principles of Lickona [36], which include respect, responsibility, and compassion, play a crucial role in shaping students' character and guiding them beyond their time at the boarding school. By applying these values in their interactions, students develop strong social skills that help them adapt to various environments and foster a sense of belonging in society. The supportive school environment allows teachers and staff to actively engage in students' character development, creating a comfortable and motivating atmosphere for personal growth.

b. The Impact of Character Education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta



Figure 3. Students of Muslimah Boarding School MAN 2 Yogyakarta during a halaqa

The character education program at the Muslimah Boarding School, 'Ihyaul Ulum' MAN 2 Yogyakarta, is deeply rooted in Lickona's principles of responsibility and compassion [37]. Those are the character education programmes that foster the development of good morals, ethics, and religious values among students. They are taught to exhibit positive behaviours towards themselves, their peers, and their environment, contributing to the formation of a well-rounded personality. Through daily activities and routines, students learn to be independent and responsible for their actions. For instance, they are trained to maintain cleanliness and manage their personal needs, which instills a sense of discipline and accountability. The intensive interaction with peers and mentors in the boarding school setting helps students develop strong social skills. They learn to communicate effectively, collaborate, and empathise with others, which are essential skills for thriving in society. The focus on moral and

spiritual development equips students to face various challenges in the future. They are expected to adapt well to broader environments and contribute positively to their communities. Students who receive strong character education tend to be more motivated to excel academically and participate in extracurricular activities. This is reflected in the success of alumni who demonstrate dedication and enthusiasm in pursuing further education and careers.

Overall, a strong emphasis on character education helps students to develop essential skills that will benefit them in society. By promoting communication, collaboration, and empathy, students are better prepared to face challenges and contribute positively to their communities. This focus on moral and spiritual development not only helps students excel academically but also motivates them to pursue further education and careers with dedication and enthusiasm.

c. Supporting and Inhibiting Factors of Character Education at the 'Ihyaul Ulum' Muslimah Boarding School MAN 2 Yogyakarta

The study identified various factors that supported the implementation of character education at the 'Ihyaul Ulum' Muslimah Boarding School, MAN 2 Yogyakarta. Those are the boarding school settings that provide a structured environment where students are monitored continuously. This allows for consistent reinforcement of character values throughout their daily activities. The integration of character education into the curriculum, including religious teachings and moral lessons, ensures that students receive a well-rounded education that emphasises character development alongside academic learning. Teachers and staff are actively involved in character education, serving as role models and mentors. Their commitment to fostering a positive environment encourages students to adopt the values being taught. The school encourages communication and collaboration with parents and the community, which helps reinforce the values taught at school. Regular meetings and updates with parents enhance the support system for students, and daily activities, such as cleanliness duties, halaqa and prayer times, are designed to instill discipline and responsibility in students. These routines help embed character education into their everyday lives.

On the other hand, some inhibiting factors are that students come from various backgrounds, which may lead to differences in values and attitudes towards character education. External forces, such as peer pressure or societal norms, may have an impact on students in ways that are at odds with the values the boarding school teaches. These influences can undermine the effectiveness of character education. This diversity can sometimes create challenges in achieving a uniform understanding of the expected behaviours, and some students may initially resist character education initiatives, especially if they are accustomed to different values and behaviours from their parents at home. Overcoming this resistance takes time and consistent effort from educators. Understanding these factors can help improve the effectiveness of character education programs in similar educational settings.

4. Conclusion

The character education program at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta emphasises the values of responsibility, self-independence, and self-discipline. Through structured daily activities programs like morning wake-up calls, cleanliness duties, halaqa and attending prayers, students are continuously guided towards developing their character in a comprehensive manner. The unique environment of a boarding school allows for 24-hour monitoring of students' behaviour, ensuring that these values are ingrained in their daily lives. This character education program fosters a strong sense of community and social interaction among students at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. By participating in daily activities together, students are encouraged to engage with their peers and the broader community, which helps them develop social skills and the ability to adapt to various social environments. This interaction is crucial for fostering a sense of belonging and acceptance in society. This collaborative environment not only helps students grow individually but also promotes a sense of unity and cooperation within the school community. The strong sense of community and social interaction at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta creates a supportive environment with musyrifahs actively involved in the character development of students. This supportive atmosphere contributes to students feeling comfortable and motivated to improve themselves.

Factors such as Structured Environment, Comprehensive Curriculum, Active Involvement of Educators, Community Engagement, and Daily Routines and Activities play a crucial role in character education at the Muslimah Boarding School 'Ihyaul Ulum' MAN 2 Yogyakarta. While there are several strong supporting factors that enhance character education at 'Ihyaul Ulum', there are also challenges

that need to be addressed to ensure the effectiveness of the program, such as Diverse backgrounds of students, external influences, and resistance to change.

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IMPLEMENTATION OF SESTRADI PRINCIPLES AT STIKES NOTOKUSUMO YOGYAKARTA

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Abstract

The Sestradi principles, representing the esteemed values of the Pakualam tradition, are deeply integrated into the ethos of Stikes Notokusumo Yogyakarta, an institution affiliated with Yayasan Notokusumo. This research aims to document the ways in which these principles, centered around moral integrity, ethical leadership, and social responsibility, are woven into the academic and extracurricular life at the institution. Utilizing a descriptive qualitative approach, this study draws on in-depth interviews with lecturers and laboratory staff, alongside direct observations of institutional practices. Key findings highlight the introduction of Sestradi courses, the ceremonial recitation of the Sestradi pledge in morning classes, and the establishment of an "*honesty canteen*" all of which foster a character-driven educational environment. These practices underscore the institution's commitment to producing graduates with a strong sense of ethics and national responsibility, aligning with its broader vision and mission.

Keywords: sestradi principles, andragogy, character education

1. Introduction

The Pakualam tradition, dating back to the early 19th century, represents a unique blend of leadership, cultural heritage, and social responsibility that has influenced Yogyakarta's governance and educational systems [1]. Historically, the rulers of Pakualam have been known for their emphasis on moral governance, where rulers were expected to act with integrity, compassion, and a commitment to serving the people [2]. These values have been passed down through generations and continue to shape the ethical and cultural landscape of the region [3].

The Sestradi principles, rooted in this tradition, are built around three core pillars: moral responsibility, ethical leadership, and social duty. These pillars reflect the Pakualam belief that true leadership and societal contribution are not just about authority or expertise but are fundamentally about character, compassion, and the ability to inspire and lead others towards collective well-being. These principles find strong resonance in contemporary discussions of character education and andragogy (the method and practice of teaching adult learners), where the focus is on the development of individuals who can navigate both personal and professional challenges with integrity [4].

In the context of modern education, especially at Stikes Notokusumo Yogyakarta, these principles serve as a framework for character formation. The institution, recognizing the growing demand for professionals who are not only technically skilled but also ethically grounded, has sought to integrate these traditional values into its educational processes. The implementation of Sestradi principles at Stikes Notokusumo is part of a broader strategy to develop students who can embody leadership with responsibility—an ideal that has become increasingly critical in sectors like healthcare, where decisions often have profound ethical implications [5].

The theoretical underpinning of this approach draws from character education theories, which argue that the development of moral and ethical values should be a core component of any educational system. Scholars such as Thomas Lickona have long advocated that the cultivation of virtues—like honesty, responsibility, and respect—are essential for the holistic development of individuals [6]. These virtues align closely with the Sestradi principles, which emphasize internal character over external achievement.

Furthermore, andragogical theories, pioneered by Malcolm Knowles, emphasize that adult learners are particularly responsive to educational experiences that are relevant to their real-world contexts and allow for self-directed learning [7]. The incorporation of the honesty canteen and the Sestradi pledge at Stikes Notokusumo is an example of experiential learning, where students actively practice the values they are taught in real-life scenarios. This method encourages a deeper

internalization of ethical principles, as students are not simply passive recipients of knowledge but are actively engaged in demonstrating honesty, trustworthiness, and responsibility in their daily lives.

Moreover, the inclusion of the Sestradi course in the academic curriculum provides a structured platform for students to critically engage with these values and understand their relevance in a professional healthcare context. As healthcare professionals are frequently faced with ethical dilemmas—ranging from patient confidentiality to equitable access to care—grounding students in strong moral principles prepares them to navigate these challenges with a clear ethical compass.

Through this multifaceted approach, Stikes Notokusumo Yogyakarta positions itself as a leader in character education, fostering not just skilled health professionals but individuals who are committed to ethical practice and social responsibility. This integration of traditional values with modern educational methods highlights the enduring relevance of cultural heritage in shaping future leaders who are both competent and morally guided.

2. Method

The research employs a descriptive qualitative approach, aiming to explore and document the implementation of Sestradi principles at Stikes Notokusumo Yogyakarta [8]. This methodological choice is well-suited for the study as it allows for a deep understanding of the cultural and ethical integration within an academic institution, focusing on human behaviors, values, and the institutional practices surrounding character education. The descriptive qualitative design is used to capture the nuances and complexities of how Sestradi principles are integrated into the daily life of the institution. This method prioritizes naturalistic data collection, allowing the researchers to observe and interpret behaviors in their actual settings. By focusing on real-life scenarios, the research captures the practical applications of traditional values in both academic and extracurricular activities.

The study targets key individuals involved in the daily academic and administrative functions at Stikes Notokusumo. The respondents include 3 lecturers involved in teaching the Sestradi course and other subjects where ethical and moral education is integrated. Also, 2 laboratory workers, who were selected due to their active participation in student development programs that emphasize honesty and responsibility, such as the honesty canteen. These respondents were chosen through purposive sampling, based on their involvement in the direct application of Sestradi principles. This sampling technique ensures that the data collected is rich in context and highly relevant to the research questions.

Data collection was conducted through two main techniques, there are semi-structured interviews were conducted with lecturers and laboratory staff to gather detailed insights into their experiences with the implementation of Sestradi principles. Also, direct non-participant observations were carried out during key institutional activities such as morning pledge sessions, Sestradi classes, and the operations of the honesty canteen. This method allowed the researchers to see how the principles are practiced in real-time, providing firsthand data on the day-to-day embodiment of the values.

The data collected from interviews and observations were subjected to descriptive analysis. This involved several key steps include transcription interviews were transcribed verbatim to ensure that all nuances of the conversations were preserved. Also interpretation were then interpreted within the theoretical frameworks of andragogy and character education, showing how these frameworks apply to the specific context of a culturally-driven educational institution.

3. Results and Discussion

4.1 Results

The findings of this study highlight the comprehensive integration of Sestradi principles into both the academic and extracurricular life of Stikes Notokusumo Yogyakarta. The results are categorized into three main areas:

- **Academic Integration**

The Sestradi course, introduced as part of the formal curriculum, ensures that every student is exposed to the values of honesty, integrity, and ethical leadership. The course was reported to have a significant impact on students' understanding of moral principles, with faculty members noting increased discussions around ethics in healthcare and patient care during classroom interactions.

The Sestradi pledge, recited at the beginning of morning classes, reinforces the importance of personal and collective responsibility. Observation data indicate that this daily ritual has become a core component of institutional culture, with both students and staff expressing a shared sense of commitment to uphold these values.

- **Extracurricular and Institutional Activities**

The establishment of the honesty canteen serves as a real-world application of Sestradi principles. The canteen operates without supervision, allowing students to purchase items based on trust. Observation revealed that the canteen has been largely successful, with students adhering to the honor system, reinforcing their personal sense of honesty and responsibility. Instances of dishonesty were rare, and when they occurred, students themselves were quick to address them, further demonstrating the internalization of these values.

- **Faculty and Administrative Support**

Faculty members and administrative staff expressed strong support for the Sestradi initiative, noting that it aligns with the institution's mission to produce not just competent healthcare professionals but also individuals who are morally grounded. Interview data indicated that the faculty actively incorporate these values into their teaching methods, creating a holistic approach to education.

4.2 Discussion

The results indicate that the implementation of Sestradi principles at Stikes Notokusumo Yogyakarta has had a profound effect on both institutional culture and individual behavior. These findings align with Thomas Lickona's theory of character education, which posits that virtues such as honesty, responsibility, and respect must be actively taught and reinforced within educational institutions. The Sestradi course serves as a formal means of instruction, while the honesty canteen provides a practical, real-life application of these values, both contributing to the development of students' moral character.

- **Character Education in Practice**

The consistent use of the Sestradi pledge not only fosters a collective sense of responsibility but also reflects Lickona's emphasis on the importance of rituals and traditions in building character. According to Lickona's framework, repeated actions such as the pledge help inculcate moral values, making them an integral part of students' daily lives. This ritual is more than just a symbolic act; it serves as a daily reminder of the ethical standards that students are expected to uphold.

- **Andragogical Learning in the Sestradi Context**

The study also draws parallels with Malcolm Knowles' andragogical theories. Knowles argued that adult learners are more self-directed and benefit from practical, experience-based learning. The honesty canteen exemplifies this concept by giving students an opportunity to apply their ethical learning in a real-world context. The success of this initiative supports Knowles' theory that adults learn best when they are allowed to take responsibility for their actions, making the learning process more meaningful and self-directed. Furthermore, the faculty's role as facilitators rather than authoritarian figures aligns with the andragogical model, where instructors act more as guides, allowing students to explore and internalize ethical principles on their own terms. This approach has led to increased student engagement and motivation, as students feel a sense of ownership over their learning and moral development.

- **Challenges and Areas for Improvement**

Balancing Traditional Values with Modern Educational Demands

One of the key challenges identified in the implementation of Sestradi principles is the difficulty of balancing traditional values with the modern, fast-paced demands of healthcare education. While the principles of integrity, honesty, and social responsibility are essential for producing well-rounded professionals, they sometimes clash with the competitive, high-pressure environment that characterizes healthcare. Faculty members reported instances where students struggled to apply these values in situations where the focus was on academic achievement and performance under stress, such as during exams or clinical placements. This challenge aligns with broader discussions in character education theory, which emphasize that virtues must be contextualized and continuously reinforced, especially in high-stress environments where ethical shortcuts may be tempting. As Thomas Lickona suggests, character education must be comprehensive, addressing not only moral understanding but also moral action and the ability to apply ethical principles in difficult situations. In the case of Stikes Notokusumo, there may be a need to incorporate more real-world simulations or ethical dilemma workshops into the

curriculum to help students practice applying these principles in challenging, real-life healthcare scenarios.

Sustaining the Honesty Canteen Model

While the honesty canteen has been largely successful, with students generally adhering to the honor system, there were isolated cases of dishonesty. Faculty members expressed concerns about how to ensure the long-term sustainability of this initiative. Some suggested introducing periodic reviews or peer-led monitoring to maintain accountability while still promoting trust and self-discipline. From the perspective of andragogy, Malcolm Knowles' theory emphasizes the importance of self-directed learning and giving adults autonomy over their actions. However, in environments where external pressures or temptations exist, a more blended approach may be necessary—combining autonomy with accountability measures. This would still respect the principles of self-directed learning while providing a safety net to ensure that ethical behavior is maintained over time.

Developing Long-Term Ethical Resilience

Another challenge is fostering long-term ethical resilience among students. Faculty noted that while students may display ethical behavior during their time at the institution, it is uncertain how these values will hold up once they enter the professional healthcare environment, where they may face even more complex ethical dilemmas. To address this, Stikes Notokusumo could explore post-graduation mentorship programs or continuing education workshops that focus on ethical practice in healthcare. By maintaining a connection with graduates, the institution can offer ongoing support as they navigate their professional careers. Additionally, incorporating case-based learning that involves real ethical dilemmas from alumni experiences could provide students with deeper insights into the kinds of moral challenges they may face in the future.

4. Conclusion

The conclusion of the article highlights that the implementation of the Sestradi principles at Stikes Notokusumo Yogyakarta has been successful in fostering a strong ethical foundation among students. By integrating these principles into both academic and extracurricular activities, the institution has created a culture that emphasizes honesty, integrity, and ethical leadership. The introduction of practices like the Sestradi pledge and the honesty canteen provides students with practical experiences to internalize these values, preparing them for ethical challenges in their professional healthcare careers. However, the study also acknowledges the challenges in balancing traditional values with modern educational demands, and suggests the need for continuous support, such as post-graduation mentorship, to ensure long-term ethical resilience in graduates.

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A Bi-directional LSTM Approach to Forecasting the Stock Prices of Indonesian Sharia Banks

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Abstract

The financial markets are inherently complex and dynamic, which presents significant challenges for the accurate forecasting of stock prices. It is often the case that traditional statistical models are unable to adequately capture the non-linear and intricate patterns that are inherent to financial data. Recently, deep learning models, particularly Long Short-Term Memory (LSTM) networks, have demonstrated considerable potential for enhancing prediction accuracy. LSTM networks address the vanishing gradient issue inherent to conventional RNNs, thereby facilitating the learning and retention of information across extended sequences. This study employs a bidirectional long short-term memory (BiLSTM) approach to forecast the stock prices of Indonesian Sharia-compliant banks, utilising information from both past and future states to enhance accuracy. Hyperparameter tuning was conducted, resulting in an optimal configuration with 200 units and a dropout rate of 0.2, which achieved the lowest RMSE and MAPE values. The results demonstrate the effectiveness of BiLSTM models in financial forecasting, while highlighting the necessity for continuous evaluation and adaptation to ensure robustness across varying market conditions.

1. Introduction

The financial markets are inherently complex and dynamic, which presents substantial challenges for accurate stock price forecasting. Despite the widespread use of traditional statistical models such as ARIMA and GARCH for time series prediction, they often prove inadequate for capturing the non-linear and intricate patterns that are inherent to financial data. In recent years, machine learning techniques, particularly deep learning models, have demonstrated considerable potential for enhancing prediction accuracy. Of these, Long Short-Term Memory (LSTM) networks, a variant of Recurrent Neural Networks (RNNs), have attracted considerable interest due to their capacity to capture long-term dependencies in sequential data.

LSTM networks, as proposed by [1] were devised to address the vanishing gradient issue encountered by conventional RNNs, thereby facilitating the learning and retention of information across extended sequences. The architecture of LSTM incorporates memory cells and gating mechanisms, which regulate the flow of information, enabling the network to retain pertinent features over extended time intervals. This renders LSTM particularly well-suited to time series forecasting, where future values are frequently contingent on a lengthy sequence of past observations.

While the use of long short-term memory networks (LSTMs) has proven to be a fruitful approach in many fields, recent developments have seen the emergence of bi-directional LSTM (BiLSTM) models, which have the potential to offer further advancements. In contrast to the conventional LSTM, which processes data in a unidirectional manner (commonly in a forward temporal direction), bi-directional LSTM (BiLSTM) networks facilitate the processing of data in both forward and backward directions. The bi-directional processing enables the model to capture context from both past and future states, thereby facilitating a more comprehensive understanding of the sequence. In their 2005 study, [2] demonstrated the effectiveness of BiLSTM in a range of sequential tasks, particularly in the areas of speech recognition and handwriting recognition. In the context of financial time series, a bidirectional long short-term memory (BiLSTM) network can leverage information from both past and future stock prices, which may result in more accurate predictions.

The application of LSTM and BiLSTM in stock price forecasting has been the subject of extensive study. [3] conducted a comparative analysis between LSTM and traditional methods, and their findings indicated that LSTM exhibited superior performance in predicting stock returns. Similarly, [4] introduced

an attention-based LSTM model, which further enhanced the prediction accuracy by focusing on relevant segments of the input sequence. These studies highlight the potential of deep learning models in financial forecasting, prompting further investigation into their applicability for diverse financial instruments and markets.

The principles of Sharia-compliant banking, which is governed by Islamic law (Sharia), prohibit interest (riba), excessive uncertainty (gharar), and investments in haram (prohibited) industries such as alcohol and gambling. Consequently, the stock prices of Sharia-compliant banks may display distinctive patterns in comparison to those of conventional banks. The distinctive regulatory framework and ethical considerations associated with Sharia-compliant banks necessitate the development of bespoke forecasting models that can account for these differences. Nevertheless, research focusing on the stock price forecasting of Sharia-compliant banks using advanced machine learning techniques is scarce.

This study aims to address this gap by employing a bi-directional long short-term memory (LSTM) approach to forecast the stock prices of Indonesian Sharia-compliant banks. As the largest Muslim-majority country, Indonesia has a notable presence of Sharia-compliant financial institutions. The stock market performance of these banks is influenced by a range of factors, including economic conditions, regulatory changes, and market sentiment. This study aims to leverage the bi-directional processing capability of BiLSTM to capture the complex dependencies in the stock price data of Sharia-compliant banks and enhance forecasting.

2. Related Work

The forecasting of stock prices for Sharia-compliant banks has attracted considerable interest in recent years due to the distinctive attributes and regulatory frameworks that govern these financial institutions. Sharia-compliant banks operate in accordance with Islamic principles that prohibit interest (riba), excessive uncertainty (gharar), and investments in prohibited industries (haram). These principles exert an influence on the financial behaviours and risk profiles of these banks, thereby necessitating the utilisation of specialised methodologies for stock price prediction.

The field of Sharia stock price prediction has developed considerably in recent times, with the incorporation of a range of machine learning and deep learning techniques aimed at improving the accuracy of forecasting. For example, [5] investigated the potential of six model from any variant of Auto-Regression Integrated Moving Average (ARIMA) in forecasting the stock prices in Malaysia. Their findings suggest that hybrid models integrating multiple techniques may offer superior performance compared to single-method approaches. Similarly, [6] examined the efficacy of Long Short-Term Memory (LSTM) networks in predicting the stock prices of Sharia-compliant stocks. Their findings indicated that LSTM models could effectively capture the non-linear patterns present in financial time series data.

A study by [7] is worthy of note for its application of a bidirectional LSTM model and Grid search to the forecasting of stock prices of sharia stock. The findings demonstrated that BiLSTM models could capitalise on both past and future data to improve prediction accuracy, outperforming traditional unidirectional models. Another noteworthy contribution by [8] pertains to the integration of sentiment analysis with LSTM models for the purpose of predicting the stock prices. The findings indicated that the incorporation of market sentiment could markedly enhance the predictive performance of LSTM models.

The study by [5] examined the efficacy of ARIMA and LSTM models in forecasting the stock prices of Islamic banks in Bangladesh. The comparative analysis demonstrated that while ARIMA models were suitable for short-term predictions, LSTM models were more effective for capturing long-term dependencies and non-linearities in the data. Furthermore, a recent paper by [9] proposed a novel hybrid model combining LSTM and GARCH models to predict the volatility of stock price index, which exhibited superior performance compared to individual models.

The distinctive characteristics of Sharia-compliant banking stocks require a bespoke methodology for forecasting. A number of studies focusing on Sharia-compliant banking have emphasised the necessity of considering ethical and regulatory aspects in their analysis. To illustrate, [10] investigated the influence of macroeconomic variables on the stock prices of Islamic banks in Indonesia. Their findings revealed that factors such as inflation and interest rates exerted a pronounced impact on these stocks, differentiating them from conventional banks.

Another significant study by [11] examined the volatility of Sharia-compliant banking stocks using GARCH models. The findings indicated that these stocks exhibited lower volatility compared to their conventional counterparts. This can be attributed to the stringent regulatory requirements and ethical investment guidelines. Moreover, [12] investigated the utility of machine learning algorithms, including

Random Forest and Gradient Boosting, in forecasting the stock prices. They underscored the significance of feature selection and data preprocessing in enhancing model performance.

In an empirical study conducted by [13], the efficacy of utilising fundamental analysis indicators, including Price-to-Earnings (P/E) ratios and Dividend Yield, in forecasting the stock prices of Sharia-compliant banks was investigated. The results indicated that fundamental indicators could offer valuable insights into the financial health and future performance of these banks. Furthermore, [14] investigated the use of reinforcement learning algorithms for dynamic portfolio management, demonstrating the potential of these advanced techniques in optimising investment strategies.

3. Research Method

Data Collection

The initial step in this study is the collection of historical stock price data for Indonesian Sharia-compliant banks. The data is obtained from reliable financial databases, including Yahoo Finance and the Indonesia Stock Exchange (IDX). The dataset comprises daily stock prices, including opening, closing, high, low, and adjusted closing prices, as well as trading volumes spanning the past five years. This ensures the robustness and comprehensiveness of the data set in capturing market trends and anomalies.

Data Preprocessing

Once the raw data has been collected, it is subjected to a pre-processing phase with the objective of ensuring quality and consistency. Missing values are addressed through the utilisation of interpolation techniques or the continuation of the preceding known value. Subsequently, the data is normalised through the application of Min-Max scaling, thereby ensuring that all features contribute equally to the model training process. Additionally, the data is partitioned into training and test sets, with 80% allocated for training and 20% reserved for testing. This approach ensures that the model is evaluated on unseen data, preventing overfitting.

Model Architecture

The primary focus of this study is the implementation of a Bi-directional Long Short-Term Memory (BiLSTM) model. The architecture of the BiLSTM model is designed to capture long-term dependencies in the time series data by processing input sequences in both forward and backward directions. This bidirectional processing enables the model to leverage information from both past and future states, thereby enhancing the predictive accuracy. The model comprises multiple layers of LSTM units, each followed by dropout layers to mitigate overfitting. The final layer is a dense layer with a linear activation function, which outputs the predicted stock prices..

Training and Optimization

The BiLSTM model is trained using the Adam optimiser, which is known for its efficiency and adaptive learning rate capabilities. The loss function employed is the Mean Squared Error (MSE), which quantifies the mean squared discrepancy between the actual and predicted stock prices. Early stopping is utilised to terminate the training process once the validation loss ceases to decline, thereby preventing overfitting and ensuring optimal performance. The training process entails tuning hyperparameters, including the number of LSTM units, batch size, and learning rate, through a grid search to identify the optimal configuration for the model.

Evaluation

To evaluate the performance of the BiLSTM model, two key metrics are employed: Mean Absolute Percentage Error (MAPE) and Root Mean Squared Error (RMSE). MAPE measures the accuracy of the model by expressing the prediction error as a percentage, making it intuitive and easy to interpret. RMSE, on the other hand, provides a measure of the average magnitude of the prediction error, giving more weight to larger errors due to its squared nature. These metrics are calculated as follows:

$$MAPE = \frac{1}{n}\sum_{i=1}^{n}\left|\frac{y_i - \hat{y}_i}{y_i}\right| \times 100\% \quad (1)$$

$$RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2} \quad (2)$$

where y_i represents the actual stock prices, $\hat{y}_i$ represents the predicted stock prices, and n is the number of observations. By utilizing these metrics, the model's predictive performance is comprehensively evaluated, ensuring that it not only fits the training data well but also generalizes effectively to new, unseen data.

4. Result And Discussion

Data Description

The experimental setup for this study involves an analysis of the stock prices of four Sharia-compliant banks listed on the Indonesian Stock Exchange. The banks under consideration are Bank Aladin Syariah Tbk. (BANK), Bank Syariah Indonesia Tbk. (BRIS), Bank BTPN Syariah Tbk. (BTPS), and Bank Panin Dubai Syariah Tbk. (PNBS). The dataset comprises daily closing prices from January 2022 to June 2024. For the purposes of model training, data from January 2022 to December 2023 will be utilised, while the data from January 2024 to June 2024 will serve as the test set, with a view to evaluating the model's predictive performance.

Data Preprocessing

The data preprocessing phase is crucial for ensuring the accuracy and reliability of the predictive models. The dataset for this study comprises daily closing prices of four Sharia-compliant banks: Bank Aladin Syariah Tbk. (BANK), Bank Syariah Indonesia Tbk. (BRIS), Bank BTPN Syariah Tbk. (BTPS), and Bank Panin Dubai Syariah Tbk. (PNBS), spanning from January 2022 to June 2024. Initially, any missing values (NA) in the dataset will be addressed by employing interpolation techniques to maintain data continuity without introducing biases. Subsequently, the data will undergo normalization using Min-Max scaling, transforming the closing prices to a range between 0 and 1. This normalization step is essential to ensure that the model training process is not skewed by differing scales of the data points, thereby enhancing the model's learning efficiency. After normalization, the data will be split into training and testing sets, with data from January 2022 to December 2023 used for training and data from January 2024 to June 2024 used for testing. This preprocessing ensures that the data is clean, consistent, and appropriately scaled, providing a solid foundation for the subsequent modeling phase.

Experimental result

The results as shown in Figure 1 indicate that the model with hyperparameters {'units': 200, 'dropout_rate': 0.2} achieved the best performance, with an RMSE of 4.845 and a MAPE of 2.08%. This model configuration was subsequently used for further predictions on the test data

Table 1. Experiment result

Unit	Dropout rate	RMSE	MAPE (%)
100	0.2	5.123	2.34
150	0.3	4.987	2.21
200	0.2	4.845	2.08
100	0.4	5.032	2.29
150	0.5	4.903	2.18

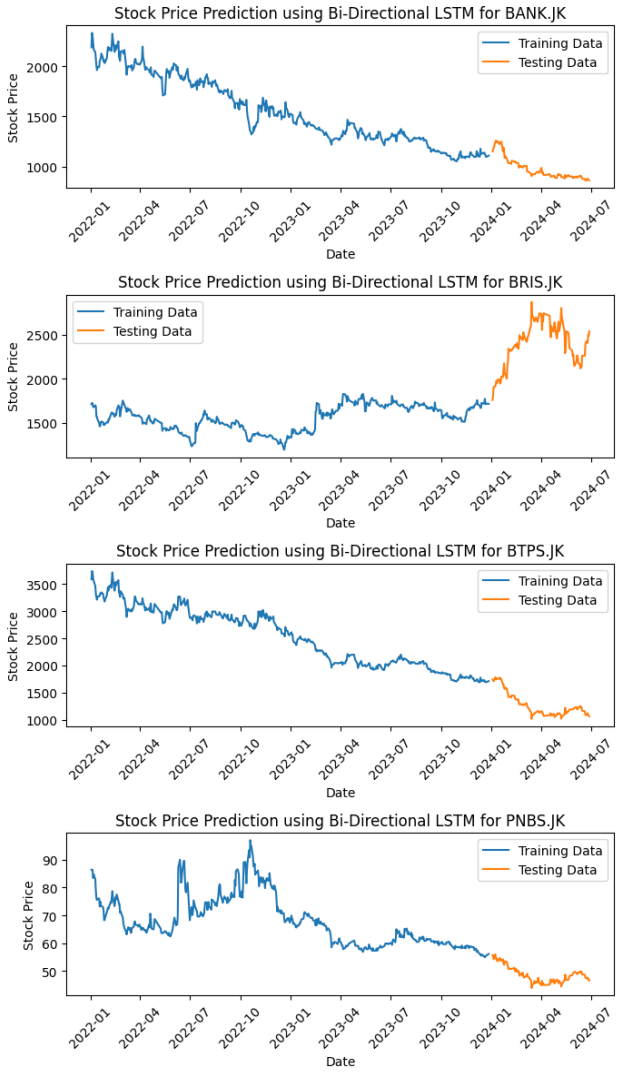


Figure 1. Stock Price Dataset

The aim of this study was to assess the efficacy of the Bi-Directional LSTM model in forecasting the prices of Islamic stocks, specifically those listed under the ticker symbols "BANK.JK", "BRIS.JK", "BTPS.JK", and "PNBS.JK". The results of the hyperparameter tuning process indicate a significant variance in performance based on the selected configurations. In particular, the number of units and dropout rate had a discernible impact on the model's accuracy, with a higher number of units generally correlating with superior performance.

The model's capacity to discern intricate temporal relationships within the stock price data is substantiated by the low RMSE and MAPE values, particularly in the trial exhibiting optimal performance. The bi-directional LSTM's architectural configuration, which permits the processing of information from both past and future states, is particularly well-suited to financial time series data, where such dependencies are crucial.

Nevertheless, limitations to the model's application must be acknowledged, despite its successful performance on the test data. The model's performance may be susceptible to fluctuations in the stock market, and its generalizability may be limited during periods of significant market volatility. Furthermore, the model was trained on a relatively short time frame, and its predictions may not be as robust over longer periods or in different market conditions.

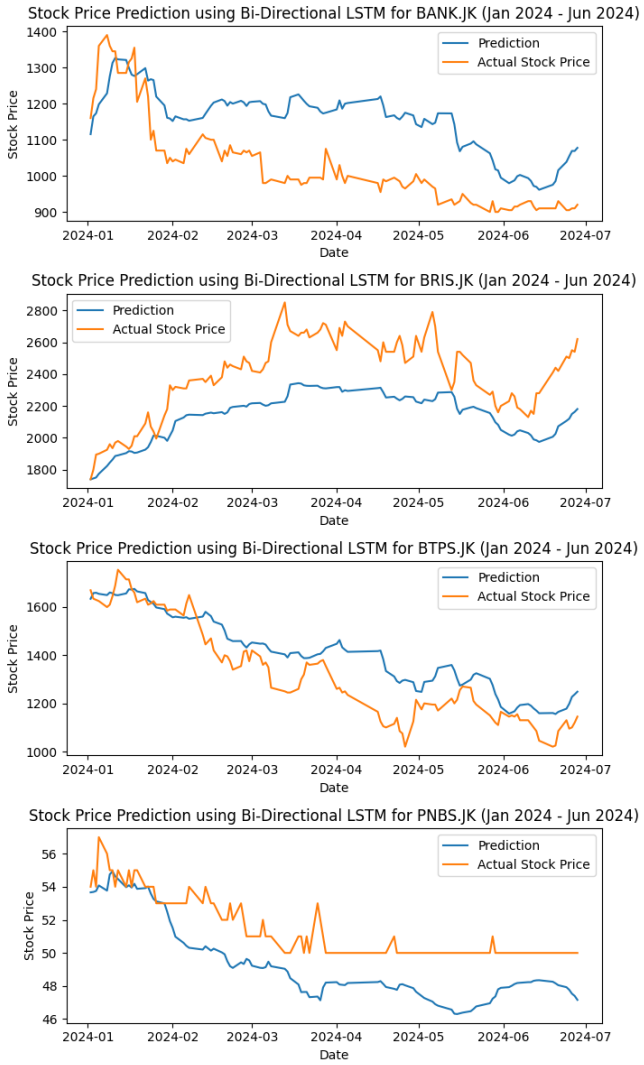


Figure 2. Prediction result

In this research, a Bi-LSTM model was employed to predict stock prices of Islamic banks in Indonesia. The model's performance was evaluated using RMSE (Root Mean Square Error) and MAPE (Mean Absolute Percentage Error) across different configurations, notably variations in unit numbers and dropout rates. The results demonstrated the model's effectiveness, with RMSE values ranging from 4.845 to 5.123 and MAPE between 2.08% and 2.34%. This discussion compares these findings with existing literature on Bi-LSTM and related deep learning models for stock price prediction.

Performance of Bi-LSTM

Bi-LSTM models have been extensively used in stock price prediction due to their ability to capture bidirectional dependencies in time series data. In this study, the best configuration yielded an RMSE of 4.845 and a MAPE of 2.08%. This performance is consistent with other studies that found Bi-LSTM to outperform unidirectional LSTM models in stock market prediction. For instance, a study predicting the S&P 500 index using Bi-LSTM reported lower error rates compared to traditional LSTM, particularly in capturing intricate market fluctuations [15,16]. The ability of Bi-LSTM to process both past and future information enables it to more accurately forecast volatile and non-linear time series like stock prices.

The model tested different configurations of units and dropout rates to assess their effect on prediction accuracy. The lowest RMSE (4.845) was achieved with 200 units and a dropout rate of 0.2, while the highest RMSE (5.123) was recorded with 100 units and a dropout rate of 0.2. These findings align with literature indicating that increasing the number of units generally improves model performance up to a point, as seen in a comparison of LSTM and Bi-LSTM models for various financial predictions, where higher unit counts led to more robust forecasts [17]. Moreover, the dropout rate plays a crucial role in preventing overfitting. In this study, the best-performing models used lower dropout

rates (0.2–0.3), which is consistent with findings from other stock price prediction models. Research on the optimal dropout rates in deep learning models suggests that too high a rate may lead to underfitting, reducing the model's ability to learn patterns in data [18].

Bi-LSTM's superior performance in this study is consistent with its application in other domains. For example, a comparative analysis of LSTM, GRU, and Bi-LSTM in stock price prediction showed that Bi-LSTM achieved the lowest prediction error when tested on both individual stock prices and stock indices. In these cases, Bi-LSTM consistently demonstrated better handling of complex time dependencies in the data[16]. Additionally, hybrid models combining Bi-LSTM with other techniques, such as attention mechanisms and feature extraction methods, have been shown to further enhance prediction accuracy. For example, one study combined Bi-LSTM with a Convolutional Neural Network (CNN) and attention mechanisms, resulting in even lower RMSE and MAPE values compared to standalone Bi-LSTM models [17] .

Several studies have explored the performance of deep learning models in financial markets. For instance, a study using a CNN-BiLSTM hybrid model for predicting the stock prices of the Shanghai Stock Exchange found that the hybrid model achieved better performance than individual models, with RMSE values lower than 5 across different configurations [17]. Another study that applied a Bi-LSTM model to predict the closing price of the Chinese stock market showed a similar trend, with MAPE values consistently below 2%, indicating that Bi-LSTM models are highly capable of capturing the intricate behaviors of stock market data [18].

A key observation from comparing the current study's results with other research is that Bi-LSTM models generally outperform unidirectional models, such as standard LSTM, particularly when applied to financial data with complex temporal patterns [16]. The bidirectional nature of Bi-LSTM allows the model to consider both historical and future trends, which is crucial for accurately predicting stock price movements in volatile markets like those of Islamic banks.

Limitations and Future Directions

While the Bi-LSTM model performed well in this study, there are still some limitations to consider. First, the study only explored a limited range of unit numbers and dropout rates. Future research could expand on these findings by experimenting with a wider range of configurations, including different optimizers, learning rates, and additional layers, to further improve the model's performance.

Moreover, external factors such as market sentiment, macroeconomic indicators, and geopolitical events were not incorporated into the model. Incorporating such features, as done in other studies using sentiment analysis and multi-input models, could enhance the predictive power of Bi-LSTM for stock prices Additionally, combining Bi-LSTM with other advanced techniques like reinforcement learning or genetic algorithms may yield even better results in stock price prediction.

5. Conclusion

In conclusion, the bidirectional LSTM model exhibited considerable promise in forecasting the prices of the selected Islamic stocks. Following meticulous hyperparameter tuning, the model exhibited minimal error rates, thereby indicating a high degree of accuracy in its predictions. The optimal model configuration, comprising 200 units and a dropout rate of 0.2, yielded the most precise predictions, as evidenced by the lowest RMSE and MAPE values. The study emphasises the significance of hyperparameter tuning in optimising model performance and illustrates the capabilities of the Bi-Directional LSTM in processing financial time series data. However, this also highlights the necessity for continuous model evaluation and adaptation in order to guarantee robustness across varying market conditions.

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Exploration of Middle School Science Teachers' Ability to Develop E-Assessment Tools for Science Literacy Based on Education for Sustainable Development

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Abstract

The scientific literacy scores of Indonesian students remain concerning. Therefore, there is a pressing need for innovations in e-assessment for scientific literacy. This study involved a training program on developing e-assessments based on Education for Sustainable Development (ESD). The participants included 30 science teachers from various junior high schools. The training covered topics such as e-assessment, scientific literacy, and ESD-based assessment. It was conducted over 18 hours. Subsequently, participants were tasked with creating ESD-based scientific literacy assessments, which were submitted two weeks later. A qualitative analysis was performed on the submitted assessments. The results indicated that the junior high school science teachers demonstrated an understanding of and were capable of developing ESD-based scientific literacy e-assessments.

Keywords: scientific literacy, E-assessment, ESD

1. Introduction

The scientific literacy scores of Indonesian students remain alarming. According to the Trends in International Mathematics and Science Study (TIMSS), Indonesian students' scientific literacy scores from 1999 to 2015 ranged from 397 to 510. In 2015, Indonesia ranked 44th out of 47 participants (Zetterqvist & Bach, 2023). Similarly, the Programme for International Student Assessment (PISA) reported that Indonesia ranked 62nd out of 70 participants with a score of 403 (Kamil et al., 2021). The most recent PISA report, released in December 2022, indicated a decline of 13 points in Indonesia's scientific literacy score (OECD, 2023). Research by Fadilah et al. (2020) revealed the following findings: (1) the highest understanding of scientific content was in biodiversity (82%), while the lowest was in fluids (4%), and the average score for scientific processes was 54%, with specific performances in identifying scientific issues (47%), explaining scientific phenomena (41%), and using scientific evidence (75%). The low levels of scientific literacy necessitate serious attention from teachers, educators, and policymakers.

Support for teachers to enhance scientific literacy has the potential to positively impact students' scores (Usmeldi et al., 2021). PISA defines three main dimensions of scientific literacy: content/science knowledge, context/science application, and competencies/science processes (Aditomo & Klieme, 2020). Science knowledge is essential for understanding natural phenomena and the changes caused by human activities. In terms of context, PISA assessments are framed within broader life situations and are not limited to the school environment. Scientific contexts can be personal, social, or global (OECD, 2023). Science competencies involve processes such as: (1) explaining surrounding phenomena scientifically; (2) evaluating and designing scientific investigations; and (3) interpreting data and scientific evidence.

A needs analysis conducted among science teachers in Yogyakarta indicated the following challenges: (1) teachers face difficulties in designing and implementing lessons that facilitate the enhancement of students' scientific literacy; (2) teachers lack understanding of the aspects and indicators of scientific literacy, often conflating it with reading literacy initiatives promoted in all junior high schools in Yogyakarta; and (3) teachers are not trained in developing scientific literacy assessments.

Based on discussions with the head of the Science Subject Teacher Discussion Group (MGMP) in Yogyakarta, the pressing issues to address include teachers' difficulties in developing lesson plans and scientific literacy assessments. In alignment with technological advancements and the digital era, many educational practices now incorporate technology. Additionally, as societal contexts evolve, learning is increasingly oriented towards Education for Sustainable Development (ESD). This approach is particularly relevant for scientific literacy assessment, which emphasizes competencies beyond mere knowledge acquisition. Given the importance of teachers' abilities to develop ESD and improve

students' scientific literacy, it is essential to conduct training on developing ESD-based scientific literacy e-assessments. The objective of this initiative is to enhance the capacity of teachers within the MGMP in Yogyakarta to create ESD-based scientific literacy assessments.

2. Method

The training program was conducted over one day using several methods, including:

a. **Brainstorming**
   This method was employed to elicit teachers' experiences in developing science assessments.
b. **Lecturing**
   This approach provided teachers with information regarding:
   (a) The concept of ESD-based assessment;
   (b) Scientific literacy assessment;
   (c) Assessment development.
c. **Discussion**
   This method was implemented in small groups to identify the needs for developing ESD-based assessments. Activities included curriculum analysis, material analysis, and collaborative concept mapping. This method was also used for evaluating the workshop activities both during the planning phase and throughout the implementation.
d. **Workshop**
   This method offered teachers the opportunity to practice developing assessments based on the outcomes of the discussion activities. It included demonstrations, simulations, consultations, and product discussions.

During this training, participants were divided into 15 groups, each consisting of two science teachers. All groups were given a period of two weeks to complete their ESD-based scientific literacy assessment tasks.

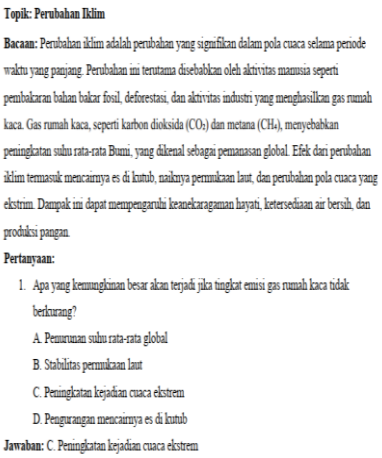
3. Results and Discussion

Based on the developed ESD-based scientific literacy assessments, the results are presented in Table 1.

Table 1. Quality of ESD-Based Scientific Literacy Assessment Items

No	Characteristic of Items	Presentation
1	Focus on Sustainability	100
2	Multidisciplinary Integration	100
3	Relevance to Daily Life	100
4	Critical Thinking Skills	100
5	Problem-Solving Solutions	100

Based on Table 1, it is evident that the science teachers from the MGMP in Bantul District are capable of developing ESD-based scientific literacy assessment items. An example of the ESD-based scientific literacy assessment item created by the teachers is presented in Figure 1.



Topik: Perubahan Iklim

Bacaan: Perubahan iklim adalah perubahan yang signifikan dalam pola cuaca selama periode waktu yang panjang. Perubahan ini terutama disebabkan oleh aktivitas manusia seperti pembakaran bahan bakar fosil, deforestasi, dan aktivitas industri yang menghasilkan gas rumah kaca. Gas rumah kaca, seperti karbon dioksida (CO_2) dan metana (CH_4), menyebabkan peningkatan suhu rata-rata Bumi, yang dikenal sebagai pemanasan global. Efek dari perubahan iklim termasuk mencairnya es di kutub, naiknya permukaan laut, dan perubahan pola cuaca yang ekstrim. Dampak ini dapat mempengaruhi keanekaragaman hayati, ketersediaan air bersih, dan produksi pangan.

Pertanyaan:

1. Apa yang kemungkinan besar akan terjadi jika tingkat emisi gas rumah kaca tidak berkurang?
   A. Penurunan suhu rata-rata global
   B. Stabilitas permukaan laut
   C. Peningkatan kejadian cuaca ekstrem
   D. Pengurangan mencairnya es di kutub

Jawaban: C. Peningkatan kejadian cuaca ekstrem

Figure 1. Example of ESD-Based Scientific Literacy Assessment Item Developed by Teachers

Based on Figure 1, it is evident that the focus on sustainability in the assessment item revolves around the discussion of climate change impacts. This approach fosters environmental awareness and encourages action. The item also integrates concepts from both chemistry and biology, demonstrating its multidisciplinary nature. Furthermore, the relevance of the item to daily life is highlighted through the connection to climate change, weather, and various gases, all of which are familiar to students. Answering this question requires critical thinking skills, emphasizing the importance of analysis and evaluation in understanding scientific issues.

4. Conclusion

ESD-based scientific literacy e-assessment is a crucial form of e-assessment. Therefore, science teachers must be proficient in developing ESD-based scientific literacy e-assessments. Training and support activities are highly effective in enhancing science teachers' abilities to create these e-assessments.

Acknowledgement

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TPACK-Based Learning Media Development Training for High School Teachers in Kulon Progo Regency

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Abstract

This paper discusses the implementation of a professional development program designed to empower high school teachers in Kulon Progo, Indonesia, through training on Technological Pedagogical Content Knowledge (TPACK). The program addresses the pressing need for enhancing teachers' pedagogical skills using digital media and technology in education, particularly for remote and hybrid learning environments. The study outlines the training structure, methods, and evaluation techniques, with the goal of improving the teaching quality in Kulon Progo and fostering more interactive and student-centered learning approaches. The training resulted in a significant increase in teachers' abilities to integrate technology into their teaching practices, improving both student engagement and educational outcomes. The paper concludes by discussing the implications of the TPACK framework in supporting teacher professional development and enhancing education quality in Indonesia.

Keywords: TPACK, teacher training, interactive media, digital learning, professional development

1. Introduction

The quality of education is deeply interconnected with the efficacy of instructional practices employed by teachers. Research indicates that student learning outcomes are significantly influenced by the methods and tools used in the classroom (Darling-Hammond et al., 2017). In Indonesia, particularly in Kulon Progo, the need for improving teaching practices has become evident. According to the 2019 National Examination results, the average test scores for students in both basic and secondary education levels in Kulon Progo were notably lower than the national average (Ministry of Education and Culture, 2019). This discrepancy highlights the urgent need for innovative solutions that can enhance the teaching and learning process.

One promising approach to address this issue is through the integration of digital technology in education. The use of technology in classrooms has been shown to improve student engagement, facilitate personalized learning, and enhance instructional delivery (Schmidt et al., 2009; Mishra & Koehler, 2006). However, integrating technology into teaching practices requires teachers to have both technological proficiency and an understanding of how to align these tools with pedagogical goals. This is where the TPACK (Technological Pedagogical Content Knowledge) framework plays a pivotal role.

The TPACK framework, developed by Mishra and Koehler (2006), provides a comprehensive approach to the integration of technology in education. It emphasizes the importance of combining technological knowledge with pedagogical and content knowledge, enabling teachers to use technology effectively in their lesson planning and delivery. Numerous studies have demonstrated the potential of the TPACK framework to improve teaching practices and student learning outcomes when properly implemented (Koehler & Mishra, 2009; Harris et al., 2010). This framework equips teachers with the necessary skills to adapt their instructional methods to the demands of a technology-driven educational landscape.

In response to the need for improved teaching practices in Kulon Progo, this paper examines a TPACK-based media development training program aimed at empowering high school teachers. The program seeks to enhance the quality of teaching by fostering both technological proficiency and pedagogical effectiveness. By equipping teachers with the tools and knowledge to create interactive media for their lessons, the training program aims to make learning more engaging, accessible, and relevant for students. This study evaluates the outcomes of the program and explores its implications for the future of teacher professional development in the context of digital learning environments.

2. Methodology

The study employed a Research and Development (R&D) methodology as outlined in the proposal, which included a multi-phase approach:

- **Needs Analysis**: A thorough analysis of the educational needs of high school teachers in Kulon Progo was conducted, focusing on their current teaching practices and challenges with integrating technology into their classrooms.
- **Planning and Design**: The training curriculum was designed based on the TPACK framework, incorporating various digital tools such as multimedia presentations, e-portfolios, and adaptive learning platforms.
- **Implementation**: Teachers participated in workshops and hands-on training sessions, where they were introduced to new technologies and taught how to integrate these tools into their teaching methods.
- **Evaluation and Revision**: The effectiveness of the program was evaluated through both qualitative and quantitative measures, including teacher feedback, student performance data, and classroom observations. Revisions were made based on this feedback to improve future iterations of the training program.

3. Results and Discussion

The training program yielded significant improvements in teachers' ability to integrate technology into their lessons. Teachers reported increased confidence in using digital tools, such as interactive whiteboards, online quizzes, and virtual simulations, to enhance student engagement and learning outcomes. The adoption of TPACK not only improved teachers' technological skills but also allowed them to better align their content delivery with pedagogical goals.

The discussion highlights the importance of continued professional development in equipping teachers with the skills to meet the demands of 21st-century education. The TPACK framework proved to be an effective model for guiding teachers in the integration of technology, pedagogy, and content knowledge. Furthermore, the program's success underscores the need for institutional support, such as providing access to necessary digital infrastructure and offering ongoing mentoring and training opportunities.

4. Conclusion

This study demonstrates the effectiveness of the TPACK-based media development training program in improving the teaching practices of high school teachers in Kulon Progo. By focusing on the integration of technology into pedagogical strategies, the program has the potential to significantly enhance the quality of education in the region. The findings suggest that TPACK can serve as a valuable framework for teacher professional development, particularly in areas where digital literacy is still emerging. Future research should explore the long-term impacts of such training on student performance and investigate how similar programs can be scaled to other regions.

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Social Media for Children: A Social Ecological Analysis of the Role of Family and School

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Abstract

The purpose of this study is to reveal the role that families and schools should play in addressing the phenomenon of the negative effects of social media for children. Through qualitative research with a case study approach, the role of families and schools in addressing social media for children is analyzed in depth by using Bronfrenbrenner's social ecology theory to analyze the results obtained. Families and schools have a crucial role in educating and evaluating children's social media through programmed and continuous guidance and supervision. If the role is not performed, then the negative effects of social media such as addiction, stress, depression, anxiety, content imitation, can easily affect children's character.

Keywords: Social Media, Families, Schools, Effect, Role

1. Introduction

Play and learning in a child's world become a process in the formation of creativity and thinking—children's cognitive, affective, and psychomotor skills are trained [1].Children need interaction between themselves, the environment, peers, and others around them to gain knowledge. Everything that is abstract and concrete in the surrounding environment is a source of learning for children [2,3]. However, social media has changed children's learning and experience [4]. Thus, concerns from various parties are getting stronger because social media not only has a positive role but also has a negative effect that affects children's emotional and character development, which has a domino effect on their cognitive and affective.

Data shows that Indonesia ranks 9th out of 10 countries that use social media the most, accessing social media for an average of 191 minutes a day [5]. WhatsApp, Instagram, Facebook and TikTok are the four most popular platforms used in Indonesia [6]. In fact, Indonesia ranks second among all countries in the world that frequently access the TikTok application [7]. Every year, TikTok users experience a surge from 2020 to 2022 by 22% [8]. In addition to social media, people in Indonesia also like to play online games, amounting to 94.5 million online game players, and ranks 3rd from all countries in the world [9]. Online game players spend more than four hours a day [10]. Indonesia itself has policies related to internet access contained in Government Regulation No. 71 of 2019 and Minister of Communication and Information Technology Regulation No. 19 of 2019, both of which limit content that violates the law [11]. However, there are no policies related to usage intensity, content restrictions, content creation, and specific media platforms. As a result, the restriction policy cannot be fully implemented.

Today, children easily access social media, and every child has a device and internet facilities in their environment [12]. Reporting from Dataindonesia.id, the percentage of internet use in 2021 to 2022 by children aged 5-12 years is 62.42%, while at the age of 13-18 years, it is 99.16%. The negative impacts of social media such as language looseness-making popular language dominate over standard language, seeking answers instantly-eliminating the spirit for deeper exploration of questions, decreasing time for direct social interaction-time spent too much on social media, weakening ways of behaving (etiquette and ethics) when communicating with others, and the heavy flow of social media

with a variety of false truths [13]. Apart from that, social media has positive impacts, such as meetings without distance (communication with parents, schools, and peers), a variety of information to increase knowledge, different truths teaching respect for differences, and an entertainment arena to unwind [14]. From this explanation, it can be synthesized that the positive and negative impacts of social media received by children are largely determined by the social structures that supervise and guide them, including family and school [15].

Schools invite parents to be involved in children's education, especially in their cognitive and emotional growth and development, so that in providing cognitive learning, the formation of children's ethics and morals is a shared responsibility [16]. Cognitive and affective formation is certainly inseparable from various influencing indicators, one of which is social media. Although in reality, parents state that social media tends to have more negative impacts than positive because, with the existence of social media, children spend too long in cyberspace and exposure to inappropriate content that is not suitable for their age. Parents consider these features to hinder education [17]. Therefore, parents need to reinterpret social media, which has become their children's latest social environment, and think about the best parenting to provide guidance regarding the limits of good and bad social media accessed by children.

Teachers and principals who are educators of children at school must educate, supervise, and evaluate children's social media access by providing space and time for children to think critically when viewing various content on social media [18], because content on social media has false truths and inappropriate displays such as violence and sexuality - content that children must filter wisely. Children's character development at school should be communicated intensely to the family [19]. Families and schools become role models in modeling the positive functions of social media to children, such as intense communication in discussing children's development at school and contextual learning that requires cooperation between teachers and parents. If the communication space is open between teachers and parents, the process of supervising children can be done easily [20]. Although children are allowed to communicate directly with their teachers through social media, teachers need to limit the topic of communication, which does not go beyond learning at school.

Reality has shown that bad characters on social media are feared to affect children's education. This phenomenon obliges parents always to advise children and teachers to provide an overview of the adverse effects of social media in schools through seminars or case studies in classroom learning [21].

Based on the complex phenomenon of social media and its implications for students, this article will explore the roles that families and schools should play in managing children's social media. The results of this research will be discussed in depth using Bronfenbrenne's social ecology theory.

2. Methods

This research uses a qualitative method with a case study approach to reveal cases that occur in the field in depth. The case study approach deals directly with individual cases in actual reality . The research subjects were 22 people consisting of parents, teachers, principals, and fifth-grade students at Primadana and Supriyadi Elementary Schools in Semarang. The selection of subjects considered the researcher's assumptions, such as active social media users and family involvement in providing access and schools that have an intense awareness of the impact of social media on students. These limitations were used to look at the breadth and depth of the research, not simply the number of samples included [22,23]. The purpose of sampling is to obtain relevant data, abundant in essence and rich in information appropriate to the research [22] The selection of research subjects is based on purposeful sampling techniques.

Data collection techniques included in-depth interviews, observation, and documentation conducted at home and school. In-depth interviews were conducted with parents, teachers, principals, and students. Observations were made to observe students. Documentation consisted of brief biographical data of the informants. Triangulation of techniques and sources was carried out to verify the validity of the data that had been taken. The analysis in this study used techniques from Hubberman & Milles, namely field notes, data presentation, data reduction, and conclusion drawing [24], and the matrix used in data presentation used a role matrix [22]. In this study, the data were presented in order from families (parents), schools (teachers & principals), and students (social media users). The results of this study will be discussed using Bronfenbrenner's social ecology theory.

3. Results And Discussion

Results

The results presented in this research are in narrative form. The researcher tells a complex and comprehensive story from the data obtained from various sources. The presentation of the results in narrative form was chosen because the interview data was too long (although it had gone through the data sorting process) from 22 research subjects. Categories of results according to student names written in the form of initial names, including EKB, MAF, FAR, AZE, JKA, VLN, LNA, LNF. While the initial names for teachers and principals include AII, NFI, ADY, REE, MSN, and WBW. The results of research from families and students, there are backgrounds, family roles, and students' use of social media. Meanwhile, the research results obtained from schools outline three operational indicators of social media by students, namely entertainment, education, and communication. At the end of the research results, the categories of social media management by students synthesised from the family and school are presented.

Family: Its Role in Children's Social Media Operations

a. EKB

In EKB's family, her father is self-employed, and her mother is a pharmacist. But as parents, they always take the time to educate and evaluate EKB. This is evident from the efforts of EKB's father. While working, EKB's father invited his son to join him in learning and playing at his shop. When EKB's mother comes home, she also discusses with her father and EKB at the shop. More attention is given because EKB is an only child; his three younger siblings have passed away. The rules in EKB's family are based on an agreement between her parents and EKB. However, when it comes to the use of social media and online games, EKB's father gives EKB a bit of freedom.

EKB's father explained that the use of social media as entertainment for EKB is free but organized. Free in the sense that there is no specific schedule, while regular means still using social media according to his needs and age. This requires strict evaluation by EKB's father. As a father, he also gave EKB the responsibility of time and quota to use it wisely. His father often advised him that there should be no harsh or negative sentences on WhatsApp, let alone demonizing people.

EKB's father admits that social media is very helpful in its role as an educational medium, but the role of parents is still needed. He reasoned that if children are less critical in seeking information and knowledge on social media, then the results of their answers will not be valid. So confirmation is still needed from parents.

According to EKB's father, the presence of social media as a means of communication has a positive role. This is because it facilitates communication between busy parents and their children. Likewise, to monitor the attitude and behavior of children at school, the communication relationship between parents and teachers is always established. If there is deviant behavior, parents can quickly ask the class teacher directly.

The use of social media is given on the condition that it is free and organized; EKB has the responsibility to utilize the time and quota to use social media as entertainment. The negative impact did not happen to EKB because her parents gave her strict supervision control, although it was not shown concretely in front of EKB. Social media entertainment is limited to watching Mael Lee's vlogger account on YouTube, which displays parodies of social criticism or indeed contains humor content. EKB only needs social media as communication to take her home from school.

b. MAF

MAF's family, whose father works as a lecturer returns home late at night. And MAF's mother is a part-time private employee, making the role of educating, teaching, and evaluating controlled by the mother's role. Meanwhile, supervision and policy are held by the father's role. MAF's mother takes a part-time job in order to have more time for MAF and his younger brother, and MAF's father, although he comes home late at night, immediately provides supervision and policies in the form of educating and evaluating, as well as reminding various family rules between parents and students that have been agreed upon.

MAF's father, he allows his children to utilize social media as a means of education. Supervision is given when his child has obtained information from social media. Discussions are always held between parents and children to find the right answers. Although he admits that he is helped by social

media as a means of education, MAF's father argues that the knowledge on social media is little, the reason is because the final results are still discussed and evaluated by parents.

Social media as a means of communication does provide easy access because it crosses time and distance. MAF's father said that the Whatsapp application was able to communicate various activities at home in the midst of his busy schedule as a lecturer at a private university. This communication is carried out by him to monitor student activities at home. However, one time he evaluated the Whatsapp group of MAF's class; the content was chaotic and excessive. There were many unimportant discussions, content that was not age-appropriate, and harsh words. The content of these conversations can have a negative influence on children. He also agreed that control over the use of social media as a means of communication should be carried out continuously.

MAF tends to utilize social media as a means of entertainment, playing on social media accounts to communicate online games with his friends, looking for everything about online games on social media, and watching YouTube shows that show a player playing one of the online games with a vulgar display or not in accordance with his age (account: KIMI HIME) and playing online games (PUBG and Mobile Legends). MAF admitted that she was tempted to watch KIMIHIME because it looks vulgar and shows cleavage. MAF hid this from her parents.

c. FAR

FAR's family father is a nurse and health lecturer who is very busy in his career. Furthermore, FAR's mother works as a housewife. Even so, FAR's father spends time with his son to educate, teach knowledge, evaluate, and supervise the use of social media. FAR's parents divide the tasks in implementing the four indicators; the father educates affective and psychomotor, which focus on religious values, politeness, and social media. And FAR's mother focuses on her child's cognitive or academic.

FAR's father feels a dilemma in giving responsibility to his son for using social media as entertainment. On the one hand, he does not agree with his son using social media as entertainment since elementary school. On the other hand, his child needs social media to look for assignments and communicate; in the midst of being busy looking for assignments, children will definitely get a gap to find entertainment on social media. FAR's father also admitted that online games make it difficult for him to control his children. Online games make users always continue playing. This makes FAR forget about time. Likewise with YouTube, FAR's father's fear is in the YouTube algorithm, namely other video recommendations while playing videos. FAR's father realizes that his son is already smart; it is proven that if parents pass by to supervise, FAR immediately presses the back/home button.

Social media as a means of education is recognized by FAR's father. Even so, his father participates as a tutor and supervisor. Especially for doing assignments from school, he guides his son in finding answers on social media.

FAR's father explained the advantage of communication through social media is that it makes it easier to listen to teacher reports on children's behavior at school about their emotional, social and cognitive development, such as preventing bullying practices and children's misunderstandings in the learning process. Children themselves can ask for assignments or information from the school to their peers or class teachers. Supervisory control is carried out by FAR's father in monitoring his child's WhatsApp application.

The role of social media is scheduled and supervised by FAR's parents by checking the history of social media. In terms of education, social media is also given flexibility on the condition that it is only for the search for knowledge, while social media communication is needed for parents to monitor FAR in attitudes and behavior to avoid bullying and behavioral deviations. As for FAR, entertainment is only through YouTube on schedule and Instagram. YouTube is more focused on educational media to support learning. Social media communication is needed by FAR only to communicate with parents.

d. AZE

In AZE's family, her father works as a banker in Rembang city, while her mother works as a housewife. AZE's father and mother have bachelor's degrees. AZE's family lives not far from Supriyadi Elementary School. Because the father works outside the city, the mother's role has more portion at home in educating and evaluating AZE.

AZE's mother answered that the schedule for using social media as entertainment had been given to the child. The program was implemented to limit excessive use. Supervisory control is carried out by his father, who comes home once a week to check the search history in AZE's various social media applications. The impact felt by her mother is the negative imitation of social media, such as being brave to her parents and feeling lazy.

For AZE's family, if the child has an assignment from school or wants to find information through social media, they are allowed to use the search engine. Supervisory control is not given.

As a means of communication, Mrs. AZE said the benefits of social media include being able to monitor and supervise her children while at school. Such supervision can be in the cognitive (learning outcomes) and affective (attitude or behavior) domains. Meanwhile, AZE needs social media communication to communicate with her father, who works out of town.

Social media has also become a necessity for AZE. The use of social media as entertainment is always monitored by AZE's parents by checking AZE's social media history and search history. Social media that is often favored by AZE is videos from Korea (K-POP), although, in its operation, there is a scheduled regulatory agreement, namely on weekends (Friday-Sunday). Utilization as education is also used instantly by AZE as a shortcut when encountering difficult assignments or questions from school. For social media as communication, AZE's mother is needed to monitor and supervise AZE, but there needs to be communication with the class teacher. Meanwhile, AZE needs social media communication for video calls with her father, who works out of town.

Social media has also become a necessity for AZE. The use of social media as entertainment is always supervised by AZE's parents by checking AZE's social media history and search history. Social media that is often favored by AZE is videos from Korea (K-POP), although, in its operation, there is a scheduled regulatory agreement, namely on weekends (Friday-Sunday). Utilization as education is also used instantly by AZE as a shortcut when encountering difficult assignments or questions from school. For social media as communication, AZE's mother is needed to monitor and supervise AZE, but there is no communication with the class teacher. Meanwhile, AZE needs social media communication for video calls with her father, who works out of town.

e. JKA

In JKA's family, her father is an entrepreneur who works outside the city, while her mother is a housewife. JKA's family lives in one of Semarang's housing estates. JKA's mother admits that she plays a bigger role at home than JKA's father, as her father often goes out of town. Parents make rules and make agreements with their children about using social media as entertainment. Even so, as a mother, she emphasizes that the father's role is very important. She feels that her children will be scared if their mother calls their father, so they will stop playing on social media. However, Mrs. JKA cannot limit her son's passion for K-POP, so JKA imitates things in K-POP and brings them into his daily activities, such as songs, dances, and performances. JKA's mother conducts supervision by always checking the search history when the device is finished making children's entertainment on social media.

JKA's parents find social media search engines helpful. If JKA gets an assignment from school, she automatically instructs him to open his device and ask his child to independently search for various answers on social media. Mrs. JKA said that the benefit of social media as a means of communication is that information from the school and family is always available and up-to-date. Mrs. JKA does not control the supervision and ownership of her children's social media accounts.

Social media plays an active role in JKA's life, one of which is to foster imitation. This was stated by her mother but denied by JKA herself. In entertainment, JKA often imitates the language, behavior, and appearance of K-POP. Although the use of social media for entertainment is scheduled, sometimes JKA's mother relaxes the use of her son. Supervision of social media is monitored by checking the history of social media searches. JKA likes to open YouTube as entertainment by watching Blackpink and BTS (K-POP) as her reference in imitating their style, language, appearance, and dance. For social media as education, although JKA's mother argues that every assignment is done through social media using a laptop, it is different from what JKA said, that she searches via Google. This behavior makes JKA addicted to social media, as evidenced when she encounters a difficult problem or assignment, then opens a search engine on social media. Social media as a means of communication has little effect on JKA, as he does not interact with friends, family, and teachers and often does activities only at home. JKA's mother does not control her attitude at school with the class teacher and only uses communication for information or announcements from the school.

f. VLN

In VLN's family, her father is a private sector employee, and her mother is a part-time entrepreneur, housewife and psychology student. The psychology major was deliberately chosen to educate VLN so that VLN's mother could understand VLN's character deeply. VLN's family lives in a sparsely populated housing estate.

VLN's mother admits that the influence of gadgets is very big on children. As a parent, she is still confused about how to limit her child's use of social media and online games. Her mother can still do the law of consequences; if her mother does not hold the device, VLN is not allowed to play with the device. But only to that extent; the rest of VLN's mother uses religious education for the child. This was done because, as a parent, she was no longer able to provide excessive supervision and follow-up.

As a psychology student, Mrs. VLN bases the psychology of children when seeking knowledge through social media - there must be a percentage. Not all of the child's questions should be searched through social media. This is so that children do not depend on social media. According to him, children also need to read learning information from books. The reason is there is some information on social media that cannot be accounted for. So, when the child's learning results are finished, parents must check them again and match them with the material in the textbook.

VLN's father is not allowed to bring gadgets to school, which makes it difficult for Mrs. VLN to communicate with her child regarding school pick-up and drop-off. Even though the communication application from social media is needed for Mrs. VLN to pick up her child and deliver her belongings that are left at home. Mrs. VLN does not control her children's behavior at school. In addition, there is no communication to monitor children's behavior between parents and class teachers.

Social media has a big influence on VLN's life. He is more inclined to use social media and online games as entertainment. The entertainment can be in the form of playing online games (PUBG and mobile legend) and watching youtube accounts that display tutorials on playing online games. The most influential impact on VLN's politeness is that she is tempted and likes to watch KIMIHIME's YouTube account. VLN admitted that she liked KIMIHIME's videos because of her appearance: her breasts were slightly exposed. This happened due to the unscheduled use of devices by VLN's parents, so every day, VLN freely accessed online games and KIMIHIME YouTube. Even though parents have supervised checking the history, VLN can open it secretly without the knowledge of VLN's parents.

However, it was through watching online games that VLN learned about the abusive talk (this was also conveyed by VLN's mother), as well as YouTube videos from the KIMIHIME account that made VLN tempted because of the sexy appearance, which had an impact on VLN's psychology and behavior in viewing a woman.

g. LNA

In LNA's family, her father is self-employed, and her mother is a housewife. Her father has a bachelor's degree (diploma) in multimedia, and her mother has a bachelor's degree in information systems. LNA's family lives in a densely populated housing estate in the neighborhood of private offices. LNA's father has his own business and often comes home; even so, her father has a small portion of the time for LNA. LNA's father still likes to channel his hobby to futsal. While LNA's mother has more time for her children at home, even so, sometimes her time is divided into two with the automotive community she participates in. LNA's parents' flexibility is because LNA's grandparents live together at home.

LNA's mother explained that although social media is important for children, limits must remain. She gives advice to her children on what content they should and should not see. In fact, by giving two sides of black and white, it makes children more curious to open it. Supervisory control is carried out by checking the history, as well as blocking negative and inappropriate content for their age. As for the child's passion for Korean movies, the mother cannot limit it because it has become her child's hobby or spectacle.

Mrs. LNA does not provide follow-up in monitoring social media as a means of education by children. In addition to not providing supervisory control, she directly entrusts scientific information to children; there needs to be direction and guidance from parents.

Mrs. LNA emphasized that social media as a means of communication is needed to obtain information from the school and ask about activities with children. LNA's parents did not use social media as a medium of communication with teachers in monitoring children's behavior at school.

The role of social media has a significant impact on LNA. Although LNA's mother has blocked negative social media accounts, she is unable to limit the consumption of social media as entertainment, one of which is LNA's penchant for consuming K-POP entertainment. This makes LNA often use YouTube to watch KPOP and even buy books. Social media as education is done on the basis of LNA's family not providing tutoring to LNA. Meanwhile, LNA uses social media as communication to channel her hobby of community on social media with other KPOP fans. LNA's behavior in utilizing social media is due to the absence of a schedule and LNA's parents, who allow her always to access social media.

h. ALF

ALF's family has a self-employed father who directs a car repair shop. ALF's mother used to work at the education and culture office outside of the city and decided to quit her job to spend time with her children. ALF's father has a bachelor's degree in economics and a bachelor's degree in mechanical engineering (trainer), while ALF's mother has a bachelor's degree in public administration.

ALF's mother said that giving children gadgets to play on social media is inappropriate. As a parent, she does not make policies, rules or agreements with her children but says that the government is the most responsible. For Mrs. ALF, the government should provide restrictions by giving halal and haram "signs" on each social media application.

Mrs. ALF said that social media as an educational tool is only to support the learning program. Stay focused on the material taught by teachers in class and in textbooks. For her, parents must also select the answers that children get from social media search engines.

According to Mrs. ALF, children do not need to be given social media applications on their gadgets. Supervision of children is limited to Whatsapp groups between guardians and class teachers. ALF's parents do not control supervision through personal communication with the teacher.

The role of social media in ALF is not significant. This is a result of the parents' strict policies and rules for ALF. Although scheduled, ALF only has a short time to open social media for entertainment, such as YouTube. Although ALF says he does not want to play online games and his mother does not allow it, ALF's history of watching YouTube online games implicitly suggests that he wants to play online games like his friends. Not having a social media account for entertainment and communication, ALF argues that he does not need to have one because it is not important to him. Even though ALF only opens YouTube for entertainment, his mother still feels guilty for providing these facilities and says that the government should be responsible for labeling social media as "halal" and "haram".

School: Its Role in Children's Social Media Operations

Teachers and principals also have a crucial role in determining policies through advice given to students. Directions and restrictions need to be given by educators to their students while at school. To simplify the goals and objectives conveyed by the school, it is categorized into three indicators obtained from the answers of the research subjects.

1. Entertainment

AII said that in using social media as entertainment, students must first obtain moral education, to filter and sort out what videos they can or cannot imitate. As a class teacher, AII gives this advice, but there needs to be supervision and communication with parents regarding students' use of social media as entertainment.

NFI said that not only do teachers play an important role, but there must be good cooperation with parents. Because parents have more time with students, supervision should be carried out by parents freely. Because at school it is not allowed to bring devices, parents should have supervisory control by always checking the accounts and social media history used by students as entertainment. According to Mrs. NFI, advice on the use of social media is also needed by students, although she realizes that there must be negative impacts. However, so far, she feels that there has been no "internal"

communication between teachers and parents to discuss the role of social media as entertainment by students.

According to ADY, the use of devices to browse social media as entertainment can mean that: students have special characters in learning, and there are students who have to play social media first in order to learn. Although ADY himself admits that if social media is very broad and unlimited, then there must be limits. The restrictions were not explained by ADY. He did not internalize value education related to which concepts should be imitated and should not be imitated from social media by students.

REE said that the use of social media as student entertainment is common thing, but limits are also needed. Even so, he did not explain what limits needed to be done. There is no supervisory control between teachers and parents in the use of social media by students. As a classroom teacher, REE observes that there is a lot of imitation of student behavior due to social media, such as Korean movies and songs. These Korean films and songs produce language behavior, appearance, body style, dance, and Korean songs sung by students.

As the principal, MSN made a policy restricting students from bringing devices to school. As a follow-up step, MSN asked parents to always appeal to their children by checking their social media history. According to her, the impacts of excessive social media use include: physical (eye and body health) and psychological (decreased sense of empathy, emotions tend to erupt, uncontrolled imitation behavior, eroding faith).

WBW, as the school principal gave a positive appreciation for the existence of social media such as Instagram and YouTube. For him, social media is indeed needed by students as long as it is utilized as well as possible. However, policies, programs, advice, and supervisory control are not carried out by Mr. WBW as restrictions on the use of social media by students so that they are not used excessively.

2. Education

AII conveyed that the existence of social media can help students explore when learning to explore the subject matter. AII gave direction in the form of advice: it is permissible to open social media as long as it is for doing assignments.

NFI said that they could get a variety of general knowledge that is in books from social media. She gave examples such as practical learning tips, mathematical formulas, and various other materials. However, NFI also provides restrictions through advice so that not all questions or assignments are done through social media. This is an effort so that students can avoid having a dependence on social media.

ADY admits that there are several school assignments whose completion requires social media. Because he believes that the material contained in the national curriculum student book is very little, and the scope is small. So social media is needed to explore and elaborate on the material in more depth.

REE said that social media is very good if it is used to support learning. REE even asked students to look for references on social media as a comparison to the material in the book. However, REE gave advice on the need to filter answers obtained from social media because the truth is still doubtful.

As a principal, MSN realizes that the advancement of technology is a necessity, cannot be rejected, and, as much as possible, taken advantage of. He conveyed to parents the need for assistance to students, even though social media was used to do assignments at home. Supervisory control is carried out continuously by Mr. Muhsino in collaboration with his parents.

As the principal, WBW, said that the positive purpose of social media is to explore learning materials that have been given by teachers in class. However, he does not conduct policies and supervision of students regarding students' use of social media as a means of learning.

3. Communication

AII said that social media, as a means of communication, can help teachers communicate about student behavior at school to parents. This behavior can be seen in the development of students in participating in learning or their politeness behavior. If the teacher considers students good enough, then there is no "internal" communication between teachers and parents. NFI said that social media as a means of communication does not affect teachers and students. The benefits are felt if there is communication between teachers and parents. Because students cannot bring devices, teachers only store some students' numbers. It is intended that parents can supervise their children at home and school.

Even though various behavioral deviations have been written in the order book, NFI still reports them to parents. What parents often ask is about cognitive and behavioral issues at school.

According to ADY, social media such as Whatsapp helps various school programs and policies that must be carried out. This is realized through the communication relationship between teachers and parents. ADY also said that parents often ask about their children's cognitive (learning outcomes), affective (behavior), and spiritual (religious education) at school. Meanwhile, there needs to be more communication through social media between teachers and students.

REE feels helped by the presence of social media through its communication features. It can communicate various important information from the school to parents. If there is deviant student behavior, parents can directly contact the teacher via social media to discuss it.

As the principal, MSN admits that social media as a medium of communication is indeed very helpful as a liaison between the school and the family. However, there is some information that becomes privacy to the school, which cannot be explicitly conveyed to parents. Teachers must be able to sort and choose things that need to be conveyed to parents. The communication should be formal and one-way (from teacher to parent). If there is something that parents want to ask, MSN suggests coming directly to the school. This policy is to make the discussion more comfortable because the language on social media is very limited. The limited language on social media often needs to be improved between teachers, parents and students.

As the principal, WBW supports social media as a means of communication between teachers and parents. However, he always provides direction and supervision to each teacher to avoid getting involved in less useful chats. For this reason, Mr. WBW appealed to teachers to be able to condition communication formally and only important information from the school, not more than that. According to him, communication is done through social media as needed.

Social Media: Wise Steps to Provide Operational Limits

All research subjects agreed that social media is a necessity born from the development of the latest technology, so its presence cannot be rejected and must be filtered in its operation. The restrictions presented below are the results of reductions taken from interviews and observations made to families, schools, and students. This limitation is needed so that families and schools wisely give advice and make agreements with students regarding the use of social media.

1. Scheduled Use

Social media operations have a clear schedule agreed upon by the family, school, and students. Because of the unlimited freedom in using social media, it causes negative effects on students, namely addictive behavior.

2. Social Media Account Ownership

In a technology-based era, social media is needed to establish relationships with friends in cyberspace. However, the creation of social media accounts needs to be studied comprehensively about its usefulness. Families and schools communicate and consult: Is the student ready to have a social media account?

3. Search History

Families have full responsibility for checking the history of students' social media accounts. The school can only provide reminders to the family regarding the search history on the student's social media account. Checking the search history is done continuously, which can be done directly (opening the student's device) or remotely (cloning the student's social media account on the parent's device). Although the gap remains because of the sophistication of today's technology that gives users the flexibility to delete history one by one or in its entirety.

4. Restricted Content

Parents can consult with teachers regarding content that needs to be restricted because it is not appropriate for the age of the students, especially in their emotional and social development. Blocking social media applications that have a tendency to show violent and sexual content should be done.

5. The Truth on Social Media is Not Credible

Social media offers a variety of information about science, from classical to contemporary. Families and schools need to advise students not to rely too much on social media. Information on social media should only be used as a reference, not as an absolute answer. Students need to confirm answers obtained on social media (Instagram, YouTube, etc.) with notebooks and textbooks obtained from the school.

6. Limited Language

Social media does offer access to communication across distance and time. However, families and schools need to conduct an in-depth study regarding the needs of students in communicating with their families, schools, or peers. The language on social media could be more extensive, especially in written language. This limitation can lead to misunderstandings because individuals who interact cannot see verbal (concrete) expressions with their interlocutors.

Discussion

The discussion in this research is to review the results of case studies of students as social media users and the roles that must be carried out by their families and schools, starting from the grand theory analysis, followed by the roles and policies of families and schools presented with supporting theories.

Social Ecology: Family, School Relationships in View of Student Social Media Operations

Bronfenbrenner's social ecology states and visualizes that a person's development is shaped by the influence of a complex set of systems in the environment [25]. These complex systems consist of family, peers, social institutions (including schools), and individual communities and cultures (including social media). Bronfenbrenner's social-ecological system categorizes five systems of the surrounding environment: close interpersonal interactions to broad cultural influences. The five systems are the microsystem, mesosystem, exosystem, macrosystem and chronosystem (Santrock, 2018), as illustrated in the following figure:

The microsystem consisting of family, school, and students' surroundings (peers and social media) is relevant to the Tri-Center of Education initiated by K.H.Dewantara, that the education received by students occurs in the family realm, the college realm, and the youth or community realm [26–28]. In these three environments, a dialectical process occurs (mesosystem), providing a mutual experience—influencing and being influenced between social actors and social structures. The ecosystem is the condition that determines the development of students, such as social media and background from family and school (socio-cultural). The macrosystem consists of the values that surround students' lives, which can be seen from the advice and regulations practiced by families and schools. Meanwhile, the Chronosystem is the time dimension that provides guidance on various levels of events or essential phenomena of students' sociocultural conditions.

Microsystems are the environments where individuals spend the most time, in families, peers, schools and neighborhoods. In the microsystem, individuals interact directly with parents, teachers, peers and others. For Bronfenbrenner, the student is not a passive recipient of experiences but rather someone who reciprocally interacts with others and helps build the microsystem. Mesosystems involve the relationships between microsystems. Examples are the relationships between family experiences and school experiences and between family and peers. Education conducted at home is nothing but a socio-cultural practice, meaning that values are internalized and practiced in the form of programs that parents have arranged for children [29]. Although sometimes families and schools experience misunderstandings in educating children due to ignorance of each other's educational goals, families and schools learn and understand each other to reach a consensus. Families must participate in continuing the learning process that has been carried out at school [30]

Any decision or policy made by the family determines the quality of childcare [31]. A father and mother are responsible for parenting children. Although, in practice, psychologically, a mother has a stronger power to use her mother tongue in guiding children [32]. Of course, this can be utilized by a mother to regulate access to entertainment by children through social media. The development and emotional problems of students are determined by the parenting provided by their families. Family structural therapy is needed to fulfill the roles taken between father and mother in parenting in educating children. An understanding that teaches the limits of each role as a parent so that the practice of a parent in providing guidance to children is clear and not contradictory [33]. This can be realized when the family presents learning to children through experience; a mother gives advice to children about the positive

and negative effects of social media, while a father provides firmness in the rules that have been made regarding the use of social media. Economic family background can be used as a positive or negative basis for providing valuable education to children [34]. For example, parents who are low in social and economic class have two choices, making it an excuse for children to be independent in determining their learning process or still taking the time to educate and evaluate children's development. Therefore, the supervision of children's social media does not care about the family background. Every family has a choice in educating and evaluating, of course, through different ways. For children's education to be successfully implemented, families need schools in the process [30].

Families and schools need to utilize social media as a communication medium to discuss children's emotional, social, and cognitive development [20]. In the context of social media becoming the new world for children, teachers and parents need to conduct consultation sessions to discuss the policies that should be made to limit children in operating their social media. Teachers and principals are also obligated to develop policies and curricula that aim to recapture the attention of children distracted by social media [35,36]. Schools also need to present lessons that discuss multicultural and civic education because the cultural hegemony in social media can change children's paradigms, perceptions and behaviors [37]. As educational institutions that are role models for children, schools can provide another perspective, namely using social media, especially digital technology in learning [38]. This aims to divert children's views on negative content from social media so that children tend to view social media as an educational tool. It should be emphasized that in addition to the curriculum, policies and regulations that schools have made, the teaching style of each teacher will determine the emotional development of children [39]. Therefore, teachers can provide an overview of the positive and negative impacts of social media use directly or incorporate it into the subject matter. As mentioned, families or schools cannot stand alone in carrying out the role of educating and evaluating children in using social media. There must be active and harmonious involvement between families and schools [30,34,40,41].

Ecosystems operationally emerge through experiences in other environments (students do not have an active role) and influence "what" is experienced by students and teachers in a direct context; social media is one example of an ecosystem. Social media is indeed the closest environment to students or the virtual world that students visit every day. However, students do not have the authority to regulate the content that is present in it. Instead, social media offers a variety of features that can easily influence students' characters. Actually, social media aims as a means to make it easier for someone to access entertainment, education, and communication [42]. However, there are also many violent contents scattered on social media [43]. If not used wisely, social media that contains a variety of content and is freely displayed on social media can affect children's affective state: experiencing depression, anxiety, and stress [44]. In addition, social media can affect children's academic ability [4].

Not only does it affect children's psychology, but it also affects the social aspects of children. Social media can make children anti-social individuals [14,21], more comfortable being alone or isolated [45], procrastination and difficulty in decision-making [46], moral panic [47], questionable content [48]. If the use of social media is not supervised, the negative impact of social media on the social sphere can easily occur.

The outbreak the impact that arises from the phenomenon of children using social media is due to the fact that nowadays, children are given easy access and flexible facilities. This is shown by the fact that parents give gadgets to their children from an early age [12]. However, families and schools have the hegemony of power in authority in determining what kind of social media access is used by children [49–53].

Macro systems involve culture on a broad scale. Culture is what encompasses the role of ethnicity and socio-economic factors in student development. Culture is the context in which students, parents, peers and teachers live - reinforcing the values and customs of society. For example, the culture of the family and school shapes students' emotional and social development. The chronological system includes the socio-historical conditions of student development. The life experienced by students today will certainly be different from that experienced by their parents or grandparents. Character building or students' emotional and social development occurs in the social and cultural arena that accompanies the passage of time or students' daily lives. The culture in question is the internalization of moral values provided by families and schools and cultivated or familiarized by children in their daily lives (Altın et al., 2019; Arslan, 2021; Ü. Şahin, 2019; Saputri & Marzuki, 2021; Weis et al., 2022). Thus, positive moral values can prevent children's tendency to access negative content on social media. However, these moral values do not stop at the implementation stage but are already in the form of praxis or

children's character. The formation of this praxis certainly requires different habituation techniques and time for each child (Altın et al., 2019; Berkowitz, 2022; McGrath et al., 2022; Susilo et al., 2022). Families and schools have a crucial role in guiding and supervising children in operating their social media programmatically and continuously.

4. Conclusion

Parents and schools are concerned about how social media affects children's emotional, social and cognitive development. Social media is a means of entertainment, education and communication. When children use social media, it requires educating and evaluating through guidance and supervision by parents, teachers, and principals. Families and schools must work together harmoniously through intense communication to make policies to limit children's use of social media. If not handled intensely by families and schools, the negative effects of social media can easily affect children's character.

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HOW DOES THE SUBJECTIVE WELL-BEING OF SCAVENGER EMERGE? UNDERSTANDING THE ROLE OF IRRATIONALITY AND MONEY ETHICS MEDIATION

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Abstract

This study aim to construct a structural model of the subjective well-being of scavengers and offers significant insights into the complex interactions between irrational behavior (confirmation bias, herd behavior, and loss aversion), money ethics, and social support. This study uses a quantitative method with the research population includes 250 scavengers from the Supit Urang landfill in Malang City, selected through total sampling due to the manageable population size. Data analysis uses Structural Equation Modeling (SEM) with SEM-PLS software, covering outer model testing, inner model estimation, Goodness of Fit (GoF), and hypothesis testing. The results reveal that confirmation bias does not significantly affect scavengers' well-being, largely due to their limited access to reliable information and educational resources. Herd behavior was found to positively influence subjective well-being but did not significantly affect money ethics. Strong social networks within scavenger communities emphasize collective norms, which often overshadow personal financial ethical considerations. Lastly, the study indicates that loss aversion has no significant impact on either subjective well-being or money ethics. This suggests that in economically precarious situations, the fear of loss takes a secondary role to the immediate need for survival, minimizing its influence on financial decisions and ethical behavior. This research contributes to a deeper understanding of the unique factors influencing the subjective well-being of scavengers, particularly in marginalized settings, and highlights the critical role of social support in shaping their financial ethics and well-being.

Keywords: behavioral economic, irrationality, money ethics, subjective well-being, scarvengers

1. Introduction

In the Sustainable Development Goals (SDGs), poverty alleviation remains a primary focus of development across various world countries. One type of poverty that has emerged in society is cultural poverty. According to the theory of cultural poverty proposed by Oscar Lewis, cultural poverty is a culture that arises due to prolonged economic hardship [1], [2]. This form of poverty can also be considered a part of the subculture of society, characterized by similar traits among different ethnic groups. It indicates individuals who are less capable of adapting to and responding to their marginalized position in a society marked by class structure and characterized by individualism and capitalism.

Governments and the private sector are working to reduce poverty rates across different parts of the world, particularly in developing countries. This has had a positive impact on reducing poverty rates in many developing nations each year. The Multidimensional Poverty Index (MPI) report notes a significant reduction in poverty rates in various countries [3]. India has successfully lifted 415 million people out of poverty in the last 15 years, China has seen 69 million people emerge from poverty in the previous four years, and Indonesia has reduced poverty by 8 million in the last five years. Reducing poverty rates in these developing countries is a significant step towards achieving SDG Goal 1: "No Poverty," aiming to halve global poverty within the last 15 years.

The objective of SDG's goal 1 is certainly intertwined with other goals, such as reducing inequality worldwide. Over the past four decades, various Asian countries have succeeded in lowering their Gini ratio index, indicating regional inequality. Figure 1 below is an overview of the Gini ratio trends in several Asian countries

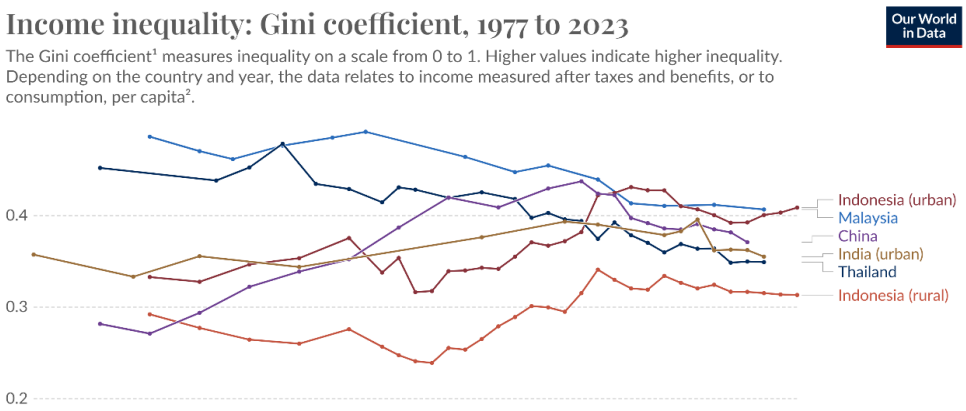


Figure 1. Index Rasio Gini Trend Past Four Decades
Source: [4]

Nevertheless, Indonesia is one of the few countries in Asia experiencing an increase in its Gini ratio index. In 2023, the Gini ratio index in Indonesia saw a significant rise, reaching 0.41 in urban areas and 0.31 in rural areas [4]. This indicates a growing inequality in income distribution in Indonesia, particularly in urban regions. The increase highlights the widening gap between the rich and the poor in Indonesia, potentially leading to various negative social and economic impacts on society. Serious efforts are needed from the government and relevant parties to address this inequality and ensure a more equitable distribution of income across all regions of Indonesia. The inequality in Indonesia is predominantly urban. It become a crucial issue to solve because there are more than 15 million urban populations in Indonesia [5], which is higher than the population in rural areas. Figure 2 below is a comparison of the Gini ratio index between urban and rural areas in Indonesia.

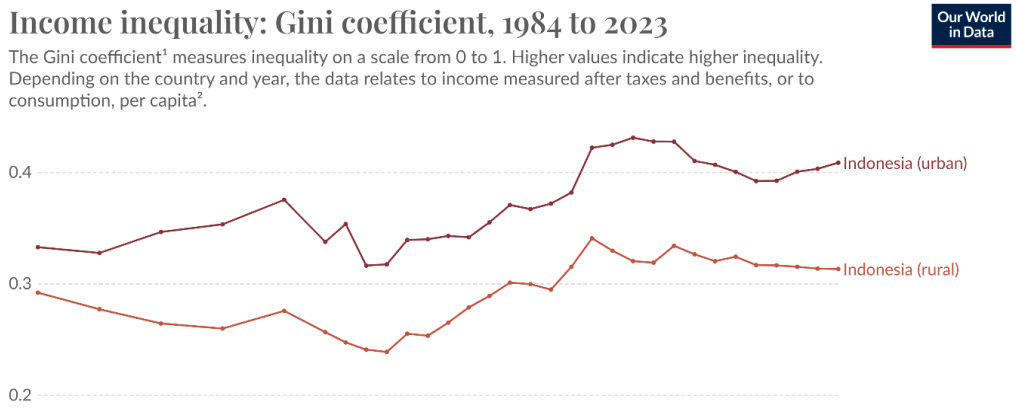


Figure 2. Comparison of Index Rasio Gini Trend in Indonesia
Source: [4]

From the Figure 2 above, it can be seen that the Gini ratio index in urban areas is higher than in rural areas. This high level of inequality is certainly linked to the low level of community welfare [6]–[10]. This inequality is particularly evident among marginalized groups such as scavengers. Individuals choose to become scavengers as an alternative to improve their welfare. In the hierarchy of informal jobs, being a scavenger occupies the lowest position, with most of the workers being men, women who are not elderly, and children [11], [12]. As part of the informal workforce, scavengers often face job insecurity, unstable income, and social insecurity. However, the decision to become a scavenger is also influenced by an individual's perception of happiness, life satisfaction, or welfare. Thus, individuals who feel subjectively happy and satisfied with their lives tend to have greater social appreciation and better cope with their problems [13], [14]. This is known as subjective well-being.

Subjective Well-Being (SWB) can be described as each individual's experience, encompassing specific positive or negative assessments of various aspects of life [15], [16]. Individuals with low levels

of subjective well-being tend to view life negatively, consider events as unpleasant experiences, feel a lack of affection, and are often dissatisfied with their achievements, which can lead to emotions such as anxiety, depression, and anger [17]. Conversely, good subjective well-being can also stem from small joys and a collection of happy events experienced by the individual [18]. Moreover, the environment and situations can influence an individual's level of subjective well-being. Environments and conditions that provide happy life experiences will enhance an individual's subjective well-being [14], [18]. A person's level of life satisfaction is usually influenced by the standards set by the individual subjectively, depending on their environment, insights, situations, and life experiences [15], [19].

In pursuing their well-being, people often engage in irrational economic activities. These irrational economic behaviors can be approached from the perspective of behavioral economics, which explains how individuals' irrational behaviors contribute to achieving their well-being [20]–[24]. In behavioral economics, the assumption that humans always act rationally in decision-making does not align with empirical evidence of human behavior as economic beings. Three aspects of irrational behavior emerge when individuals consider their decisions and social impacts: loss aversion, herd behavior, and confirmation bias [23]. Research on subjective well-being is still scarce and has produced varying results. These differences have not yet addressed the challenge of understanding the development of subjective well-being research among marginalized communities.

This study addresses a significant gap in subjective well-being (SWB) research. Despite the continuous growth of research in the SWB field, there is still limited information on the performance of SWB initiatives [25], [26]. Therefor, this research contruct structural model for subjective well-being of scarvengers in term of retionality and money ethics medhiation. Additionally, It outlines several significant gaps, including how money ethics influence SWB, which aspects affect social support's role in constructing subjective well-being, and how irrational economic behavior constructs subjective well-being.

2. Literature Review

Departing from the Theory of Subjective Well-Being (SWB), which states that subjective well-being is an experience felt by each individual and includes specific positive or negative assessments of various aspects of life to achieve happiness [27], this theory posits that the way individuals perceive and manage resources can influence the dimensions of life satisfaction, positive affect, and negative affect. Several factors influence an individual's subjective well-being, such as employment [28] and education [29]. These two factors are shaped by individual behavior toward money, which is subjectively believed to enhance their well-being [30].

On the other hand, the theory of money ethics describes how an individual behaves toward money, encompassing cognitive, affective, and behavioral components [30]. Money ethics are also linked to attitudes, behaviors, and actions in relation to others [31], [32]. In shaping the subjective well-being of scavengers, money ethics is also intertwined with green economic practices. The concept of a green economy serves as a foundation for achieving sustainable economic growth, focusing on resource efficiency, product life cycles, and the development of sustainable technologies [33]–[35]

Several studies have explored the relationship between money ethics and subjective well-being. For instance, Srivastava et al. (2001) revealed that money ethics plays a crucial role in shaping subjective well-being through the underlying motives. Other studies show that money ethics can create relative, not absolute, happiness. However, the economic behavior of individuals, as reflected in money ethics, is not always rational. The behavior of scavengers, who ignore certain choices and educational investments to achieve better financial outcomes, exemplifies irrational behavior in their pursuit of subjective well-being.

The relationship between irrational individual behavior concerning money ethics and subjective well-being is based on behavioral economic theory. This theory explains how individuals' irrational behavior influences their satisfaction [20]. In the context of behavioral economics, the assumption that humans are always rational in decision-making does not align with empirical evidence of human behavior as economic beings [21], [23]. Several factors contribute to individuals' irrationality, including loss aversion, herd behavior, and confirmation bias. These factors tend to emerge when individuals make decisions that affect others, particularly regarding money ethics.

In shaping an individual's subjective well-being, social support plays a vital role in either strengthening or weakening the influence of money ethics. This paradigm is based on the concept of

social support as explained by Barrera et al. (1981). Social support can enhance the positive influence of money ethics on subjective well-being, especially when individuals receive good social support in implementing positive money ethics [15]. Therefore, this study aims to construct a structural model of the subjective well-being of scavengers, as a marginalized community, to identify key factors that contribute to their subjective well-being in the city of Malang. Therefore, the hyphotesis of this research are:

H1: Confirmation bias has a significant positive effect on money ethics.
H2: Confirmation bias has a significant positive effect on subjective well-being.
H3: Herd behavior has a significant positive effect on money ethics.
H4: Herd behavior has a significant positive effect on subjective well-being.
H5: Loss aversion has a significant positive effect on money ethics.
H6: Loss aversion has a significant positive effect on subjective well-being.
H7: Money ethics has a significant positive effect on subjective well-being.
H8: Social support strengthens the effect of money ethics on subjective well-being.
H9: Money ethics mediates the effect of confirmation bias on subjective well-being.
H10: Money ethics mediates the effect of herd behavior on subjective well-being.
H11: Money ethics mediates the effect of loss aversion on subjective well-being.

3. Method

Design and Data

This research uses a quantitative method that adopts the research procedures from Hair et al. (2018). The unit of analysis used in this research is the individual unit with the research population consists of all scavengers who are members of the scavenger association at the Supit Urang landfill in Malang City, totaling 250 individuals. This number was obtained directly from the Supit Urang Landfill Office, which operates under the Malang City Environmental Agency. The selection of scavenger association members at the Supit Urang landfill is based on the fact that it is the only landfill in Malang City, serving as a waste disposal site for several neighboring areas. Consequently, many scavengers in the association are not only from Malang City but also from surrounding regions. The sampling technique used in this research is total sampling, where the sample size is equal to the population. The use of total sampling is justified by the relatively small population of 250 respondents, which is considered sufficient for the purposes of the study (Kazerooni, 2001). This approach allows for a good generalization representing the entire population under study.

Variabel Measurement

In this research, there are three exogenous variables, one mediating variables, one endogenous variable, and one moderating variable, which are operationalized using indicators that adopt from several previous references to create a closed questionnaire using a Likert scale.

Data Analysis

The data was analyzed using Structural Equation Modeling (SEM) with the help of the SEM-PLS application which cover several stages of test including outer model calculation, inner model estimation, Goodness of fit (GoF) and hypothesis testing [36], [37]. The research framework showing the relationships between variables is presented in Figure 3.

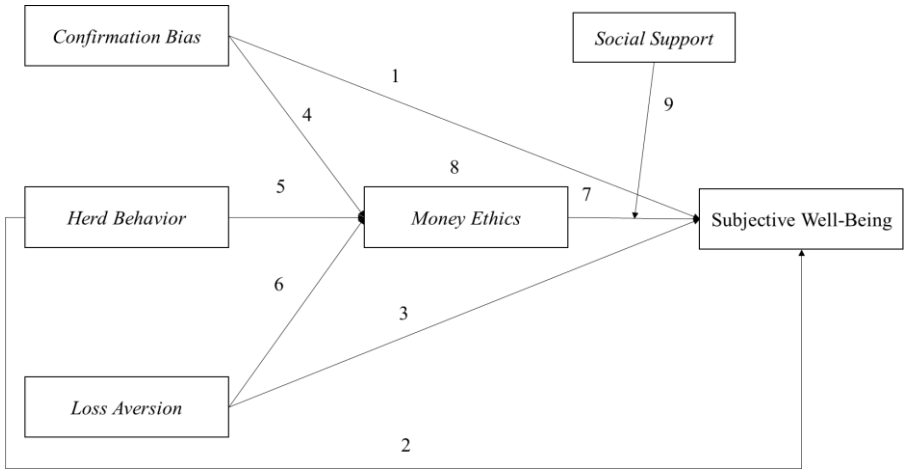


Figure 3. Research Framework

4. Results and Discussion

Results

The data analysis results revealed a fit structural model, as evidenced by several metrics, including path coefficient (β), path statistic significance (p-value), and the variance explained in the structural model (Figure 4).

Assessment of Measurement Model

Evaluating the measurement model is a crucial process that offers valuable insights into the reliability and validity of the scales used to measure latent constructs and their corresponding observed indicators [36]. Several criteria can be applied to determine the reliability or internal consistency of a psychometric tool: (i) Cronbach's alpha, which relies on the inter-correlations among observed indicators (a value above 0.70 indicates acceptable reliability, while a value exceeding 0.80 is considered excellent); (ii) composite reliability [36]; and (iii) the reliability coefficient of Dijkstra-Henseler's rho (ρA) [38]. For the latter two, a threshold value of 0.70 is recommended [36].

Convergent Validity

It demonstrates the degree to which observable indicators can converge to represent a latent construct that reflects the data. Convergent validity is assessed through the average variance extracted (AVE), which should exceed 0.5. The findings from our study indicate that the AVE values are satisfactory, with 0.652 for confirmation bias, 0.529 herd behavior, 0.749 for loss aversion, 0.738 for money ethics, 0.839 for social support and 0.652 for subjection well-being (see table 1)

Discriminant Validity

Two commonly used criteria for evaluating discriminant validity are the Fornell–Larcker criterion and heterotrait–monotrait ratio (HTMT) [37]. The Fornell–Larcker criterion posits that the square root of the AVE for each construct should exceed its highest correlation with any other construct in the model, while HTMT estimates the correlation between factors (see Table 2). For adequate distinction between two factors, the HTMT value should be significantly less than 1. It recommended that HTMT values be below 0.9, with a preferable threshold below 0.85 [37]. Table 3 present the inferential statistics for HTMT values, which should be lower than 0.85 to indicate good reliability.

Indicator Realibility

An alternative metric for evaluating the reliability of individual indicators is by examining their outer loadings, which reflect the amount of variance in the observed variables explained by the latent constructs [36]. The outer loadings for all construct indicators, each exceeding the minimum acceptable threshold of 0.7.

Table 1. Convergent Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Confirmation Bias	0.733	0.735	0.849	0.652
Herd Behavior	0.573	0.580	0.771	0.529
Loss Aversion	0.670	0.700	0.856	0.749
Money Ethics	0.823	0.833	0.894	0.738
Social Support	0.809	0.810	0.913	0.839
Subjective Well-Being	0.866	0.868	0.903	0.652

Table 2. The Fornell-Larcker Criterion

	Confirmation Bias	Herd Behavior	Loss Aversion	Money Ethics	Social Support	Subjective Well-Being
Confirmation Bias	0.807					
Herd Behavior	0.480	0.727				
Loss Aversion	0.095	0.015	0.865			
Money Ethics	0.636	0.389	0.052	0.859		
Social Support	0.629	0.387	0.104	0.515	0.916	
Subjective Well-Being	0.568	0.441	0.172	0.684	0.552	0.807

Table 3. The Heterotrait–Monotrait Ratio (HTMT)

	Confirmation Bias	Herd Behavior	Loss Aversion	Money Ethics	Social Support	Subjective Well-Being
Confirmation Bias						
Herd Behavior	0.729					
Loss Aversion	0.155	0.096				
Money Ethics	0.812	0.539	0.110			
Social Support	0.812	0.570	0.145	0.634		
Subjective Well-Being	0.709	0.600	0.221	0.805	0.654	

Assesment of Structural Model

A structural model can be utilized to evaluate the linear regression effects between endogenous constructs by defining the pattern of relationships among the various constructs [36].

Collinearity Assesment

To assess the potential presence of collinearity within the structural model, tolerance or variance inflation factor (VIF) criteria may be employed [39], [40]. All construct indicators examined show VIF values less than 5, suggesting that no collinearity exists among the indicators.

Coeficient of Determination

Previous studies suggest that the coefficient of determination (R^2 value) represents the proportion of variance in the dependent variable(s) explained by one or more predictors. This value ranges from 0 to 1, reflecting the predictive accuracy of the structural model. According to Hair et al. (2019), threshold values of 0.19 is weak, 0.33 is moderate, and 0.67 is strong levels of explanatory power. In this study shows that loss aversion, herd behavior, and confirmation bias can together explain 41,3% of the variation of money ethics in the population. In addition loss aversion, herd behavior, confirmation bias, money ethics and sosial support can together explain 55,7% of the variance of subjective well-being

F^2 Effect Size

Cohen (1988) suggests that f^2 values of 0.02 for significant independent variables indicate a small effect, while values of 0.15 and 0.35 correspond to medium and large effects, respectively. The effect sizes of confirmation bias is 0.443 which has a large effect on money ethics, while herd behavior (0.016) and loss aversion (0.000) has no effect on money ethics because f^2 value are less than 0.02.

Predictive Relevance (Q^2)

The Stone–Geisser Q^2 value serves as an indicator of predictive power or relevance [43], [44]. By performing the blindfolding procedure, we obtained Q^2 values greater than zero, demonstrating the high predictive relevance of our model.

Standardized Root Mean Square Residual (SRMR)

The standardized root mean square residual (SRMR), calculated as the difference between the observed and predicted correlations, can be viewed as an absolute goodness-of-fit measure, particularly

suitable for PLS-SEM-based models [45]. Values below 0.10, or more conservatively, 0.08, are considered indicative of good fit [36]. Our model exhibits a strong SRMR value of 0.069, indicating a good fit which less than 0.08.

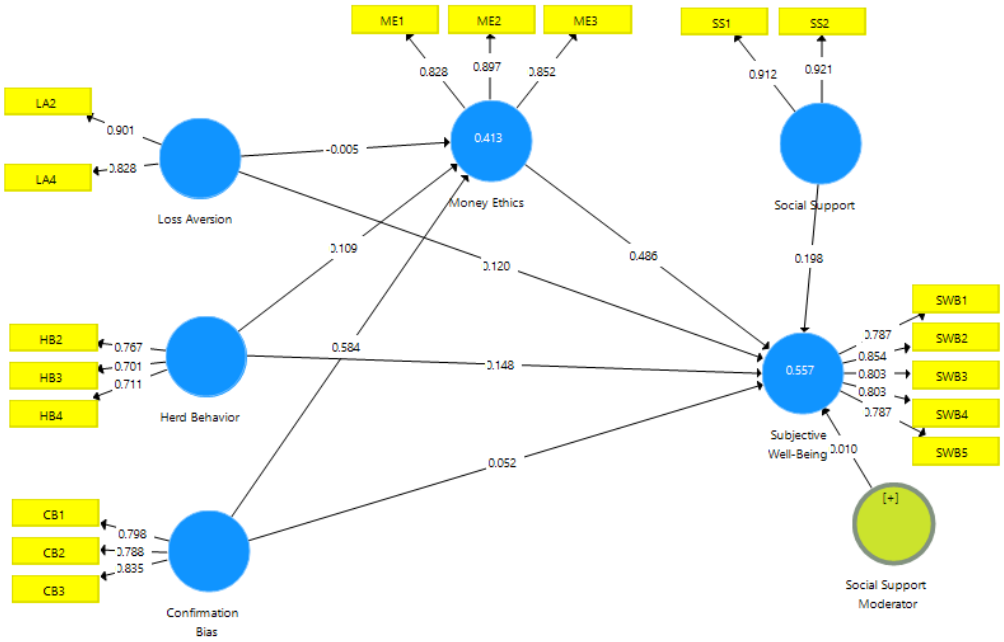


Figure 4. The primary results of the partial least squares model include the reporting of path coefficients and R^2 values.

Hypothesis Testing

To test of both direct and indirect link hypotheses, a bootstrapping procedure [36] is typically employed to assess the statistical significance of the coefficients. Tables 9 present both the significant direct and indirect effects within the path model, including means, standard deviations, t-values, and p-values. Table 9 shows that the hypotheses presented in this study have p-values from 0.000 to 0.947 (>0.05), mean that there were several hypothesis which not meeting the established criteria (<0.05) are H2, H3, H5, H6, and H8, while the hypothesis which meeting the the criteria are H1, H4, and H7.

The moderating effect was assest according to Hair et al. (2018) and Henseler & Sarstedt (2013). The hypothesis result shows that social support *p-value* is greater that 0,05 which mean that it can not be moderating variabel between money ethics and subjective well-being (table 9). It also confirm by simple slopes plot (figure 5) which shows there was no moderating effect of social support between money ethich and subjective well-being.

To assess the mediating variable, we applied the bootstrapping analysis method by [36] . The results of the bootstrapping analysis shows that money ethics reveal an insignificant mediation effect of herd behavior (0.102 > 0.05) and loss aversion (0.947 > 0.05) which mean that money fail to mediating the effect on herd behavior, and loss aversion to subjective well-being. Meanwhile, money ethics was supported to mediating effect on confirmation bias to subjective well-being (0.000 < 0.05) (see figure 9)

Thus, we can conclude that there were four hypothesis was supported (H1,H4,H7,H9) and seven hypothesis was not supported (H2, H3, H5, H6, H8, H10, H11)

Table 9. The summary of hypothesis testing result

Hs		Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Support
	Direct Effect					
H 1	CB -> ME	0.577	0.058	10.047	0.000	Yes
H 2	CB -> SWB	0.050	0.074	0.703	0.483	No
H 3	HB -> ME	0.119	0.064	1.691	0.091	No
H 4	HB -> SWB	0.149	0.058	2.531	0.012	Yes
H 5	LA -> ME	0.003	0.075	0.066	0.947	No
H 6	LA -> SWB	0.114	0.072	1.678	0.094	No
H 7	ME -> SWB	0.483	0.068	7.104	0.000	Yes
H 8	SS (Moderation) -> SWB	0.013	0.036	0.279	0.780	No
	Indirect Effect					
H 9	CB -> ME -> SWB	0.279	0.049	5.843	0.000	Yes
H 10	HB -> ME -> SWB	0.057	0.032	1.637	0.102	No
H 11	LA -> ME -> SWB	0.002	0.036	0.067	0.947	No

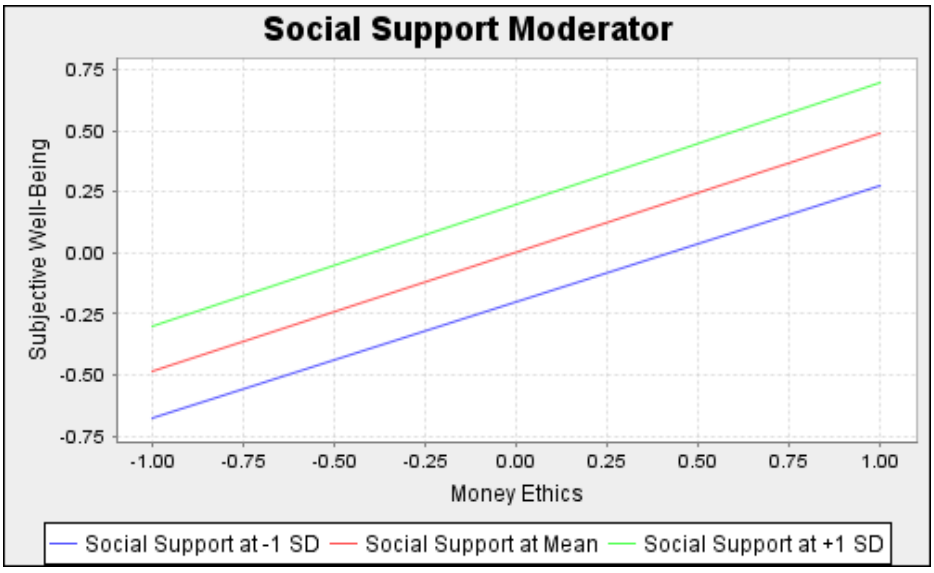


Figure 5. Moderating effect of social support on the relationshio between money ethics and subective well-being

Discussion

Based on the results of hypothesis testing conducted after identifying a fit structural model, several hypotheses were not accepted, both in terms of direct effects and indirect effects. Detailed explanations regarding these findings are as follows.

Direct Effects

The hypothesis testing of direct effects indicates that confirmation bias does not significantly affect the subjective well-being of scavengers. Scavengers often face limitations in accessing credible information, low education, and cognitive resources. Confirmation bias refers to the tendency to seek and interpret information that supports one's preexisting beliefs. However, for scavengers, their access to relevant information, especially in the context of finance and well-being, may be severely limited. This situation could render confirmation bias less relevant in influencing their well-being. This is also supported by research from [46], which shows that confirmation bias is more prevalent among individuals with greater access to information, who tend to seek information that confirms their views. In marginalized communities like scavengers, who may lack access to information, confirmation bias has a lower impact on their well-being. Other studies indicate that individuals with low socioeconomic status focus more on basic needs than on cognitive factors like confirmation bias in determining their well-being [16]. In this case, the basic needs of scavengers dominate over their tendency to seek information that supports their initial beliefs. Additional research suggests that individuals with limited resources, such as education and access to information, are less influenced by cognitive biases like confirmation bias because they lack sufficient information or capacity to evaluate various options and make decisions based on initial preferences [47]. In the case of scavengers, these limitations can diminish the ability of confirmation bias to influence their subjective well-being.

On the other hand, confirmation bias affects how individuals construct views or values about money (money ethics), based on personal experiences, social influences, and information received. When someone holds certain beliefs about money, such as "money is a symbol of success" or "money is the source of problems," they are likely to seek and interpret information that supports these beliefs, reinforcing their ethical values regarding money [30], [31].

In the context of herd behavior, this variable shows a significant impact on subjective well-being but does not significantly influence money ethics. Herd behavior is closely related to social pressure and the need for acceptance within a group. Engaging in behaviors that mimic the group often provides a sense of social connection, which is an important component of subjective well-being [14], [15]. When individuals feel that they conform to social norms or group standards, they may feel more satisfied with their lives, as social support plays a crucial role in happiness. Individuals who feel connected to a social group will generally have higher levels of well-being [48], [49]. In the context of herd behavior, individuals who follow group norms may experience increased subjective well-being due to the sense of belonging and social support from their community. However, this contrasts with the formation of money ethics, where money ethics tends to be more influenced by deeply held personal beliefs, moral values, or individual experiences regarding money, rather than by social pressure or group norms [30]. Money ethics often reflects long-established principles, such as views on the importance of money in life; herd behavior is not strong enough to change or influence those beliefs. Herd behavior is more likely to affect short-term behavior rather than deep moral beliefs. Research by Blommestein (2006) on herd behavior in the stock market indicates that following the majority often influences short-term financial decisions but does not alter individuals' fundamental beliefs or views about money in the long term. People may follow temporary trends, but their ethics regarding money remain stable.

Another results of hypothesis testing also show that loss aversion does not affect subjective well-being and money ethics among scavengers. This finding is supported by research from Tversky & Kahneman (1981), which indicates that loss aversion plays a more significant role in affecting well-being for those with sufficient financial resources to consider risks in their decisions. For lower economic groups like scavengers, their primary concern is how to earn enough income for daily survival, which means they may not be overly concerned with more abstract or long-term potential losses. Additional research by Diener & Biswas-Diener (2008) shows that individuals struggling to meet basic needs have different priorities in life, where the main focus is survival rather than anxiety about future losses. The theory of Maslow's hierarchy of needs indicates that basic needs, such as food, shelter, and security, must be met before individuals can contemplate more abstract concerns, such as fear of loss [53]. In the context of scavengers, as basic needs are often not stably met, loss aversion does not play a significant role in influencing their subjective well-being. Furthermore, in low socioeconomic conditions, individuals are more likely to focus on "survival mode," prioritizing immediate and short-term achievements over considering future loss risks [52]. Similarly, loss aversion also proves to have no effect on money ethics. Research by Barberis 92018) indicates that loss aversion influences investment decisions, such as the tendency to sell losing assets more quickly. However, this behavior is not related to changes in moral beliefs or ethics regarding money, but rather to behavioral preferences

concerning risk. Within the scavenger community, norms and values evolve based on shared experiences. They share a common perspective on money use and income management, which may not be significantly influenced by loss aversion but rather by collective agreements within the community. The theory of community formation and social hierarchy suggests that community values are shaped through interaction and shared experiences [55]. In this regard, scavengers may develop money ethics more based on collective needs and daily experiences rather than on fear of loss.

On the other hand, social support also does not moderate the effect of money ethics on subjective well-being, as social support typically plays a significant role in psychological aspects such as stress management or interpersonal relationships [56]. However, in the context of financial relationships and money ethics, social support may not have a direct influence because values about money are more personal and depend on individual experiences and subjective understanding of well-being. Previous research also indicates that financial factors, such as an individual's perception of money, are more related to financial status, personal satisfaction, or their well-being than to social support [57]. Therefore, social support has a greater impact on emotional support but is not strong enough to influence the relationship between money ethics and subjective well-being.

Indirect Effects

The results of hypothesis testing for indirect effects indicate that money ethics does not moderate the influence of herd behavior and loss aversion on subjective well-being. In the context of scavengers, this occurs because they often live in mutually supportive groups where group norms and behaviors significantly influence individual decision-making [11], [58]. When there is a tendency to conform to group decisions or behaviors, the ethical values individuals hold, such as money ethics, may not be strong enough to influence the decisions made. In strong social environments, such as among scavengers, group-oriented behaviors can overshadow ethical considerations related to money or the existing norms within that context [59], [60]. This can result in decisions that do not reflect money ethics values, rendering their impact on subjective well-being negligible.

In the context of loss aversion, scavengers, who often live in economically uncertain conditions, tend to experience a strong fear of loss. In such situations, loss aversion defined as the greater psychological discomfort associated with losses compared to gains which can lead to more reactive and emotionally driven decisions, disregarding the ethical and moral values involved. Furthermore, loss aversion often results in strong emotional responses, where individuals prefer to avoid losses rather than pursue gains [50], [59]. In the case of scavengers, when financial losses become a primary concern, the values of money ethics may be sidelined.

5. Conclusion

The findings of this study provide fit structural model of scavenger's subjective well being and assest significant insights into the complex interplay between irrationaly (confirmation bias, herd behavior and loss aversion), money ethics and social support affecting the subjective well-being of scavengers. The research revealed that confirmation bias does not have a substantial impact on the well-being of scavengers, primarily due to their limited access to credible information and educational resources. Scavengers often navigate an environment characterized by scarcity and instability, which diminishes the relevance of confirmation bias in shaping their perceptions and decisions. Instead, their focus tends to be on immediate survival needs rather than abstract cognitive processes. Moreover, while herd behavior was found to positively influence subjective well-being, it does not significantly impact the ethical perspectives surrounding money among scavengers. The strong social networks within scavenger communities often emphasize collective norms and behaviors, which can overshadow individual ethical considerations. This indicates that, within these groups, the pressure to conform to group decisions may lead individuals to prioritize social acceptance over personal values related to financial ethics. Additionally, the study highlighted the role of loss aversion, which did not significantly influence either subjective well-being or money ethics among scavengers. This finding suggests that in economically precarious situations, where immediate financial survival is a pressing concern, the psychological discomfort associated with potential losses may take a back seat to the urgency of securing daily needs. Thus, the fear of loss does not play a crucial role in shaping their financial decisions or ethical frameworks.

Limitation And Future Research

This study has several limitations that should be acknowledged. Firstly, the focus on scavenger communities may limit the generalizability of the findings to other populations. Future research should

explore similar themes across diverse socio-economic contexts to enhance understanding of cognitive biases and social influences. Secondly, the reliance on self-reported measures of subjective well-being and ethical perspectives may introduce bias because of time limitation. Employing mixed methods, such as qualitative interviews or longitudinal studies, could provide a deeper insight into these constructs. Additionally, the study did not account for demographic variables like age, gender, and education level, which may influence the relationships examined. Future research should incorporate these factors to provide a more comprehensive view.

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ANALYSIS OF CONTENT VALIDITY-AIKEN INDEX IN THE INTERACTIVE LKPD FOR INDONESIAN LANGUAGE LEARNING GRADE XI OF POETRY WRITING ABILITY

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Abstract

Interactive Student Worksheets (ISW) based on digital in learning have a crucial role. Interactive ISW functions in transforming students' knowledge and abilities, especially in difficult-to-understand materials. One of the abilities that is difficult for high school students in grade XI in the Indonesian Language subject is the ability to write poetry. The purpose of this study was to obtain evidence of content validity with the Aiken Index on interactive ISW based on ISpring. The content validity testing of ISW was carried out by three experts, namely Indonesian Language material experts, design experts and Indonesian Language learning experts. The results of the expert test obtained were analyzed using descriptive techniques. The results of the content validity test with the Aiken Index showed that the Aiken validity index was 0.843 for material validity, 0.800 for design validity, and 0.817 for learning validity. Based on these results, it can be concluded that interactive ISW based on ISpring is declared feasible and meets the requirements for use in Indonesian Language learning for the sub-achievement of writing skills.

Keywords: interactive ISW, Content Validity, Aiken Index

1. Introduction

Writing ability is still a serious problem for students in the learning process. This can be seen from the relatively low learning outcomes of students. (Jannah et al., 2020). Writing ability is a complex ability, so it is common that this writing ability requires more attention. (Ekorini, 2021). Lubis (2021) stated that this problem can be anticipated if teachers are able to apply the right learning model.

Based on literature studies and observations in several schools, especially in class XI of SMA Muhammadiyah 3 Surakarta, researchers found that not a few teachers apply the lecture method in learning Indonesian. Teachers also carry out learning without using any media. (Pane et al., 2024). Mahmur et al. (2021) The use of lecture methods in lecture learning is less effective, especially in improving at a high level, namely writing skills. The lecture method used by teachers cannot transform knowledge and concepts well, so that many students have difficulty understanding the concept.

Educators should be able to design and plan learning well so that writing skills can be achieved well. Teachers can make various innovations in learning, one of which is using interactive learning by presenting accurate supporting media. One of the recommended learning methods in achieving writing skills according to Magdalena et al. (2021) is with Project Oriented Problem Based Learning (POPBL). In systematic learning, students will be guided to express their ideas in writing. However, not only that, media in the form of worksheets is needed to support this model.

The ability to write in the sub-achievement of writing poetry with the use of interactive ISW and the POPBL learning model is very important. According to Halimah (2014), Writing skills are divided into 2, namely initial writing and advanced writing. Initial writing skills are usually applied in kindergarten to elementary school which studies basic understanding of grammar and word/sentence structure. While advanced writing skills can be applied at the junior high school and senior high school levels. One of the advanced writing skills that is an obstacle for students is writing poetry texts (Istiqoh, 2021). Writing poetry is also divided into 2, namely writing physical and spiritual elements. Ani & Lazulva (2020) reveals that spiritual elements can follow if the writer is fluent in writing physical elements. The physical elements in question include rhyme, diction, imagery, style, and the suitability between the title and the theme.

Learning to write poetry texts will be an obstacle for students, if the learning process does not provide the right model and media services. With the unavailability of these services, the characteristics of the ability to write poetry that are imaginative, creative and contextual cannot be realized properly.

Currently, the worksheets used by both teachers and previous researchers have not met good qualifications. Sometimes teachers only use worksheets without going through testing procedures in terms of content and display quality. Previous research conducted by Atmojo et al. (2022) stated that interactive ISW based on live worksheets can improve cognitive learning outcomes of grade V students at SDN Jajar. However, the obstacle faced is that students often complain that advertisements appear which disrupt the learning process. In line with previous researchers, the implementation of interactive ISW carried out by Fauzi et al. (2021) effective in improving cognitive abilities.

From the two previous researchers, it became a strong basis for innovation, one of which was to overcome the presence of advertisements when used in learning. Thus, researchers will use digital-based ISW without ad interference and have various features, namely using ISW based on iSpring Suite.

The use of interactive ISW based on iSpring Suite which will be used in POPBL will be a role for students to learn to improve their writing skills. (Ariani, 2020). The POPBL model is expected to be a control of student learning activities in the classroom so that they remain well conditioned and coordinated. While the use of ISW will help students to express ideas directly on the idea of writing poetry.

As an innovative media, a feasibility test is needed, in this case to ensure that this interactive ISW is in accordance with the learning achievement indicators. In accordance with the requirements, this product is in the good category if it meets the elements of valid, reliable and useful. (Groundlund & Linn, 1990; Groundlund, 1982; Groundlund, 2003; Kusaeri & Suprananto, 2012; Mardapi, 2012 ; Mardapi, 2008). However, in this study, the researcher will test one criterion, namely validity. This validity will be achieved through content or test validity. This content validity at least meets the suitability of the content, readability and functionality of the test instrument used. (Groundlund & Linn, 1990; Groundlund, 2003)

Evidence of the qualification of the eligibility of the media in the form of **ISW** can be done with several tests. One of them is the content validity test with the Aiken method. Generally, the two methods are for testing the results of developing test instruments or other assessments. However, several other studies state that the results of media development can be tested for eligibility based on content through the Aiken method. (Wira, 2021). The Aiken method can also be used as a basis for testing the validity of learning media. (Mulyono & Rahman, 2021).

The use of the Aiken Content Validity method has the advantage that in one aspect of the assessment it can involve at least two or more raters who are experts in a particular field. Testing the validity of the content of the LKPD that researchers have can be seen from two things, namely content validity and construct validity. Content validity is related to the degree of measuring power of the tool to be measured. In other words, content validity refers to the extent to which the test material can measure the entire material or material being taught. (Aiken, 1988;Azwar, 2012). Meanwhile, construct validity refers to validity, which shows the extent to which the test results truly reveal the characteristics or theoretical constructs that are being measured. (Duch et al., 2001). Testing the validity of this content is the main objective of the researcher in writing the current paper.

Based on the description above, this article focuses on testing the validity of the interactive ISW content based on iSpring Suite which is assumed to be used in POPBL learning to develop writing skills in class XI students of SMA Muhammadiyah 3 Surakarta in learning Indonesian Language.

2. Method

This study aims to obtain evidence of Content validity with the Aiken index on interactive ISW based on ISpring. This ISW was developed with an open source application.

Obtaining the validity value of this Interactive ISW as credible evidence to support the learning process that takes place with the POPBL method. Content validity with this Aiken index involves 3 experts, namely Indonesian language material experts, design experts, and Indonesian language learning experts. This content validity test was conducted in September 2024.

Data collection was carried out using a checklist assessment sheet instrument with a scale range of 1-5 according to the assessment aspects in each assessment aspect. A score of 1 indicates very inappropriate, a score of 2 is less appropriate, a score of 3 is quite appropriate, a score of 4 is appropriate and the highest score of 5 is very appropriate.

The Indonesian language material expert was assessed by Drs. Agus Budi Wahyudi, M.Hum which consists of the assessment aspects of the Suitability of the material with the learning objective indicators; The material presented is in accordance with the needs of students; The material encourages children's curiosity; The material provided is accurate and easy for students to understand.

The assessment of media design experts by Taufiq Satria Mukti, M.Pd. includes indicators There is a description of learning achievements and learning objectives; There are instructions for use; There is a student activity column; Using a variety of fonts (bold, italic, capital, small capital) to emphasize the writing; Using no more than two types of fonts so as not to interfere with the display; Using a standard font size so that readability is clear; Placement of illustrations or images does not interfere with the content text; Illustrations are in accordance with reality so as not to cause misunderstanding; Not dependent on other teaching media in their use. Meanwhile, the assessment of Indonesian language learning experts was carried out by Dr. Main Sufanti, M.Hum which includes the accuracy of learning procedures, systematic learning processes in ISW, suitability of assessments and teaching materials that are carried out.

The Interactive ISW assessment data that has been carried out by experts will be analyzed using descriptive statistical techniques, namely describing the assessment scores for each expert and also calculating the Aiken validity index.

3. Results and Discussion

Content validity testing using the Aiken method was conducted by three experts, namely Indonesian language material experts, media design experts, and Indonesian language learning experts. This test aims to obtain validity values for interactive ISW based on Ispring.

Data analysis that has been carried out on the results of expert assessments of interactive ISW based on Ispring is presented in table 1 as follows:

Table 1: Results of Aiken Content Validity Test

	Assesment		
	Content	Design	Learning
Aiken Index	0.843	0.800	0.817

Based on the analysis conducted by the index on all aspects of the assessment, it can be said that the interactive ISW is feasible to use. Based on the category of feasibility, the score exceeds 0.8. According to Jauharati et al. (2022) states that the interactive ISW is very feasible to use to support the learning process in the sub-material of writing poetry. Validity describes the quality of any product that will be used (Hadita et al., 2020). This validity can be done in various ways, both in terms of content and empirically. Content validity can be done using various methods, namely focus group methods, surveys, and expert opinions (Hermawan, 2019).

In this study, the researcher has conducted an assessment or rater to obtain the validity of the material through experts as evidence of the quality of the product created. This statement is in line with Sutaguna et al. (2023) which states that in creating a product, the initial step before it is used or implemented is to conduct a feasibility test. This feasibility test aims to re-check several indicators that must be met in a product. In this study, several qualifications that need to be met are in testing the suitability of learning materials, the suitability of several aspects of a media, and the right learning procedures for using the media.Pengujian dengan Indeks Aiken dinyatakan pada formula sebagai berikut:

$$\mathbf{V = \sum s / [n(c-1)]}$$

Information:
s = r – lo
Io = the lowest validity assessment number (e.g. 1)
c = highest validity assessment number (e.g. 5)
r = the number given by the assessor

The results of the analysis of the assessments of these three experts are presented in Figure 1 as follows:

item	item 1		item 2		item 3		item 4		item 5		Item 6		Item 7		Item 8		Item 9	
rater	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo	r	s=r-lo
Ahli-1	5	4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3
Ahli-2	5	4	4	3	5	4	4	3	5	4	5	4	5	4	4	3	5	4
Ahli-3	5	4	4	3	4	3	4	3	5	4	4	3	5	4	3	2	5	4
TOTAL s		12		9		10		9		11		10		11		8		11
c-1	4																	
n(c-1)	12																	
V		1		0.75		0.833		0.75		0.9167		0.833		0.917		0.667		0.917
		7.5833																
Indek Aiken	0.843 valid dan layak digunakan																	

Figure 1: Assessment of the material quality aspect

The results of the assessment are evidence that the Interactive LKPD based on Ispring that has been developed has received a good assessment predicate. All experts involved in the assessment gave an average score of 4, which means that the content of the LKPD developed meets good content suitability. The assessment is also evidence that one aspect of the quality of the suitability of Indonesian language material for grade XI SMA is assessed with 9 indicators. The researcher needs to convey that the aspect of the LKPD media design assessment and also the assessment of Indonesian language learning experts are assessed with 10 indicators.

This validity tool is used to determine the validity of the interactive LKPD media based on Ispring Suite by experts. This tool is used in the form of a validation sheet to obtain validity data on the media developed before being applied.

The benchmark used in compiling the validation tool in this study is the Likert Scale, where on this scale the variables to be measured are described into variable indicators. These indicators are then used as a starting point for compiling instrument elements, which can be statements or questions. The answers to each instrument using the Likert scale have a gradient from very positive to very negative. Content and media validation analysis is based on the results of validator evaluation by experts. Data obtained through questionnaires are analyzed using descriptive statistics. The steps for conducting the analysis are based on the use of Aiken V statistics formulated as follows:

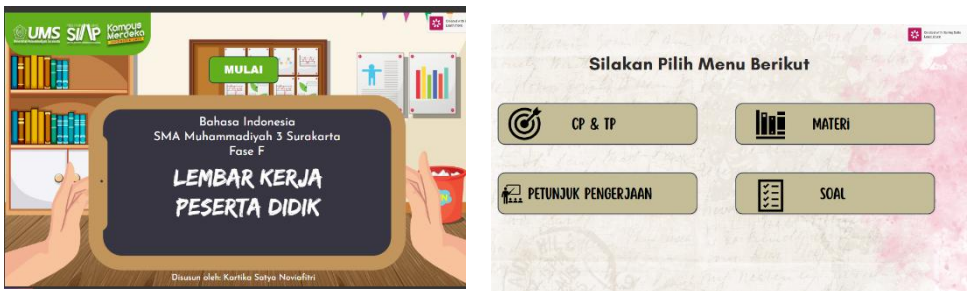


Figure 2. *iSpring Suite* LKPD Display

The image shows the user interface of the Interactive Student Worksheet (ISW) based on iSpring Suite and designed for Indonesian language learning at SMA Muhammadiyah 3 Surakarta. Created in digital format, this ISW has a game-like appearance, designed to create a fun and entertaining learning atmosphere. On the home page, you will see the ISW title with the "start" button at the top, giving an attractive and user-friendly impression. In addition, there are various menu options that give students access to various functions such as materials, questions, CP & TP, and work instructions.

The use of iSpring Suite technology in designing this ISW aims to overcome boredom in the learning process by presenting interactive elements. With a game-based approach, this ISW can encourage active student participation, provide a more dynamic learning experience and make the learning process more interesting. In addition, the easy-to-understand structure and attractive graphics can increase student learning motivation and create a more effective and enjoyable learning atmosphere.



Figure 3. Writing Activity Display in *iSpring Suite* LKPD

The image above shows writing activities on an interactive LKPD based on *iSpring Suite*. This LKPD is designed according to *Project Oriented Problem Based Learning* (POPBL) learning model. In this model, students are presented with a problem in the form of a choice of several pictures given by the teacher. The student's task is to choose one of the images that best fits his personal experience.

After selecting an image, students are asked to write a poem that matches the image they chose. This approach encourages students to use creativity and critical thinking skills in composing literary works based on visual understanding and reflection on personal experiences. The aim is to improve students' writing and creative thinking skills in an interactive and fun atmosphere.

4. Conclusion

Based on the results of the content validity assessment by experts on the validity of the interactive ISW based on iSpring Suite, it can be concluded that it is feasible with an average feasibility score of 0.8 or in the very feasible category, it can be used in POPBL learning to improve the poetry writing skills of class XI students of SMA Muhammadiyah 3 Surakarta.

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New Design Of Blended Learning For Understanding State Finances

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Abstract

Blended learning should provide the same results compared to other learning models. However, the implementation of blended learning at the Polytechnic of State Finance STAN has not practically provided the expected academic performance results. Therefore, it is necessary to develop a new design of blended learning, especially to improve understanding of state financial management. By using the structured literature review method, we designed a new design of blended learning that combines theory, methods and technology adopting the results of previous research. The novelty of this study is that we add essay writing as a method or media in blended learning. This model can be applied in other universities whose students are working. We hope that further research can elaborate on the application of this model.

1. Introduction

Blended learning models have recently developed rapidly and are widely used in educational institutions along with the rapid development of technology. Blended learning is considered the most effective and most popular teaching method adopted by educational institutions because it is considered effective in providing flexible, timely, and continuous learning [1]. In the health sector, blended learning has shown consistently better effects on knowledge outcomes than traditional learning [2]. In the field of tourism, blended learning is able to increase cognitive participation and emotional participation [3]. Another advantage of blended learning is that it can increase students' attention, self-confidence, and perception of satisfaction, and has a higher level of perceived satisfaction than face-to-face learning [4].

The implementation of blended learning at the Polytechnic of State Finance STAN is intended so that Ministry of Finance employees can continue their education flexibly. This method is considered mutually beneficial. For the organization, its employees can still continue their studies, but on the other hand, they do not need to leave their office and jobs. For the organization, they do not lose the resources needed to run the organization, but on the other hand, their employees are expected to improve their competence. The same thing is expected from the employee side, they can get permission to continue their education which is expected to provide a better career in the future. For campuses or educational institutions, blended learning is also considered more efficient in terms of costs and use of other resources. Although blended learning has many advantages, its implementation at the Polytechnic of State Finance STAN, especially for the Introduction to State Financial Management course, has not provided expected results. Objectively, the effectiveness of learning can be measured by students' academic performance [4].

Table 1. Descriptive Statistics of Academic Performance of Blended Learning

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
nilai	9	67,48	90,41	79,9633	7,09914	-,233	,717	-,269	1,400
Valid N (listwise)	9								

Table 2. Descriptive Statistics of Academic Performance of Face-to-Face Learning

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
nilai	44	73,09	91,00	84,0005	4,70943	-,785	,357	-,053	,702
Valid N (listwise)	44								

Based on Table 1 and Table 2, students who participated in blended learning had lower minimum, maximum, and average scores and higher variations than those who did traditional face-to-face learning. Although the Mann-Whitney test shows no significant difference in the average scores between the two learning models (Table 3), the difference in minimum and mean scores is important for this campus which requires an academic performance limit for its students to graduate. There are indeed challenges that must be faced in implementing blended learning, including teaching technology [1] and material quality [5]. However, some experimental research results show that blended learning provides the same learning outcomes compared to face-to-face learning models (Bowen et al., 2014 ; Griffiths et al., 2015).

Table 3. Statistics Test

	Nilai
Mann-Whitney U	131,000
Wilcoxon W	176,000
Z	-1,587
Asymp. Sig. (2-tailed)	,112
Exact Sig. [2*(1-tailed Sig.)]	,116[b]

a. Grouping Variable: Metode
b. Not corrected for ties.

Although there is no standard way to develop a blended learning model [7], it is important to prepare a learning model that is appropriate and useful for improving the competence of a particular field of science. In this study, we tried to develop a new design for a blended learning model that is expected to give students a better understanding of state finances compared to using traditional face-to-face learning models, at least to have the same level of understanding.

2. Literature Review

Blended Learning Model

There are several blended learning models that have been developed and implemented in educational institutions, for example Massive Open Online Courses (MOOCs)-based BL Design. This learning model is used to help facilitate understanding and increase motivation to learn for students[8]. MOOCs with face-to-face classes helps make teaching more effective, efficient, and interesting. MOOCs-based BL is applied to improve the pedagogical process and optimize education costs. Although MOOCs does not fully meet the quality criteria, MOOC-based BL design includes group activities, readings, complementary activities, diversification of assessment methods, meetings for feedback with students, video classes to comment on exercise results. This design allows for reducing gaps related to collaboration and interaction, instructional design, information and support to students, assessment, content, and technology related to the course [9]. However, MOOCs still need to be developed to better facilitate the capture and analysis of data relevant to its structure. For example, determining who is just 'watching' in the early period of the MOOCs, who is just peeking, who is an active participant, and when and why participants leave (completely). Some Learning Management Systems (LMS) do have the capacity for such learner and learning analysis. MOOCs have been implemented using a variety of tools and may or may not use an established LMS [10].

Many research results define blended learning as learning based on the dimensions of face-to-face learning and technology-mediated learning. However, this definition does not provide an adequate theoretical basis for making decisions to develop a blended learning model. The definition of blended learning must include context, theory, methods, and technology. Thus, blended learning is the use of an

appropriate mixture of theories, methods, and technologies to optimize learning in a particular context. Table 4 illustrates how a blended learning model can be developed by identifying the optimal mix of learning methodologies and technologies [11].

Tabel 4. Blended Learning Decision Matrix

Context	Theory	Methods	Technologies
Known	Injection	Tutorial Drill	Lecture Book Video
Complex	Construction	Construction Exploration	Open-ended learning environments Construction kits and tools Spreadsheets
Knowable	Integration	Puzzle Discussion Debate	Games Discussion tools
Chaos	Immersion	Experience Field Trip Apprenticeship	Blogs Logbooks Assessment tools

Table 4 shows that the choice of a particular learning medium depends on the context, and the face-to-face or distance dimension is part of the context. It is the context that drives the decision about what and how to combine the face-to-face or distance dimensions.

Cronje (2006) said that for known knowledge, cause and effect can be repeated, felt, and predicted, and valid best practices and standard operating procedures have been established. This context requires a learning style/approache that is highly objectivist and low in constructivist (Injection). Direct instruction media is most appropriate. Therefore a blended learning model will concentrate on Instruction. In a face-to-face environment, this would mean lectures and demonstrations, and in a distance environment, using books (physical or digital) or videos (instructions).

For Complex knowledge, cause and effect are only retrospectively coherent, and pattern recognition is required. This context requires a learning style that is low in objectivist and high in constructivist (the quadrant of construction). Here students learn how to understand complexity. It is important to realize that constructivist learning is more about learning to learn than learning to acquire skills.

For knowable knowledge, analytical thinking and a simpler or more fundamental approach are required. This context requires a learning style that is objectivist and highly constructivist (the quadrant of integration). This is the domain of puzzles, not problems. Puzzles have solutions known to the instructor but unknown to the learner, while problems may have infinite solutions. The goal in this context is to teach systems thinking. In a face-to-face environment, discussion and debate may be the medium, whereas in a remote environment, this is the domain of bland chat groups and discussion forums.

The Chaos realm is the realm of experience. There is no perceived cause and effect relationship and interventions are aimed at regaining stability. This context requires a learning style that is objectivist and low in constructivist (the quadrant of immersion). In this context learning is experiential, and internships (field trips). There is no teaching in this context and learning is incidental and unintentional. The technologies involved here are diaries and blogs, and the methodological focus should be on assessment, not instruction.

Knowledge Enhancement Strategies

It is now important to focus on educational resources and forms of competency development as key factors behind the development of productivity, innovative capacity, and competitiveness. This effort needs to be supported by changes and improvements in competency requirements that are assumed to occur due to increasing internationalization, new production concepts, wider use of information technology, and the increasingly dominant role of knowledge-intensive production in many

organizations [12]. It is therefore important to build the "right" competency framework to produce the "right" change. According to Law Number 20 of 2003 concerning the National Education System, competency includes attitudes, knowledge, and skills. A competency framework is a framework for measuring specific skills, assessments, knowledge, and job attributes to perform a role effectively. A competency framework essentially aligns personal performance with organizational values. This framework can help evaluate employee performance and ensure employees meet adequate skills [13].

Competency development sometimes has a meaning that indicates the individual learning process through which competency will be obtained. Competency development can be done through various strategies and methods [14]. Several research results show strategies for improving competency, especially improving knowledge. The essays have long served to develop students' intellectual and reflective qualities and to assess their mastery of a variety of disciplines. However, in recent years, essays have become less common in academic settings. Yet essays give voice to the writer's creative imagination, allowing them to critique rarely questioned assumptions and explore new possibilities for intellectual and social change. As such, essays can still make useful contributions to academic fields. Essays express an individual's reasoning and argument. In this respect, essays grant the author the right to an opinion (but not an unfounded or wild opinion), the right of a writer to express a view without having to prove it in the same way or with the kind of rigor as an academic thesis or research paper. Essays grant the author the authority to use the first-person singular point of view and to say 'I believe that', not as an expert or a witness, but as a thinking subject. The essay may draw inspiration from a single question ('Why war?'), the work of another writer, a set of statistics, a casual observation, a work of drama or fiction, an image, a story, or any popular cultural artefact. The essay is then driven forward by exploratory logic, a logic dominated by the question 'Why?' 'Then what?' and perhaps especially 'What if?' [15].

3. Research Method

This study uses a structured literature review approach that reviews a number of articles from various forms of literature collected from various sources and with predetermined criteria. This approach was chosen because it is very helpful in developing insights, critical reflections, and future research agendas in emerging research fields[16]. This study is structured into four main phases [17,18].

Phase I, selection of research questions. During this phase, the author creates general questions related to the research theme, namely: 1) how to implement blended learning; 2) how to improve knowledge. Questions need to be formulated in advance so that the discussion becomes more focused. Phase II: Article search. At this stage, the author searches for relevant articles using keywords such as "blended learning" or "competency enhancement" or "Quizzes" or "Learning Discussion" or "Learning Debate" or "Essay". Phase III: Determination and use of review criteria for inclusion of relevant literature. There are many articles distributed in electronic form that discuss various fields of science. From the various articles found, the author must determine the criteria for reviewing relevant literature that is in accordance with the research theme. Based on the results of the search in the second phase, improvements were made using the following criteria, namely: document type: journal articles published between 2020-2024, but the author also searched and reviewed journal articles published before 2020 and are still related to broaden the view; research field: limited to the field of learning only; citations: not limited by the number of citations to include relatively recently published articles that have not received much attention. Details of article identification for this study are presented in Table 5.

Table 5. Article selection scheme

Selection Process	Quantity
Articles according to search criteria	1.091
Articles match the research theme	33

Phase IV: In-depth analysis. After reviewing the articles collected through a literature search and selecting those relevant to the objectives and scope of this study based on the selected effective criteria, the author then reads the literature in the form of journals starting from the title, and abstract, to the conclusion while trying to gain an understanding or view conveyed in the article. Based on an understanding of various related articles, the author synthesizes how blended learning designs can be used to improve understanding of state finance.

4. Results And Discussion

Blended Learning Models Existing

The blended learning scheme currently implemented at the Polytechnic of State Financial STAN for the Introduction to State Financial Management course is as follows:

1. Covering 16 meetings consisting of 8 online meetings and 8 offline meetings.
2. At the end of each meeting, whether online or offline, an exam is held to evaluate learning outcomes.
3. Online learning is carried out because the participants have the status of active employees who are given study assignments so that they are given the opportunity to continue their studies in between their working hours. online learning is done synchronously and asynchronously.
4. Online and offline learning using a student-centered learning approach.
5. Blended learning activities are supported by a Learning Management System (LMS) for material distribution, assignment instructions, and test reviews.
6. Students take part in Public Lecture activities to gain an understanding of the latest State Finance policies from Ministry of Finance officials.

The implementation of blended learning at the Polytechnic of State Finance STAN presents several challenges, including:

- Commitment of organizational leaders. Employees who take blended learning need time to attend online meetings and work on assignments independently. Therefore, commitment is needed from the organization and all organizational leaders to provide sufficient space for employees who are taking blended learning education. However, sometimes during synchronous meetings, employees cannot attend because they have assignments or work. On several occasions, even during synchronous sessions, employees are on duty in the field.
- Commitment of the employees concerned. Taking blended learning education requires self-control from students. Employees are given more authority to regulate their own learning patterns, especially outside of synchronous sessions. However, in some cases this actually makes employees more relaxed because there are no regularly scheduled class meetings compared to classical classes. Likewise with the commitment to completing assignments independently.
- Readiness of facilities and infrastructure. The blended learning method that uses a combination of synchronous and synchronous still requires facilities and infrastructure, especially from the internet network. Meanwhile, some employees who choose to take blended learning courses are actually in remote areas where the internet infrastructure is inadequate.
- The student-centered learning mindset has not been fully implemented. The current approach to higher education is towards student-centered learning. The blended learning method is actually a very fitting method and is close to this approach. However, instead of this approach being applied, even in the classical method, most students still hope to use the student-centered learning approach. As a result, the blended learning method is not effective enough when the student's mindset still hopes that the learning process is centered on the instructor.

New Design of Blended Learning for Understanding State Finances

Before developing a blended learning design to improve knowledge about state financial management, a competency framework that aligns personal performance with organizational values is needed [13]. Polytechnic of State Finance STAN as a vertical unit of the Ministry of Finance has organizational values that are internalized by all its employees, namely Integrity, Professionalism, Synergy, Service, and Perfection. The competency framework that is the foundation for building a blended learning design is as follows:

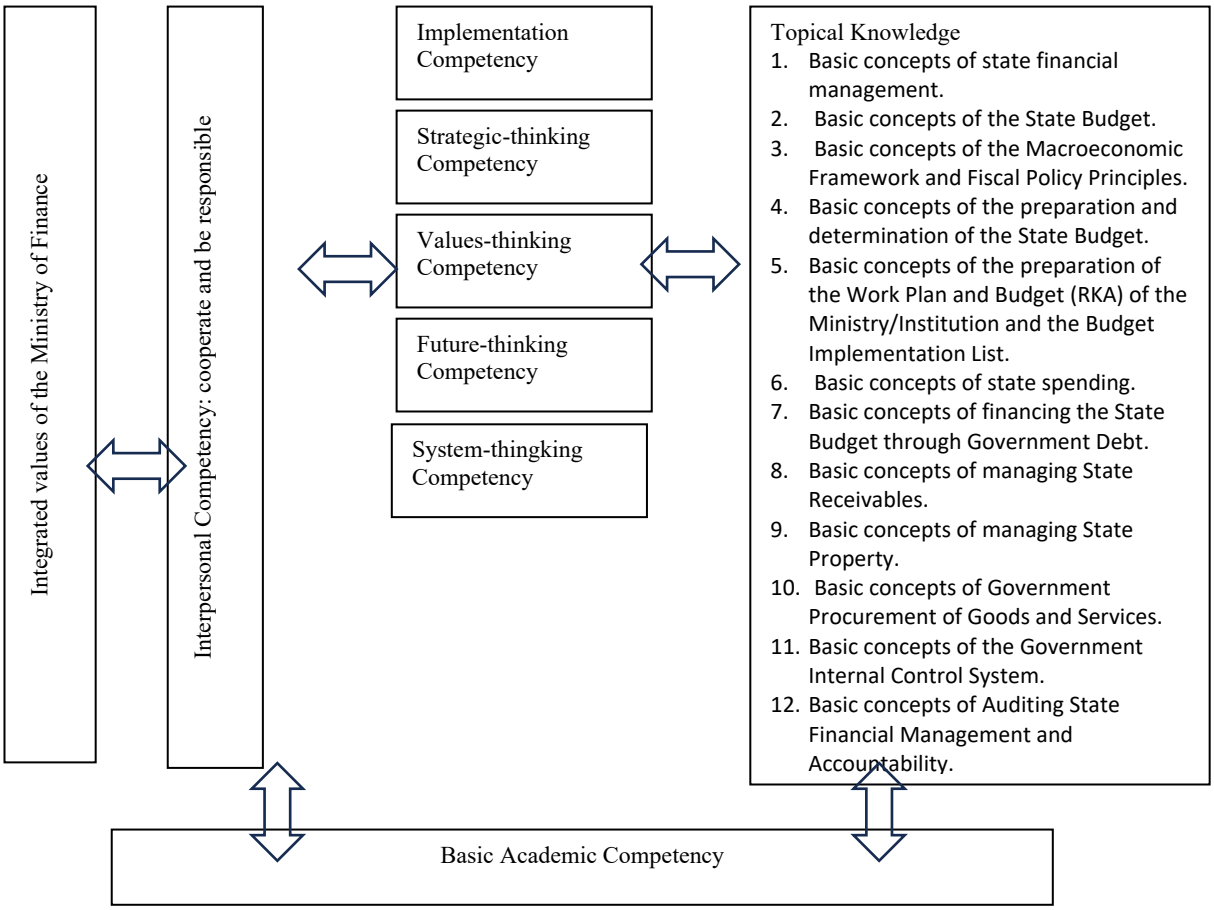


Figure 1. A competency framework that integrates organizational values

The blended learning design that we developed adopts the concept of using a mixture of theories, methods, and technologies that optimize learning in a particular context [11], as presented in Table 6 below.

Table 6. A new Model of Blended Learning For Understanding State Finances

Context	Theory	Methods/Media	Technologies
Knowable	Integration	Puzzle/Quiz Discussion Debate Essay	Learning Management System (LMS) PKN STAN for Quizzes, Video and Essay

According to the author, the Introduction to State Financial Management course is included in the domain of knowable knowledge because this course has a very broad scope which certainly contains various very complex problems and challenges. So studying this course requires analytical and reductionist thinking. Because students who take part in blended learning are those who have the status of active employees of the Ministry of Finance who understand the concept of state finance, they have the ability to build understanding based on their own knowledge and experience (constructive learning approach). However, even though they have knowledge and experience, they still need an injection learning approach, where there are teachers/instructors who have greater knowledge, skills, and/or attitudes than those who will carry out validation and standardization interventions on the competencies to be built by learners. Thus, combining the construction and injection learning approaches with the right conditions is what is called integration learning [19].

The integrated learning approach can use media such as puzzles (quizzes), discussions, and debates [11]. Practice recalling in class with quizzes can improve academic achievement. Even repeated

quizzes produce better performance than repeated reading [20] and understand the topic better [21]. Multiple-choice question quiz makes it easier to understand knowledge [22]. However, closed questions have been criticized for promoting shallow learning, often resulting in poor learning outcomes. These disadvantages can be overcome by embedding closed questions in effective instructional designs involving feedback [23]. Quizzes can be paper-based or online. Students who are given paper-based quizzes have higher test scores and retention tests [24].

Discussions in learning have been proven to be useful for improving student collaboration and achieving better learning outcomes. The students gained significantly higher behavioral and cognitive engagement when teachers played a facilitation role during discussions [25]. Active learning techniques and discussions combined with the process of forming skills-based teams in small groups provide positive empirical results on skill achievement [26]. However some tutors and students are uncertain about the value and quality of the learning process in online discussions [27].

Debate is a platform that provides a space to exchange opinions on interesting topics. Through debate, we can learn various aspects of persuasive arguments. The language of the debaters and their interaction patterns play a key role in changing the minds of others. However, there is still room to explore the impact of the debaters' backgrounds (e.g., gender, education level, ethnicity) on persuasion [28]. The effectiveness of an argument cannot be determined solely by its textual content; but it is important to consider the characteristics of the participants in the debate [29]. In recent years, the Ministry of Finance has held the APBN Debate event attended by students from various universities. According to researchers, students who take the Introduction to State Financial Management course can be encouraged to participate in this activity to sharpen their understanding of state finances, either as participants or as audiences.

As a novelty in this research, we added a new method/media of blended learning, namely essays. This method is very suitable for students who already have experience working in the field of state finance. With this experience, they can convey their views based on what they already know and do themselves. In this context, writing an essay is a transformation from experience to knowledge [30]. Several research results report that students often fail to write argumentative essays. The reasons include a lack of knowledge about the characteristics of a good argumentative essay, or they have difficulty practicing them when writing argumentative essays. This suggests that students need additional support to write high-quality argumentative essays [31]. Assigning essays in blended learning is a challenge for teachers in the digital era. Currently, there are many artificial intelligence technology devices that can be used to help students in doing their academic assignments. Even an artificial intelligence system can help a student create a complete essay in seconds and plagiarism software will not detect the essay he wrote as machine-made [32]. So teachers need to design essay writing assignments in such a way that students are reluctant to use technological assistance and prefer to want help from their own brains.

Based on the new design, the blended learning scheme for understanding state financial management can be designed as follows:

1. Covering 16 meetings consisting of 7 online meetings and 9 offline meetings.
2. The first 7 meetings of students taking part in synchronous and asynchronous online learning.
3. At the first meeting before the lecturer delivered the material, students were assigned to prepare 2 essays on the implementation of state financial policies in their respective work units.
4. The first essay is read by each student at the third meeting. If time permits, the lecturer and other students discuss it. If time is not enough, the lecturer can choose several interesting essays to be used as class discussion material.
5. The second essay was presented at the fourth meeting with a discussion scheme similar to the third meeting.
6. At the seventh meeting, students were given a quiz to review the understanding they had gained at the previous meeting
7. At the eighth meeting, students took the Mid-Semester Exam.
8. At the beginning of the ninth meeting, the lecturer said that he would use the debate method for learning. Students were assigned to prepare 4 debate teams (adjusted to the number of students), namely 2 affirmative teams and 2 opposition teams. In this meeting, the lecturer also delivered several debate motions. The motion is used as a basis for each team to determine their stance whether to support or reject the motion given. The affirmative team is the team that supports the motion. While the opposition team rejects it.

9. The debate method can be implemented at meetings 12 and 13. It is carried out sequentially so that students still feel the spirit of academic debate. The twelfth meeting was attended by one affirmative team and one opposition team, adopting the concept of formal debate [33]. Likewise, the implementation of the debate at the thirteenth meeting.
10. At the fifteenth meeting, students take part in Public Lecture activities to gain an understanding of the latest State Finance policies.
11. At the sixteenth meeting, students took the Final Semester Exam.
12. Blended learning activities are supported by a Learning Management System (LMS) for material distribution, assignment instructions, and test reviews. Adopting MOOCs-based BL, several videos about state finance, for example the State Budget Press Conference, can be embedded in the LMS.

To make it easier to get an overview, the learning scheme can be seen in the following figure.

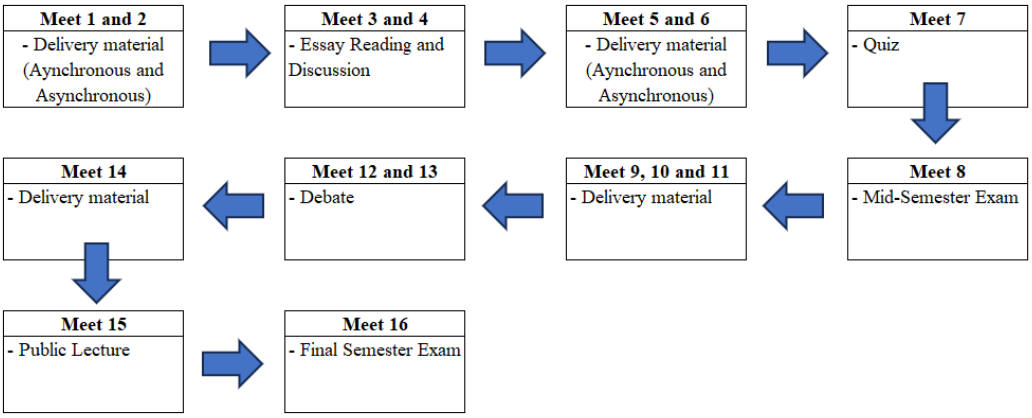


Figure 2. Blended learning scheme with a new model

This model can be applied in other universities whose students are working. There are several challenges in implementing the new mixed learning model, including:

a. Lecturers must understand the concept of debate which must be explained to students, some of whom may not understand the concept of debate.
b. Lecturers must always follow the latest developments regarding state financial policies, both pros and cons, which are not only useful for delivering material in class, but also when preparing debate motions.

The development of a blended learning model is not enough if it is not followed by several policy changes, including:

- There needs to be a written commitment between the campus and the employee's work unit so that employees who are studying through blended learning are given a different workload. This must also be stated in writing in the performance target, namely in the key performance indicator. Some key performance indicators must be transferred to achievements related to the employee's position as a student.
- Adequate assessment is needed to assess the competence and commitment of prospective students who will undergo a blended learning study program. This has been done by most doctoral programs, because doctoral programs by research tend to use independent study patterns or independent study methods that are very close to blended learning. Students with high commitment and adequate competence are needed to study with the blended learning method
- Work units that meet the criteria for their employees to undergo blended learning must be ensured to have adequate internet infrastructure. This must be one of the requirements.
- The student-centered learning mindset must be instilled from the start. Preparatory classes or workshops are needed for employees who will study through blended learning. This is to provide an introduction and provision to the student salon regarding the existing methods. Of course, the campus introduction period for those taking courses with the blended learning method must be differentiated from students taking courses classically offline. In Indonesia, this is one of the things done by Universitas Terbuka whose students take courses independently or with blended learning.

5. Conclusion

The new design of blended learning to improve understanding of state financial management at the Polytechnic of State Financial STAN adopts the concept of a combination of theories, methods, and technologies used. The advantage of this model is the learning theory used, namely the integration learning theory. This theory combines a construction learning approach that utilizes students' knowledge and work experience in the field of state financial management and an injection learning approach that relies on the knowledge and experience of teachers. This learning concept can apply several learning methods or media including quizzes, discussions, debates, and writing essays. The Learning Management System that has been used by Polytechnic of State Financial STAN to support learning activities can still be used, but can still be varied with other technologies. This model has several challenges in its implementation, namely the teacher's understanding of debate is very necessary and updating the teacher's knowledge of the development of state financial management policies. We hope that this model can be applied and further research can elaborate on the results of applying this model.

Acknowledgments

We would like to thank all Polytechnic of State Finance STAN students who continue to maintain the spirit of studying state finance. We would also like to thank all parties who have helped complete this research.

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IMPROVING THE ANALYSIS COMPETENCY OF YOUNG MINISTRY OF FINANCE EMPLOYEES THROUGH THE PROJECT-BASED ASSIGNMENT AND EXAM APPROACH (PUBER)

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Abstract

The Society 5.0 era provides many opportunities for organizations to become more analytical and data-driven. Organizations need analytical competencies that can bridge data, information, knowledge, and decision-making. We developed a project-based learning model inspired by models developed by previous researchers. Using an experimental method, we tested 2 groups of young employees of the Ministry of Finance who are currently continuing their higher education. One group followed the learning model we developed while the other group did not. Data were collected during 2023 and 2024. Using the mean difference test method, the test results showed that the group of students who followed our learning model had better analytical competencies. Subjectively, this study also revealed what competencies increased after following our learning model.

1. Introduction

The Society 5.0 era has made society no longer just a technology enthusiast. Artificial intelligence, automation, the Internet of Things, and digitalization that have been rolled out since the Industry 4.0 era are now integrated with human life so that they can provide solutions to social problems, improve the quality of life, and have a positive impact on society in a sustainable manner. Technological developments facilitate access to education for all levels of society that have so far been constrained by geographical aspects. Of course, this is expected to facilitate and accelerate the process of achieving the country's goals, namely advancing public welfare and educating the nation's life.

The use of technology that supports the activities of various organizations produces so much data. Business activities provide many opportunities for organizations to become more analytical and data-driven[1]. The business environment continues to change and become increasingly complex. Organizations, both private and public, are under pressure that forces them to respond to changing conditions quickly and innovatively. Responsibility requires organizations to be agile and often make strategic, tactical, and operational decisions, some of which are very complex. Such decision-making may require a lot of relevant data, information, and knowledge. Data processing into an insight that is considered in the decision-making framework must be done quickly, often in real-time [2]. More organizations are realizing that they need to employ people who understand data to develop complex analytical models. However, 42% of executives said that data analysis has slowed decision-making, and the majority (85%) believe that increasing data volume is not the main challenge, but rather the ability to analyze and act on it in real-time [3]. For this, analytical competencies are needed that are able to bridge data, information, knowledge, and decision-making. According to Law Number 20 of 2003 concerning the National Education System, competencies include attitudes, knowledge, and skills. While analytical competencies are the ability to explore data to obtain information about the business and can be used to provide tactical or operational decision support, so that decisions can be made faster and/or more precisely[2]. Thus, this analytical competency is very much needed by all organizations. The Ministry of Finance is no exception, as one of the most important organizations in Indonesia that has strong policies, instruments, performance, and influence to realize a just and prosperous Indonesia. In the future, the Ministry of Finance will face various increasingly complex state financial problems along with various dynamics of economic, political, legal and technological changes both at the national and

global levels. Researchers point out the need for proactive and forward-looking business strategies and economic policies in dealing with various economic turmoil [4].

Considering the increasingly complex problems and challenges ahead, the Ministry of Finance needs to prepare young employees who have analytical competencies. Currently, a number of young employees of the Ministry of Finance are continuing their education at various universities, one of which is the Polytechnic of State Finance STAN. To help improve analytical competencies, several learning models need to be applied to them, for example, the use of mobile technology in the learning process[5] or project-based learning. Project-based learning not only helps students develop necessary technical skills but also provides an excellent opportunity to advance analytical and critical thinking skills [6]. Many research results report that the project-based learning model provides many benefits, including encouraging the development of science and technology skills and competencies such as scientific investigation, technological skills, design processes, and problem-solving skills. Even project-based learning can build personal and interpersonal skills. Personal skills, for example, develop high-level cognitive skills such as critical and analytical thinking, autonomy, discipline, responsibility, creativity, and curiosity. While interpersonal skills, for example, the ability to work with others and form teamwork[7]. In this study, we propose a project-based learning concept that can improve the analytical competencies, attitudes, knowledge, and skills of young employees of the Ministry of Finance.

2. Literature Review

Building a Competency Framework

Change managers, at all levels, must be competent in identifying the need for change. They must also be able to act in a way that ensures change. Although those leading change may work hard to achieve improvement, it is widely accepted that up to 60 percent of change programs fail to achieve their intended outcomes. Doing it 'wrong' can be costly. It is therefore vital for those responsible for change to get change 'right', but getting it 'right' is not easy. Change agents, whether managers or consultants, are often less effective because they fail to recognize some of the key dynamics that influence outcomes and therefore do not always act in a way that allows them to exercise adequate control over what happens[8]. In many change management theories, the trust and willingness of change recipients to change are seen as key factors in the success of the change process. Conversely, resistance to change is seen as something that must be overcome by management in order to complete the change process[9].

There is now a widespread belief in the importance of focusing resources on education and forms of competency development as key factors behind the development of productivity, innovative capacity and competitiveness. This belief is supported by the changes and increases in competency requirements assumed to occur along with increasing internationalization, new production concepts, wider use of information technology and the increasingly dominant role of knowledge-intensive production in many companies[10]. Thus, referring to the theory of change management, it is very important for management to build the "right" competency framework to produce the "right" change.

A competency framework is a measure of the skills, judgment, knowledge, and attributes of a specific job required to perform a role effectively. A competency framework essentially aligns personal performance with the values of the organization. It can help evaluate employee performance and ensure employees meet adequate skill sets[11]. Over the past decade, the number of sustainability programs in higher education has increased significantly including sustainability-focused programs, reflecting the field of sustainability science and sustainability-oriented programs in business, education, law, and so on. However, it remains a challenge for employers, students, educators, and program administrators to clearly articulate what competencies these programs develop in students. Several competency frameworks in sustainability have been proposed. Experts emphasize the need for improvement in the following key competencies:

1. Future thinking competency to be able to iterate and continuously refine one's future thinking (visions, scenarios, etc.).
2. Value thinking competency to be able to distinguish intrinsic and extrinsic values in the social and natural environment; to recognize normalized oppressive structures; to identify and clarify one's own values; to explain how values are contextually, culturally, and historically reinforced;

to critically evaluate how particular values align with agreed-upon sustainability values; and to distinguish between espoused and practiced values.

3. Strategic thinking competency to be able to recognize the historical roots and embedded resilience of intentional and unintentional unsustainability and the barriers to change; to creatively plan innovative experiments to test strategies.
4. Interpersonal competency to be able to apply the concepts and methods of each competency not only as "technical skills," but in ways that truly engage and motivate diverse stakeholders and empathetically work with different ways of collaborators and citizens. knowing and communicating.
5. Integrated problem-solving competencies to be able to combine and integrate the steps of the sustainability problem-solving process or competencies, while utilizing related disciplines, interdisciplinarity, transdisciplinarity, and other ways of knowing[12].

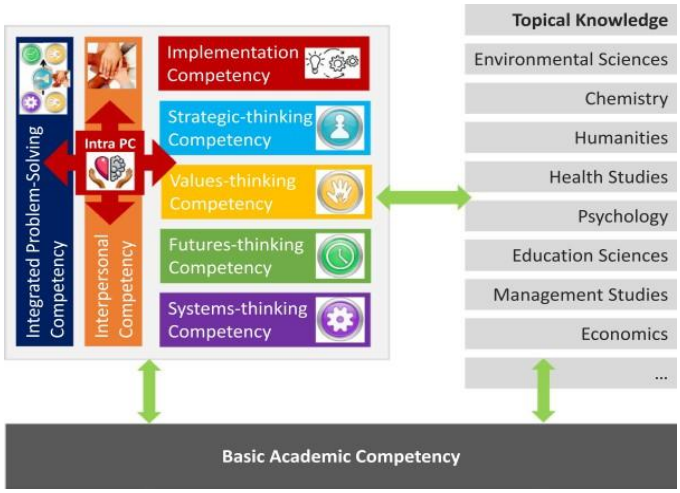


Figure 1. Three-Dimensional Model Linking Core Competencies in a Sustainability Framework

Project-Based Learning

Project-Based Learning (PBL) is an approach to learning that is built around real-world learning activities and tasks that present challenges for students to solve. These activities generally mirror the type of learning and work that people do in the everyday world outside the classroom. PBL is typically conducted by a group of students working together to achieve a common goal. PBL teaches students not only content, but also essential skills that students must have in order to function as adults in our society. These skills include communication and presentation skills, organizational and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking[13].

Project-based learning is not new. The approach was developed by author John Dewey and his student William Heard Kilpatrick in the early 20th century. Dewey developed the idea of the project method (or project work) which grew out of the architectural and engineering education movement that began in Italy in the late sixteenth century. The last few decades have seen renewed interest in the approach. In many countries, it is now considered an innovative approach to teaching science and technology. In scholarly publications there are several different expressions used to refer to the project method of science and technology including project-based pedagogy approach, project-based learning, project-based teaching, project-based instruction, project-based science, and project work[7].

Given the many expressions/terms used in the project-based learning model, it allows instructors to continue to develop the learning model. In this study, the author uses the term Project-Based Assignment and Examination (Penugasan dan Ujian Berbasis Proyek: PUBER) which refers to The (Continuous) Assignment and Project Activity Based Learning and Examination (CAPABLE) System[14] or Project-Based Assignment (PBA) where students are assigned to interpret field data, identify problems, explain and solve practical problems. Although in this assignment students are allowed to work in groups, in the end they are still required to make individual reports[15]. In addition, this study also refers to the Practical Project-Based Assignments model which focuses on analytical and research

activities[16]. Project-based exams are also in line with the organization of education at the Polytechnic of State Finance STAN as a civil service college of the Ministry of Finance.

Previous research

Students who participated in the Project-Based Assignment found this learning more engaging. They enjoyed learning how to apply knowledge to solve real-world geotechnical problems. It appeared that most of the class was not ready or interested in PBL activities because they preferred traditional learning methods. The course's teaching team found it difficult to motivate students to voluntarily adopt new and more challenging learning approaches (such as PBL), especially students who only wanted to learn what was needed to pass the course. A combination of traditional methods with some elements of PBL may be a good alternative because it still satisfies the majority of students who prefer the traditional approach and also provides opportunities for other 'more active' students to learn more than the traditional approach can provide[15].

The (Continuous) Assignment and Project Activity Based Learning and Examination (CAPABLE) system provides several benefits including:

- Teachers can closely know the level of understanding of the student group which is useful for them, in planning the content and delivery of subsequent lectures very precisely.
- While working on assignments-presentations, students are asked to work in groups. This helps them a lot in clearing their doubts. It also promotes collaborative learning. With careful planning, weak students can be grouped appropriately, thereby helping them build self-confidence.
- Students can remember for a very long time, the mistakes they have made and the corrections given to them. This is not possible in traditional testing.
- Assignments can be very imaginative and innovative, which not only tests their understanding but also ignites the enthusiasm that learning ideally provides[14].

Practical Project-Based Assignments in foreign language teaching can make the learning process more practical and dynamic, focus on analytical and research activities, work with various authentic sources of information, and contribute to the development of students' professional autonomy, both linguistic and professional competence. Positive feedback from students indicates a good perception of this teaching method and an increase in the level of satisfaction with the learning process. This learning also provides high creative and motivational potential of project-based assignments in foreign language studies in the field of "Tourism" and emphasizes the development of students' mental abilities[16].

3. Research Method

Data and Data Collection Methods

The researcher conducted an experiment on 2 groups of students. The first group took part in PUBER learning with a learning scheme that had never been implemented at the Polytechnic of State Finance (STAN). Then the second group took part in face-to-face learning in class as usual. The data used in this study are primary data in the form of sample academic grades, namely mid-term exam, final exam, and activity scores processed by the author who is also the lecturer in charge of the course. The researcher uses academic grade data to measure competency improvement because this data objectively becomes a measure of learning effectiveness[17]. For the Applied Statistics course, the PUBER learning method is used, while the Statistics course uses the non-PUBER learning method. In this study, academic grades are considered to reflect the analytical competency of young employees of the Ministry of Finance who are carrying out study assignments at the Polytechnic of State Finance STAN in the DIII Accounting and DIII Tax Study Programs. The data period is 2023.

Other primary data is the feedback of young employees of the Ministry of Finance regarding the PUBER learning model. This data was collected through a survey in February 2024. Perception data was collected using a questionnaire containing questions grouped into 3 (three) dimensions of competence based on Law Number 20 of 2003 concerning the National Education System, namely the attitude dimension (given the symbol A), knowledge (given the symbol K), and skills (given the symbol S). Each question is given a scale of 1 to 5, meaning 1 = Not Helpful and 5 = Very Helpful.

Analysis Method

To statistically test whether there is a difference in the analytical competence of young employees of the Ministry of Finance, the author uses the independent sample mean difference test method with the assumption that the population standard deviation is unknown and assumed to be unequal[18]. This difference test is carried out by comparing the academic scores of young employees who follow the PUBER AND non-PUBER learning models. The statistical test value is calculated using the following formula:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (\text{where } \mu_1 - \mu_2 \text{ is often assumed to be } 0)$$

While the formulation of the hypothesis is:

H_0: There is no difference in the average academic value of young employees of the Ministry of Finance who follow the PUBER AND non-PUBER models.

H_1: There is a difference in the average academic value of young employees of the Ministry of Finance who follow the PUBER AND non-PUBER models.

The project-based learning approach in this study modifies the Assignment-Based Learning and Testing System (Continuous) and Project Activities (CAPABLE)[14] and other project-based assignment models with the following operational scheme:

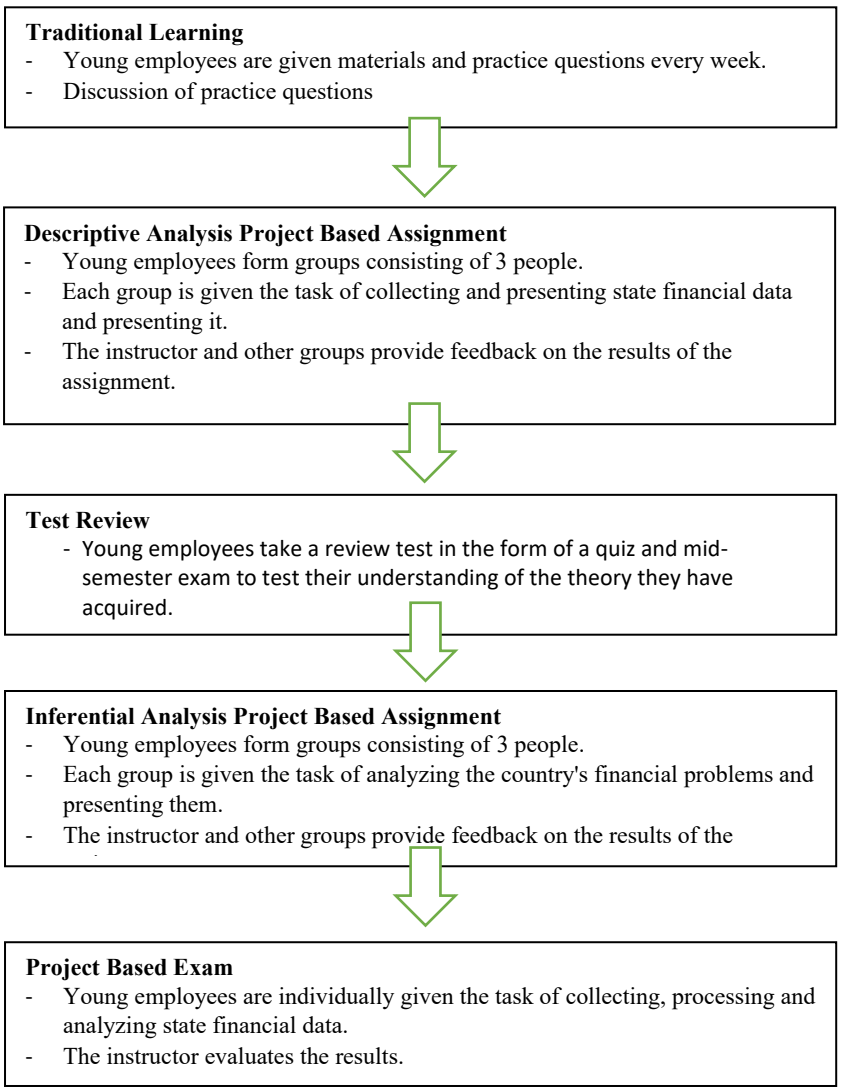


Figure 1. PUBER learning scheme

4. Results And Discussion

PUBER and non-PUBER Learning Scheme

The PUBER learning model is a learning model that uses the media of State Finance problem-solving projects to encourage increased analytical competence. The author assumes that analytical competence is difficult to improve if using general learning models. Young employees who are on average in their 20s are future analyst candidates who have a high level of curiosity, a spirit of development, great creativity and innovation. They need to be facilitated with a learning model that is adaptive to their needs. Therefore, this learning model is designed in such a way as to encourage increased analytical competence of young employees of the Ministry of Finance. This learning model is stated in a Semester Learning Plan document as one of the guidelines in implementing learning activities. A comparison of achievements between the PUBER and non-PUBER learning models is presented in the following table.

Table 1. Comparison of Learning Outcomes

No	non-PUBER	PUBER
1	Explains basic concepts of statistics, sampling techniques, and data presentation.	Understand the concepts of Descriptive Statistics and Inferential Statistics and implement them in practice.
2	Understanding the basic concepts of data characteristics (data centralization and distribution)	understanding the concept of opportunity.
3	Understanding the basic concept of probability.	Understanding the concept of probability distribution.
4	Understanding the basic concept of mean hypothesis testing.	
5	Understanding the concepts of correlation and simple linear regression	
6	Understanding the basic concepts of qualitative data analysis (cross tabulation)	
7	Able to use data processing software (statistics)	

In general, the achievements of the two learning models have similarities, namely being able to understand the concept of descriptive and inferential statistics and being able to apply them in the field of State Finance. The differences between the two learning schemes can be explained as follows:

Non-PUBER learning

1. Includes 16 meetings consisting of 14 face-to-face meetings and 2 written exam meetings.
2. Among the 14 face-to-face meetings, 6 quizzes are conducted to review the understanding that has been obtained in the previous meeting.
3. At each face-to-face meeting, each young employee is given an understanding of Statistics, tax data literacy and the use of analysis tools (SPSS).
4. At each face-to-face meeting, each young employee is given assignments in class and at home to complete Statistics questions and discuss them together in class.

PUBER Learning

1. Includes 16 meetings consisting of 14 face-to-face meetings, 1 written exam meeting, and 1 project-based exam meeting.
2. At the beginning of the meeting, it was conveyed to the young employees that they had to complete 2 analysis projects. The delivery at the beginning of the meeting was intended so that they could have enough time to prepare for the two projects. The data and themes that were used as the basis for the project came from the work units of each young employee, so that in addition to facilitating data collection, it also made it easier to identify problems to be analyzed so that the results could be a contribution to thinking for each work unit. In addition, by integrating

subjects with their environment, it allows the development of students' cognitive and social skills (Dantas & Cunha, 2020). Of course, this project supports efforts to improve one of the key competencies, namely integrated problem-solving competencies to be able to combine and integrate the steps of the process or sustainability problem-solving competencies, while utilizing related disciplines (Brundiers et al., 2021).

3. The first project was carried out in groups consisting of 3 people with the theme of State Finance in Figures as an effort to improve Descriptive Statistics analysis competencies. In this project, they are required to learn independently how to visualize state financial data using analysis tools such as Excel, Google Looker Studio, Tableau, Power BI, Metabase or others.
4. The second project is done individually with the theme of State Financial Data Inference as an effort to improve the competency of Inferential Statistics analysis.
5. The first project is presented and discussed in class at the 5th meeting. While the second project is submitted its report to fulfill the Final Semester Exam.
6. Unlike other project-based learning models, in this PUBER model, young employees of the Ministry of Finance are encouraged to take part in competitions or conferences to present their projects. The hope is to gain knowledge and experience from others, increase competitiveness and develop cooperation so that they can further improve analysis competency. To encourage enthusiasm, those who take part in the activity will be given an activity score, a Mid-Semester Exam score, and a Final Semester Exam score of at least 80. Even if they succeed in getting the best predicate in the competition/conference activity, they will be given a score of 100.
7. In face-to-face meetings, each young employee is given an understanding of the material and guidance on using analysis tools (Excel).
8. In the face-to-face meeting, each young employee is given an assignment in class to complete practice questions and discuss them together in class.
9. Between face-to-face meetings, quizzes are given 2 times to review their understanding.

Measuring Analytical Competence

To measure analytical competence, we use 2 approaches, namely descriptive statistical analysis and inferential statistical analysis. The sample data amounted to 80 people consisting of 40 people taking non-PUBER learning and 40 people taking PUBER learning. The description of this sample data is presented as follows.

Table 2. Descriptive Statistics of the PUBER Model

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AcademicPerformance	40	72,34	90,02	81,5355	3,95230	-,050	,374	-,142	,733
Valid N (listwise)	40								

Table 3. Descriptive Statistics of the Non-PUBER Model

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AcademicPerformance	40	69,90	87,57	79,2713	4,52331	-,077	,374	-,715	,733
Valid N (listwise)	40								

Based on Table 2 and Table 3, the PUBER Model produces better analytical competency compared to non-PUBER learning. This can be seen from the higher minimum, maximum, and average values and lower variation. When viewed from the data distribution, both models have negative Skewness values, which means that most of the data values are on the right side of the average, meaning that most young employees have academic values above average, although there are some very low values. Both models also have negative Kurtosis values, indicating that the data is more evenly distributed and less concentrated around the average value (mean). Although both models have differences in academic average values, both still need to be tested for differences in means to determine

whether the difference is statistically significant or not. Before conducting a test for differences in means, there are requirements that must be met, namely that both samples are taken randomly and the number of samples is more than 30 each (Triola, 2015). In this study, both requirements have been met. The test for differences in means is as follows.

Table 4. Group Statistics

Model		N	Mean	Std. Deviation	Std. Error Mean
AcademicPerformance	PUBP	40	81,5355	3,95230	,62491
	Non-PUBER	40	79,2713	4,52331	,71520

Table 5. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
AcademicPerformance	Equal variances assumed	1,303	,257	2,384	78	,020	2,26425	0,94975	0,37340	4,15506
	Equal variances not assumed			2,384	76,621	,020	2,26425	0,94975	0,37291	4,15559

Based on Table 5, the t-count value is 2.384 and when compared to the t-table value at a degree of freedom of 39 and a significance level of 5% (two-tailed) which is 2.023, then the t-count is in the critical area. Thus, the decision to test the hypothesis is to Reject H0 which means that there is a significant difference between the academic scores of young employees who follow the PUBER learning model and non-PUBER Learning. The positive t-count value indicates that the analytical competency produced by the PUBER learning model is higher than that of the non-PUBER Learning model. The results of this study support the project-based practical assignment model, one of which focuses on analytical and research activities [16].

The PUBER learning model received a positive response from young employees of the Ministry of Finance. According to them, this learning model is more helpful in improving data analysis skills than improving knowledge or attitudes (Figure 2). One of the skills needed in the field of data analysis is using analytical technology devices. This is in line with the wider use of information technology in many companies [10]. In addition, this learning model also stimulates competitiveness and collaboration because some of them participate in competition/conference activities as part of the PUBER learning model such as the National Statistics Olympiad and Statistics Infographic Competition. Student participation in activities outside the classroom also encourages increased analytical competence. This is shown in their Final Semester Exam scores, almost all of which get a score of more than 80 outside of the additional score for participating in competitions/conferences. This learning model shows that project assignments should not end in discussions in class, but can be directed to be presented outside the classroom so that they can improve student competence obtained from experts outside the classroom.

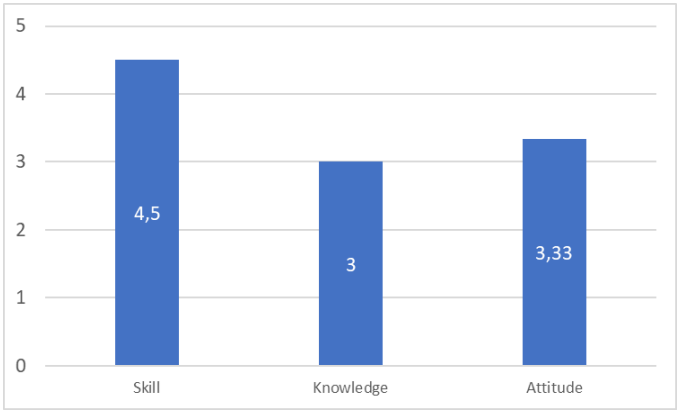


Figure 2. Student Perceptions Regarding the Benefits of Project-Based Assignments and Examinations for Improving Analytical Competence

5. Conclusion

The Project-Based Assignment and Exam (PUBER) learning model has its own uniqueness compared to other project-based learning models. This learning model integrates the world of work with vocational higher education. In this model, young employees of the Ministry of Finance must complete a project to solve State Financial problems faced by their respective work units and are encouraged to present the project at a competition/conference. Thus, they not only gain knowledge and experience of analytical competence in the classroom but also gain from experts outside the classroom.

There is a significant difference between the analytical competencies of young employees of the Ministry of Finance who follow the PUBER and non-PUBER learning models. Subjectively, the more dominant competency resulting from the PUBER learning model is the increase in skills, especially in problem-solving abilities and the use of analytical technology devices.

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SEKOLAH YANG-EYANG MODELING FOR GRANDCHILD CAREGIVING: A LESSON FROM EAST JAVA, INDONESIA

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Abstract

The Grandparents' School, run by the *Sekolah Yang-Eyang*, plays a crucial role in the success of sustainable education through intergenerational care. This initiative emphasizes the role of support in education. This research focuses on modeling techniques in the alternative education of the *Sekolah Yang-Eyang*. The study uses a qualitative case study method and centers on Karang Werda Bungur, a village in Jember with the Tanoker Community in East Java, Indonesia. Data collection methods include observation, interviews, questionnaires, and document analysis. The research findings reveal four dominant types of modeling techniques: individual role models from community leaders; more effective utilization of infrastructure; governance systems; traditional and cultural practices. Models embedded in community culture make collaborative caregiving more profound. This is achieved by building good learning habits through direct observation. Grandparents need practice in translating abstract caregiving concepts into practical actions, and caregiver models help them do this. Thus, by directly demonstrating sustainable actions to caregivers, they will have the necessary knowledge base for effective expected behavior. Research on these modeling techniques helps *Sekolah Yang-Eyang* institutions foster positive learning experiences and caregiving practices. This approach can provide solutions for implementing *Sekolah Yang-Eyang* programs that focus on collaborative child care in education.

Keywords: sekolah yang-eyang, grandchild caregiving, grandparent school, modeling techniques, community development

1. Introduction

Sekolah Yang-Eyang or Grandparents School is an alternative educational institution that voices great concern for children and conducts activities related to collaborative caregiving [1]. Founded through collaboration between the Karang Werda Bungur community and the Tanoker Ledokombo Jember community in February 2018, *Sekolah Yang-Eyang* emerged as a response to various childcare challenges in the modern era. Integrating children's education is crucial to address children's issues both inside and outside the community [2]. *Sekolah Yang-Ey*ang aims to create communities that are sensitive to child-rearing issues [3], [4], by integrating child education curriculum with community education [5].

The background of *Sekolah Yang-Eyang* establishment is based on several important factors. In Ledokombo, many residents entrust their children to their grandparents, either because parents work as migrant workers abroad or because parents work and do not employ domestic workers. This situation creates problems in caregiving, where children tend to be more spoiled and grandparents often provide defense when children are given understanding by their parents. The difference in challenges between the grandparents' era and their grandchildren's current era, especially in the digital age, is also an important consideration. The grandparents or *eyang* need learning about good and healthy child-rearing methods in accordance with today's challenges.

Sekolah Yang-Eyang has several main objectives. First, to be a forum for the grandparents to increase knowledge and skills, both for themselves and for raising grandchildren, with a foundation of good character. Second, to provide a space for sharing and venting (discussion) among fellow grandparents. Third, to find solutions together if there are obstacles in raising grandchildren or problems faced by the grandparents.

By integrating children's education with community education [5], *Sekolah Yang-Eyang* plays an important role in addressing children's issues both inside and outside the community. The grandparents not only learn how to raise grandchildren, but are also empowered to become productive and quality seniors[6]. Through this approach, *Sekolah Yang-Eyang* aims to create quality seniors while expanding safe and comfortable spaces for the daily lives of the elderly, the development of grandchildren, happy households, and a healthy environment for families, relatives, friends, and the wider community [6].

An example of this is included in how Bandura applies the social learning theory to education, including such concrete practice as modeling learning [7], [8]. Modal modelling technique is the action of representing selective objects or actions as models to mimic by mother and father [9]. It discusses ideas on how a moderator can role model for parents what is to be expected behavior can come into play, part of it being osmotic learning. This involves showing examples of particular activities or actions. If you wanted to explain how something works, it can demonstrate. It presents the material, from which models for learning goals and outcomes are derived [10]. Modeling: When grandparents themselves develop their knowledge in the subject, get involved with more vigor, create fluid situations or conserve costs and time.

Modeling with good model features [11], Material-relating to grandparents needs fun practical challenging and activity-rich. Learning-based modal modeling mostly aggregates and searches for observed behavior as a result of which this kind of learning is overfitted from one observation to another. We are talking about cognitive processes here which means that there is more to it than just aping others but also adapting the behaviours of other through symbolic representation and recording this for future use. Modeling is essential because people like to use models that are more competent and higher in status. Humans understands what might be imitated and what cannot. These are certain benefits they, without question, expect from modeling.

Modeling in learning for grandparents to become critically aware [12]. They will watch the model you give to see how it is done. In addition to information provided by the facilitators, grandparents can also self-discover other aspects of their parenting behavior with trial experience from model. Consequently, grandparents will change with behaviors.

Behavior change can be measured in five characteristics [8], namely: showing disinterest, deliberating, designing, doing, and maintaining. The Disinterest-seems" I dont feel like doing this") Here, people around refuse to take child caregiving center stage which is a potential societal threat, and denies that children poor caregiving can result in social disasters [13]. Deliberating as this author fondly calls it, the "I might change" phase and above all that people or groups are ambivalent about child-related issues and collective caregiving. They find it hard to understand the cascading effects of doing nothing and can roll back into apathy mode. Progress comes from making tough decisions, knowing that to move is better than standing still [14]. They are unaware of the impact on life if they do not respond. Consequently, they are not ready to change and may return to being uninterested. To push towards the next, decisions need to be made because taking action is more substantial compared to doing nothing. The third is designing or the 'I am going to change' stage. One step they begin to take is coming back together as individuals or communities to recognise the value of caring for their children and supporting one another in doing so. This will involve thinking about strategies at different levels - political, organisational and personal. The feasibility of these proposed actions is then assessed in terms of how effective they are and whether the public will accept them. Next is doing or the "I am changing" stage Action: this step includes implementing the action plan already prepared, in this case emphasizing on collaborative caregiving education. The last characteristic is maintaining or the last step, also known as the "I have changed." This is when the community or organization begins to act based upon that new view; This usually happens between 6 months and up to a year after you start the change process.

Modeling techniques are included in the contextual approach. This provides a model for knowledge or skills that can be simulated by grandparents during the learning process. *Sekolah Yang-Eyang's* modeling technique adopts four strategic and integrated modeling techniques. Based on the research background, this study analyzes how *Sekolah Yang-Eyang's* modeling techniques improve the quality of collaborative caregiving.

2. Method

This research describes a qualitative case study approach undertaken to investigate education from *Sekolah Yang-Eyang* caregiving educational model. This study will use a single case design, to discover the characteristics of these educational programs that are unique and valuable [15]. Research is an iterative process structured in three main stages - broad exploration, focused investigation and validation. Stages are divided into phases (preparation, fieldwork and data analysis). It involves triangulating methods of data collection, such as interviews and observations (participatory, focused or selected), combined with document analysis. This holistic approach seeks to capture comprehensive and complementary information.

Selection of participants we used a combination purposive and snowball sampling technique, which identified community founders (grandparents), leaders (leadership circle) and facilitators. Further triangulation requires participation of other groups such as master users, community members and educational organizations in the area to ensure accuracy.

The research instrument is essentially an interview that focuses around 4 areas: role models, use of infrastructure, governance systems and institutional culture/traditions. The interview topics in turn become a basis for further exploration.

The processes for data collection include interviews; observations of institutional cultures and traditions, and analysis of documentation. This latter one comprises of manuscripts from community ancestors, books and works by leaders that reflects the curriculum basic at *Sekolah Yang Eyang*. We have followed additional theoretical data from literature survey.

The data analysis is informed by the Miles and Huberman [16], model characterized using: "Data reduction, presentation, drawing conclusions and verification". The validation process combines information obtained from interviews, observations and document analysis to develop a comprehensive description of the type of educational modeling done by *Sekolah Yang-Eyang* as well as its impact on quality collaborative caregiving. The method consists of research design, population, samples, variables, instruments, data gathering, and data analysis as shown in Figure 1.

3. Results and Discussion

3.1. Individual role models from community leaders

Role modeling by facilitators and community leaders at *Sekolah Yang-Eyang* is a direct implementation of Bandura's social learning theory. Facilitators and community leaders act as "models" demonstrating behaviors, attitudes, and skills expected to be adopted by the grandparents in raising their grandchildren[17]. Good behavior from an individual can provide useful information. Concern for children is exemplified by community leaders [18], facilitators (companions), and grandparents. The model shown by community leaders includes: demonstrating positive parenting practices. They consistently show positive ways of interacting with children. For example, when a child misbehaves, facilitators will demonstrate how to handle the situation calmly and effectively, without using violence or threats, not just as superiors who stick to doing things right, but doing the right things by providing room for growth, emotional and moral support for their members. In addition, they practice using language appropriate to the child's developmental level, provide clear instructions, and use questioning techniques that encourage critical thinking in children. Facilitators and community leaders provide examples of how to use digital technology wisely and how to guide children in using devices. They demonstrate how to set time limits for device use, choose age-appropriate content, and discuss potential online risks with children [19].

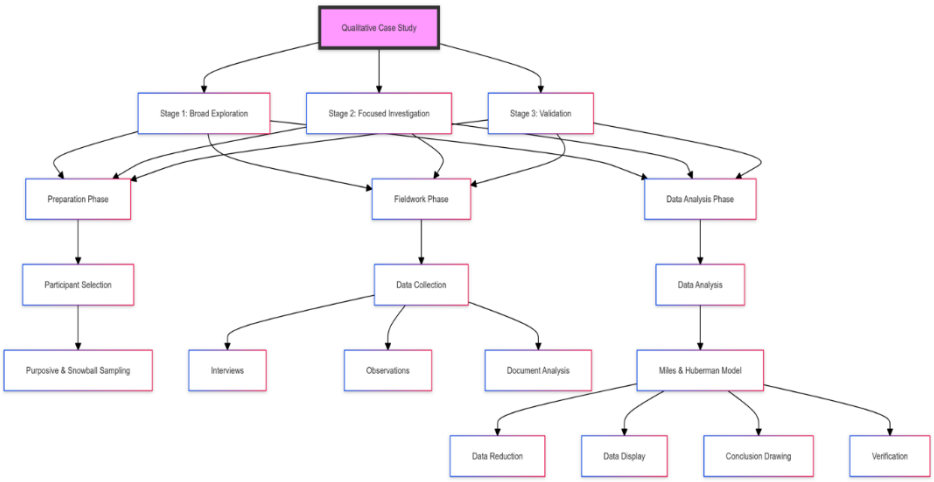


Figure 1. Research Design

These models also show the importance of a healthy lifestyle through their own behavior. This can include practices of eating healthy food, doing regular physical activity, and managing stress in positive ways [20]. Facilitators and community leaders demonstrate a spirit of lifelong learning by

continuously updating their knowledge about child development and current parenting trends. They share this new knowledge with the grandparents, showing that learning never stops even in old age. They show constructive ways of resolving conflicts, both between children, between children and adults, and among adults. This provides a model for grandparents on how to handle tensions or disputes in the family. These role models demonstrate the importance of empathy in parenting, showing how to understand and respond to children's emotional needs.

This is in line with the theory of teacher effectiveness as a model because most students understand and follow their teachers. Students see teachers as competent figures. There are two factors that have been proven to enhance observational learning. Individual examples by grandparents at Sekolah Yang-Eyang include participation in collaborative caregiving, providing the right to play for children, educating children, providing protection, providing healthy food [20] and providing friendly provisions using devices. Furthermore, child-oriented role modeling goes in the same direction. Leaders act as role models in providing examples of learning attitudes and behaviors that are oriented towards collaborative caregiving[21].

In addition to leaders, almost everyone in this community can be a model for others, whether facilitators for grandparents, grandparents for other grandparents, or even grandparents for facilitators or community leaders [22]. Some modeling seems unintentional, for example, a grandparent with collaborative caregiving insight allows her grandchildren to play in the Tanoker Community to learn dancing, storytelling, playing stilts and so on as a habit. However, some modeling is sometimes intentional. A grandparent explains that she is sometimes motivated to engage in collaborative caregiving because she wants facilitators and other grandparents to imitate her[1]. Therefore, the modeling techniques between leaders, facilitators, and grandparents positively influence each other.

The results indicate that caregiving and perceived similarity with grandparents are the two most likely predictors of successful modeling. If a model is warm, affectionate and somewhat similar to themselves in magical thinking style grandparents may be apt to imitate [23]. The typology of the grandparent within that community also represents that nurturing, tenderness and adoration as manifest in their natural behaviour. In *Sekolah Yang-Eyang* community, many grandparents claim that facilitators are their friends and mentors, even as high as the family-family. The proximity of parents and outside consultants is a factor which greatly influences the efficacy of role models. Facilitators and grandparents, discussing how these intergenerational relationships improve their efforts to model sustainability. Leading by example, a good role model is that serves his self as the beneficial behavior of child education - children are required in training cooperation behaviors from their parents and following this close relationships between grandparents-facilitator can also be very effective for sustainable development prospects

3.2. Effective utilization of infrastructure

The aspect of facilities and infrastructure and how they are operated can be a powerful medium for teaching grandparents about sustainability. *Sekolah Yang-Eyang* has made prominent efforts to reduce negative impacts on collaborative caregiving and increase positive impacts on their community by utilizing their facilities based on collaborative caregiving principles through *Sekolah Yang-Eyang* as a promising model for providing community-friendly facilities. These efforts include: designing learning spaces that are safe, comfortable, and stimulate creativity [24]. This becomes a model for grandparents on how to create an environment that supports the growth and development of grandchildren in their own homes. They create outdoor learning areas to bring them closer to nature. By providing outdoor learning areas, *Sekolah Yang-Eyang* models the importance of bringing grandchildren closer to nature and the benefits of experiential learning. The presence of traditional game tools such as stilts in the Tanoker community [25] becomes a concrete model for grandparents about the importance of preserving traditional games and their benefits for the physical and social development of grandchildren. Each grandparent's house is used as a laboratory to practice educational materials. This models how learning can be integrated into daily life [26].

Maintaining infrastructure means ensuring the community's physical systems function well, including facility maintenance, fieldwork, human resource management, cooking, and cleaning. Through modeling infrastructure and facility use, *Sekolah Yang-Eyang* not only teaches theory about good parenting but also directly demonstrates how these principles can be applied in the physical environment [27]. Grandparents can observe, experience, and then imitate or adapt these practices in their own homes. By involving grandparents in infrastructure operations, such as making healthy food or expanding safe spaces for seniors and their grandchildren, *Sekolah Yang-Eyang* promotes a sense of

ownership and responsibility towards the place and community. This in turn encourages grandparents to be more active in creating an environment that supports good caregiving.

Interestingly, the grandparents and facilitators at *Sekolah Yang-Eyang* are responsible for the school's infrastructure. At Sekolah Yang-Eyang, no one employs support staff. Instead, the grandparents and facilitators serve as its caretakers. They clean, process waste, and maintain *Sekolah Yang-Eyang's* facilities. The grandparents are responsible for longer-term tasks and work projects than routine facility maintenance[28]. The most common reason cited by institutional leaders for maintaining facilities and their operationalization is to be a model of collaborative caregiving education for the grandparents.

The very buildings themselves possess a hidden curriculum every bit as powerful and effective in teaching as any subject taught within those walls. We don't think of academic buildings as being at the pedagogical core, but they are. Well - being open in building community facilities and their operations is a crucial element of turning them into an effective learning medium, so transparency it has to be. These helps ensure that the social and economic implications of its facilities are apparent to students (grandparents in this circumstance) and others. Facilitators at *Sekolah Yang-Eyang* describe collaborative caregiving as a way to teach. Its effectiveness was attested by a few of the interviewees.

Transparency to grandparents in how operations work, as well as creation of collaborative caregiving facilities. Among these are the promotion of grandparental participation in community activities, healthy eating[20], more opportunities to be with grandchildren (as well as other seniors), environmental justice, social rehabilitation and transparent democracy in their villages. Grandfather or parents working in the operation and maintenance of infrastructure also create a sense of belonging to that place and community [29]. The facilities and operational overview of *Sekolah Yang-Eyang* provide a model for an estate that supports learning through the practice of collaborative caregiving by reducing dependency on lecture decentralization to grandparents; they contextualize talks in collaborations about future developmental issues; since grandmothers have been given direct access to experience real social responsibilities. iterative and increase the sense of community participation are managed constructionally.

3.3. Governance System

This modeling focuses on how *Sekolah Yang-Eyang's* governance system becomes an example or model for principles of democracy and social justice [30]. This governance system is not only a way to run the organization, but also becomes a powerful learning tool for *Sekolah Yang-Eyang* participants. In that, Sekolah Yang-Eyang modeled governance after social justice and community participation. Grandparents in this community are taught about social justice by modeling participatory processes. Integrated Policies: are developed together by the community leaders, founders and then adopted to understand together as a group how their decisions can be applied in common but this also involves grandparents-grandchildren inclusively with facilitators benefits everyone. The governance structures of this community not only serve as a model for inclusive decision-making, they are also about giving the students some sense of ownership. Participatory governance structures in the community encourage grandparents' sense of belonging to the community and prepare grandparents to participate in a democratic society.

Modeling through this governance system has a significant impact. The grandparents not only learn about democracy and social justice in theory, but they experience it directly in daily practice at *Sekolah Yang-Eyang.* They learn how to voice opinions, listen to different perspectives, negotiate, and reach consensus. Furthermore, this experience can be transferred into the context of caregiving. The grandparents can apply the same principles in their interactions with their grandchildren, creating a more democratic and fair family environment.

Thus, modeling through the governance system not only teaches about organizational structure, but also important values such as inclusivity, fairness, and active participation. This aligns with *Sekolah Yang-Eyang's* goal to create a community that is sensitive to grandchild care and supports positive development for both grandparents and their grandchildren.

3.4. Traditional and cultural practices

Being as culture affects how a person behaves and thinks, it is one of the most effective ways by which we learn. A set of cultural beliefs and values that are accepted as correct by a particular group. The community culture is reflected through the various elements like rituals, traditions, buildings programs and teaching methods extra-curricular activities of a community [31]. Even if communities cannot change the culture outside of them, not at least in the near term (until all their organizationally

based participants have had a turn), surely they can ensure that longstanding practices within those boundaries are supportive rather than destructive to coping. A few rituals and traditions that offer education gets welfare through network childcare nurtured communication ways.

Every morning on Mondays and Thursdays, the grandparents gather and do exercises together. This activity not only promotes a healthy lifestyle but also models the importance of routine and consistency in daily life. *Sekolah Yang-Eyang* holds lectures that discuss relevant topics such as grandchild care, simple living, awareness of protecting nature, personal growth, community, and social justice. This models the importance of lifelong learning and openness to new ideas. They also hold Khoirunnisa recitations which become a model of spiritual development, where spiritual development encourages spiritually-based caregiving[32].

The grandparents are taught and encouraged to practice making healthy food without preservatives[20]. This models the importance of good nutrition in grandchild care and promotes a healthy lifestyle. *Sekolah Yang-Eyang* encourages the use of traditional games like stilts. This models local cultural values and the importance of play in grandchild development. *Sekolah Yang-Eyang* encourages outdoor activities like jogging and morning exercises. This models the importance of connection with nature and physical activity in daily life. The grandparents are encouraged to share experiences and information about their grandchildren's development. This models the importance of open communication and community support in caregiving.

Topics of other lectures include grandchild care, simple living, awareness fo protecting nature or personal growth and community (or social justice webpacks). In addition, *Sekolah Yang-Eyang* promotes the concept of sustainability by instilling it through tradition. After the exercises, all grandparents and facilitators leave school for their morning physical activities (jogging or gymnastics practice). In doing so, they conduct healthy cooking training. These rituals encourage coordination, grit and nature. Foster parents and grandparents foster sustainability by raising children who value it[33].

By creating a community-based caregiving culture, *Sekolah Yang-Eyang* offers grandparents an alternative cultural model to that which they might experience in the world outside. Partial caregiving is so rooted into norms and values of the Indonesian society to a degree that it can be quite challenging to envision an alternative communal-type mode amongst communities. Culture is embedded in society and will not change fast. These learning communities treat the ground and relationship between friendship early education cooperative care [34]. may exist for the actual practice to be supported by unfriendly cultures of some cultivation can represent real formidable problems. Culture building will not be an easy thing to do, and communities would have to take a hard look at the ways in which their culture undermines educational efforts with respect from either side of our collective parenting experience. But the fruits of successful cultural transformations can be well worth it.

Through this culture and traditions, *Sekolah Yang-Eyang* creates an environment that consistently models the values and practices it wants to instill in the grandparents. The grandparents not only learn theoretically about good caregiving, but also experience and practice it directly in a supportive community context. Modeling through culture and traditions is effective because it provides concrete and sustainable examples of how desired values and practices can be integrated into daily life [35]. This helps grandparents more easily adopt and internalize these behaviors and values, which in turn they can apply in raising their grandchildren.

Collaborative caregiving-based education can be a highly influential force for shaping every aspect of the society. This leads to a domino effect in which an educational culture underpinned by the spirit of care and collaboration encourages peer-to-peer modeling across all levels. So, in that community individual behaviours begin to reflect the cultural norms which resonates down towards ancient practices with operational methods of schools and school governance [36]. *Sekolah Yang-Eyang* model demonstrates this by building a culture that changes the target behaviour at multiple levels, from an individual level to facility utilisation and school governance as well. The change in culture is facilitated through the integration of traditions, rituals and ceremonies; which ignite behavioural shifts. Communities in which partnership values are truly learned from the start and practiced continuously as part of their cultural roots. This comprehensive approach ensures that the ideal of shared caregiving is more than a goal to be taught, but rather an everyday reality in every corner and aspect of community life. Consequently, and other caregivers who have been continuously exposed to these practices — are more likely over time as well to internalize this educational philosophy.

4. Conclusion

Collaborative grandchild caregiving education employs modeling techniques to foster learning through practice within communities. This approach encompasses several key aspects: individual role models from community leaders; more effective utilization of infrastructure; governance systems; traditional and cultural practices. By observing and emulating these models, grandparents acquire knowledge through hands-on application rather than theoretical understanding. This practical approach to learning about collaborative caregiving values and education is more likely to result in acceptance and adoption of these behaviors. Modeling techniques are particularly effective in helping grandparents transform collaborative caregiving concepts into tangible actions. Through direct and ongoing observation of regular practices, grandparents gain the practical knowledge necessary to implement these behaviors in their own lives. This method of learning equips grandparents with the skills and understanding needed to embrace a more sustainable lifestyle. As a result, communities can anticipate that grandparents who have directly experienced collaborative caregiving practices through modeling will be better prepared to incorporate these approaches into their own caregiving roles.

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Assessing the Accuracy and Consistency of Formative Assessment Instruments in Physics: A Validity and Reliability Study

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Abstract

This research aims to empirically analyze the validity and reliability of formative assessment instruments in Physics subjects. The method used was a survey design with a sample of 220 students selected through simple random sampling. Data was collected using formative tests designed to measure various aspects of student abilities. Construct validity was analyzed through second level Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), while reliability was measured using Cronbach's alpha and composite reliability. The findings show that the formative assessment instrument has valid factor loadings (>0.50) and adequate model fit based on the CFI, TLI, RMSEA, and SRMR criteria. The instrument also demonstrated high consistency in measuring the constructs of interest. The conclusion of this research is that the instrument developed is valid and reliable for use in Physics formative assessments. The implications of this research indicate that the use of survey design and rigorous analysis can ensure the quality and reliability of assessment instruments, as well as provide useful insights for the development of evaluation methods in education. Recommendations for future research include application of this instrument in a broader context and adjustments based on user feedback to increase the effectiveness and acceptability of the instrument in the field.

1. Introduction

In the educational context, the development of valid and reliable assessment instruments is essential to ensure the effectiveness of evaluation and optimal learning quality. Validity, as one of the main elements, measures the extent to which an assessment instrument actually measures what it is intended to measure, such as specific skills or knowledge in a particular subject[1,2]. Validity includes several dimensions, including content validity, construct validity, and criterion validity, which collectively determine the extent to which an instrument reflects the evaluation objectives and competencies expected of students[3,4]. Content validity ensures that the items in the instrument cover all aspects relevant to the material being taught, while construct validity assesses the extent to which the instrument measures the claimed theory or concept, and criterion validity connects assessment results with external criteria or expected results[5,6]. Meanwhile, reliability refers to the consistency and stability of the results obtained from the instrument in various tests and situations[7,8]. Reliability includes aspects such as internal consistency, which measures the degree to which items in an instrument correlate with each other, and temporal stability, which assesses the degree to which assessment results remain consistent when administered at different times[8]. Ideally, the assessment instruments designed should be able to provide accurate and consistent results, not only under ideal conditions but also in various educational contexts and environments[910]. In other words, a reliable instrument should be able to provide similar results when used by different groups of students or in different settings[11]. Valid and reliable assessments not only ensure that student abilities are measured appropriately, but also increase confidence in the evaluation results provided[12]. High validity and reliability increase the accuracy and reliability of the data obtained, which in turn can influence decisions regarding learning and curriculum development[13]. Instruments that meet these standards help educators to make more informed decisions

about student progress and the effectiveness of their teaching, as well as provide a solid basis for pedagogical improvements and adjustments.

However, in practice, many assessment instruments used in the field do not fully meet the expected validity and reliability standards. The main problem that often arises is the inability of instruments to function optimally in various educational contexts, resulting in evaluation results that are not accurate and fair[14]. In many cases, assessment instruments cannot capture the complexity and diversity of student needs and characteristics, resulting in evaluation results that do not reflect actual abilities[15]. In addition, some instruments may only work well in certain contexts or only for certain groups of students, thereby reducing their ability to be widely used in different educational situations.

Existing theoretical gaps often include a lack of deep understanding of how validity and reliability theories can be translated into concrete assessment practice. Although much literature emphasizes the importance of understanding validity and reliability theories, the application of these theories in the development of assessment instruments is often not carried out thoroughly[16]. These theories often remain at a level of abstraction without providing sufficient practical guidance on how to apply them in the design and testing of assessment instruments. As a result, many assessment instruments that are developed are not systematically tested for validity and reliability, or are not well adapted to specific needs and contexts in the field[17]. Furthermore, deficiencies in the related literature often include a lack of empirical studies evaluating the validity and reliability of formative assessment instruments in the context of specific subjects, such as Physics. Existing research is often inadequate in terms of methodology, scope, or analytical detail, leaving gaps in the understanding of how such instruments function in real educational contexts. This shows the need for more in-depth and detailed research to evaluate and develop assessment instruments that are truly effective and reliable.

On the empirical side, there is a lack of studies that systematically test the validity and reliability of formative assessment instruments in the context of specific subjects, such as Physics[18]. Existing research is often inadequate in terms of methodology or scope, leaving gaps in the understanding of how such instruments function in real educational contexts. This creates an urgent need for more comprehensive and systematic research to evaluate the effectiveness of formative assessment instruments, especially in complex subjects such as Physics[13]. This research presents innovation by integrating comprehensive analytical methods to evaluate the validity and reliability of special formative assessment instruments in Physics subjects. By using a comprehensive approach, this research aims to provide new insights into the strengths and weaknesses of existing instruments, as well as to identify aspects that require improvement. The practical contribution of this research is expected to include the development of more accurate and reliable assessment instruments, which can be applied in various educational settings to improve the quality of evaluation and student learning outcomes. The aim of this research is to empirically analyze the validity and reliability of formative assessment instruments in Physics subjects. This research is expected to make a significant contribution to the development of more effective evaluation instruments, as well as offer data-based recommendations for improving and applying assessment instruments in a broader educational context.

2. Methodology

Research Design

This study used a survey design, a common method in educational research for collecting quantitative data from a large sample[19]. This option allows for in-depth analysis of the relationships between variables related to student performance in Physics through formative assessments. The survey design was chosen because it can provide representative and comprehensive data, ensuring the validity and reliability of the instrument, as well as cooling the data collection method. By using surveys, this research can test the instrument thoroughly and produce relevant insights about the effectiveness of assessments in developing students' skills.

Sample and Data Collection Technique

The sample for this study consisted of 220 students, selected using simple random sampling to ensure each participant had an equal opportunity to be included, thereby reducing potential bias. Data were collected through a formative test specifically designed to assess the constructs of interest, focusing on students' abilities in Physics. The formative test includes various types of questions or items aligned with the predetermined learning objectives. These items were crafted to not only evaluate students' understanding but also to foster their critical thinking, analytical skills, and problem-solving

abilities. Clear instructions were provided to the participants on how to complete the test, and their responses were collected anonymously to encourage honest and accurate reporting. This approach also ensured adherence to research ethics by protecting the confidentiality of the participants.

Data Analysis Techniques

The data analysis process begins with an assessment of construct validity using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) at the second-order level[20]. EFA was used to identify the underlying factor structure of the formative test and to determine how items grouped together under specific constructs. Items with factor loadings greater than 0.50 were deemed valid and retained, while those with loadings above 0.30 underwent further scrutiny to assess their relevance[21,22]. Following EFA, CFA was conducted to confirm the factor structure identified and to evaluate the overall fit of the measurement model. This evaluation utilized fit indices such as the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) to ensure the model's adequacy[23]. All analyzes were carried out using R Studio, which facilitated sophisticated data manipulation and statistical examination. In addition to validity, the reliability of the formative test was assessed through Cronbach's alpha and composite reliability to ensure consistency in measuring the constructs across various items. Items failing to meet the reliability criteria were revised or removed to improve the instrument's robustness. By integrating these rigorous analytical techniques, the study ensures that the formative test is both theoretically sound and empirically reliable, thereby serving as a dependent tool for future educational assessments in Physics.

3. Results And Discussion

KMO and Bartlett test of Sphericity

In the context of evaluating the construct validity of formative tests, the use of the KMO and Bartlett's test is an important first step in checking the quality and suitability of the data before further analysis is carried out [1]. The KMO (Kaiser-Meyer-Olkin) test was used to evaluate the extent to which the data were suitable for factor analysis, while the Bartlett test tested the significance of the correlation between variables in dataset [2]. These two tests help ensure that the data used can reliably validate the constructs involved in the formative test.

Table 1. KMO and Bartlett's Test of Sphericity

Parameter		Mark
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,930
Bartlett's Test of Sphericity	Approx. Chi-square	3841,539
	df	66
	Sig.	,000

Based on the results presented in table 40, the KMO value meets the requirements, so this data is suitable for further analysis. The eligibility criteria are that the KMO value must be more than 0.7, or at least 0.5, with a Bartlett significance value below 0.05. Bartlett's test tests whether the intercorrelation matrix is an identity matrix or not. If the significance value is <0.05, then the intercorrelation matrix is not an identity matrix and factor analysis can be carried out [3]. The analysis results show that the KMO value is 0.930, which is greater than 0.7, and the significance value is 0.000, which is smaller than 0.05. Therefore, the intercorrelation matrix is not an identity matrix, allowing for factor analysis.

MSA (Measure of Sampling Adequacy)

The next condition that must be met is sample adequacy, which is measured using the MSA (Measure of Sampling Adequacy) value. The minimum MSA value that must be met is 0.5 [4]. The MSA value results for each item are in the following table.

Table 2. MSA (Measure of Sampling Adequacy)

Item Parameters	MSA Value
Overall MSA	0.930
B1	0.947
B2	0.946
B3	0.954
B4	0.983

Item Parameters	MSA Value
B5	0.841
B6	0.880
B7	0.960
B8	0.915
B9	0.957
B10	0.971
B11	0.918
B12	0.919

Based on the analysis results in table 41, all items have an MSA value above 0.5. Items with quite high MSA values include Item B4 with a value of 0.983, Item B10 with a value of 0.971, and so on up to Item B1 which has a value of 0.947. Therefore, all items met the sample adequacy requirements for further analysis.

Model Fit Test

The model fit test results show that the model used fits the observed data based on various evaluation statistics.

Table 3. Model Fit Test

Model Parameters	Cut off Value	Mark	Description
Statistical test (t-test)	-	322,779	Fit
Degrees of freedom (df)	-	50	
P-value (Chi-square)	> 0.05	0	Fit
Comparative Fit Index (CFI)	≥ 0.90	0.927	Fit
Tucker-Lewis Index (TLI)	≥ 0.90	0.904	Fit
Akaike (AIC)	Smaller is better	3897,046	Fit
Bayesian (BIC)	Smaller is better	3992,068	Fit
Root Mean Square Error of Approximation (RMSEA)	≤ 0.08	0.057	Fit
Standardized Root Mean Square Residual (SRMR)	≤ 0.08	0.015	Fit

Based on table 42, it shows a test statistic (t-test) of 331,467 without a cut off value, and a p-value (Chi-square) of 0 indicates that there is not sufficient evidence to reject the null hypothesis, indicating the model fits well. Apart from that, the Comparative Fit Index (CFI) was 0.927 and the Tucker-Lewis Index (TLI) was 0.904, both of which met the fit criteria with a value of ≥ 0.90. The relatively small Akaike (AIC) and Bayesian (BIC) values, namely 3897.046 and 3992.068 respectively, also indicate that this model is better in comparing other alternative models. The Root Mean Square Error of Approximation (RMSEA) is 0.057 and the Standardized Root Mean Square Residual (SRMR) is 0.015, both of which meet the fit criteria well with a value of ≤ 0.08. Overall, the results of the model fit test show that this model is appropriate to the existing data and can be trusted to explain the relationship between the variables involved in this research.

Model Parameter Estimation

Table 43 displays the parameter estimates for the measurement model with latent variables and indicators. The observed latent variables include measurement items (B1 to B14) as well as measurement indicators (M1 to M4) and waves.

Table 4. Model Parameter Estimation

Latent Variables	Estimate	Std. Err	z-value	P(>|z|)	Std.lv	Std. all
B1	0.174	0.028	6.26	0	0.174	0.190
B2	0.120	0.024	5,037	0	0.120	0.146
B3	0.640	0.065	9,805	0	0.640	0.554
B4	0.819	0.075	10,857	0	0.819	0.660
B5	0.184	0.021	8,759	0	0.184	0.196
B6	-0.073	0.018	-4.04	0	-0.073	-0.078

Latent Variables	Estimate	Std. Err	z-value	P(>|z|)	Std.lv	Std. all
B7	0.049	0.005	9.94	0	0.049	0.243
B8	0.059	0.012	4,956	0	0.059	0.035
B9	0.086	0.009	9,159	0	0.086	0.120
B10	0.194	0.021	9.36	0	0.194	0.125
B11	0.021	0.004	4,686	0	0.021	0.028
B12	0.208	0.022	9,333	0	0.208	0.122
M1	0.262	0.036	7,291	0	0.353	0.353
M2	0.176	0.035	5,094	0	0.419	0.419
M3	0.002	0.002	0.915	0.36	0.011	0.011
M4	0.022	0.015	1,411	0.158	0.016	0.016
Wave	0.480	0.077	6.28	0	1	1

The results of data analysis in table 43 show that all latent variables (B1 to B12, M1, M3, M4) have statistically significant positive estimates (z-values range from -4.04 to 10.857, with all P values < 0.001). This indicates that all of these latent variables contribute positively to the constructs observed in this study. In addition, the Wave variable also shows a significant positive estimate (z-value = 6.28, P < 0.001), indicating that wave has a large influence in the observed model, with a strong overall standard estimate and standard estimate. Thus, it can be concluded that the results of this data analysis confirm the existence of a significant relationship between the latent variables studied and the constructs observed in this study.

R Square (effect size)

The results of the R Square analysis show how much variation in the latent variable can be explained by the observed variable or its manifestation in the observed model.

Table 5. R Square (Effect Size)

Latent Variables	Estimate	Latent Variables	Estimate
B1	0.810	B9	0.880
B2	0.854	B10	0.875
B3	0.446	B11	0.972
B4	0.340	B12	0.878
B5	0.804	M1	0.647
B6	NA	M2	0.581
B7	0.757	M3	0.989
B8	0.965	M4	0.984

The results of data analysis in table 44 show that the R-square value for the observed latent variables varies. The latent variables B1, B2, B5, B7, B9, B10, B11, and B12 indicate that the percentage of variation in the observed constructs can be explained significantly by these latent variables. Other latent variables such as B3, B4, also have R2 values that are less than 50% of the variation in the observed constructs. The variables M1, M2, M3, and M4 also have high R2 values, indicating that the variability in the observed constructs can be well explained by the associated latent variables. Although the latent variable B6 does not have an available R2 value (NA), the overall analysis results show that the model significantly explains variation in the observed constructs, with the latent variables providing diverse contributions to a deeper understanding of the phenomenon studied.

Path Standardized Value

Path standardized value is a value that has been standardized in path analysis or SEM. This value measures the strength and direction of the relationship between variables after standardization with a mean of zero and a standard deviation of one. The range of values is -1 to 1, with positive values indicating a positive relationship (the independent variable increases, the dependent variable also tends to increase), negative values indicate a negative relationship (the independent variable increases, the dependent variable tends to decrease), and values close to 0 indicate a weak relationship or not significant [5] . Path standardized values help interpret variable relationships in analytical models, which are important for testing hypotheses and validating models.

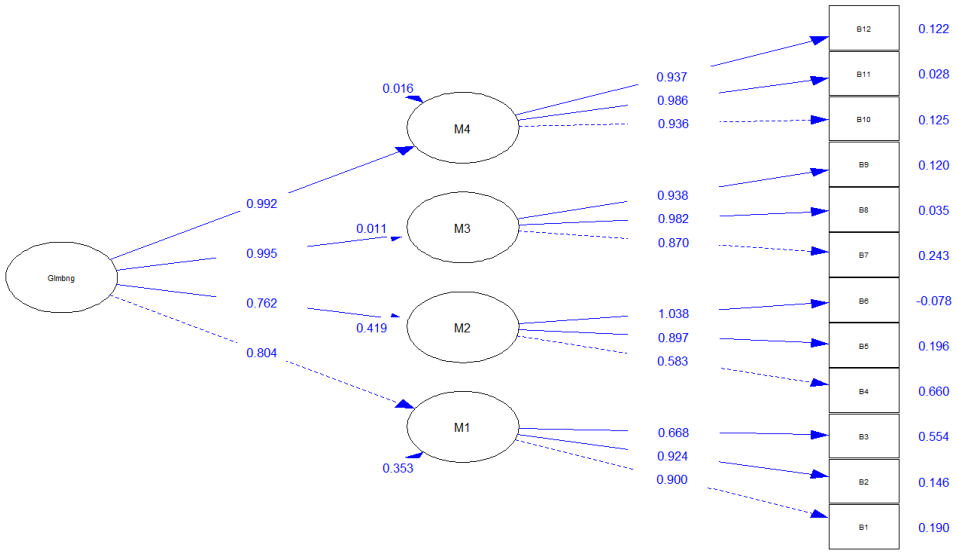


Figure 1. Path Standardized Value

Based on the 22 path diagrams (Path Standardized Value) provided, the main wave variable (Glmbng) shows loading factors on the latent dimension variables (M1, M2, M3, M4) which are all more than 0.4, namely ranging from 0.804 to 0.995. This shows that the main wave variable has a strong relationship with each latent dimension [6]. Furthermore, from the latent dimension variable to each question item (B1 to B12), the loading factor is also more than 0.4, ranging from 0.583 to 1.038. This shows that each latent dimension has a significant relationship with the related question items. In other words, this diagram illustrates that the main wave variables have a very strong contribution to the latent dimension variables, and these latent dimension variables also contribute significantly to the items being measured. All factor loadings that are above 0.4 indicate that each relationship in this model is valid and strong

Reliability Estimation Results

Based on the data, the reliability of the instrument is measured using two main measures, namely McDonald's Omega (ω) and Cronbach's Alpha (α). The reliability category for these values is included in the "Very High" category, because it is in the range 0.90 ≤ ω and 0.90 ≤ α. The 95% confidence interval for McDonald's Omega ranges from 0.954 to 0.969 [7]. This indicates that, with a 95% confidence level, the reliability of the instrument is estimated to be within this range, which is also in the "Very High" category. Similarly, the 95% confidence interval for Cronbach's Alpha is between 0.950 and 0.965, which also indicates “Very High” reliability [8].

Table 6. Frequentist Scale Reliability Statistics

Estimate	McDonald's ω	Cronbach's α	Average interitem correlation
Point estimate	0.961	0.957	0.688
95% CI lower bound	0.953	0.949	0.628
95% CI upper bound	0.969	0.965	0.742

The analysis results in table 49 show that the point estimate value for McDonald's Omega is 0.961, while for Cronbach's Alpha it is 0.957. Additionally, the average interitem correlation is 0.688, with a 95% confidence interval ranging from 0.628 to 0.742. Although there is no strict standard category for average interitem correlation, this value is generally considered very good, because it shows a strong positive correlation between items in the instrument. Overall, based on the McDonald's Omega and Cronbach's Alpha values, the measured instruments show a very high level of reliability. This indicates that the instrument has very good internal consistency, and the results obtained from this instrument can be considered very reliable and consistent for the purposes of the measurements carried out. Based on statistical analysis of individual item reliability, the tested instrument shows a very high level of internal consistency (see table 7), in accordance with the results of the McDonald's Omega (ω) and Cronbach's Alpha (α) tests.

Table 7. Frequentist Individual Item Reliability Statistics

Items	If item dropped	
	McDonald's ω	Cronbach's α
Item 1	0.959	0.953
Item 2	0.959	0.953
Item 3	0.966	0.961
Item 4	0.962	0.957
Item 5	0.961	0.955
Item 6	0.958	0.952
Item 7	0.959	0.958
Item 8	0.952	0.950
Item 9	0.956	0.952
Item 10	0.954	0.952
Item 11	0.955	0.951
Item 12	0.953	0.952

If each item is removed one by one, McDonald's ω values range from 0.952 to 0.966, while Cronbach's α values range from 0.950 to 0.961. This indicates that the instrument remains in the "Very High" reliability category even when one item is removed, as all values remain above 0.90. Item-rest correlation, which measures the correlation of each item with the total score without that item, ranges from 0.559 to 0.928. The items with the highest correlation are Item 11 (0.928) and Item 8 (0.919), indicating that these two items are very consistent with other items in measuring the same construct. Other items such as Item 9 (0.876) and Item 12 (0.878) also showed a very strong correlation with the total score, indicating a significant contribution to the reliability of the instrument. On the other hand, Item 3 and Item 4 have lower item-rest correlations, respectively 0.559 and 0.698, but are still within the range that indicates a positive contribution to instrument reliability. Overall, these results indicate that each item in the instrument contributes positively to overall internal consistency. The McDonald's ω and Cronbach's α values which remain high even though one item is deleted, as well as the item-rest correlation, which is generally strong, indicate that this instrument is very reliable for the measurement purposes carried out.

Discussion

The results of instrument analysis in this research show very good validity and reliability, which were obtained through testing using recognized methods. The validity of the instrument was measured using the KMO (Kaiser-Meyer-Olkin) test and Bartlett's Test of Sphericity. The KMO value of 0.930 indicates that the data has sufficient sample size for factor analysis, while the significant Bartlett test ($p < 0.05$) confirms that the correlation matrix between items shows a strong enough relationship for further analysis. These results are in accordance with the theory put forward by Kaiser (1974) and are in line with previous research findings which emphasize the importance of construct validity in the development of research instruments. The reliability of the instrument was measured using McDonald's Omega and Cronbach's Alpha, both of which showed very high reliability ($\omega = 0.954$ to 0.969, $\alpha = 0.90$). This high reliability shows the consistency of the instrument in measuring the same construct on various occasions, in accordance with the reliability theory proposed by McDonald [7]. These results indicate that the instruments used have strong internal consistency, which is essential in educational research and evaluation. The model fit tested with various indices (CFI, TLI, RMSEA, and SRMR) showed a good fit between the proposed model and the existing data, supporting the overall construct validity. These fit indices, all of which meet the cut-off criteria suggested in the SEM literature, indicate that the model can explain the relationships between variables well. Previous research, such as that conducted by Hair[30], supports that models with good fit indices are worthy of use for further interpretation. The high R-Square value on the latent variable also indicates that the model can explain the observed construct variability well, supporting the predictive validity of the instrument. In addition, the significant Path Standardized Value confirms the strength of the relationship between the variables in the model, which supports internal validity in path analysis.

Theoretically, this research makes a significant contribution in strengthening the understanding of validity and reliability as key elements in the development of research instruments, especially in educational contexts. By emphasizing the importance of construct validity and internal consistency through rigorous testing, this research confirms that validity and reliability are not just technical aspects

but are also the basis of accuracy and credibility in scientific measurements. The use of sophisticated validation methods, such as the KMO and Bartlett tests and model fit analysis with SEM, provides a strong theoretical foundation for the development of instruments that can reliably measure complex constructs. This enriches the literature on the importance of a comprehensive methodological approach in ensuring that instruments not only meet reliability and validity standards but are also able to address the increasingly complex analytical needs in educational research.

Empirically, this research shows that the instrument that has been tested has the potential to be widely used in various research contexts, especially in measuring similar constructs in various settings. This indicates that the instrument has high flexibility and adaptability, so it can be applied in various studies with different populations and contexts. With very high reliability and proven validity, this instrument provides a guarantee that the data obtained from its use will be of high quality, which in turn will support better decision making based on research results. These empirical contributions are essential in the development of more precise and reliable evaluation methods in the field, as well as in strengthening responsible and scientifically valid research practices. In conclusion, the results of this analysis not only show that the instruments used are valid and reliable, but also emphasize the importance of a thorough evaluation of these two aspects in developing research instruments. Thus, this research contributes to a deeper understanding of how validity and reliability can directly influence data quality and research results, while encouraging the development of better instruments in the future.

4. Conclusion

Based on the findings of this research, it can be concluded that the instrument developed shows high validity and reliability, strengthening the reliability of the instrument in measuring relevant constructs in various educational research contexts. These findings emphasize the importance of validity and reliability in instrument development, where valid and reliable instruments can increase the accuracy and credibility of research results, as well as support more informed decision making in educational practice. However, this study also has several limitations. One of the main limitations is the limited generalizability of the results, considering that this research was conducted on a relatively small sample and in a specific context. Additionally, use of the instrument in different settings may require adjustments to maintain its validity and reliability. For future research, it is recommended that testing of the instrument be conducted on larger and more diverse samples, as well as in various educational contexts, to test whether the same results can be replicated. In addition, the development of instruments that can measure other aspects of the constructs under study would be beneficial to broaden understanding of this topic and provide a more comprehensive contribution to the academic literature in this area. The use of other, more innovative methods in testing validity and reliability can also be considered to provide a more in-depth perspective and ensure that the instrument being developed truly reflects the construct being measured accurately.

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EARLY CHILDHOOD'S LEARNING USING RELIGIOUS, STEAM APPROACH BASED ON THE SURROUNDING ENVIRONMENT

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Abstract

This descriptive research aims to determine the implications of Religious, STEAM based learning based on the surrounding environment. Using descriptive qualitative research methods using observational data collection techniques, interviews were then analyzed according to Miles and Humberman's analysis. Steps for A Religious and STEAM-based learning activities that are implemented in learning activities using various media from the environment around children, especially children who live in riverside areas, so that they utilize materials around the river. In every learning activity that is fun for children, it can be concluded that in implementing Religious STEAM-based learning based on the surrounding environment, it can develop aspects of early childhood development.

Keywords: Early childhood, STEAM, environment-based

1. Introduction

Nowadays, awareness of the importance of education for children from an early age is in line with the development of various sciences about early childhood through research conducted by experts in the field of early childhood education, which has given birth to various educational programs for children so that a child's development can develop optimally according to the child's potential. This education is not only carried out in the family, but is also carried out outside the home.

Early Childhood Education is the basis of children's further education which is full of challenges and various problems that children will later face, so early childhood education is an opening window to the world (window of opportunity) for children [1]. Recent research reveals that quality early childhood care and education have an impact that lasts a lifetime. A valuable source of research on child care comes from the Study of Early Child Care and Youth Development (SECC) by the National of Child Health and Human Development (NICHD) in 1989 to answer many questions regarding the relationship between parenting experiences and characteristics and child development [2].

The development of human potential into actual abilities cannot be separated from the influence of the environment in which the human is located. So, to make humans into individuals who are useful for themselves, for society, and for the development of science and technology, quality education is needed [3]. Indonesian society is a religious people, who respect religious teachings. Parents' attention to religious education for children has an effect on increasing religious enthusiasm, which in turn fosters developments in the emergence of Islamic-based schools, in this case not least in PAUD institutions.

The development of institutions that establish early childhood education programs is experiencing rapid development in both urban and rural areas. Education for early childhood is at a low level in the world of education, but it is the most meaningful level and is the most basic foundation. This happens because early childhood is a national asset whose success determines the success of a nation's future.

The rapid advancements in the field of education, coupled with increasingly complex social challenges and parents' growing recognition of the importance of religious education for children from an early age, have led to the swift development of religion-based kindergarten (TK) education. As widely acknowledged, early childhood is a critical phase known as the golden age, during which all aspects of a child's development are highly receptive, facilitating their capacity to learn various subjects. Teaching religious and moral values is essential at this stage, achieved through habituation activities both in school and within children's daily lives. In this context, Fowler (1981) asserts that faith does not automatically emerge; rather, children are born with a readiness for faith but require an environment

filled with love, care, and interaction with nurturing caregivers for their faith to develop. He emphasizes that faith encompasses both development and conversion, with development paving the way for conversion [4].

Based on Fowler's opinion above, children's faith or belief in God does not automatically appear. Children are born ready to believe but need an environment of love, attention, and interaction with caregivers or parents and the child's environment so that their faith develops. Faith involves development and conversion.

Recently, various problems have emerged as a result of developments over time. One form of contemporary development that has a negative impact is the moral decline of the nation's next generation. Behavior that is contrary to religious values is very close to children. Children begin to imitate negative behavior such as hate speech, being impolite when speaking, and imitating bad things has become a favorite. This behavior occurs because at the age of birth to six years children are in the imitation phase [5]. Efforts that can be made by educators who have a role in an institution are to familiarize children with behaving according to religious and moral values. Morals are instructions regarding good or bad that will be received through a person's actions, attitudes, obligations, morals and character [6] (Sumarni & Ali, 2020). Educators can also act as facilitators who are able to facilitate all children's needs to support children's development in their learning activities [7]. Teachers can carry out this habit through daily routines at school. Teachers as educators in schools have a role in instilling religious values in children, such as when starting the learning process children are directed to read prayers before studying, sing religious songs, and so on.

Educators play a crucial role in familiarizing children with routine and exemplary activities, which helps instill and nurture religious and moral values. Teachers can design daily activities that align with community needs, taking into account the types of activities that are appropriate for children aged 0-6 years. Early childhood education focuses on child-centered learning that is adapted to the child's developmental level and growth stages. Fundamentally, early childhood learning consists of creating a structured curriculum that includes a variety of learning experiences delivered through play, tailored to the children's potential and the developmental milestones they are expected to achieve for their overall competency [8].

Learning for early childhood, apart from developing the potential within children, also aims to develop children's sensitivity to their environment. Children can see the environment as a learning center and learning resource, as a potential that must be optimized and as a vehicle that must be preserved. Therefore, the development of learning plans in PAUD must be rooted in the surrounding environment. Optimizing the potential of the environment can also be interpreted as utilizing all objects and tools in the environment as learning resources and media that can be developed by teachers and children themselves as an alternative to the limitations or deficiencies of the learning media they have [9].

The results of this research aim to enhance the understanding of educators and students regarding the surrounding environment as a valuable learning resource. This environment offers a variety of opportunities that children can utilize to expand their insights and knowledge beyond what is typically covered in the classroom. An engaging and effective early childhood learning process is influenced by several factors, including the availability of learning resources that support educational activities. These resources play a crucial role in the success of the early childhood learning process and in achieving the desired developmental outcomes [10].

Children start using STEAM skills very early. When babies drop toys and learn that toys fall, they begin to learn about the natural law that objects fall downwards. They pick things up and find out that the doll is soft and the plastic cup is hard. One year old babies make observations and experiments to learn the laws of nature such as cause and effect and explore when they see something that violates those laws of nature.

Based on the explanation above, the author tries to formulate Religiuos, STEAM Approach where in early childhood learning teachers use a learning approach that emphasizes the development of children's religion, science, technology, art and mathematics. Students as learning objects play a role in learning new concepts, thinking, expressing ideas, asking questions, conducting simple research,

applying learning results through action, carrying out social interactions, and applying religious aspects as a manifestation of strengthening character education. Even though the roles of teachers and students are not the same, they must work together to complete the planned project as well as possible.

Religious and STEAM-based learning provides a meta-disciplinary approach to education that fosters children's religious abilities, as well as their critical thinking and creativity in problem-solving. This aligns with the perspective of Buinicontro (2017), who argues that integrating STEAM into the curriculum presents new opportunities for students to engage directly in the design learning process, resulting in the creation of innovative products and enhanced problem-solving skills. Such learning environments encourage active participation in educational activities, and through collaborative project work, children experience joy while playing and learning together. Additionally, utilizing the surrounding environment as a learning resource enriches educational experiences; by allowing young children to observe their environment, balance is added to learning activities. This approach emphasizes that learning occurs not only in classrooms and homes but also in outdoor settings [11]..

The environment as a learning resource greatly influences aspects of children's development such as the development of children's religious and moral values, physical development, social and cultural skills, emotional and intellectual development of early childhood. The aim of this research is to describe learning activities using religious and STEAM approach based on the early childhood environment

2. Method

This research employs a qualitative approach, focusing on Sabilal Muhtadin Kindergarten in Banjarmasin as the research setting. The researcher serves as the primary instrument for data collection, utilizing observation techniques, in-depth interviews, and the analysis of existing documentary data. The respondents include the kindergarten principal and teachers. Data collected were analyzed throughout the entire data collection process using Miles and Huberman's descriptive analysis framework.

3. Results and Discussion

The curriculum encompasses moral and religious education, emphasizing the cultivation of virtuous character traits, the regular practice of worship such as ablution and prayer, as well as the memorization of short surahs and daily prayers. It further addresses five key developmental domains: emotional, which focuses on fostering self-confidence, independence, initiative, perseverance, and self-awareness; cognitive, which enhances concentration, object recognition, logical-mathematical thinking, critical analysis, and comprehension of rules; language, which develops skills in listening, interpreting messages, reading, and writing; physical, which promotes body awareness, fine and gross motor skills, and overall physical well-being; and social, which nurtures interpersonal skills and social interaction. The curriculum also integrates three types of play: sensory-motor play, where children engage with their environment through their senses and physical activity, thereby stimulating brain development; symbolic or role play, which fosters creativity, memory retention, teamwork, vocabulary expansion, and self-regulation through the enactment of real-world scenarios; and developmental play, where children convey their ideas through media, such as fluid materials like water and sand or structured materials like building blocks. These forms of play are incorporated into daily activities across various centers, including those for natural materials, blocks, preparation, religious activities, macro and micro role play, and art, all designed to support the five developmental domains.

The character of scientific learning seen in Sabilal Muhtadi Kindergarten is that learning activities are divided into several activity steps, namely: opening, core and closing. Opening activities, also known as preliminary activities, are an effort to achieve an atmosphere or condition where children are ready to learn before entering the core learning activity stage. Teachers are expected to be able to condition students to learn well. Opening activities in learning are included in the initial preparation (pre-instructional) category, leading to the core activities. During the learning process with a plant theme, the teacher uses learning resources available in the school environment. Teachers use various types of leaves and flowers as learning media to teach children to count and recognize colors. The counting activity is carried out by counting the leaves on the twigs that have been taken, and the color recognition activity is carried out by distinguishing the colors of the leaves and flowers around the child. In early childhood learning, most of the initial activities begin with the teacher sitting in a circle with

the children. In general, learning activities are divided into 3 stages, namely opening activities, core activities and final activities. Each learning stage consists of several forms of activities as follows:

Table 1. Stages of learning activities

No	Stage	Description of Activity	Remarks
1	Opening Activity	Such as singing, telling stories, or tadarus reading activities that children recite consist of Surah Al Ma'un verses 1-7, Surah Al Quraish verses 1-4, Surah Al Fill verses 1-5. Chair verses and daily prayers such as prayer for looking in the mirror, prayer for putting on clothes, prayer for taking off clothes, Tadarus semester II. Consisting of Surah Al Huamazah verses 1-9, Surah Al Ashr verses 1-3, daily prayers consist of prayers entering the mosque and prayers leaving the mosque. The thoyyibah sentences spoken by children consist of: Ta'awudz, Basamalah, Tasbih, Hamdalah/tahmid, Takbir, Tahlil, Istigfar, Sholawat, and children recite Asma Ul Husna. Children sit in a circle guided by the teacher.	
2	Activity	a. Determining basic questions: The teacher raises basic questions about the activities to be carried out. The teacher demonstrates the steps for project activities by utilizing materials available in the child's environment. b. Designing Project Planning, Teachers facilitate project activities by utilizing materials available in the child's environment c. Children make projects from materials that have been prepared by the teacher. Children use materials from the surrounding environment that have been prepared by the teacher d. Guiding problem investigations by means of the teacher asking children about what they don't understand about their project and encouraging children to create their project. e. Developing and presenting results, children complete their projects with full responsibility and dare to present their work to the class f. Analyze and test problem solving processes and results. Children explore the results of project assignments that have been given by the teacher	The activities carried out were making fish from used plastic bottles and seeds, making boats from ilung leaves and making traffic signs from cardboard.
3	Closing activity	Reflection Activities The teacher gives the children the opportunity to explain the activities that have been carried out Reinforcement The teacher invites the children to conclude today's material together The teacher draws conclusions from the material that has been given Follow-up The teacher conveys the material that will be discussed the next day Prayers and closing greetings. The teacher ends the lesson by giving advice and motivation The teacher says hello	
		Reflection Activities	The teacher gives the children the opportunity to explain the activities that have been carried out Reinforcement
		The teacher invites the children to conclude today's material together	The teacher draws conclusions from the

No	Stage	Description of Activity	Remarks
			material that has been given
		Follow-up The teacher	Follow-up The teacher conveys the material that will be discussed the next day
		Prayers and closing greetings.	conveys the material that will be discussed the next day
		Prayers and closing greetings.	The teacher ends the lesson by giving advice and motivation The teacher says hello

The learning activities are designed using project learning which is divided into three project activity themes, namely the activities of making ships from ilung leaves, making traffic signs and making fish from used bottles. During the activity, the children looked enthusiastic and enthusiastic about participating in the learning activity from start to finish. The new thing they got was used bottles and ilung leaves, which until now they usually didn't see as trash or used items that couldn't be used, turned out to be an interesting learning medium.

Tabel 2. Religious and STEAM Learning Activity Scheme

No	Learning Elements	Form of Activity
1	Characteristics of Scientific Learning	Characteristics of Scientific Learning 1. Domain Curriculum and 2013 PAUD curriculum 2. Learning Actively involves children 3. Activities of observing, asking questions, reasoning, gathering information, appear during core activities. 4. In core activities, the main activities are "say, show and check" 5. Communicating appears a lot during core activities and closing activities, especially Recalling
2	Characteristics of Religious Learning	1. Children actively participate in religious development activities in kindergarten 2. Activities begin at the beginning or in the morning when the child arrives at the school in the form of saying hello, politely and politely. 3. Habits in the form of saying greetings, saying thoyibah sentences, reading daily prayers, memorizing short surahs, and saying Asma ul Husna are given to children every day, dhuhur and dhuha prayers. 4. The example given by the teacher to the child. 5. The teacher teaches the children to recognize the objects created by Allah that are around them. The teacher invites the children through a story, singing clapping and clapping about the pillars of Islam and the pillars of faith.
3.	Religiuous, STEAM-based learning resources	1. Outside school environment (school yard, living pharmacy garden, playground and river) 2. Class 3. Central 4. Mosque 5. Swimming pool

From the table above we can understand that religious development activities are carried out every day at school through habituation activities for children which are integrated into learning activities applying the religious and STEAM approach.

Discussion

Every day children will interact with things around them, both living creatures and inanimate objects. These living creatures include humans, namely parents, teachers, neighbors and friends, various plants and animals, while inanimate objects include land, rocks and water. Children will play and look happy when playing with their friends.

The learning experiences prepared by the teacher are designed to be enjoyable and engaging for children, allowing them to play while learning. This approach fosters happiness and motivation in the learning process. It is essential for teachers to cultivate a positive and enjoyable classroom atmosphere, as it encourages children to actively participate, explore, ask questions, and express their ideas. This

aligns with Mulyasa's (2010) assertion that in the learning process, teachers are expected to create an enjoyable environment to promote children's engagement and active involvement. Learning for early childhood, including kindergarten, possesses distinct characteristics that differentiate it from other educational stages [12].

Learning activities in kindergarten emphasize the concept of learning through play and playing while learning. Play naturally motivates children to explore and deepen their understanding, while simultaneously allowing them to develop their abilities spontaneously (Masitoh, 2007). This distinctive approach in kindergarten necessitates that teachers design learning experiences that are enjoyable and engaging for children.

According to Kunandar (2012), student activity refers to students' involvement in learning through their attitudes, thoughts, attention, and participation in various activities. This involvement is essential in supporting the success of the teaching and learning process, as well as ensuring that students derive meaningful benefits from these activities. In order to promote successful learning outcomes, children must be actively engaged throughout the learning process.

This is consistent with the research conducted by Erni Mustawi, as published in the Al Athfal Journal of Children's Education, Vol. 1, No. 2, 2015, titled "Implementation of a Scientific Approach in Early Childhood Learning (PAUD)." The study highlights that learning activities which are well-managed and tailored to the needs and characteristics of children can optimize their intellectual potential from an early age. The learning process serves as a means to stimulate children's cognitive development. Therefore, it is crucial to carefully consider the methods, strategies, media, and approaches used in learning, ensuring they align with the themes and materials presented to the children. A scientific approach to learning fosters creativity, ideas, and imagination while also promoting children's religious, moral, motor, cognitive, language, social, artistic, and emotional development [13]..

Children's religious development in kindergarten is fostered through several methods: 1) habituation, an effective approach for training students to practice good deeds consistently. From morning until the end of the school day, children are accustomed to following rules such as greeting others, apologizing, asking for help politely, reciting thayyibah phrases, and performing daily prayers. All of these habitual practices are grounded in the teachings of the Quran and Hadith. 2) exemplary behavior, where teachers, staff, and all employees serve as role models for everyone within the kindergarten environment. This method is particularly effective for nurturing religious values in children, as young learners are highly adept at imitation. 3) instruction, where teachers provide guidance before the start of activities, ensuring that children understand the significance of their actions. For instance, before eating, children are taught to pray, with the explanation that prayer is an expression of gratitude for the blessings given by Allah SWT. 4) assignments, which serve as an effective method for reinforcing and instilling religious values through structured activities. 5) creating a religious environment and culture, where a supportive and conducive atmosphere aids in the implementation of religious teachings. All members of the school community exemplify Islamic values, creating a positive, enjoyable, and Islamic learning environment that encourages children to happily follow the examples set within the kindergarten.

According to Suyadi (2010), there are several strategies to enhance children's religious development: a) involving children in religious activities, which creates a lasting impression, as children directly experience various religious practices. For children at this age, such involvement serves as a foundation for future religious sensitivity; b) fostering a habit of devotion to worship, which is more effective when both teachers at school and parents at home serve as examples; c) reading Qur'anic and Nabawi stories, which helps develop children's imaginative skills. Imagination is a form of creative thinking that conveys messages quickly and profoundly. Numerous stories in the Qur'an, as well as tales of the Prophet's companions and events like Isra and Mi'raj, can cultivate religious feelings in children while also enhancing their ability to think abstractly; d) promoting social piety, where the religious knowledge imparted to children needs to be actualized in their daily lives [14].

STEAM products not only encompass the development of religious and moral values and cognitive skills, but they also incorporate other critical aspects such as affective and psychomotor development, which are essential for students navigating the challenges of the Industrial Revolution 4.0. The complexities of the 21st century necessitate competencies across various fields, and religious-based learning with a STEAM approach can serve as both preparation and practice for addressing these demands【15】. Consequently, cognitive abilities and creativity must be continually nurtured through diverse means, one of which is STEAM-based learning. This approach integrates design, creativity, and

innovation within the disciplines of science, technology, engineering, and mathematics, thereby fostering the skills required to effectively engage with globalization and advancements in science and technology.

Utilization of the environment as a learning resource for early childhood where the environment is a rich and interesting learning resource for early childhood. Any environment can be a fun place for young children. If when studying at home we only introduce young children to pictures of animals, then by utilizing the environment, young children will be able to gain more experience. When using the environment as a teacher, he can design activities that are usually carried out at home into the open air or environment. However, if we only tell the story at home, the nuances that occur will not be as natural as if we invite children to go outside and take advantage of the environment, even by using materials around the child as a learning medium. According to Winarni (2012) the environment around children is a learning resource that can be optimized to achieve quality educational outcomes. The number of learning resources available in this environment is not limited, even though they are generally not designed intentionally for education.

Purposes Innovation by using various materials available in the surrounding environment is very necessary to support the continuity of teaching and learning activities. Teachers are required to be more creative in preparing the media and learning resources needed by children from the surrounding environment. The environment around children is one of the learning resources that can be optimized to achieve quality educational outcomes. The teacher uses materials and media sourced from the environment around the child, such as seeds, shells, dry leaves, pieces of wood, as an effort to support teaching and learning. Apart from that, teachers also carry out activities outside the classroom such as fields, gardens, markets and the sea.

This success cannot be separated from the teacher's role in how the teacher designs learning to be interesting and fun for children. Teachers provide appropriate stimulation so that children's potential develops to the maximum. For each play activity, the teacher provides an explanation that is easy for children to understand. This is like what was said by Trianto (2014) [16]. The teacher explains the purpose of learning and the tasks that must be done. In this activity the teacher has explained the subject matter clearly and linked it to daily life and the tasks that must be done by children. With the teacher's explanation, children can easily understand and carry out their assignments in groups without confusion.

4. Conclusion

Based on the explanation above, it can be concluded that a) the teacher is the person who really determines the success of the implementation of the learning design, b) integrated religious development with STEAM appears every day in the initial activities, core activities and final activities, c) Utilization of the environment around the child as learning material both indoors and outdoors (school yard, living pharmacy park, mosque, and river.

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TYPOLOGY OF CIVIC EDUCATION: APPROACHES, IMPLEMENTATION, AND EVALUATION

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Abstract

Civic education serves a significant role in the development of good and intelligent citizens (smart citizens). Civic education is provided at each level of educational units in many countries using different nomenclatures based on the country's curriculum model. The purpose of this study was to investigate the application of Civic Education learning in Junior High Schools, as well as to identify the typology of Civic Education in Junior High Schools. The research method employed was phenomenological research with a qualitative approach. The subjects for this study were SMP Negeri 1 Paliyan, SMP Negeri 2 Kalasan, SMP Negeri 1 Lendah, SMP Negeri 2 Dlingo, and SMP Negeri 8 Yogyakarta. Data was collected through interviews, observations, and documentation. In this study, data analysis approaches included: 1) completely describing the phenomena/experiences encountered by the research subjects; 2) the horizonalization step involves finding remarks in interviews regarding the focus of the study; 3) organizing statements in interviews into meaningful units; 4) constructing all explanations of the meaning and essence of the informants' experiences, and 5) writing a report by providing an understanding of how someone feels a phenomenon. The findings of the study revealed that the typology of Civic Education in junior high schools includes: 1) Civic Education is optimally organized, such as encouraging students' democratic attitudes through discussion, debate, and critical thinking activities, and is applied inclusively by involving students in the learning process in the classroom; 2) Civic education is defined as political education that teaches students how to participate in the world of politics while developing their own opinions; 3) Civic education is implemented using an educational approach that includes assessing possibilities based on available facts, emphasizing the growth and deepening of public discussion, long-term perspectives, and the establishment of clear conceptions and expectations; 4) Civic Education and teacher activities in the classroom are nationalistic, social, and personal in nature; 5) Civic Education stresses citizen understanding of community issues and the power to effect social change.

Keywords: *typology, civic education, junior high school*

1. Introduction

Democracy is defined simply as "of the people, by the people, and for the people," including values like popular sovereignty, law enforcement and justice, tolerance, and respect for human rights [1];[2]. These concepts are changed to support democracy as collaborative self-government that promotes inclusive empowerment [3]. Almost every country has a political education system in place to promote civic consciousness, which serves as a tool for political socialization [4];[5]. Democratic education is an important facet of political education [6]. Democratic education is also known as Citizenship Education [7]. According to Charles and John, democratic civic education is a set of core principles that are important for thoroughly comprehending democracy and democratic citizenship [8]. According to Nu'man Soemantri, civic education is an educational program based on political democracy that is supplemented with various sources of information, including the good influence of school education, society, and parents [9]. According to Monteiro, Civic Education is expected to produce scientists with a sense of nationality and love for their homeland, civilized democracy, and competitive citizens who are disciplined and actively participate in the construction of a common life based on the Pancasila value system [10].

However, in practice, there is sometimes a gap between the notion of civic education taught in schools and citizenship issues that arise in daily life. Peterson [11] provides an overview of typology by giving several assumptions, contexts, and behaviors that determine the possibilities for teaching Citizenship Education. The typology addressed in this paper is based on five ideal types of citizenship education. First, McLaughlin [12] identifies two types of Citizenship Education: minimum and maximum. Second, Lamm [13] described a Citizenship Education approach that included Ideological

and Political Education. Third, Sears and Hughes [14] examined the use of Citizenship Education in indoctrination or education approaches. Fourth, Sim and Print [15] propose three ideal types of citizenship education that assess teachers' orientation of citizenship understanding and classroom behaviors based on components of patriotism, social concern, and personal. Fifth, Castro differentiates Citizenship Education by conservative values and awareness [16]. These various typologies serve as a foundation for evaluating the reality of Citizenship Education in Indonesia from the perspective of schooling, the national Citizenship Education curriculum that is used in Indonesia, teacher professionalism in teaching, and the methods or forms of Citizenship Education teaching used in schools. Geboers et al. [17] found that students' citizenship orientation and knowledge (committed citizenship, indifferent citizenship, ordinary citizenship, and confident citizenship) are determined by their demographic characteristics and level of education. Patterson [18] conducted a similar study, exploring secondary school teachers' conceptualization of citizenship education in pre-service and in-service professional development. Three elements of teacher beliefs about citizenship are the level of perceived citizen involvement, the value and use of knowledge, and the position of citizenship education in the curriculum. Based on this description, the purpose of this study is to 1) analyze the implementation of Indonesia's national Citizenship Education curriculum; 2) investigate the implementation of Citizenship Education learning in Junior High Schools; and 3) identify the typology of Civic Education in Junior High Schools.

2. Method

This study employed a qualitative method. The purpose of this study, which employs qualitative research methodologies, is to identify the typology of Citizenship Education used in junior high schools throughout five sub-districts in the Special Region of Yogyakarta Province. The researcher reported their findings in the field in words [19]. This qualitative research method allows the researcher to discover, explore, construct meaning, and generate hypotheses during the research process [20]. The phenomenological approach was chosen in this study as a scientific approach that explores how members of society explore their everyday world, specifically how individuals with their awareness build/construct meaning from the results of interactions with other individuals [21];[22]. As a result, the objective of this study is to uncover the essence of human experience through a variety of subjects and direct researcher involvement in data collection to identify patterns and relationships of meaning [23].

The subjects in the study were Civic Education teachers from five junior high schools in the Special Region of Yogyakarta Province: SMP Negeri 8 Yogyakarta, SMP Negeri 2 Kalasan, SMP Negeri 1 Paliyan, SMP Negeri 1 Dlingo, and SMP Negeri 1 Lendah. Data collection techniques in this study included three methods: interviews, observations, and documentation. The study results were examined in the following steps [23]: The researcher fully explained the phenomena/experiences that the research participants had with the typology of civic education in civics learning in junior high schools. All results of in-depth interviews in the form of recordings were written down in written transcripts; 2) During the horizonalization stage, the researcher found statements (interview results) about the focus of the research, details of the statements, and each statement had an equivalent value; the details were then developed without repetition. At this stage, the researcher was not permitted to make any assessments; the transcript results had to be derived solely from the interview results; 3) The statements were then grouped into meaningful units; the researcher detailed the units and wrote a text explanation of the experience, accompanied by examples. The researcher starts removing redundant and overlapping statements. The researcher then reflects on his or her thoughts using imaginative variation or structural description, seeks the full meaning that is possible and through divergent perspectives, considers the phenomenon's frame of reference, and constructs how the phenomenon is experienced; 4) The researcher then constructs a comprehensive explanation of the meaning and essence of the informants' experiences. This is the essence description stage; 5) The researcher delivers her study report with a knowledge of how someone feels about a phenomenon. The research report reveals a singular meaning, unity of the total experience, with an urgent structure.

3. Result and Discussion

Citizenship derives from the Latin term civics, which means citizen, fellow citizen, or compatriot. Citizenship is defined scientifically as the study of the relationship between citizens and their country. Citizenship in a democracy encompasses membership in a political unit, shared beliefs, and involvement in political life [24]. This demonstrates that citizens are considered not just as members of

a political community, but also as members of other communities, necessitating the implementation of an educational activity such as civic education or citizenship education. Civic education is defined as an effort to develop individuals so that they can apply their knowledge, skills, and attitudes as responsible citizens. The specific definition and pedagogical approach of civic education are determined by a variety of contextual elements, including historical traditions, geographical location, sociopolitical structure, economic system, and global trends [25]. Civic education has become a major priority in many nations as a means of developing individuals capable of dealing intelligently with local and global challenges [26]. Civic education covers a wide range of theoretical and practical topics. Civic education encompasses both democracy education and political education [27]. Civic education, as addressed here, refers to formal education in schools that prepares young citizens for the social, national, and state environment.

Civic education taught in different countries differs from one another. First, McLaughlin [12] defines two types of civic education: basic and maximal civic education. Civic education is founded on a "thin" or "thick" understanding of human virtue or perfection [12]; [28]; [29]. Minimal civic education stresses civil rights and obligations but does not address diversity or the need for active participation. Civic education is solely based on knowledge. This method focuses on communicating accurate information regarding institutions, procedures, and civil rights. This method does not promote critical thought or comprehensive understanding, resulting in a static view of citizenship in which learners' perspectives are not actively promoted or developed. Maximal education, on the other hand, seeks to enhance engagement in democracy and community life by merging multiple viewpoints and experiences, as described by McLaughlin [12] as a strategy that promotes discussion, debate, active participation, and critical thinking. This method supports a more inclusive and participatory style of citizenship education, in which students are actively involved in the learning process and encouraged to think critically about their civic roles and obligations [30]. Second, the type of approach to Citizenship Education by [12] (2000) which includes Ideological Education & Political Education. According to Lamm, ideological education seeks to persuade students to adopt a specific partisan political ideology, whereas political education teaches students how to participate in the political sphere while forming their own opinions. Therefore, Lamm underlines that the primary purpose of CCE should be to promote the process of political education.

Third, Sears and Hughes [14] examined the use of Citizenship Education in the indoctrination or education method. Sears and Hughes' arguments about citizenship education are associated with the struggle between two opposing ideas: indoctrination and education. Indoctrination is the uncritical adoption of ideologies without regard for evidence, and it is frequently characterized by slogans, dogma, an emphasis on rapid fixes, and didactic teaching techniques. In contrast, citizenship education in the educational method entails assessing possibilities based on available evidence, emphasizing the growth and depth of public conversation, long-term perspectives, and the creation of clear conceptions and expectations [14]. Fourth, the type of Citizenship Education provides three ideal types that assess the orientation of teachers' civic thinking and classroom actions based on features of patriotism, societal concern, and personal [15]. Based on a survey of eight Singaporean social studies teachers, proposes three ideal types that address their civic understanding and classroom methods. These styles include nationalist, social concern, and person-oriented approaches, whereas each approach stresses the connected environment as part of the civic education process (country, society, or individual students) [15].

Fifth, Castro divides the implementation of Civic Education based on conservative and conscious values [16]. Castro presents a typology based on actual investigations of prospective teachers' approaches to citizenship at a university in the Midwest of the United States [16]. The primary assumption is that the worldview of citizenship serves as a basis for teachers' beliefs and activities. Castro identified a form of civic education based on conservative or conscious ideals. The first type focuses on teaching certain values, qualities, and morals, whereas the second type emphasizes citizens' awareness of community issues and abilities to effect social change.

These theories were then used by researcher to identify the practice of Citizenship Education in five schools, namely SMP Negeri 8 Yogyakarta, SMP Negeri 2 Kalasan, SMP Negeri 1 Paliyan, SMP Negeri 1 Lendah, and SMP Negeri 1 Dlingo. The results of the study showed that, first, Citizenship Education in junior high schools is included in the maximum type that encourages fuller participation in democracy and community life, by combining various perspectives and experiences that encourage discussion, debate, active participation, and critical thinking [12] This is shown from the learning process at SMP Negeri 1 Paliyan through discussion activities on the manuscript of the OSIS Chairperson/Vice Chairperson nomination oration, analyzing the application of the Pancasila spirit in community life, and criticizing issues in the surrounding environment about students who drop out of

school. Students at SMP Negeri 2 Kalasan also carried out discussion activities related to the topic of the formulation of Pancasila and made questions after watching a video about the formulation of Pancasila. Similarly, students at SMP Negeri 8 Yogyakarta participate in a variety of learning activities, including discussions about democracy, elections, and common school-related incidents such as brawls. The student's discussion outcomes are then used to create a short presentation, such as a poster or infographic, using Canva.

McLaughlin further stated that maximal type citizenship education supports a more inclusive and participatory style of citizenship education, in which students are actively engaged in the learning process and encouraged to think critically about their roles and responsibilities as citizens [12] This fact is proved by the results of research at SMP Negeri 1 Paliyan that during the learning process, students are actively engaged in learning activities through 1) game activities as a trigger at the beginning of learning, which aims to encourage students to get to know each other better; 2. "Let's Tell a Story" activity, students are asked to answer questions in front of the class regarding the differences in the surrounding environment; 3) "Let's Observe" activity, students are asked to observe the environment around the school about efforts to handle victims infected with the Covid-19 pandemic; 4) "Let's Show" activity, students are asked to display a campaign speech by the OSIS chairman; 5) "Let's Observe" activity, students are asked to carry out observation activities in the environment around the school or home regarding the issue of dropping out of school; 6) In the "Let's Discuss" activity, students are asked to discuss the application of Pancasila in community life. Furthermore, in SMP 2 Dlingo and SMP 1 Lendah, in civic learning, they relate more material to social problems experienced by students every day. Civic teachers at SMP 2 Dlingo provide groups with the opportunity to identify the application of the function of Pancasila in the family, community, and state environment, and after that students are asked to present the results of their analysis in front of the class. This shows that there is an effort to encourage student debate discussions and participation. Furthermore, in SMP Negeri 8, students' critical attitudes are shown by providing comments on the discussion of "The Relationship between Pancasila and the 1945 Constitution of the Republic of Indonesia", students ask about citizen rights.

Second, the approach to implementing Citizenship Education in junior high schools involves political education. According to Lamm [13] political education is the process of teaching students how to participate in the political realm while developing their perspectives. This is demonstrated by the findings of research conducted at SMP Negeri 1 Paliyan, where students were asked to explore the application of Pancasila in community life. Specifically, students were requested to express thoughts on the question "Has the spirit of Pancasila been applied in community life?". Furthermore, teachers guide students through the learning process by directing them to explore difficulties in their daily lives and assisting them in analyzing the causes and developing solutions to such problems. Furthermore, a study at SMP Negeri 2 Kalasan revealed that students were asked to voice their ideas and provide critical questions about Pancasila's place and role as the foundation of the state. Students are asked to reflect on how they use Pancasila values in their daily lives. The political education approach in Civic Education is also represented in the learning process of SMP 1 Lendah. In Civic learning, the teacher uses political education, particularly on democracy-related content, which is subsequently linked to the OSIS election. Meanwhile, at SMP N 2 Dlingo, the teacher sometimes discusses simpler political issues so that junior high school students can understand them because some junior high school students inquire about political issues that are currently popular and discussed in the media but do not understand what is going on, so the teacher provides an explanation that students can digest. Furthermore, in SMP Negeri 8, political education is incorporated into the Civic Education learning process through democracy-related discussions. Students in discussion activities inquire about participation options other than elections because they are not yet 17 years old or have an ID card; in this activity, the teacher directs students to participate in democratic life by electing a class president or OSIS chairman at school.

Third, civics education is implemented using an educational strategy that includes an assessment based on existing evidence, emphasizing the growth and depth of public discussion, long-term perspectives, and the creation of clear conceptions and expectations [14]. The results of the study at SMP Negeri 2 Kalasan showed that the Civics learning process is long-term oriented because students, in addition to being able to explain the birth process, formulation, and determination of Pancasila as the basis of the state, students must also practice the values of Pancasila in everyday life, so that students are expected to behave in accordance with the values of Pancasila in real life. Furthermore, at SMP Negeri 1 Paliyan in the Teaching Module for the Topic "The Spirit of Pancasila in National Life", the objectives of the learning activities are listed that students must understand Pancasila holistically so that it is not only memorized but also practiced in everyday life. Likewise, SMPN 1 Lendah and SMPN 1 Dlingo, apply a student-centered learning approach. Furthermore, in SMP Negeri 8 Yogyakarta, the

educational approach in the Civic learning process is shown in the learning process which not only emphasizes the knowledge aspect but also attempts to contextualize the material, for example by inviting students to discuss several cases that occur in the educational environment such as brawls. Students are asked to analyze "Is the brawl case a form of deviation from Pancasila?". The results of the students' analysis are then presented in the form of posters or infographics.

Fourth, Civic Education and teaching practices in the classroom promote nationalism, socialism, and personalism [15]. This category comprises nationalist, socially concerned, and individual-oriented approaches, all of which highlight the surrounding environment as part of the civic education process, whether for the nation, society, or individual students. The results of research at SMP Negeri 1 Paliyan in "Meaningful Understanding" demonstrate the sort of nationalist orientation that Pancasila serves as the direction and guideline for the existence of the Indonesian nation and state. As a result, Indonesian residents must embody the spirit of Pancasila in their everyday lives. Furthermore, the Pancasila Student Profile is integrated into the learning process at SMP Negeri 2 Kalasan, SMP Negeri 1 Lendah, and SMP Negeri 1 Dlingo, demonstrating gratitude for Pancasila as the state's foundation. Similarly, the results of research at SMP Negeri 2 Dlingo and SMP 1 Lendah demonstrate a nationalist orientation, resulting from the incorporation of the Pancasila Student Profile into the learning process, namely expressing gratitude for Pancasila as the foundation of the state. Related to the practice of socially oriented Citizenship Education, in SMP Negeri 1 Paliyan it is shown in the learning activity "Let's Observe: namely by observing the surrounding environment about cases of students who drop out or do not go to school and in SMP Negeri 2 Kalasan through attitude assessment (civic disposition) one of the attitude indicators used is emotional-social intelligence. Furthermore, based on the study's findings, the approach in the learning process at SMP Negeri 8 Yogyakarta is more oriented toward the nationalist orientation of "good citizens," as evidenced by the presence of a visit from the police to explain "Traffic Rules," which is one way to provide students with information about the rights and obligations carried out by drivers on the highway, thereby forming an obedient and traffic-rule-following personality.

Fifth, Citizenship Education emphasizes citizens' understanding of communal issues and their potential to effect social change. Castro explains that the form of awareness emphasizes citizens' understanding of communal issues and their potential to compel social change. [16]. According to the findings of a study conducted at SMP Negeri 1 Paliyan, citizen awareness of social concerns may be found in the learning activity "Let's Observe," which entails watching the surrounding environment for cases of students who drop out or do not attend school. SMP Negeri 2 Kalasan promotes citizen awareness of social concerns through reflection activities that encourage students to use Pancasila values in their daily lives. At SMP Negeri 8, while Civic learning is commonly associated with Havana, students must also apply Pancasila values from their family, school, or society.

4. Conclusion

Civic education implemented in various countries has different characteristics from each other. First, McLaughlin identifies two types of civic education: minimal and maximal civic education. Second, consider the Lamm Civic Education approach, which incorporates both ideological and political education. Third, Sears and Hughes Civic Education examines the use of Civic Education in the indoctrination or education approach. Fourth, Sim and Print propose three ideal types of Civic Education that analyze teachers' orientations of civic knowledge and classroom behaviors based on features of patriotism, social concern, and personal. Castro identifies a fifth type of civic education that focuses on conservative values and awareness.

The findings of this study revealed that the typology of Civic Education in junior high schools includes: 1) Civic Education is organized maximally, such as encouraging students' democratic attitudes through discussion activities, debates, and critical thinking, and is applied inclusively by involving students in the learning process in the classroom; 2) Civic education is defined as political education that teaches students how to participate in the political realm while developing their own perspectives; 3) Civic education is implemented using an educational approach that includes assessing possibilities based on available facts, emphasizing the development and deepening of public discussion, long-term perspectives, and the establishment of clear conceptions and expectations; 4) Civic education and teaching practices in the classroom are nationalist, social, and personal in nature; 5) Civic education highlights citizen understanding of community issues and the power to enforce social change.

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The Impact of Green Trade on The Environment: A Systematic Literature Review

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Abstract

This study examines the impact of green trade on the environment, focusing on how sustainable trade practices can reduce negative effects on ecosystems. The objective of the research is to analyze various relevant studies through a systematic literature review (SLR) approach to identify the relationship between green trade and environmental quality. The methods used include the collection and analysis of data from literature published in databases such as Scopus and Web of Science. The results indicate that countries implementing green trade policies experience significant improvements in environmental quality, including reductions in carbon emissions and increased resource efficiency. These findings challenge conventional views that consider economic growth and environmental protection as conflicting interests. This research makes significant theoretical and practical contributions and opens up opportunities for further studies in broader contexts. Thus, green trade can be a strategic solution for achieving environmental sustainability and sustainable economic growth.

Keywords: green trade, environment, systematic literature review, carbon emissions, sustainability.

1. Introduction

International trade has become a controversial topic, particularly regarding its impact on the environment and economic growth. On one hand, trade can promote economic growth by increasing market access and production efficiency, which in turn can boost national income and create jobs (Ahmad et al., 2022). However, on the other hand, there are concerns that trade may lead to environmental degradation, especially when countries pursue economic gains without considering the ecological impact (Can et al., 2022). Some studies suggest that poorly managed trade can exacerbate environmental issues, such as pollution and deforestation, which often occur in countries with weak environmental regulations (Varese et al., 2022). Therefore, it is crucial to explore the pros and cons of trade in the context of environmental sustainability.

In an effort to address the environmental challenges posed by trade, the concept of green trade has emerged as a potential solution. Green trade refers to the exchange of goods and services that have a lower environmental impact compared to conventional products (Ahmad et al., 2022). Research suggests that green trade can reduce a country's environmental footprint by promoting environmentally friendly products and clean technologies (Hu et al., 2021). Thus, green trade not only contributes to environmental protection but also creates new economic opportunities, such as investment in green technologies and sustainable innovations (Chatha & Butt, 2015). However, challenges remain, including the need for supportive policies and a clear framework for measuring the environmental impact of green trade.

Although much research has been conducted on the relationship between trade and the environment, there remains a gap in the literature that deeply explores how green trade can be integrated into broader trade policies. Existing theories have not fully explained the complex dynamics between trade, economic growth, and environmental sustainability (Can et al., 2022). For instance, while there is evidence that green trade can reduce environmental impacts, the lack of understanding of the underlying mechanisms behind this relationship makes it difficult to formulate effective policies (Su, 2023). Therefore, it is essential to conduct a systematic literature review to identify gaps in the existing research and provide new insights into how green trade can be optimized to achieve sustainability goals.

The aim of this research is to investigate various studies found in databases such as Scopus and Web of Science using a systematic literature review (SLR) approach. This study aims to gather information related to the impact of green trade on the environment from various dimensions, including key thematic focuses, geographical contexts, the most common methods, the databases used, and the units of analysis applied (Mahajan, 2023). By conducting this analysis, the study hopes to identify patterns and trends that can provide a better understanding of how green trade can contribute to environmental sustainability and sustainable economic growth.

2. Research Methods

This research focuses on the impact of green trade on the environment, which serves as the primary subject of this study. Green trade refers to trading practices that prioritize environmentally friendly products and services, aiming to reduce the negative effects on ecosystems. In this context, it is crucial to understand how green trade can contribute to environmental sustainability and what factors influence this relationship. Therefore, this research will identify and analyze various relevant studies to provide a clearer picture of the impact of green trade on the environment.

The type of research employed in this study is a systematic literature review (SLR), a structured and systematic approach to literature-based research. The SLR aims to collect and analyze data from relevant literature concerning the effects of green trade on the environment. The data collected includes findings from studies published in scientific journals, books, and other academic documents. Additionally, this research will gather secondary data, encompassing supplementary information from literature related to the overall theme of the study, including the predetermined keywords.

The theoretical foundation of this research is the theory of the relationship between green trade and the environment. This theory explains how sustainable trade practices can influence environmental quality and reduce the negative impacts of trading activities. Previous research suggests that the implementation of sustainability standards in trade can improve resource efficiency and reduce carbon emissions. By understanding this theory, this study aims to further explore how green trade can be integrated into broader trade policies and contribute to environmental sustainability.

The research process in this SLR consists of several structured and transparent stages. The first stage is formulating clear and specific research questions, which will guide the literature search. Next, the researchers develop a research protocol that includes search strategies, inclusion and exclusion criteria, and data analysis methods. Data collection is conducted by searching literature across various electronic databases using predetermined keywords, such as “green trade” and “environmental impact.” Once relevant literature is identified, the researchers assess study quality, extract data, and systematically analyze it.

In this research, the data analysis technique employed is content analysis. This technique involves studying and processing data to identify patterns, relationships, and key information contained within it. Using content analysis, this research aims to present a comprehensive synthesis of existing evidence on the impact of green trade on the environment, as well as to identify gaps in the current literature and provide recommendations for future research.

3. Results

The description of data from the literature review on green trade shows an increasing interest in research focusing on the positive impact of sustainable trade practices on the environment. Many studies highlight how green trade can reduce carbon emissions and improve resource efficiency (Sulistyaningsih, 2022). Additionally, the literature notes that countries implementing green trade policies tend to have better environmental quality compared to those that do not (Kumar et al., 2022). This data suggests that green trade is not just a trend but also a strategic step towards achieving environmental sustainability.

The explanation of the data presented above indicates that green trade serves as a tool to promote innovation and investment in environmentally friendly technologies. Research shows that with incentives for green products, companies are more motivated to invest in more sustainable practices (Dechezleprêtre et al., 2019). This contributes to the reduction of pollution and the overall improvement of environmental quality. Therefore, green trade not only provides economic benefits but also contributes to better environmental protection.

The relationship between the description and explanation of green trade data with the reality of the research problem indicates that despite the positive potential of green trade, challenges in its implementation remain. Some countries still face barriers in implementing effective green trade policies, such as the lack of policy support and adequate infrastructure (Zhao et al., 2023). Therefore, it is crucial to understand both local and global contexts when implementing green trade to maximize its benefits for the environment.

The description of data from the literature review on environmental pollution shows that air and water pollution remain serious issues in many countries, particularly in developing nations. Research shows that industrial activities, transportation, and fossil fuel use significantly contribute to increased pollution (Irhoma et al., 2020). Additionally, the literature highlights that environmental pollution has broad negative impacts on public health and ecosystems (Babayemi et al., 2016). This data underscores the need for more decisive action to reduce pollution and protect the environment.

The explanation of environmental pollution data shows that despite efforts to reduce pollution through regulations and policies, their effectiveness is often hampered by weak enforcement and public awareness (Andraos & Dicks, 2012). Research also indicates that many industries continue to neglect existing environmental standards, leading to increased pollution (Mohai & Saha, 2015). Thus, a more holistic and collaborative approach is needed between governments, industries, and communities to tackle pollution problems.

The relationship between the description and explanation of environmental pollution data with the reality of the research problem indicates that green trade can function as a solution to reduce pollution. By promoting environmentally friendly products and practices, green trade can help reduce emissions and waste generated by industrial activities (Dechezleprêtre et al., 2019). However, to achieve this goal, supportive policies and a clear framework are needed to encourage the adoption of green trade practices.

The description of data from the literature review on green exports and green imports shows an increase in the trade of green products in international markets. Many countries are now adopting policies that support the export and import of environmentally friendly goods (Zhao et al., 2023). Data shows that countries active in green trade tend to have better access to global markets and can increase their competitiveness (Gong et al., 2020). This indicates that green trade not only benefits the environment but can also offer economic advantages for participating countries.

The explanation of green export and import data shows that success in green trade largely depends on government policies and adequate infrastructure support. Research indicates that countries with clear policies and support for green products tend to be more successful in increasing the volume of green trade (Rao et al., 2012). Additionally, international collaboration plays an important role in facilitating green trade, with trade agreements prioritizing sustainability (Zhao et al., 2023).

The relationship between the description and explanation of green export and import data with the reality of the research problem indicates that despite the significant potential in green trade, challenges in its implementation persist. Some countries still face barriers in accessing global green markets, such as a lack of knowledge and technology (Ozili, 2022). Therefore, it is important to develop strategies to help these countries participate more actively in green trade and take advantage of its benefits for both the environment and the economy.

4. Discussion

The summary of research findings indicates that green trade has a significant positive impact on the environment. This study identifies that sustainable trade practices not only contribute to the reduction of carbon emissions but also enhance resource-use efficiency. Moreover, the results show that countries implementing green trade policies tend to have better environmental quality. This aligns with the existing literature, which emphasizes the importance of integrating trade and environmental policies to achieve sustainability (Trivedi et al., 2018; Xiong, 2023).

In terms of the relationship between this study and other research, there are notable similarities and differences. For instance, research by Li and Choi (2022) demonstrates that trade can provide both economic benefits and positive environmental impacts. However, this study emphasizes the need for a more integrated and comprehensive approach to managing the environmental impact of trade. The strength of this research lies in its deeper focus on green trade as a concrete solution to environmental problems, a topic not extensively covered in previous studies.

The reflection on these findings shows that green trade is not merely a theoretical concept but has tangible practical implications. With the growing awareness of sustainability, this study provides evidence that green trade can be an effective tool in addressing environmental challenges. This indicates that the research objective is not only relevant but also crucial in today's global context, where climate change and environmental degradation are pressing issues (Xiong, 2023; Mwanzu, 2023).

The implications of this research are broad. First, the findings can serve as a foundation for formulating better trade and environmental policies. Governments and other stakeholders can use these results to develop strategies that promote green trade practices, which in turn can improve environmental quality and public health. Additionally, this research can guide companies in adopting more sustainable business practices (Ahmed & Mullahwaish, 2020; Bhuiyan et al., 2020).

The positive impacts of green trade, as shown in this research, can be explained by several factors. First, incentives for green products encourage companies to invest in environmentally friendly technologies. Second, policies supporting green trade create a conducive environment for innovation and the development of more sustainable products. Third, increasing public awareness of environmental issues contributes to higher demand for green products, driving the growth of green trade (Matthews et al., 2015; Yao et al., 2023).

Based on these findings, several actions should be taken to maximize the benefits of green trade. First, it is important to enhance collaboration between governments, industries, and society in formulating policies that support green trade. Second, broader education and awareness programs are needed to encourage consumers to choose green products. Third, investment in research and development of environmentally friendly technologies must be encouraged to ensure that green products can compete in global markets (Xiong & He, 2022; Fung, 2024). With these measures, green trade is expected to contribute more significantly to environmental sustainability and sustainable economic growth.

5. Conclusion

This study finds that green trade not only serves as a tool for enhancing economic efficiency but also significantly reduces negative impacts on the environment. The research indicates that countries adopting green trade policies experience tangible improvements in their environmental quality, marked by decreased carbon emissions and increased sustainable resource utilization. These findings challenge conventional views that often see economic growth and environmental protection as conflicting interests.

The contribution of this research to scientific development, both theoretically and practically, is substantial. Theoretically, this study enriches the literature on the relationship between trade and the environment by emphasizing the importance of green trade as a practical solution to environmental challenges. Practically, the findings can serve as a reference for policymakers and industry stakeholders to formulate more effective strategies for integrating sustainability into trade practices. Therefore, this research not only provides new insights but also offers concrete guidance for actionable steps.

However, this study also has limitations that need to be acknowledged. These limitations include a greater focus on specific country contexts and a lack of longitudinal data that could provide clearer insights into long-term trends in green trade. Such limitations present opportunities for future research to explore the impacts of green trade across various geographical contexts and different industrial sectors. Upcoming research could also consider social and cultural factors that influence the adoption of green trade practices.

Thus, this study demonstrates that to maximize the benefits of green trade, concrete actions must be taken. First, it is essential for governments to develop supportive policies that facilitate green trade, including incentives for companies investing in sustainable practices. Second, efforts should be made to raise public awareness about the importance of choosing green products. Third, collaboration between the public and private sectors should be strengthened to create an ecosystem that supports green trade. With these measures, green trade is expected to make a greater contribution to environmental sustainability and sustainable economic growth.

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Effect of Intake Manifold Tilt Angle on Engine Performance Using Dyno Test Tools

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Abstract

The large use of motor engines in Indonesia is a potential increase in transportation, one of which is a motorcycle. High engine performance is one of the applications in the community often done, so modification of components on the motor such as, piston modification, valve modification (valve) and modification of the intake manifold in order to produce engine performance in terms of better power and torque. This research will focus on making intake manifolds by modifying the angle of curvature and testing using dyno tests and comparing with angles in the market. This research begins with making the intake manifold of a Honda vario 125 cc KZR type motorcycle with angle variations of 110º, 120º, and 130º. In addition, there are 2 variations in the use of fuel used pertalite and pertamax. Testing will also be carried out using engine rotation speeds of 1500 rpm, 3000 rpm, and 4500 rpm using a dyno test. The test was conducted to determine the torque and power values generated from modifying the intake manifold angle by comparing with the standard intake manifold angle on the market. Based on the test results, there is an effect of intake manifold angle on torque and power using variations in engine speed of 1500 rpm, 3000 rpm, and 4500 rpm. The highest power value was obtained at an intake manifold angle of 130º of 8.0 HP with pertamax fuel at 4500 rpm engine speed and the highest torque value at an intake manifold angle of 130º of 11.63 Nm at 3000 rpm engine speed with pertamax fuel. Comparison using pertalite and pertamax fuel shows different results this is due to the octane value of pertamax is greater than pertalite. In some test results, the power and torque values obtained using pertamax show a higher value when compared to using pertalite, this is in accordance with the suggestion of using fuel on the 125cc Vario KZR motorbike, namely using pertamax.

1. Introduction

The large use of motorbikes in Indonesia has the potential to increase transportation, one of which is motorbikes. This potential results in increased air pollution in Indonesia, so efforts are needed to minimize the use of motorbikes. Based on data from the Central Statistics Agency (2019), 133 million units have been used, with an increase in usage reaching 5%. In 2022, automatic motorbike sales will experience increasing sales, one of which is the Honda Vario motorbike which is in 2nd place with the best sales according to "detik.com" and with a 2022 top brand index score of 20.8 percent. The Vario motorbike is a motorbike that has many variants every year.

Incomplete combustion systems often occur in motorbikes produced in the past, this results in increased pollution so that modifications are needed to old types of combustion motorbikes, one of which is by modifying the intake manifold. The parameters in the wrong intake manifold include the temperature and pressure of the incoming air, where the intake manifold needs to be placed in the position closest to the output [1]. The intake manifold has a certain curvature angle, with variations it is

hoped that it will be able to make the incoming air flow more smoothly and turbulently so that combustion occurs more perfectly in the combustion chamber. Various automotive motorbike companies produce many types of motorbikes, each with its own advantages in each type, one of which is the automatic motorbike, whose sales are very popular with various groups, where the automatic motorbike itself is an elegant and comfortable motorbike to ride.

2. Literature Review

High engine performance is one of the applications that is often carried out in society, so that modifications to components on motorbikes such as piston modifications, valve modifications and modifications to the intake manifold produce better engine performance in terms of power and torque. Variations in the intake manifold, especially the angle, have the potential to increase engine power [2], many people have modified their motorbikes independently, but what is unfortunate is that motorbikes that have been modified have not been tested and tested, especially tests on engine performance. and emissions that are released because the main target of the modification is only to be able to find an increase in motor speed compared to standard conditions but does not take into account how the emissions are produced, so it has the potential to result in negative impacts both in terms of performance and emissions produced because the modifier does not know the data on changes in performance and emissions. generated when the modified motor is operating. Other applications related to intake manifold design include improving the driving experience, for example by reducing the turbo-lag phenomenon[3], or using special devices to increase the intake flow density for racing applications [4].

Shaping the intake manifold can increase the homogeneity of the mixture between fuel and air, so that the new mixture enters the cylinder in a whirl. This method is able to produce more complete combustion. Fuel consumption is the use of the amount of fuel needed during the combustion process where fuel use will be determined by the process that occurs in the combustion chamber, namely the perfection of combustion [5]. The desired target is the process of complete combustion occurs where the burning of fuel in the combustion chamber occurs at the appropriate time needed and burns completely. If this happens then the use of fuel is said to be economical because the fuel used is the same but the power produced is more. Many automotive research targets changes in engine performance, the effects of the combustion process and the emissions produced, one of which is by modifying the intake manifold. Research conducted on the Mitsubishi Cold L 300 petrol motorbike regarding how much influence the length and bend of the intake manifold has on engine performance results, namely power, fuel consumption and torque [6]. It also has a long channel which allows for more complete combustion potential.

Based on the background explanation that has been explained, the main aim of this research is to modify the intake manifold and compare engine performance using standard and modified intake manifolds. Researchers are interested in researching this matter and wrote it in this thesis entitled "The Effect of Intake Manifold Slope Angle on Engine Performance Using the Dyno Test Method". The aim is to find out the value of engine performance, especially the torque and power produced by modifying the intake manifold as well as comparing the use of different fuels, namely Pertalite and Pertamax using a 125 cc Vario motorbike.

3. Research Method

This research uses an experimental method where intake manifold testing is carried out which has 3 design variations, namely the intake manifold with an angle variation of 110°, namely the intake manifold with an angle variation of 120° and namely the intake manifold with an angle variation of 130°.

This research has three variables consisting of the dependent variable, independent variable and control variable.

1. Dependent variable
   The dependent variables in this research consist of performance (torque and power) of the Vario 125 cc motorbike engine.
2. Independent Variable
   The independent variable in this research is 3 intake manifold angle variation of 110°, 120°, and 130°.
3. Variable Control
   The control variables of this research are:
   a) Fuel: Pertamax and Pertalite
   b) RPM

c) Standard condition motorbike

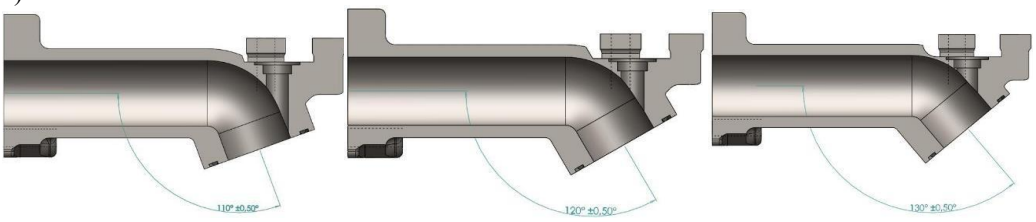


Figure 1. Intake Manifold Design Using Angle Variations 110°, 120°, 130°

4. Results And Discussion

Table 1. Power and torque testing (Pertalite)

Pertalite			
Intake manifold variations	RPM	Powe (HP)	Torsion (Nm)
Angle 110°	1500	1,6	7,92
	3000	4,0	9,21
	4500	5,7	8,93
Angle 120° (standart)	1500	1,9	8,23
	3000	4,5	9,43
	4500	5,9	9,35
Angle 130°	1500	2,0	9,31
	3000	4,7	10,05
	4500	7,1	9,64

Table 2. Power and torque testing (Pertamax)

Pertamax			
Var*intake manifold*	RPM	Power (HP)	Torsion (Nm)
Angle 110°	1500	2,0	8,11
	3000	4,0	9,27
	4500	5,2	9,19
Angle 120° (standart)	1500	2,5	8,27
	3000	4,3	9,65
	4500	6,3	9,52
Angle 130°	1500	2,7	9,44
	3000	4,8	11,63
	4500	8,0	10,23

The fuel consumption of the Supra X 125 FI engine which uses an exhaust without a diffuser is 0.4689 kg/hour. The fuel consumption value produced by the Supra X 125 FI engine which uses an exhaust using a diffuser with one hole is 0.4331 kg/hour. The fuel consumption value produced by the Supra The hole in the exhaust is 8.1% more fuel efficient than an engine that uses an exhaust without a diffuser. The fuel consumption value produced by the Supra X 125 FI engine which uses an exhaust using a diffuser with two holes is 0.4117 kg/hour. There was a reduction of 10.9% or it could be said that using a diffuser with two holes in the exhaust is 10.9% more fuel efficient than an engine that uses an exhaust without a diffuser. The fuel consumption value produced by the Supra X 125 FI engine which uses an exhaust using a diffuser with three holes is 0.3990. There was a reduction in fuel consumption by 14.9% or it could be said that using a diffuser with three holes in the exhaust is 14.9% more fuel efficient than an engine that uses an exhaust without a diffuser.

Based on figure (3), using pertalite fuel the greatest torque value is obtained at a rotation speed of 3000 rpm. At an intake manifold angle of 110º of 9.21 Nm, the torque value is lower than the torque from a standard 120º intake manifold with test results of 9.43 Nm with an engine speed of 3000 rpm. The torque value at an angle of 130º results in 10.05 Nm at an engine speed of 3000 rpm. Increasing engine speed reduces the torque value, torque will decrease which is caused by the volume of air solution in the cylinder chamber decreasing as the speed rate increases.

The decrease in the intake manifold angle of 110º occurs because the influence of the intake manifold creates a curvature angle of the final holding space, which causes the incoming fuel and air mixture to be trapped in the curvature. As a result, a lot of flow is trapped in the manifold, disrupting the intake volume of the fuel mixture into the combustion chamber [7]. The decrease in torque value occurs as the engine speed increases, this is due to the tendency for the mixture of air to fuel to decrease so that as the engine speed increases, the valve will not close completely [8]. Based on the research results obtained, it indicates that increasing the angle of the intake manifold has the effect of increasing torque on the 125cc Vario engine, while reducing the intake manifold angle can reduce the torque value.

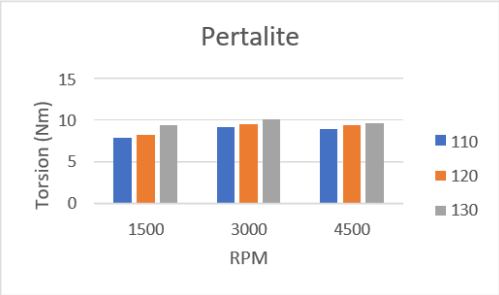


Figure 2. Pertalite Torque (Torsion) Graph

It can be seen in Figure 4 that the highest torque value with Pertamax fuel was also obtained at an engine speed of 3000 rpm at each angle of the intake manifold. The 110º angle has a value of 9.27 Nm, on the factory standard intake manifold the torque value reaches 9.65 Nm, and the highest torque value is found at the 130º angle of 11.63 Nm. The size of the torque is influenced by the engine rotation and load [7]. The difference in torque value in this case is also due to the RON value of each fuel used. Torque value for each

The engine speed using Pertamax fuel is higher than using Pertalite fuel. This shows that when high octane fuel is used, Pertamax will be more resistant to temperatures caused by pressure in the combustion chamber. This means that the fuel will not ignite spontaneously or detonate (ignite itself) before the spark from the spark plug emits it.

Pertamax with 92 octane causes the combustion process at high engine speeds to be overcome because the octane number in Pertamax is able to burn quickly and conversely, if you use Pertalite with an octane number of 90, the combustion process that occurs at high engine speeds cannot be overcome or a combustion process will occur late. The flow rate between the air and fuel mixture is one of the important factors that determines the efficiency and performance of an internal combustion engine. The torque test graphic data in Figure 4.4 and Figure 4.5 proves that there is an influence of changing the angle of the intake manifold and using fuel with a different octane value on engine performance, in this case there is a difference in torque value increasing and decreasing when compared to using a standard intake manifold.

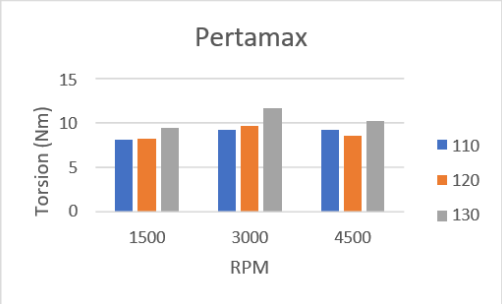


Figure 3. Pertamax Torque (Torsion) Graph

The increase in power value can be seen in Figure 5, where the greater the engine speed, the greater the power produced, in this study the largest rotation value was at 4500 rpm engine speed. At

an intake manifold angle of 110º the power value obtained is 5.7 HP, this value is not much different from the standard intake manifold angle of 5.9 HP. The highest increase in power is found at an intake manifold angle of 130º of 7.1 HP with an increase of 20% exceeding the power value with the same rotation at a standard intake manifold angle. The torque value at a 110º angle for pertalite fuel exceeds the torque value obtained at a standard intake manifold angle.

Increased combustion in the combustion chamber because the mixture of air and fuel becomes more homogeneous, which results in better combustion in the combustion chamber [9]. Turbulence is also influenced by speed, so an intake manifold without a turbulator produces a higher speed compared to the addition of a turbulator[10]. This is because it does not take long for the engine to inject, indicated by the more homogeneous the mixture, the more easily it will burn, while turbulence will also help speed up the diffusion of the flame and cause even combustion more quickly. It can be noted that each engine product is designed to use the recommended type of fuel. Lack of information regarding selecting the right type of fuel can be an initial trigger for the impact of future damage to vehicle engines[11].

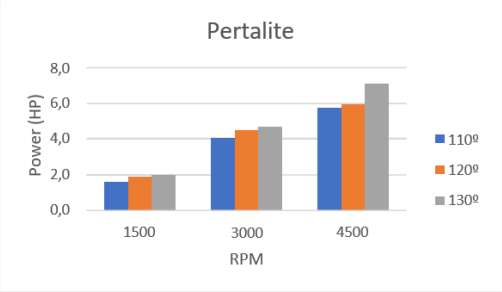


Figure 4. Pertalite Power Graph

Based on Figure 5, there is an increase in power value in line with an increase in engine speed, where in this study the highest engine speed used was 4500 rpm. In graph 4.7, there is a change in effective power. This occurs because frictional power increases as engine speed increases to the highest power value and becomes more dominant at high speeds. An intake manifold angle of 110º produces a power value of 5.2 HP, this value is lower than the standard intake manifold angle of 6.3 HP. The highest increase in power is found at an intake manifold angle of 130º of 8.0 HP with an increase of 27% exceeding the power value with the same rotation at a standard intake manifold angle.

Using a curvature angle that is not too steep will speed up the flow into the combustion chamber and increase the speed, which can cause the flow to become turbulent [7]. This is because it does not take long for the machine to inject, indicated by the more homogeneous the mixture, the more flammable it is. While turbulence will also help speed up the diffusion of the flame and cause even combustion more quickly. At low engine speeds, the friction force in the combustion chamber is small and the fuel-air mixture needs can be met so that power increases [7]. By using an intake manifold with the right curvature angle, the right turbulent flow will be produced to meet the engine's needs and increase engine torque and power. The difference in fuel use also affects the value of the power produced, the power value using Pertalite fuel is smaller than using Pertamax fuel. Pertamax fuel can increase the power value produced by a Honda Beat 110 cc motorbike, while using Pertalite results in a decrease in motor power.

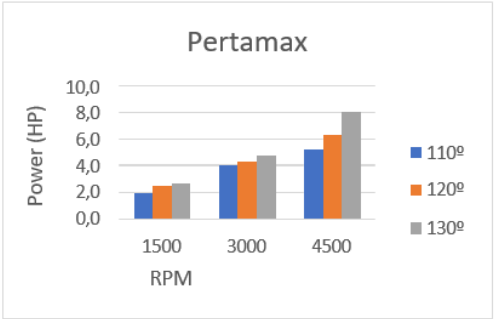


Figure 5. Pertamax Power Graph

Power and torque analysis is carried out to determine the influence and relationship between torque and power on the engine's performance behavior when running.

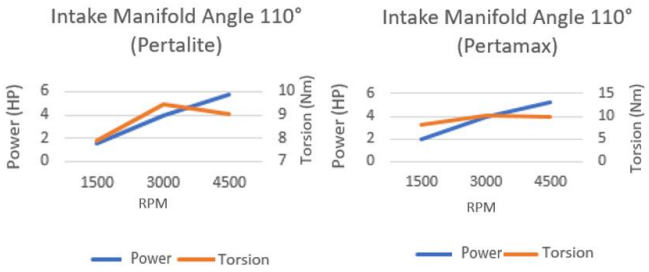


Figure 6. Comparison Graph of Angular Power and Torque (Torsion) Values 110º

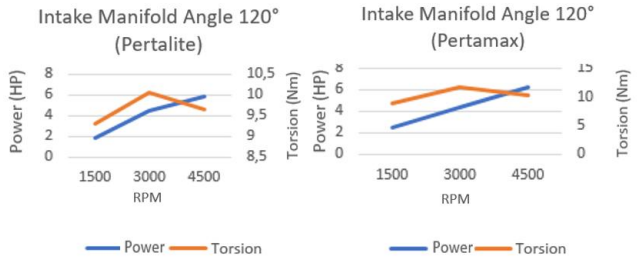


Figure 7. Comparison Graph of Angular Power and Torque (Torsion) Values 120º

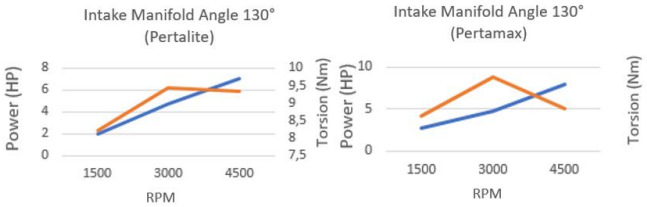


Figure 8. Comparison Graph of Angular Power And Torque (Torsion) Values 130º

The graph in Figure 6-8 shows the relationship between power and torque. The greater the engine speed, the torque value tends to decrease, but on the other hand, the power value is known that the greater the engine speed, the greater the power value, which in this study the number of engine revolutions is limited to 4500 rpm. The three intake manifold variations that use a 130º angle have power because more air flow enters the combustion chamber and increases engine speed and is also in accordance with stoichiometry theory, if at high speed more air flow is needed to increase power.

5. Conclusion

a. Based on the test results, there is an influence of the intake manifold angle on torque and power using engine speed variations of 1500 rpm, 3000 rpm and 4500 rpm. The highest power value was obtained at an intake manifold angle of 130º of 8.0 HP with Pertamax fuel at an engine speed of 4500 rpm and the highest torque value at an intake manifold angle of 130º was 11.63 Nm at an engine speed of 3000 rpm with Pertamax fuel.
b. Comparison using Pertalite and Pertamax fuels does not show too significant differences in test results. In the test results, the power and torque values obtained using Pertamax show higher values when compared to using Pertalite, this is in accordance with the recommendation for fuel use on the Vario KZR 125cc motorbike, namely using Pertamax.

Acknowledgments

Thank you to all parties who helped in completing this research.

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DIGITAL MARKETING ASSISTANCE FOR ARTS AND CULTURE GROUPS IN KARANGCEGAK VILLAGE, KUTASARI DISTRICT, PURBALINGGA REGENCY

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Abstract

This study aims to provide digital marketing assistance for arts and culture groups in Karangcegak Village, Kutasari District, Purbalingga Regency. The methods used include training and implementation of digital marketing strategies that are relevant to the needs of the group. The results of this assistance show an increase in participants' understanding of digital tools and platforms, as well as their ability to promote arts and culture products effectively. With this assistance, it is hoped that arts and culture groups can increase their marketing reach and attract more attention from the community. In addition, this study also contributes to local economic development through the use of digital technology.

Keywords: Digital Marketing, Arts and Culture Group

1. Introduction

By leveraging the courage of the platform, the entity culture can strengthen There isn't any they, expand the audience base, and in the end push the growth economy locally. Developing Accessible digital devices presents an unseen opportunity Once There is previously for the community Not only to preserve inheritance culture but also to innovate and adapt to the preferences of modern consumers. Needs urge will help focused marketing originate from the awareness that Lots initiative arts and culture local lack source Power For in a way effective reach customers and tourists potential. Digital marketing has become a tool important in promoting products and services, especially for groups that desire arts and culture to reach a wider audience. In Karangcegak Village, the implementation of digital marketing strategies can help increase shortcomings and power pull product art locally. In addition to improving marketing strategies for group art and culture in Karangcegak Village, important to consider illustration more digital marketing wide to involvement and desire public.

By leveraging a bold platform, groups can Promote and offer unique foster a sense of identity and belonging among citizens, and push participation in events and initiatives locally. This is in line with findings from various research that highlight How digital marketing significantly influences the behavior and satisfaction of customers, ultimately leading to improvement in faithfulness to brands and products locally (Al-Dosari et al. al., 2024). Furthermore, investing in session training that focuses on digital literacy will empower the member public to navigate complex bold marketing effectively, ensuring that they can adapt to preference consumers who continue to develop and progress technology (Udayasri, et al., 2024).

Approach proactive not only increases the skills of individuals but also strengthens the resilience public in a way overall that allows them to develop in an increasingly digital world. In addition, as time goes by Keep ongoing development of digital marketing, things give opportunities for group arts and culture in Karangcegak Village to collaborate with business local, creating connection symbiosis that can increase involvement in society and a sustainable economy. To host together various events or a prominent campaign culture local at a time to Promote companies around, groups can take advantage of social media platforms to connect with a broader audience. of spacious and interesting interest tourists, which is very important for the economy rural. Approach collaborative not only enriches various culture villages but is also in line with research that shows that marketing strategy integrated in a way significantly increases involvement in customers and loyalty brand among consumers (Yendra, et al., 2024). Fostering partnerships kind of will create a dynamic ecosystem where expression artists and trade live sideways in a way harmonious, and profitable for all stakeholders' interests.

2. Method

Digital marketing assistance for arts and culture groups was carried out in Karangcegak Village, Kutasari District, Purbalingga Regency. This community service activity was carried out through 3 stages, starting from the preparation and planning stage, continued with the implementation of activities, and the last program evaluation.

a. Preparation

The preparation stage is the initial stage before the implementation of community service activities. The first and most important thing in digital marketing training and mentoring is the involvement of the role of arts and culture groups. The involvement of these arts and culture groups begins with the observation process and FGD related to arts and culture which are ancestral heritages that have been passed down from generation to generation. In this preparation and planning stage, socialization and FGD were carried out with art and culture group participants.

This activity took place over 2 meetings with the results in the form of data related to the literacy and digital skills of prospective mentoring participants. This stage is carried out in a hybrid manner (offline and online). This community service is intended to provide training and mentoring in digital marketing that produces output in the form of a digital platform whose content is in the form of videos, podcasts, and digital storytelling which are expected to help promote the Marsudi Laras arts and culture group.

b. Implementation of Training

At the implementation stage, the activities are carried out in stages with 2 meetings. Starting from the formation of a digital team of young people which begins with regular discussions, including creating a concept for planning the activities carried out. The next stage is the introduction stage of the digital platform that will be used. At this stage, several digital platforms are introduced to the young people who will be involved, such as examples of digital platforms that will be used such as (Instagram, YouTube, and Podcast).

Not only getting to know the digital platform, the next stage focuses more on the introduction stage of types of digital content (video, photos, and digital storytelling). Continued with the stage of practicing digital content creation that focuses on packaging techniques and creating digital content so that visualization, and image capture, are well conceptualized. The last stage is the content management stage, this is important to study so that later in content creation it can continue to be consistent.

c. Evaluation Stages

This evaluation stage aims to see the understanding, development, and achievement of results obtained from the mentoring and digitalization process of training. At this evaluation stage, a comparison will be made before and after a series of digitalization activities are carried out. The output that produces community service reports, and publication of community service activities.

3. Results and Discussion

a. A review of the importance of digital marketing for local arts and culture groups

In an era where digital platforms dominate communication, local arts and culture groups should leverage digital marketing to boost visibility and enhance engagement. By leveraging social media and bold, targeted campaigns, these groups can effectively reach a wider audience beyond traditional geographic boundaries. This shift not only increases community engagement but also fosters a sense of cultural identity, allowing local arts to thrive in a global context.

Indonesia consists of various islands, each region of which creates a variety of arts and cultures. One of them is Purbalingga, which is unique in the field of arts and culture. The typical arts of Purbalingga are spread almost in remote villages, the arts generally consist of folk performing arts that have certain functions related to the lives of the community. The forms of art that have grown and developed include:

1) The Thug

This is a traditional art form used as a means of wedding ceremonies, the properties are in the form of kitchen utensils, each of which has symbolic meanings that contain Javanese philosophy and are useful for the bride and groom in sailing the ship of marriage.

2) Nod

This is an art form with an Islamic feel which is presented in the form of dances performed by eight players and at the end of the performance the players are drunk / mendem

3) Aplang or Dames

This is an art form similar to angguk, the players are young women.

4) Calung

It is a typical Purbalingga musical instrument made of wulung bamboo similar to Javanese gamelan instruments, consisting of gambang, barung, gambang penerus, slentem, kenong, gong and kendang. In its presentation, calung accompanies a vocalist who is usually called a sinden. The arranged music presented is in the form of Banyumasan gending, Surakarta style gending, Yogyakarta, and often also presents pop and campursari songs.

5) Ebeg or Kuda Lumping

In the form of a traditional dance typical of Purbalingga with the main property in the form of ebeg or horse braid. This art depicts the failure of horsemen with barongan, penthol and cepat attractions. In its performance, ebeg is accompanied by a gamelan ensemble

6) Lengger

It is a type of dance that thrives in Purbalingga Regency. This art is usually presented by two or more women and in the middle of the show a male dancer is present. Lengger is presented on stage at night or during the day accompanied by calung.

7) Slawatan

It is one of the musical arts that has an Islamic feel with flying musical instruments. In this art performance, songs are presented that are taken from the Perjanjen book.

The potential for unique arts and culture in Karangcegak Village, Kutasari District, uses traditional methods, namely banners. This activity aims to find out how to improve the potential of Marsudi Laras arts and culture to become more professional. The method used in this community service is training for art groups through the creation of Instagram social media accounts, as well as the creation of photo and video content, so that they can carry out social media marketing.

b. Current Condition of Arts and Culture Groups in Karangcegak Village

In examining the arts and cultural groups in Karangcegak Village, one finds a vibrant interweaving of local traditions and contemporary expressions. These groups, which include dance groups, traditional music ensembles, and craft groups, act as custodians of the village's important heritage while engaging with modern influences. Today, many of these cultural organizations face significant challenges, particularly in terms of funding and exposure; there is a clear need for strategies that increase their visibility and desirability in a rapidly changing social and economic landscape.

Efforts to document and promote local art forms that play an important role in establishing relationships with a wider audience, thus fostering appreciation and support for the unique cultural identity of Karangcegak. In addition, the transfer of knowledge between generations in these groups creates a dynamic environment for cultural preservation and innovation. With social media accounts, art groups in Karangcegak Village, Kutasari District, Purbalingga Regency are expected to be known by the wider community and carry out collaborative content with related agencies as a promotional media. The potential for the uniqueness that exists and the frequency of these groups' performances should create digital archiving. Archiving functions as a center of memory and a source of information that is very much needed by every organization. With digital archiving through Instagram, the track record of the art group will be clearly visible visually. Another advantage is that the information disseminated can reach people outside Karangcegak Village, Kutasari District, Purbalingga Regency.

c. Digital Marketing Strategy for Arts and Culture Promotion

Digital marketing refers to marketing activities aimed at promoting products or services and reaching potential customers through digital media. According to Afrina (2015), digital marketing is a widely used approach for advertising products or services and connecting with consumers via digital channels. In the globalization era, implementing digital marketing is crucial due to its wide reach and user-friendly nature.

Digital Marketing can be defined as marketing activities including branding that use various web-based media (Sanjaya & Tarigan, 2009). E-Marketing or digital marketing is defined as the use of digital technology to achieve marketing goals and efforts to develop or adjust the marketing concept itself, communicate in a global scope, and change the way companies do business with customers (Ali, 2013).

Smith and Chaffey (2013) describe digital marketing as a central component of e-business, enhancing a company's ability to reach customers, better understand their needs, add value to products, expand distribution channels, and boost sales. This is achieved through digital marketing techniques such as search engine marketing, online advertising, and affiliate marketing. Additionally, websites play a crucial role by offering information to customers, streamlining the sales process, and managing sales services. Similar to traditional marketing, digital marketing involves strategic thinking and methods to attract customers through online activities, such as testing websites with different user groups and browsers.

The use of digital marketing brings numerous advantages to business success, including easier access to information, broader networks, and improved communication. Digital marketing extends beyond simply mastering new technologies or tools; it involves applying these technologies in practical ways (Kitsios & Kamariotou, 2021; Ukko et al., 2019). Furthermore, according to Ryan & Jones (2009), the rise of digital businesses can serve as an effective strategy for companies transitioning to digital models. Such strategies can significantly impact organizational sustainability, with long-term effects lasting at least five years (Mandal, 2017; Mishra et al., 2017; Patrutiu-Baltes, 2016; Ryan & Jones, 2009)

.In the competitive digital marketing landscape, an integrated approach that leverages multiple platforms can significantly increase the visibility of arts and culture. Social media engagement serves as a key strategy, allowing direct interaction with diverse audiences while promoting local artists and cultural events. Platforms like Instagram and Facebook not only facilitate the sharing of visually appealing content but also allow for targeted advertising, ensuring that messages reach individuals with a strong interest in arts and culture. Additionally, collaborations with local influencers can amplify outreach efforts, provide authenticity, and expand reach within niche communities.

4. Conclusion

Digital marketing assistance for arts and culture groups in Karangcegak Village has great potential to increase the presence and competitiveness of local products in an increasingly digital marketplace. Through appropriate training and ongoing support, arts groups can leverage technology to expand their reach and improve the well-being of the community as a whole. In synthesizing the various elements of this research, it becomes clear that digital marketing has transformative potential for arts and culture groups in Karangcegak Village.

The findings highlight that, through tailored digital strategies, these groups can increase their visibility, engage audiences, and ultimately foster community resilience. As explored, social media integration platforms and bold marketplaces enable the amplification of local arts while promoting the rich cultural heritage inherent to the region. Furthermore, the results reveal that educating stakeholders on digital tools not only democratizes access to marketing resources but also empowers these groups to take ownership of their representation in the broader marketplace. The data suggests that continued investment in digital literacy and infrastructure, as well as collaborative platforms, will be critical to the growth and continued relevance of the arts and culture sector in Purbalingga Regency moving forward.

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Factors Influencing Vocational High School Graduates' Pathways to Higher Education, Civil Service, and Entrepreneurship: A Study in the East Coast Region of Aceh

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Abstract

Vocational high school graduates in the East Coast Region of Aceh face notable challenges in deciding whether to continue their education or enter the workforce. This study analyzes the factors influencing their decisions to pursue higher education, careers in public service (police, military, civil service), or entrepreneurship. A Simple Linear Regression analysis reveals that 92.43% of graduates opt for higher education or public service roles, while 54.45% choose entrepreneurship. The preference for higher education and public service is driven by the desire for socioeconomic mobility, with familial and environmental influences playing critical roles. The findings highlight the need for targeted policies to address the low entrepreneurial interest among vocational graduates, particularly by reducing barriers such as lack of resources and mentorship. Aligning vocational training programs with labor market demands can better support graduates in making informed career decisions. These insights contribute to improving vocational education outcomes and fostering regional economic development.

Keywords: vocational education, higher education pathways, public service careers, entrepreneurships, Aceh graduates

1. Introduction

The development of the education sector plays a pivotal role in addressing the high unemployment rate, largely caused by the mismatch between graduates' skills and available formal job opportunities [1,2]. One of the key factors in reducing unemployment and enhancing the quality of human resources is education. The Sustainable Development Goals (SDGs) emphasize the importance of education as a means to end hunger, achieve food security, and promote sustainable agriculture by 2030 [3,4]. In line with these goals, vocational education is critical in equipping individuals with the necessary skills to contribute to both local and global economies [5].

Government initiatives in Indonesia have increasingly focused on improving human resources by enhancing practical and life skills in students. As of now, Indonesia has around 55 million skilled workers, and to meet the projected target by 2030, an additional 58 million are required [2,6]. Vocational high schools (SMKs) are a vital component in supplying this workforce. Regional planning, especially in human resource development, demands a comprehensive approach that addresses not only educational needs but also economic, social, and environmental factors [7].

Vocational education plays a crucial role in preparing students for the workforce by equipping them with industry-relevant skills [8]. It is essential to consider both internal factors, such as human and natural resources, and external influences, like regional opportunities and threats, to ensure the development of skilled graduates [7,9]. This comprehensive perspective is key to ensuring that vocational education programs are aligned with labor market demands, particularly in regions where industrial growth is a priority [10]

In the East Coast of Aceh, which includes East Aceh District, Aceh Tamiang District, and Langsa City, vocational education is crucial for regional development. The area has significant potential for growth in industries such as agriculture, energy, and natural resources [11,12]. However, effective planning is necessary to ensure that vocational education aligns with local economic needs. A strategic regional development plan must integrate economic policies with social and environmental considerations to promote sustainable growth [13].

The challenges faced by vocational graduates in securing employment in Aceh are largely due to mismatches between their training and the requirements of local industries. Many graduates are not fully equipped to meet the specific demands of the labor market, which hampers their employability [14,15]. The planning for vocational education development, therefore, must consider the unique characteristics of the region, including the distribution of resources and industries [8,12]

Vocational education, when effectively planned and executed, can help address these challenges by preparing graduates to engage with the region's leading industries. A focus on local resource utilization is key, as it ensures that graduates are trained in fields relevant to the region's economy. This also involves fostering entrepreneurship among graduates, which could provide a solution to the lack of formal job opportunities by enabling them to create their own employment opportunities [16]

The integration of local economic potential into vocational education curricula can strengthen the region's economy (Kusamaningrum, 2022). Planning for regional development requires not only effective educational strategies but also institutional frameworks that support the management and financing of education systems (Hariram et al., 2023. These frameworks must be designed to address both internal factors such as natural resources and external opportunities, ensuring that vocational graduates are adequately prepared for the challenges of the local labor market.

This study seeks to analyze the alignment between vocational high schools in the East Coast of Aceh and local economic opportunities. By identifying the factors influencing vocational graduates' career pathways, this research aims to propose strategies that enhance vocational education outcomes and contribute to regional economic growth. Ultimately, this research aims to support the development of policies and educational reforms that improve the employability of vocational graduates and foster entrepreneurship (Nugroho et al., 2021; Lubis, 2024).

2. Method

2.1 Research Area

This study was conducted in the East Coast Region of Aceh, which includes East Aceh District, Aceh Tamiang District, and Langsa City. These areas were selected due to their significant potential for industrial growth in sectors such as agriculture, energy, and natural resources. Vocational high schools in these regions are crucial for regional development, making this an ideal area for studying the factors influencing vocational graduates' educational and career choices.

2.2 Research Design

This research utilized a quantitative approach to analyze the factors influencing vocational high school graduates' decisions to continue their education or pursue careers in public service or entrepreneurship. A Simple Linear Regression analysis was employed to examine the relationship between the number of vocational graduates and their career pathways (higher education, public service, entrepreneurship). This method was selected because it allows for identifying the strength and direction of the relationship between independent and dependent variables.

2.3 Data Collection

Data were collected from both **primary and secondary sources**.

- **Primary data** were gathered through structured questionnaires distributed to a sample of vocational high school graduates across the East Coast Region of Aceh. The questionnaires focused on demographic information, educational background, career preferences, and factors influencing their decisions.
- **Secondary data** were obtained from the Central Statistics Agency (BPS), vocational high schools, and regional educational offices. These data provided insight into the number of vocational graduates, unemployment rates, and local labor market trends.

A purposive sampling technique was used to select vocational schools with high graduation rates and diverse program offerings, ensuring a representative sample of graduates with varying educational and career interests.

2.4 Sample Size and Population

The study surveyed 81 vocational high school graduates from three districts. This sample size was determined based on the number of vocational high schools in the region and their respective graduation rates. Graduates from fields such as engineering, agriculture, and commerce were included to ensure a diverse representation of educational backgrounds.

2.5 Data Analysis

The collected data were analyzed using SPSS 26 to perform a Simple Linear Regression. This statistical method was used to identify the relationship between:

The number of vocational graduates (independent variable) and their choice to continue to higher education, public service, or entrepreneurship (dependent variables).

$$Y = \beta_0 + \beta_1 X + \epsilon$$

[1] Y represents the vocational graduates' career choices (higher education, public service, or entrepreneurship),
[2] X represents the number of graduates,
[3] β_0 is the constant (intercept),
[4] β_1 is the regression coefficient, and
[5] ϵ is the error term

The analysis aimed to determine the direction and strength of the relationship between the number of vocational graduates and their career outcomes. A correlation analysis was also conducted to assess the strength of association between independent and dependent variables.

3. Results and Discussion

3.1 Correlation Between Vocational High School Graduates and Higher Education/Public Service (Y1)

The Pearson correlation between the number of vocational high school graduates (X) and those continuing to higher education, police, army, or civil service roles (Y1) is 0.924, as shown in Table 1. This represents a near-perfect correlation, indicating that as the number of vocational high school graduates increases, so does the number pursuing higher education or public service positions**.**

Table 1. Correlation Between X and Y1

Pearson Correlation (Y1, X)	0.924
N	81

The Simple Linear Regression analysis produced the following equation:

$$\hat{Y}_1 = -3{,}49 + 0{,}15X$$

This equation shows that for every additional vocational high school graduate, approximately 15% of graduates continue to higher education or public service. The coefficient of determination (R^2 = 0.854) suggests that 85.4% of the variation in graduates' career choices towards higher education or public service can be explained by the number of vocational high school graduates, with other factors accounting for the remaining 14.6%.

The strong positive correlation and the results from the regression analysis demonstrate that higher education and public service roles are the preferred career paths among vocational graduates. This may be due to the societal perception of job security and status associated with these sectors in the East Coast Region of Aceh. Family influence and the desire for socioeconomic mobility are key drivers for these choices, aligning with previous studies such as Irwanto (2022), which highlighted the influence of familial expectations on career decisions.

3.2 Correlation Between Vocational Graduates and Entrepreneurship (Y2)

The correlation between vocational high school graduates (X) and those pursuing entrepreneurship (Y2) is 0.566, indicating a strong correlation (Table 2). While this relationship is significant, it is noticeably weaker than the correlation with higher education and public service, suggesting that fewer graduates are inclined towards entrepreneurship.

Table 2. Correlation Between X and Y2

Pearson Correlation (Y2, X)	0.566
N	81

The regression model for entrepreneurship is:

$$\hat{Y}_2 = 2{,}66 + 0{,}03X$$

This shows that for every additional vocational high school graduate, 3% opt to pursue entrepreneurship. The coefficient of determination ($R^2 = 0.5445$) indicates that 54.45% of the variance in graduates' choice of entrepreneurship can be explained by the number of vocational graduates.

The weaker correlation and regression results suggest that entrepreneurship remains less attractive for vocational high school graduates in the East Coast of Aceh. This can be attributed to several factors, including lack of access to capital, resources, and mentorship, which are critical for entrepreneurial success. Studies such as Nurlina et al. (2019) emphasize that while entrepreneurship offers the potential for flexibility and independence, many graduates are hesitant due to perceived risks and limited support.

3.3 Discussion of Career Preferences and Influences

The results of this study highlight a clear preference for higher education and public service careers over entrepreneurship among vocational high school graduates in the East Coast of Aceh. The near-perfect correlation for higher education and public service (Y1) suggests that graduates view these paths as more reliable and secure, offering opportunities for long-term stability and social mobility. This aligns with the findings of Nugroho et al. (2021), who noted that public service careers, especially in regions with limited private sector opportunities, are often seen as the pinnacle of career success.

The significantly lower preference for entrepreneurship, as evidenced by the correlation and regression results for Y2, suggests that entrepreneurship is still seen as a risky venture. The challenges vocational graduates face in starting their own businesses include limited access to financing, insufficient training in business management, and the lack of strong entrepreneurial ecosystems. As Lubis (2024) pointed out, vocational education programs in Aceh need to incorporate more entrepreneurial skills to better equip graduates for self-employment and innovation.

The discrepancy between public service and entrepreneurial career paths is also influenced by socioeconomic factors, as families in the region often encourage careers that promise financial stability and respectability. However, with the right policy interventions, including mentorship programs, entrepreneurship funding, and revised vocational curricula, this trend could shift, offering more vocational graduates the opportunity to consider entrepreneurship as a viable and rewarding career.

3.4 Implications for Vocational Education and Policy

The findings from this study have several implications for vocational education and policy-making in Aceh. First, there is a need to strengthen entrepreneurial education within vocational schools by providing access to resources, offering real-world business experience, and fostering partnerships with local businesses. This could address the barriers that discourage graduates from pursuing entrepreneurship and provide them with the skills and confidence to start their own ventures.

Secondly, policymakers should continue supporting higher education pathways for vocational graduates, ensuring that scholarships and opportunities in public service remain accessible. However, there should also be a greater emphasis on diversifying career options beyond public service roles by promoting regional economic sectors, such as agriculture and energy, which have growth potential.

In conclusion, by aligning vocational training with the evolving demands of the labor market and addressing the barriers to entrepreneurship, educators and policymakers can better support vocational graduates in achieving their full potential, thereby fostering economic growth and reducing unemployment in the East Coast Region of Aceh.

4. Conslusion

This study analyzed the career pathways of vocational high school graduates in the East Coast Region of Aceh, with a focus on their choices to pursue higher education, public service, or entrepreneurship. The findings revealed that 92.43% of graduates prefer continuing to higher education

or public service roles, while 54.45% choose entrepreneurship, highlighting a strong inclination toward formal employment.

The strong correlation (Pearson correlation 0.924) between the number of graduates and their pursuit of higher education/public service indicates that these career paths are seen as stable and prestigious. Socioeconomic factors, such as family influence and the desire for social mobility, are major determinants in this decision. Graduates view higher education and public service as more reliable and socially accepted options compared to entrepreneurship.

In contrast, the moderate correlation between vocational graduates and entrepreneurship (Pearson correlation 0.566) suggests that while entrepreneurship is an option, it remains less attractive due to the perceived risks, lack of resources, and limited entrepreneurial support. This highlights the need for greater efforts to promote entrepreneurship as a viable career option by addressing the key barriers that discourage vocational graduates from pursuing self-employment.

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LEVERAGING KOBI TO ENHANCE CREATIVE ABILITIES AND SOCIAL READINESS LEARNING

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Abstract

This study investigates the effectiveness of KOBI (Kartu Operasi Bilangan Integrasi) as an innovative learning media designed to enhance students' creative thinking abilities and societal readiness Learning (SRL) in mathematics education. Developed through a rigorous validation process involving experts in media, mathematics education, and language, KOBI integrates game-based learning elements to create an engaging educational experience. The research employs a quasi-experimental design with two groups of seventh-grade students from MTS N 7 Malang and MTS N Kota Batu, utilizing a two-group posttest design to assess the impact of KOBI on learning outcomes. Results indicate significant improvements in both creative thinking and SRL scores post-intervention, with the second experimental group showing a more pronounced increase in creative thinking abilities. The findings suggest that KOBI not only facilitates active learning and collaboration among students but also serves as an effective tool for enhancing creative thinking skills. This study contributes empirical evidence supporting the integration of innovative learning media in educational practices, highlighting the potential of KOBI to positively influence student engagement and learning outcomes in mathematics.

Keywords: KOBI, Creative Thinking, Game-Based Learning, Mathematics Education, SRL

1. Introduction

Learning media is an important element in the learning process, functioning as an intermediary for information between teachers and students regarding learning materials [1]. Media also has an important role in increasing students' motivation and interest in learning with a new atmosphere. The existence of supporting learning media can have a positive impact on student learning outcomes [2]. In line with research Pratiwi & Meilani (2018) which states that learning media is one of the supporting factors for student learning achievement. No exception in mathematics learning which is often considered difficult and scary. With learning media, mathematics can be a fun subject for all students [4].

Use of media in learning in research [5] is evidence that manipulative media is able to improve meta-representation. Meanwhile, in the research [6] influential learning media helps students to generate ideas and build their creativity in developing understanding by combining the knowledge and experience they have. In line with research [7] that manipulative media can combine students' understanding of mathematical concepts with collaborative abilities.

Researchers found that mathematics learning that took place at MTs N in Malang Regency and Batu City did not accommodate learning with learning media. Most of the mathematics teachers only taught using textbooks without any supporting media and tended to be monotonous. This condition was not the only one that happened. Many other researchers found similar things in the learning process [8] [9] [10] [11]. This condition is one of the main problems with learning outcomes and students' low ability to understand mathematical concepts.

This condition was found by researchers at MTs N 7 Malang that grade 7 students have not been able to master the concept of number operations. However, there has been no effort for teachers to solve this problem. Psychologically according to [12] MTs age students are in adolescence, namely the transition period from childhood to adulthood. In this condition, educators need to pay close attention

to learning needs. A similar opinion was expressed by [9] that learning needs to be adjusted to conditions and needs so that learning can take place effectively and enjoyably according to student expectations. Learning for early adolescents that meets expectations will increase active participation and direct involvement in the learning process. [13]. This will certainly support several students' abilities to grow and develop optimally.

Another problem with the low understanding of this concept is that it also has an impact on low social attitude readiness in learning. [14] revealed that student activity is a form of seriousness in learning that is expressed in various ways. Some of them are actively involved in discussions, focusing on the material, and being directly involved in various learning processes. As an effort to improve students' conceptual understanding and based on students' learning needs, researchers have implemented game-based learning innovations. Game-based learning that has been carried out by researchers before has been effective in improving certain abilities.

KOBI (Kartu Operasi Bilangan Integrasi) is an interactive learning media that can provide a more interesting and innovative mathematics learning experience [15]. KOBI is presented in the form of manipulative media in the form of number cards containing whole numbers from 0 to 10, in addition the numbers contained are integrated into Arabic numerals. Through KOBI, students can directly interact with numbers in various forms of activities, such as educational games and collaborative exercises.

KOBI as a media integrated into game-based learning. This approach combines game aspects with math education to create a more engaging and enjoyable learning experience [16]. By utilizing game elements, such as competition, challenges, and rewards [17]. In its implementation, each student gets the opportunity to arrange number operations with details of four numbers and three number operators randomly to get results close to the smallest target's number (one) or the largest target (twenty). One of the main advantages of KOBI is its ability to facilitate active learning methods. The activities in it not only help students understand concepts better but also increase their involvement in the learning process. The use of Arabic in writing numbers on cards is one of the new innovations that aims to familiarize students with Islamic elements.

The learning model that is suitable to be applied in KOBI is the TGT type cooperative learning model. The TGT learning model encourages and accommodates students to work together and communicate in group members to achieve the same goal. [18]. The learning process and KOBI media as a means allow students to practice and get used to thinking creatively in solving problems. In the context of TGT, Number Cards are often used in game and tournament phases, where students compete in mathematical activities involving number cards [19]. During this phase, students not only use KOBI to solve math problems, but also to collaborate with group members, share strategies, and plan the best strategy to win the game. Thus, KOBI functions as a tool that supports active and collaborative learning processes in improving students' creative thinking skills.

The main objective of this study is to empirically evaluate the effectiveness of KOBI in improving students' creative thinking skills and SRL. Through this study, we will prove descriptively and test the hypothesis to provide strong empirical evidence to support the quality of KOBI media as an effective learning medium in mathematics learning. These findings will contribute to the growing literature on innovative educational practices and offer insight into the potential of game-based learning to improve student engagement, creativity, and social readiness in the learning process.

2. Method

KOBI (Kartu Operasi Bilangan Integrasi) has been successfully developed by the author in previous research. KOBI has been tested through expert validity tests involving four experts, namely learning media experts, mathematics learning experts, language experts, and practitioners or teachers. The results of the expert test concluded that KOBI is suitable for use in learning mathematics on the material of number operations for MTsN grade 7 students.

The purpose of writing this paper is to present the results of empirical testing on the use of KOBI in improving students' creative abilities and SRL (Societal Readiness Learning). The type of research conducted is a quasi-experiment with a two-group posttest design (Table 1).

Table 1. Design experiment

	Pretest	Using KOBI	Posttest
1st Exp	X	X	X
2nd Exp	X	X	X

Note:
1st Exp : Experiment at MTS N 7 Malang
2nd Exp : Experiment at MTS N Kota Batu

The data obtained in the study were used to test the hypothesis whether the use of KOBI in learning can improve students' creative thinking and SRL skills. Empirical testing was conducted on two target research locations. The target research locations were class 7 MTS N 7 Malang with 20 students and class 7 MTS N Kota Batu with 32 students. The determination of the two classes was carried out using a simple random sampling technique with the assumption that all class 7s in each school were homogeneous.

The research conducted in July-August 2024 was carried out with two face-to-face meetings for each research location. The first meeting was preparation and the second was implementation. The preparation stage aims to introduce students to the procedures for using KOBI media. While the second meeting is implementation, namely measuring creative thinking skills and SRL in learning both before and after using KOBI media.

Data collection was carried out by means of a creative ability test in the form of contextual mathematical problems related to integrated number operations consisting of 4 items. While students' SRL abilities were collected through a questionnaire with a total of 20 items. The instruments used in this study have also met the eligibility of the expert test of measurement and assessment of Education. The grid for both instruments is presented in Table 2 as follows:

Table 2. Rubric instrument; a) creative thinking test; b) SRL

a) Creative Thinking Test

Creative thinking Domain	Indicator
Fluency	Students are able to solve problems with the right answers easily
Fleksibility	Students are able to solve problems using several different ideas/methods, but have a single correct answer
Originality	Students are able to find solutions using unusual, new, and unique ideas
Elaboration	Students are able to solve problems with detailed explanations

Learning Outcomes	Learning Objectives	Components of creative thinking skills
At the end of phase D, students are able to solve contextual problems using the mathematical concepts and skills learned in this phase. They are able to efficiently operate integers, rational and irrational numbers, decimal numbers, whole numbers and roots.	B10. Perform arithmetic operations on integers	*Fluency*
	B12. Using arithmetic operations on integers and providing estimates in solving problems.	*Fleksibility* *Originality* *Elaboration*

b) SRL

Elements	Aspect	Description
Contributions	Contribute to the group	Participate in providing ideas; Play an active role in groups; Work together to solve problems; Work together to make decisions from each individual's perspective

Research techniques	Finding sources for problem solving	Searching for various sources of problems; Sharing information related to the case; Recording information
Working with others	Honor	Accepting criticism and suggestions; Appreciating and respecting other people's opinions; Asking for other people's opinions
	Caring attitude	Helping friends when they are in trouble; Guiding others

The collected data were analyzed using descriptive statistical techniques to show the average, lowest value, highest value, and percentage of students' creative thinking ability and SRL. Grouping of creative thinking ability and SRL levels was done using the Scoring rubric SBI (Ideal Standard Deviation). Meanwhile, testing the hypothesis whether KOBI media in learning can improve creative thinking ability and SRL was done using the non-parametric Mann Whitney test for 2 independent samples.

3. Results and Discussion

The testing of the KOBI media in the learning process was conducted twice at different locations. The data obtained from the KOBI media testing include the achievements in creative thinking skills and SRL, which are presented in Table 3 as follows:

Table 3. Research result

	$\bar{x}$ Pretest		$\bar{x}$ posttest	
	Creative Thinking	SRL	Creative Thinking	SRL
1st Exp	21.6	116	46.75	146
2nd Exp	23.44	107	75.78	133

The data in the table above can be concluded that both trial groups on the use of KOBI media experienced an increase in scores after using KOBI media in learning. In the first experimental group, students' creative abilities increased by 25.15, in the second experimental group, there was an increase of 52.34. The two groups, when compared, the increase in students' creative thinking abilities increased more in the second experimental group. The significant increase that occurred in both experiments indicates that the use of KOBI media in learning is effective in increasing students' creative abilities. This is supported by research [20] and [21] which states that the use of learning media can improve creative thinking ability.

However, the data in table 3 shows that in experimental group 2 which has a higher increase in creative thinking ability, the value of students' SRL ability is reversed. Students' SRL ability achieves a higher score and a higher change in improvement than the first experimental group. Data on the percentage of changes in creative thinking ability and SRL are presented in Table 4 as follows:

Table 4. Percentage Change in Ability

		1st Exp (%)	2nd Exp (%)
Creative Thinking	Increase	70	84.4
	Even	25	12.5
	Decrease	5	3.14
SRL	Increase	60.1	58
	Even	23.2	23.7
	Decrease	16.7	18.3

The data in table 4 shows that the use of KOBI media in learning provides changes in the form of increasing students' creative thinking and SRL abilities. However, this increase is still followed by a relatively small decrease in all aspects of ability.

Empirical testing does not stop at descriptive testing. But hypothesis testing is carried out to reaffirm that statistically the use of KOBI media has a positive impact on hypothesis testing. $H_o : \mu_1 =$

μ_2 dan $H_a : \mu_1 \neq \mu_2$. This test is meaningful if the test with a value less than the 95% significance level or if the sig value <0.05 then the null hypothesis is rejected with the meaning that the two test groups have significant differences in value. However, if otherwise then both groups have the same condition. The Mann Whitney test data is presented in table 5 as follows:

Table 5. Hypothesis Testing

Uji Mann Whitney		In group	Inter-group
Creative Thinking	1st exp	0.001	0.001
	2nd exp	0.000	
SRL	1st exp	0.001	0.001
	2nd exp	0.001	

Testing was conducted with Mann Whitney to answer the hypothesis. Based on the test results with a significance level of 95%, it can be stated that all tests meet the significance value <0.005. Thus, it can be concluded that there is a significant change, namely an increase in creative thinking skills and SRL after learning takes place using KOBI media.

5. Conclusion

The implementation of KOBI in the learning process has shown a significant positive impact on students' creative thinking abilities and Societal Readiness Learning (SRL). The data indicates that both experimental groups experienced notable improvements in their scores after utilizing KOBI, with the second experimental group demonstrating a higher increase in creative thinking skills compared to the first group. In summary, KOBI serves as an effective educational tool that enhances students' creative skill and societal readiness level, promoting a more engaging and collaborative learning experience. The findings support the continued exploration and integration of innovative learning media in educational practices.

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Physics Learning with Local Wisdom and STEM Approaches: Is It Effective in Increasing Students' Mathematical Representation in the Medeka Curriculum?

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Abstract

Research aims to develop a Physics E-book based on Andong Local wisdom to improve students' mathematical representation that meet the criteria of valid, practical, effective, and describe the profile of achivment mathematical representation. The type of research was Research and Development (R&D) with a randomized pretest-posttest control group design of three groups. The product and question item instruments were validated by two physics experts, and then an empirical, limited, and wide test was used with 396 students and 7 physics teachers in 3 senior high schools in Yogyakarta, Indonesia. The results revealed that: (a) Product was declared valid according to material experts and the media. The average validation score was 1.8 (Excellent) which exceeded the ideal score of 0.68, and the rater agreement score was 0.84 (strongly agreeable) by Cohen-Kappa, and 1 by CVR-CVI; b) The practicality of product according to teachers and students on a limited scale of 0.98 (very practical category) and 0.85 (very practical) with some improvements such as written language and the use of physics notation, then on a broad scale obtained a score of 100 (very practical) and 0.90 (very practical); (c) Product was effective in improving mathematical representation. Effect size score of 0.83 (very high category) for mathematical representation; and (d) The class that has applied product has the highest profile of students' mathematical representation.

1. Introduction

The rapid development of science and technology in the 21st century has made both of them the main focus today. This makes the physics teaching method develop significantly. Teaching methods that used to be teacher-centric must now shift to student-centered[1].Students are required to learn independently using all available learning resources, freely explore their knowledge, and teachers continue to guide them[2]. Therefore, the Indonesian government transforms the educational curriculum into a merdeka curriculum.

The goal of Indonesia's merdeka curriculum is to raise educational standards by promoting knowledge and education growth. This curriculum helps students to learn independently and produce a learning system that is student-centered, inclusive, adabtive and relevant[3–6]. This curriculum is an important step towards the transformation of Indonesia's education system. It is hoped that learning will become more meaningful and effective so that students have the ability to understand, convey, and represent information in various ways, which is called multi-representation ability.

Multi-representative abilities consist of verbal, graphic, vector, visual, and mathematical representations. The concept of physics has always been associated with mathematical representation[7–10]. The function of mathematical representations in physics are to bridge abstract concepts with the conditions of everyday life[11], Strengthen a deep understanding of concepts[12,13], minimizing the interpreter's confusion on the concept of physics[14]. This is also emphasized by Rahmasari & Kuswanto (2023) that the concept of physics presented will be much more concrete. However, not a few students still find it difficult to define mathematical equations in physics materials[15].

Work and energy are directed toward physics materials that enhance students' abilities in both mathematical representation[13,16]. Some students still experience misconceptions related to the concept of material in daily life[17], misconceptions in distinguishing between different concepts of energy, work, force, and power[18–24], so that it can disrupt an accurate understanding of work and energy materials[21,25–27].

In overcoming these misconceptions, educators can combine knowledge from local wisdom with physics. Both can improve and make it easier for students to understand a learning[28–30]. Of course, in a learning with local wisdom, the right approach is needed to be used. A growing trend in education is to combine STEM (Science, Technology, Engineering, and Mathematics) approaches with indigenous knowledge[31–38]. Physics encourages students to connect learning materials with real-world culture and

context. Physics learning is inseparable from mathematical representation. In this case, there is a need for E-book media with a STEM approach based on local wisdom. In addition to fostering a more equitable learning environment, educational materials that draw inspiration from the local culture can help students develop their mathematical representation skills. Andong transportation is one of the local wisdoms with which Yogyakarta students are most familiar. STEM learning activities based on local knowledge can provide students with new experiences. The e-book developed is an application program that can provide a fun learning process by prioritizing understanding of concepts. Thus, the purpose of this research is to produce and find out the practicality and effectiveness of physics e-books on the STEM approach based on local wisdom andong and the achievement profile of mathematical representation of high school students.

2. Literature Review

Merdeka Curriculum

Indonesia has a new educational curriculum called merdeka curriculum. This transformation to the curriculum brings a big change for Indonesia in the 21st century. The Merdeka Curriculum has become a fundamental educational innovation, emphasizing freedom of learning and the development of creativity[39]. This new curriculum can maximize the potential and learning outcomes of students in an interesting and direct learning experience [40]. The success of this curriculum can be seen in the pedagogic competence of students and the profession of a teacher in teaching[6,41]. However, there are not many references for professional teachers in implementing this merdeka curriculum, there are still many teachers who use conventional methods, making it difficult for students to understand learning

Mathematical Representation

Representation is the student's interpretation of the problem as a tool in finding solutions [42,43]. In addition, as a cognitive tool to communicate and carry out scientific reasoning [44,45]. So that it can be the ability possessed by a person to translate physical concepts into the form of mathematical formulas or equations whose purpose is to find solutions to problems. Physics learning uses mathematics as a model of phenomena and explains the relationships between variables and their functions[45–48]. Concepts in physics are also closely related to mathematics and are also the most widely used[43,49–52], because physics really needs mathematical equations in managing numerical data in an experiment. Mathematical equations are also often referred to as the language of physics. The indicators of mathematical representation used in this study are performing calculations with mathematical equations including entering known values into equations, writing down mathematical equations used correctly and accurately, performing mathematical calculation operations correctly and accurately, and interpreting facts into mathematical equations including writing down known and asked quantities in problems, associating problems into learning concepts [45,53–56]

E-book with STEM Approach

Physics e-book relates learning to natural phenomena. The presentation of the e-book is based on Fogarty (1991) with model models. This model emphasizes that students have several abilities, the researcher targets students to have the ability to represent mathematics and multidimensional concepts into one lesson, which in this case uses a STEM approach. The application of the STEM approach in the classroom seeks to improve the learning process and learning outcomes[57–61]. The e-book component contains an introduction, contents, a conclusion, a guide to conducting experiments and evaluations, interesting topics of discussion, multimedia content in support of display, and the text on the discussion material is displayed visually.

Andong Local Wisdom

The physics learning system based on local wisdom can make it easier for students to understand learning while passing on cultural values to them[62,63]. Indonesia has various kinds of local wisdom, one of which is Andong transportation. It is a traditional transportation of Yogyakarta and its surroundings such as solo and klaten[64]. It is one of the transportation icons because it has its uniqueness[65]. it uses horse propulsion to operate[66]. The specification has four wheels, namely two wheels at the front and two wheels at the rear, the size of the front wheels is smaller than the rear wheels[67]. The process of andong starting to move until it stops has to do with the concepts of business and energy, in this case the horse and the andong chariot are considered a unit or a system.

3. Research Method

The researcher used the ADDIE development model in this study. By adapting the design from Branch (2010) which consists of several stages, including Analyze, Design, Develop, Implement, and Evaluate (ADDIE). The quality criteria obtained in this study are validity, practicality, effectiveness and the profile of students' mathematical representation ability[69]. Wide-scale field test design using quasi-experimern with randomized pretest-posttest control group design as seen in Table 1.

Table 1. Randomized pretest-posttest control group design

Class	Pretest	Treatment	Posttest
Experiment 1	(O_1) Mathematical representation ability test	(X_1) Learning using physics e-books on a STEM approach based andong local wisdom	(O_2) Mathematical representation ability test
Experiment 2	(O_1) Mathematical representation ability test	(X_2) Learning using physics e-books integrated with andong local wisdom	(O_2) Mathematical representation ability test
Control	(O_1) Mathematical representation ability test	(X_3) Learning using physics books from the Ministry of Education and Culture on Merdeka Curriculum	(O_2) Mathematical representation ability test

The researchers used cluster sampling techniques to select participants for empirical tests, limited-scale tests and broad-scale tests. The empirical test used 288 students in three schools in the city of Yogyakarta. The limited scale test used 5 teachers and 36 students who had studied work and energy materials. The wide-scale test used 108 students who were divided into three classes at Senior High School in Yogyakarta. The instruments used for data collection were:

a. The physics ebook assessment sheet with a STEM approach based on andong local wisdom consists of an assessment table for content, materials, and technology. This was given to two validators who are physics education lecturers who are experts in the fields of physics, education, and technology.
b. The validation sheet for the mathematical representation question contains two scoring tables. The first table includes indicators for representation mathematical questions and the level of each item in the critical thinking aspect. Validators give a value between 1 and 3. Meanwhile, the second table assesses the content, construction, and language items. If these three aspects are met, the validator gives a checkmark, otherwise a cross if the aspect is not met
c. The mathematical representation ability test contains work and energy materials with a STEM approach based on andong local wisdom. There are 8 essay questions using an indoctor synthesized from indicators of mathematical representation ability from several experts, which can be seen in the literature review. For the cognitive level using the C4 level in the Merdeka Curriculum
d. Practicality questionnaire physics ebook with a STEM approach based on andong local wisdom for 7 teachers and 36 students. The researcher adapted the method of Ofianto et al. (2023) in conducting tests and analysis of the practicality assessment of physics e-books, namely by providing assessment sheets to teachers and students to see the responses to the physics e-books developed. This questionnaire contains 20 statements, seven items about the material, four items on language, four items about appearance, two items on the characteristics of the e-book and three items about application operation.
e. Learning implementation sheets filled out by physics teachers at the research site. The goal is to find out the percentage of learning implementation carried out in experimental and control classes. The results are reinforcing and supporting evidence of the quality results of effectiveness obtained in large-scale trials. The reference is the design of learning activities.

After all the data was collected using the above data instruments, the researcher continued to analyze the data using the following techniques:

a. The Validity of Product

The validated products are e-book physics on STEM approaches based on andong local wisdom and mathematical representation skills. The validation value is calculated using the average, ideal score and KAPPA coefficient to determine the agreement between raters with a focus on their reliable value, then categorized based on Table 2[70].

Table 2. Ideal score criteria

Score	Category
$X > \overline{X}_i + 1,8SB_i$	Excellent
$\overline{X}_i + 0,6SB_i < X \leq \overline{X}_i + 1,8SB_i$	Good
$\overline{X}_i - 0,6SB_i < X \leq \overline{X}_i + 0,6SB_i$	Enough
$\overline{X}_i - 1,8SB_i < X \leq \overline{X}_i - 0,6SB_i$	Less
$X \leq \overline{X}_i - 1,8SB_i$	Very Less

Note:

$$\overline{X}_i = \frac{1}{2}(skor\ tertinggi\ ideal + skor\ terendah\ ideal) \quad \text{i)}$$

$$SB_i = \frac{1}{6}(skor\ tertinggi\ ideal - skor\ terendah\ ideal) \quad \text{ii)}$$

The calculation of the kappa coefficient using Equation iii) and the criteria of the kappa coefficient can be seen in Table 3[71]

$$k = \frac{p_o - p_e}{1 - p_e} \quad \text{iii)}$$

Table 3. Cohen's Kappa criteria

Score	Category
$k < 0,40$	Disagree
$0,40 < k < 0,75$	Agree
$k > 0,75$	Strongly agree

The validity results for the question items were strengthened by analysis using the Content Validity Ratio (CVR) and Content Validity Index (CVI)[72]. CVR is a method of measuring the feasibility of the content of a product by considering an agreement between raters or appraisers, which is then followed by the calculation of the CVI value[73]. The determination of the number of raters refers to Guilford & Fruchter (1978), namely the assessment with CVR and CVI is carried out by 2 experts, so the criteria or categories of validity quality can be seen in Table 4.

Table 4. CVR and CVI criteria

Score	Category
$0,80 < (CVI)(CVR) \leq 1,00$	Very High
$0,60 < (CVI)(CVR) \leq 0,80$	Tall
$0,40 < (CVI)(CVR) \leq 0,60$	Enough

$$\frac{0,20 < (CVI)(CVR) \leq 0,40 \quad \text{Less}}{0,00 < (CVI)(CVR) \leq 0,20 \quad \text{Low}}$$

The calculation of CVR and CVI can be seen in Equation iv) and v)[72]

$$CVR = \frac{n_e - N/2}{N/2} = 2\frac{n_e}{N} - 1 \qquad \text{iv)}$$

$$CVI = \frac{\sum CVR}{n} \qquad \text{v)}$$

Note:
n_e = Number of assessors who give essential responses to items
N = Rates
n = Many questions

After being declared valid in the previous test, the question instrument must be continued with an empirical test to find out the fit, reliability and difficulty level of the developed question items. The assessment criteria refer to the Item Response Theory (IRT) with the rasch analysis model[75]. The reliability of question items using Cronbach Alpha (Kr20) which criteria can be seen in Table 5 and the results of the difficulty level of the question items can be seen on the wright map using data analysis software.

Table 5. Cronbach Alpha (Kr20) criteria

Score	Category
<0,50	Very Not Good
0,50-0,60	Bad
0,61-0,70	Enough
0,71-0,80	Good
>0,80	Excellent

b. The Practicality of Product

The calculation of the practicality of the physics e-book Equation vi) and the criteria for the practicality score can be seen in Table 6 [71].

$$Skor\ Kepraktisan = \frac{Skor\ yang\ diberikan\ penilai}{Skor\ maksimum} x\ 100\% \qquad \text{vi)}$$

Table 6. Practicality score criteria

Score	Category
$0 < x \leq 20$	Impractical
$20 < x \leq 40$	Less Practical
$40 < x \leq 60$	Quite Practical
$60 < x \leq 80$	Practical
$80 < x \leq 100$	Very Practical

c. The Effectiveness of Product

The researcher used the ANOVA Test on a wide scale. Before conducting this test, there are prerequisite tests that are carried out first[76], including normality and homogeneity test. Finally, carry out an effect size test. This analysis is seen based on the results of Partial Eta Squared. The resulting criteria can be seen in Table 7.

Table 7. Effect size score criteria

Score	Category
$0{,}00 \leq ES < 0{,}20$	Very small effect
$0{,}20 \leq ES < 0{,}50$	Little effect
$0{,}50 \leq ES < 0{,}80$	Medium effect
$0{,}80 \leq ES < 1{,}30$	High effect
$1{,}30 \leq ES$	Very high effect

4. Result and Discussion

Analysis, Design, and Develop Stage

The physics e-book based on andong local wisdom with STEM approach is designed to still refer to the provisions of the Merdeka Curriculum. The components of the e-book consist of instructions for using it, introduction (learning outcomes, learning objectives, and concept maps), learning topics along with worksheets for experiments, practice questions, bibliography, and developer profiles. The display is sahown in Figure 1 and the analysis of the feasibility of the product by the experts is shown in Table 8.



Figure 1. Display of physics e-book based on andong local wisdom with STEM approach

Table 8. Physics e-book validation results

Component	Cohen's Kappa	CVR	CVI	Component	Cohen's Kappa	CVR	CVI
Cover	0.84	0	0.5	There are topics of work and energy	0.84	1	1
Instructions for use				There is a work topic such as energy change			

Component	Cohen's Kappa	CVR	CVI	Component	Cohen's Kappa	CVR	CVI
Achievement learning		0	0.5	There is a topic of the law of conservation of energy			
Goals learning		1	1	Energy worksheet			
Concept map		1	1	Work and energy worksheets			
Materials		1	1	Energy conservation law worksheet			
Worksheets		1	1	STEM approach parameters			
Example of problem		1	1	Contains the integration of andong local wisdom			
Exercises		1	1	Discovery learning syntax			
Bibliography		1	1	E-book is easy of use			
Developer profile		0	0.5	Presentation, layout, language			
Validator Decision: Worthy of Revision							

Based on the results of the calculation analysis with Cohen's Kappa, the result was 0.84 with the category of strongly agreeing. This means that the value of each rater of the agreement strongly agrees with the feasibility of the physics e-book. Then continued with the ideal score shown in Table 9.

Table 9. Effect size score criteria

Average	Ideal Score				Ideal Score Interval	Category
	Ideal Score Maximum	Ideal Score Minimum	X_i	SB_i		
1,8	1	0	0,5	0,1	$rerata > \overline{X}_i + 1,8SB_i$ $1,8 > 0,68$	Excellent

The researcher continued by looking at the results of the analysis using CVR and CVI in Table 8 to obtain the feasibility quality of the physics e-book in terms of construction and content, which is declared valid or feasible. There are two validity criteria that are very high and medium. The valid criteria are found in the assessment component cover, achievement learning, and developer profile. Meanwhile, in addition to these items, the valid criteria are very high. According to Guilford & Fruchter (1978) and reviewed by McLean (1979) said that even if the validity of the product developed is at the moderate valid criterion, the product can still be said to be valid. The same thing is done to find out the validation of the instrument about the ability to make mathematical representations. The validation results obtained a result of 1 for the value of the Cohen's Kappa, ideal score, CVR, and CVI with the category very high. Testing for mathematical representation problem instruments is followed by empirical tests. The results are shown in Table 10.

Table 10. Results of empirical test analysis of mathematical representations

Indicator	Question	*MNSQ*	*ZSTD*	*PT. Measure Corr.*	Status	*Logit/ Measure*	*Difficulty Level*
Incorporating known values in work and enegry problems into mathematical equations	1	1.11	1.2	0.67	Fit	0.92	Very difficult
Perform mathematical calculation operations correctly and accurately related to work and energy	2	0.67	-4.3	0.75	Fit	0.06	Difficult
Write down the mathematical equations used correctly and accurately related to the	3	0.95	-0.6	0.78	Fit	0.08	Very difficult

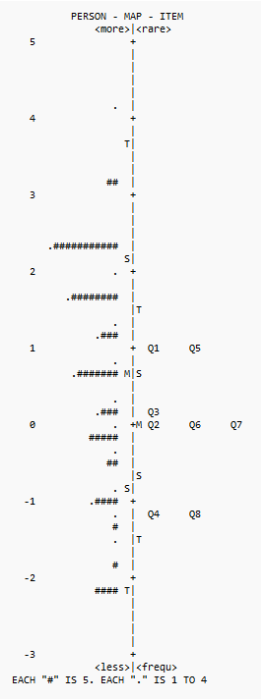
Indicator	Question	*MNSQ*	*ZSTD*	*PT. Measure Corr.*	Status	*Logit/ Measure*	*Difficulty Level*
law of conservation of energy							
Write down the quantities that are known and asked in the questions about energy	4	1.34	3.7	0.73	Fit	-1.10	Easy
Linking the problem of andong moving on an inclined trajectory to the concept of energy learning	5	0.86	-1.6	0.73	Fit	1.01	Very difficult
Linking the problem of andong moving on an inclined trajectory into the concept of potential energy learning	6	0.67	-4.4	0.75	Fit	0.06	Difficult
Linking the problem of andong moving on an inclined trajectory into the concept of mechanical energy learning	7	0.98	-0.2	0.78	Fit	0.06	Difficult
Linking the problem of andong moving on an inclined trajectory into the concept of work learning	8	1.34	3.7	0.73	Fit	-1.10	Easy

Based on Table 10, the researcher gave a blue mark for the question items that fit in each criterion. According to Boone et al. (2014), the question items are said to be fit based on three indicators, including Outfit Mean Square (MNSQ), Outfit Outfit Z-Standard (ZSTD), and Outfit PT. Measure Corr. The question item is said to be fit on the MNSQ Outfit if it gets a score in the range of 0.5 to 1.5. ZSTD in the score range of -2 to 2. Meanwhile, Outfit PT. Measure Corr., from 0.40 to 0.85. Based on these three indicators, the question item will be concluded to be fit if one of the 3 indicators has been met, so it can be concluded that all questions about the ability of mathematical representation are declared fit and are advanced to the stage of reliability and difficulty level of the question item. The results of the reliability of the mathematical representation question shown in Figure 2a and 2b

```
TABLE 3.1 REKAPAN UJI EMPIRIS REPRESENTASI MATEM ZOU399WS.TXT  Jan  9 17:27 2
INPUT: 288 PERSON  8 ITEM  REPORTED: 288 PERSON  8 ITEM  5 CATS    WINSTEPS 3
-------------------------------------------------------------------------------

     SUMMARY OF 288 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                        MODEL          INFIT        OUTFIT
|          SCORE     COUNT     MEASURE   ERROR      MNSQ   ZSTD   MNSQ   ZSTD
|-----------------------------------------------------------------------------
| MEAN      19.5       8.0         .72     .52       .95    -.4    .99    -.4
| S.D.       6.3         .0        1.48     .07       .97    1.7   1.08    1.8
| MAX.      30.0       8.0        4.24     .82      6.30    5.3   7.94    6.6
| MIN.       6.0       8.0       -2.24     .43       .12   -2.9    .12   -2.7
|-----------------------------------------------------------------------------
| REAL RMSE    .59 TRUE SD    1.36  SEPARATION  2.30  PERSON RELIABILITY  .84
|MODEL RMSE    .52 TRUE SD    1.39  SEPARATION  2.64  PERSON RELIABILITY  .87
| S.E. OF PERSON MEAN = .09
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .89
```

(a)

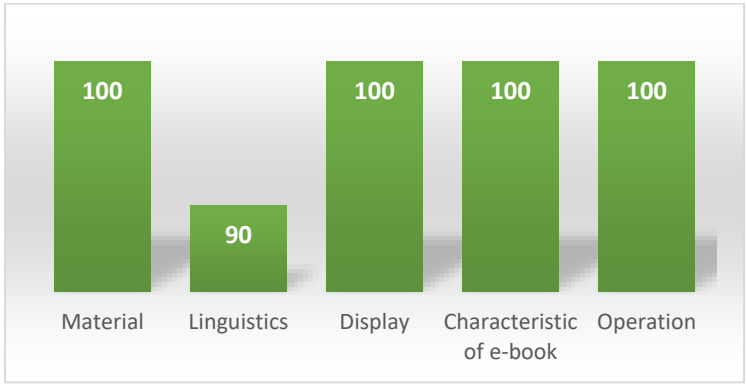


(b)

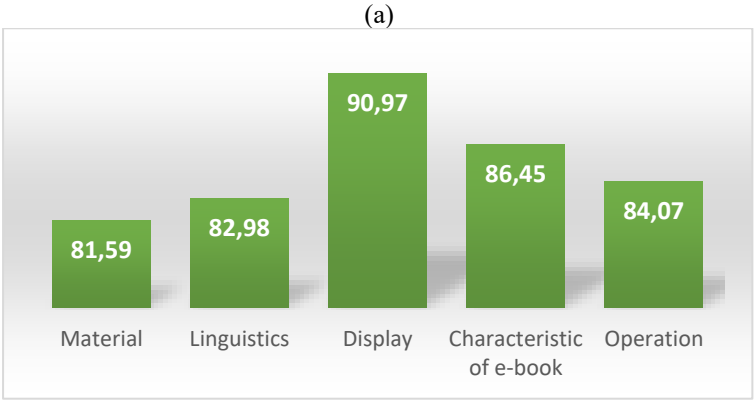
Figure 2. (a) The results of the reliability of the mathematical representation question; (b) Results of wright map of mathematical representation question item difficulty

Based on Figure 2a, the reliability result of Cronbach Alpha (Kr20) was 0.89, which is in the very good category. This means that the question instruments developed are declared reliable. Furthermore, the researcher also looked at the level of difficulty of the question items using the results of the wright map. Based on Figure 2b, the logit or measure value is in the range of 5 to -3. Question items 1, 3 and 5 as very difficult questions are scored in the range of 0-1, questions 2, 6, and 7 are in line with the score of 0, questions 4 and 8 are in the range of -1 to -2. If the student's position is below the question item number, it means that the student has not been able to answer the question, but if the student's position is above or parallel to the question item number, it means that the student is able to answer the question below him or parallel to it. If the question items are scattered still within the range of logical values listed in the output, then the question is said to be suitable for use, even though it is in a very difficult and easy criterion [75,78–80]. Person shows the distribution of students who answer questions, and items show the distribution of question items[75,78,80]. The order of question items from the top to the end shows very difficult questions to easy questions[79]. In addition, the interpretation of the difficulty level can also be seen in the Table 10.

Finally, a limited-scale test was conducted. This test determines the response of teachers and students to physics e-books created before being used in large-scale tests. This test produces the practicality value of the e-book on a limited scale. The results of the practicality test by teachers were found that teachers 1, 2, 4, and 5 gave a 100% assessment, and teacher 3 gave a score of 90%. Overall, the final score given by the teacher to the physics e-book obtained a score of 98%, which in this case is in the very practical categoryThe researcher also looked at the practicality of the e-book more comprehensively by considering the practicality of each aspect shown in Figure 3a and the perspective of the students shown in Figure 3b.



(a)



(b)

Figure 3. (a) Results of practicality by teachers in every aspect; (b) Results of practicality by students in every aspect

Based on the results of the practicality percentage and Figure 3a the results of practicality did not get a 100% score because there was still writing that was not in accordance with the rules, for example giving a period at the end of a sentence and in the e-book using clear and communicative sentences. Based on the input from the teacher, the researcher used it as material to be revised. If the total score and average of these five aspects were calculated, a result of 98% is obtained by being in the very good category. The researcher also looked at the results of practicality by the students and obtained an overall score on each aspect as shown in Figure 3a. The total and average value of the five aspects was obtained by 85.41%, which means that it is in the very practical category.

The assessment of practicality by teachers and students received very practical scores, but the researcher still considered the suggestions that had been given by teachers and students. The next step is for the researcher to revise the physics e-book to make it better. After the revision, the physics e-book can be implemented on a wide scale and tested for its effectiveness.

Implement Stage

Effectiveness testing consists of various stages, including the Mixed Design ANOVA and effect size. Before that, two prerequisite tests must be met, includingmn ormal distributed data shown in Table 11, and homogeneous distributed data shown in Table 12.

Table 11. Normality Test Results

Variable		Class	*Shapiro Wilk* *Sig.*
Mathematical Representation	Pretest	Experiment Class 1	0,13
		Experiment Class 2	0,10
		Control Class	0,50
	Posttest	Experiment Class 1	0,53
		Experiment Class 2	0,70
		Control Class	0,09

Table 12. Homogeneity Test Results

Box's M	F	df1	df2	Sig.
18,25	0,86	20	39574,87	0,63

Based on Table 11, the sig value is ≥ 0.05, so it can be said that the data is distributed normally. Box's M analysis shows a sig > 0.05, meaning there is similarity in the variance of the mathematical representation variable or the data homogeneous. Because the requirements of normality and homogeneity are met, the results of the Mixed Design ANOVA as shown in Table 13.

Table 13. The Output of Mixed Design ANOVA

Mauchly's Test of Sphericity				
Within Subject Effects	Mauchly's W	df		Sig
Time	1.000	0		.
Test of Within-Subject Effects				
Source		df	F	Sig
Time	Sphericity Assumed	1	6685.512	.000
	Greenhouse-Geisser	1.000	6685.512	.000
Time*group	Sphericity Assumed	1	75.726	.000
	Greenhouse-Geisser	1.000	75.726	.000
Tests of Between-Subject Effects				
Source	Mean Square	df	Sig	Partial Eta Square
Group	420.526	2	.000	0.83
Pairwise Comparisons				
(I) Time	(J) Time	Mean difference (I-J)		Sig
Pretest	Posttest	-16.573*		.000
Postest	Pretest	16.573*		.000
Multiple Comparisons				
(I) Time	(J) Time	Mean difference (I-J)		Sig
Experiment Class 1	Control Class	4,354		0,000

	Experiment Class 2	6,661	0,000
Experiment Class 2	Experiment Class 1	-4,354	0,000
	Control Class	2,306	1,000
Control Class	Experiment Class 2	-6,661	0,000
	Experiment Class 1	-2,30	1,000

The value of sig on the Mauchly's Test of Sphericity is not provided in Table 13. The pretest and posttest are the only two levels of measurement, which accounts for this outcome. Due to this outcome, there is only one set of difference scores and no means of determining whether there has been a sphericity breach. But sig it can be presumed <.005, indicating that sphericity is not satisfied. Thus, the Greenhouse-Geisser value from the Within-Subject Effects Tests serves as the reference for interpreting the results. The box time explained the variation in time because a sig of less than .001 suggests that mathematical representation abilities vary over time in the entire sample (F(1.131) = 6685.512, sig <.001). The Time*group box explained the interaction. The F value is significant because sig < .001 indicates that the changes in mathematical representation over time are not equivalent across the three groups. In the test of between-subjects effects, the sig < 0.05, so it can be concluded that there is a significant difference in pretest and posttest scores. To strengthen the results of previous tests, the researcher conducted a pairwise comparison test, which aimed to compare the effectiveness of the influence of each type of treatment used on the research variables in the experimental class 1, experimental class 2, and control classes. The mathematical representation in the class given the physics E-book treatment on the STEM approach based on andong local wisdom also had a more significant improvement difference. In the class that used the Andong Local Wisdom Integrated Physics E-book treatment, it was stated that there was no significant difference in improvement with the physics book from the Ministry of Education and Culture, this was shown by a significance value of >0.05, which was 1,000. The same thing happened in the classroom with the treatment of physics books from the Ministry of Education and Culture to the Andong Local Wisdom Integrated Physics E-book. Therefore, the value of mathematical representation with physics E-book treatment on the STEM approach based on andong local wisdom has a significant increase. The significance value of the difference in mathematical representation caused by each treatment that has been given, is strengthened again by the Multiple Comparisons test. The results of the mathematical representation ability obtained a sig value in experimental class 1 compared to experimental class 2 of 0.000 (0.000 < 0.05), which shows that the critical thinking ability in experimental class 1 is significantly different from experimental class 2, as well as the control class. Therefore, it is known that the order of comparison of the increases, namely the experimental class 1 > the experimental class 2 > the control class.

The gradient of students' mathematical representation ability in each treatment can be seen in the form of an estimated marginal means of measure graph. This graph shows the increase from time 1 (pretest) to time 2 (posttest). The image of the estimated marginal means of measure results is shown in Figure 4.

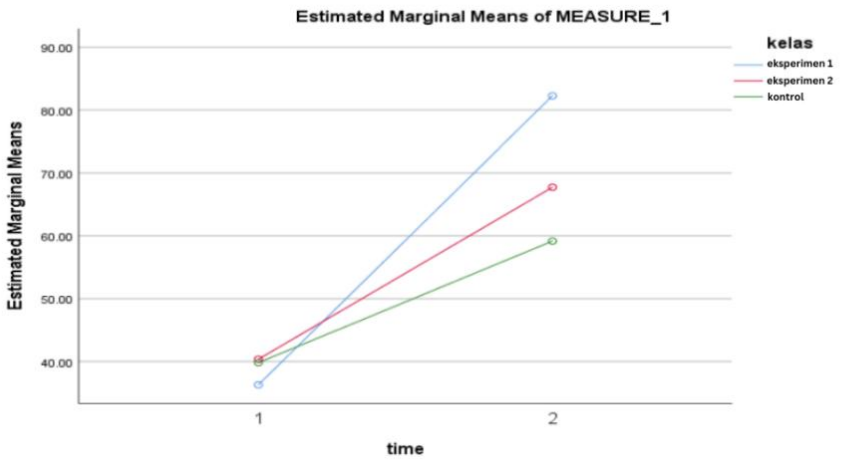


Figure 4. Results of Estimated Marginal Means of Measure

Figure 4 also shows that the blue line (experimental class 1) has experienced a very sharp increase compared to the red line (experimental class 2) and green (control), so that the mathematical representation of the class using the physics e-book on the STEM approach based on andong local wisdom has experienced a sharper increase compared to the other two treatments. The researcher then conducted an additional test with an effect size test by looking at the partial value of eta squared.

The results of the effect size test obtained a partial eta squared score on the results of the tests of between-subjects effects got a score of 0.83 included in the high effect category, if the percentage is 83%, so it can be concluded that the physics e-book on the STEM approach based on anodng local wisdom has a high effect of 83% for the mathematical representation of high school students. The remaining 17% did not have any effect on students because there were external factors that could not be controlled by researchers. This will certainly affect the learning outcomes of students' representation skills[81]. In this case, the external factor that can be known by the researcher is that there are some students who cannot participate in classroom learning, because they have responsibilities in the organization at the Student Council. so the learning schedule collided with the student council meeting at school.

The researcher also sought to find out the achievement profile of students' mathematical representation abilities as well. The results of the achievement of mathematical representation ability of student ability are shown in Figure 5.

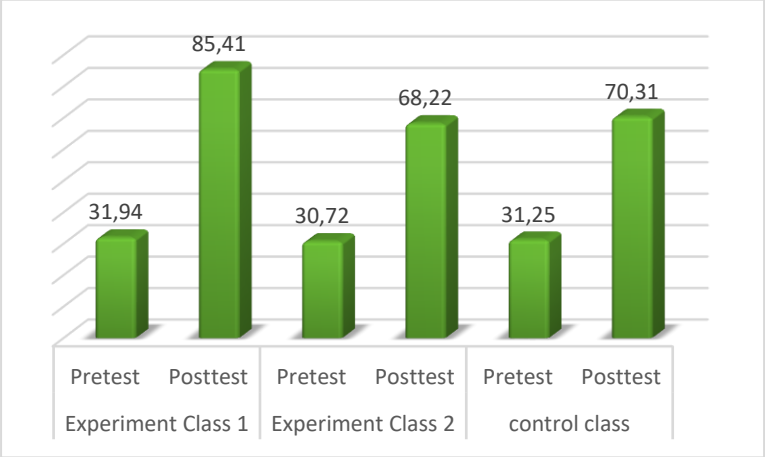


Figure 5. Results of the achievement of mathematical representation ability of students

The researcher also analyzed the improvement of mathematical representation ability based on each developed indicator shown in the Table 14.

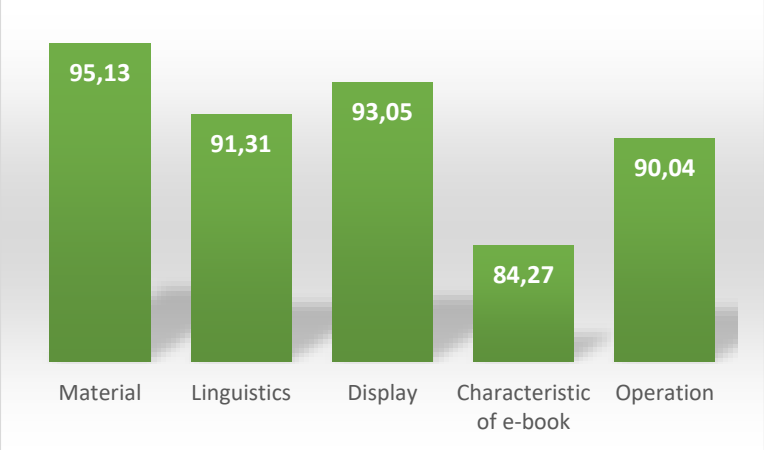
Table 14. Results of Improvement of Each Metric Representation Indicator

Class	Question Type	Question item	Average
Experiment class 1	Pretest	1	1,47
		2	1,41
		3	1,16
		4	1,05
	Posttest	1	3,50
		2	3,33
		3	3,44
		4	3,38
Experiment class 2	Pretest	1	1,41
		2	1,08
		3	1,25
		4	1,16
	Posttest	1	2,88
		2	2,83
		3	2,86

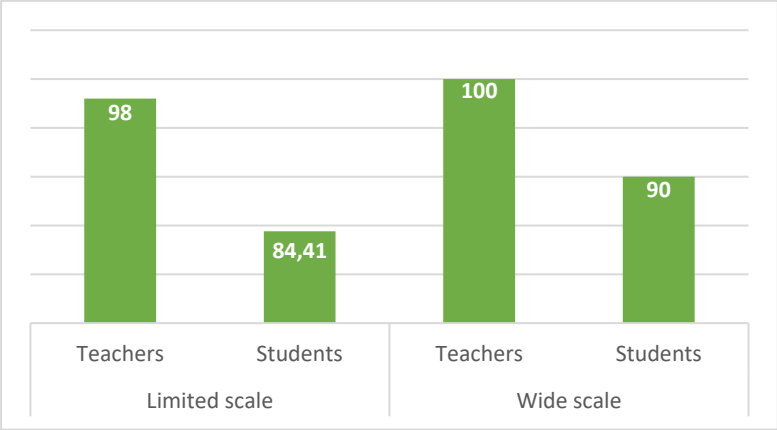
		4	2,33
Control class	Pretest	1	1,36
		2	1,19
		3	1,22
		4	1,22
	Posttest	1	2,86
		2	3,02
		3	2,94
		4	2,41

Based on Table 14, it can be seen that each indicator between the pretest and posttest questions has increased. The blue color in the table shows the indicator of the question that has experienced the greatest improvement in each class. Experimental classes 1 and 2 experienced an increase in problems 1 and 3 with indicators of calculating with mathematical equations, in contrast to the control class, which experienced an increase in problem number 2 (interpreting facts into mathematical equations). This means that experimental classes 1 and 2 have been able to perform calculations with mathematical equations and need more sharpening to have indicators of interpreting facts into mathematical equations, according to Ureña et al. (2024) this can be done by increasing the practice of questions by interpreting facts into mathematical equations, then students' abilities will be more honed and accustomed to working on these problems. Inversely proportional to the control class, it requires reinforcement for the indicator to perform calculations with mathematical equations. The highest average size was found in experimental class 1 by applying physics e-books to the STEM approach based on andong local wisdom, which was 3.50 and 3.44.

Finally, the researcher conducted a practicality test on a wide scale. It was found that the teacher gave a 100% assessment which means the teacher gave a perfect assessment, but one of the teachers gave a suggestion for a STEM-based physics e-book, namely by adding sample questions and the researcher followed up by adding several more sample questions. The researcher also looked at the students' responses, over all in each aspect 95.13% with the category of very practical for the material aspect, 91.31% with the category of very practical for the linguistic aspect, 93.05% with the category of very practical for the display aspect, 84.27% with the category of very practical for the characteristic aspect of the e-book and 90.04% with the category of very practical for the operational aspect, for more conciseness can be seen in Figure 6a.



(a) Practical results by students in every aspect of the wide-scale test



(b) Improvement of practicality results of physics e-book

Figure 6. Practicality Test Results of the STEM-Based Physics E-Book Across Various Aspects

Based on the results of the analysis of practicality on a limited scale and a wide scale, the practicality in the wide-scale test has increased, this can be seen in Figure 6b. The increase obtained in the wide-scale test was 2% of the teacher's assessment and 5.59% of the student's assessment.

Evaluate Stage

At the evaluation stage, conduct an analysis of the implementation of learning. The goal is to evaluate the activities from the beginning to the end that have been carried out and find out how much learning has been carried out during the research. The results of the assessment of learning implementation in each class are shown in Table 15.

Table 15. Results of Learning Implementation Assessment

Class	Meeting	Percentage of Implementation	Average
Experiment Class 1	Meeting 1	96,55%	94,08%
	Meeting 2	90,47%	
	Meeting 3	95,23%	
Experiment Class 1	Meeting 1	88,00%	88,98%
	Meeting 2	84,21%	
	Meeting 3	94,73%	
Control Class	Meeting 1	96,00%	95,49%
	Meeting 2	95,23%	
	Meeting 3	95,23%	

Table 14 shows the average learning implementation in each class. Each class did not achieve a score of 100% because the researcher did not carry out learning activities such as not doing attendance, not explaining the learning mechanism, and not carrying out learning reflection.

The results of these findings are in accordance with previous relevant research studies which state that a STEM-based product and integrated with local wisdom is considered to be significantly more effective in improving students' abilities, especially mathematical representation [83–87]. These results are also supported and based on findings on the background and previous literature reviews that have explained that physics learning in STEM based on local wisdom can increase the contextuality, innovation and up-to-date learning. In addition, the physics e-book on the STEM approach based on andong local wisdom is also suitable to be applied to the merdeka curriculum. Learning using this e-book is designed contextually, student-centered, and in accordance with the needs of students and teachers, as the independent curriculum requires learning to be student-centered. All of these things can improve students' learning ability[2,88,89]. Li et al. (2024) also said in their meta-analysis research, revealing that student-centered learning can improve students' academics, as evidenced by education in 2010-2020, which applied it to have a significant effect.

Based on the above discussion and the results of the analysis of statistical tests on a wide-scale test, the researcher concluded that in each class there was a significant difference in the mathematical representation ability of students. Of the three types of treatments, by referring to the results of students' ability achievements and statistical analysis, the physics e-book on the STEM approach based on andong local wisdom is considered the most effective and has a significant effect on improving students' mathematical representation ability compared to the two treatments given. On the other hand, if you compare the effectiveness of the treatment given in the experimental class 2 and the control, The improvement results in the control class were greater than in the experimental class 2. The control class was given a physics book treatment from the Ministry of Education and Culture, an merdeka curriculum with the help of PheT Simulation, while the experimental class 2 was given a physics e-book treatment integrated with andong local wisdom without the help of a virtual lab. The researcher conducted a literature review to find out the cause of the control class having a greater increase than the experimental class 2. It turns out that the control class has increased even more because the class is assisted by PheT simulation. This is in accordance with the results of research conducted by Banda & Nzabahimana (2023) and Ng & Chua (2023) that learning using PheT Simulation can improve student learning outcomes.

5. Conclusion

The development of content, worksheets, and e-books from the STEM approach based on Andong local wisdom is included in the right category for work and energy learning. Mathematical representation items met valid and reliable criteria for use as pretest and posttest instruments. The average mathematical representation ability score increased significantly from pretest to posttest for all students. However, the increase in the average score was not the same in every class. The experimental class 1 used the physics e-books on a STEM approach based andong local wisdom had significantly higher mathematical representation than the experiment 2 used and the physics e-books integrated with andong local wisdom and the control class used the physics books from the Ministry of Education and Culture on the Merdeka Curriculum. Factors that contribute to these differences include STEM approaches, andong local wisdom, the use of media to convey knowledge, contextual learning according to student experience, student-centered learning, and referring to the independent curriculum.

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New Dimensions for Studying Computational Thinking (CT)

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Abstract

Computational Thinking (CT) is increasingly recognized as a crucial skill set in the digital age, encompassing problem-solving techniques that are applicable across various disciplines. This study introduces a new framework for evaluating CT skills, focusing on four key dimensions: CT Content, CT Concept Learning Tools, CT Perspective, and CT Practice. A comprehensive assessment tool was developed and validated using Aiken's V, a content validity coefficient, to ensure the relevance and effectiveness of the items within each dimension. The study involved 150 colleges and five experts. The results were analyzed to determine the reliability and validity of the assessment tools. The CT Content dimension assessed colleges' understanding of fundamental CT aspects related to learning topic studied, while the CT Concept Learning Tools dimension evaluated their proficiency with educational tools used to teach CT. The CT Perspective dimension measured colleges' attitudes toward CT and its relevance to their future careers, and the CT Practice dimension focused on colleges' ability to apply CT in practical scenarios. Aiken's V values for all items exceeded 0.70, indicating high content validity. The results demonstrated that the developed assessment tool is a reliable and valid measure of colleges' CT skills across all four dimensions. This study contributes to the growing body of research on CT for evaluating and enhancing CT skills among colleges.

Keywords: CT, concept, content, dimensions, perspective, practice

1. Introduction

The integration of Computational Thinking (CT) in education has become a vital skill, essential not just for computer scientists but for people in diverse fields. The concept gained prominence through [1] who characterized it as a problem-solving approach involving abstraction, algorithmic thinking, and automation. Wing's work underscored the critical importance of CT in our increasingly digital world.

Since then, the inclusion of CT in education, particularly from K-12, has seen significant growth. [2], [3] highlight that CT involves a variety of cognitive processes such as logical reasoning, pattern recognition, and decomposition skills that extend far beyond computer science. This recognition has driven efforts to integrate CT into broader educational curricula, acknowledging its potential to enhance problem-solving abilities and prepare colleges for a future where digital literacy is as essential as traditional literacy.

[4] offered a framework for studying and assessing CT, which includes three key dimensions: computational concepts, computational practices, and computational perspectives. Their contributions have significantly influenced the way educators and researchers approach the teaching and evaluation of CT skills.

This framework has been further developed in numerous studies, including those by Shute et al. (2017), who detailed the core components of CT necessary for colleges to master this skill set. The growing research on CT has also focused on its application in teacher education. [6], [7] argue that for CT to be successfully integrated into classrooms, teachers need adequate preparation in both the knowledge and pedagogical strategies necessary to teach these concepts. [8], [9]also discuss the challenges and opportunities in formulating a comprehensive definition of CT that can be effectively applied in educational settings.

Despite advancements in promoting and understanding CT, challenges remain. [10] emphasize the need for further research into the most effective methods for teaching CT, particularly through programming or simple coding, as seen in accessible platforms like Scratch. Moreover, the [11] points to the need for a more detailed understanding of the scope and nature of CT, suggesting that future research should explore how these skills can be integrated across various subjects and educational levels. Therefore, this study aims to develop a new dimension of computational skills by analyzing

relevant literature and then testing the designed dimensions with the input of experts, lecturers, and colleges to ensure their applicability across multidisciplinary subjects.

2. Method

Research Design

This study employed a quantitative research design to develop and validate an assessment tool for evaluating CT skills. The tool was designed to measure four key dimensions of CT namely CT Content, CT Concept Learning Tools, CT Perspective, and CT Practice. Aiken's V, a statistical measure for content validity, was used to validate the items within each dimension. Subsequently, the learning instrument for each computational thinking dimension was tested with 100 colleges.

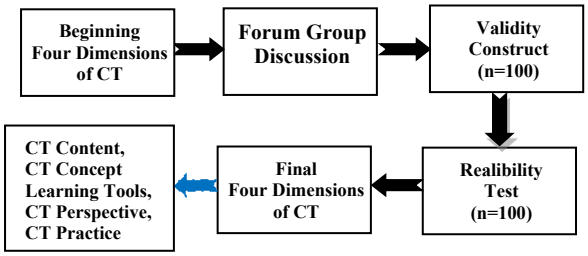


Figure 1. Research Design

Participants

The study involved five expert judgements, four lecturers and one hundred colleges of biology education study program. The participants were selected using a stratified random sampling method to ensure representation from different levels of prior experience with computing and programming. The age range of the participants was between 18 - 20 years which distributed in semester 3-5.

Instrument Development

The assessment tool comprised multiple-choice and essay questions for CT Content; multiple-choice questions for unplugged CT Concepts; digital learning product assessments for plugged CT Concepts; closed questionnaires for CT Perspectives; and open questionnaires and observation sheets for evaluating CT Practice. The items were developed based on a thorough review of literature on computational thinking research, including works by [4], [8], [9], [12], and [13], [14], and were reviewed by a panel of experts**,** lecturer and tested to colleges in order to ensure their relevance and clarity.

Aiken's V Analysis

Aiken's V was used to assess the content validity of the items within each dimension. This involved having a panel of experts rate the relevance of each item on a scale of 1 to 4, with 1 being "not relevant" and 4 being "highly relevant." Aiken's V values were then calculated for each item, with values greater than 0.70 indicating satisfactory content validity.

Reliability Analysis

To verify the reliability of the assessment tool, Cronbach’s alpha was calculated for each dimension. A Cronbach's alpha value of 0.70 or above was deemed acceptable for assessing internal consistency.

Data Collection

The data collection process took place over two months. Participants completed the assessment tool

in a controlled setting, where their responses were systematically recorded and analyzed. Additionally, observations were made during practical problem-solving activities to assess the CT Practice dimension. The study did not require ethical review and approval for human participants, as it

complied with local legislation and institutional guidelines. Written informed consent was obtained from the participants' legal guardians or next of kin.

Data Analysis

The gathered data were analyzed using descriptive statistics, validity, and reliability analysis. Validity and reliability were employed to confirm the structure of the assessment tool, while Aiken's V provided insights into the content validity of the items.

3. Results and Discussion

3.1. Results

Validator Assessment

In this study, the validity of the instruments was enhanced through a panel of experts who reviewed the items. The assessment tool was reviewed by a panel (forum group discussion) of five experts in CT and educational assessment from different institution. The experts evaluated each item for clarity, relevance, and alignment with the theoretical constructs of CT which analysed by Aiken's V. The overall feedback from the validators indicated that the items were well-constructed and appropriate for measuring the intended dimensions of CT. Their feedback helps to refine the instruments, ensuring the questions are not only relevant but also comprehensive in capturing the depth of CT dimensions. Minor revisions were made to a few items based on the experts' suggestions, particularly in the CT Content and CT Perspective dimensions.

Aiken's V analysis was conducted to quantify the content validity of the items. The results showed that all items across the four dimensions had Aiken's V values above 0.70, indicating strong content validity. The highest mean Aiken's V was observed in the CT Perspective dimension (0.93), while the lowest was in the unplugged CT Concept dimension (0.87). These results confirm that the items are highly relevant to the constructs they are intended to measure.

Table 1. Validator Aiken's V Results for CT Dimensions

Assessment Components		Aiken's V Index				
		Computational Thinking Dimention (CT)				
		Content (*n=2)	Concept Learning Tools (n=5)		Practice	Perspective
			Scratch	*Non-Scratch*	Questionnaire (n=5)	
Average	Construction	0.89	0.89	0.87	0.91	0.93
	Content Feasibility	0.89	0.91	0.87	0.93	0.91
	Language	0.92	0.88	0.92	0.92	0.93
	Assassment	0.92	0.93	0.90	0.90	0.93
Overall Mean		0.90	0.90	0.89	0.92	0.93
			0.895			
Category		Excellent	Excellent	Excellent	Excellent	Excellent

Note: *n = Number of Expert Judgement

Tabel 2. Validator Aiken's V Results for CT Practice Observation

Assessment Components		Aiken's V Index
		Computational Thinking (CT)
		Practice
		Observation Sheets (n=5)
Rerata	Initial Learning Activity	0.87
	Initial Interaction	0.91
	Core Interaction	0.91
	Problems Encountered	0.93
	Final Interaction	0.93
Overall Mean		0.91
Category		Excellent

The empirical validity test of the CT-Content ecology instrument and CT-Learning Tools Non-Scratch in this research used validity analysis, aided by the Statistical Package for the Social Sciences

(SPSS) software. This analysis was performed on 100 biology education students from Sanata Dharma University (USD) Yogyakarta.

Table 3. Lecturer Aiken's V Results for CT Dimensions

Assessment Components		Aiken's V Index				
		Computational Thinking Dimention (CT)				
		Concept			*Practice*	*Perspective*
		Content (*n=4)	*Learning Tools* (n=4)		Questionnaire (n=4)	
			Scratch	*Non-Scratch*		
Rerata	Construction	0.89	0.89	0.87	0.91	0.93
	Content Feasibility	0.89	0.91	0.87	0.93	0.91
	Language	0.92	0.88	0.92	0.92	0.93
	Assessment	0.92	0.93	0.90	0.90	0.93
Overall Mean		0.90	0.90	0.89	0.92	0.93
Category		Excellent	Excellent	Excellent	Excellent	Excellent

Note: *n = Number of lecturers

Tabel 4. Lecturer Aiken's V Results for CT Practice Observation

Assessment Components		Aiken's V Index
		Computational Thinking (CT)
		Practice
		Observation Sheets (n=4)
Rerata	Initial Learning Activity	0.83
	Initial Interaction	0.89
	Core Interaction	0.92
	Problems Encountered	0.92
	Final Interaction	0.92
Overall Mean		0.90
Category		Excellent

Validity Test

The validity test ensures that the assessment tools are aligned with the research objectives, allowing for a precise evaluation of the learners' CT skills across various dimensions. This ensures that the research accurately measures what it intends to. The CT- Content ecology instrument consists of 30 items (20 multiple-choice items and 10 essay questions), while the CT-Concept Learning Tools Non-Scratch consists of 30 items. The factor analysis results showed validity in terms of construct validity based on empirical data. Sample feasibility tests using the Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO-MSA) and Bartlett's Test were prerequisites for conducting factor analysis. The KMO-MSA and Bartlett's Test results are shown in Table 5.

Table 5. KMO and Bartlett's Test of Sphericity for CT- Content & CT-Learning Tools Non-Scratch

KMO dan Bartlett's Test				
		CT- Content		*CT-Learning Tools Non Scratch*
Kaiser Meyer Olkin Measure of Sampling Adequacy		MCQ	Essay	MCQ
		0.614	0.620	0.631
Bartlett's Test of Sphericity	*Approx. Chi-Square*	293.649	75.107	573.759
	Df	190	45	435
	Sig.	0.000	0.000	0.000

Table 5 shows that the KMO (Kaiser Meyer Olkin Measure of Sampling) value for the CT-Concept Content, CT-Learning Tools Non-Scratch, and personal creativity questionnaire instruments is greater than 0.5 with a significance level of 0.05. This demonstrates that the KMO precondition for the tested items is met, allowing the analysis to proceed. According to [14] Bartlett's Test of Sphericity also meets the requirements with a significance level below 0.05 (5%), indicating a good category. Therefore, the factor analysis can proceed as it meets the necessary conditions.

The next analysis is construct validity, which is determined using the anti-image matrices to assess the suitability of individual variables for further analysis. Construct validity helps determine which computational thinking (CT) items are valid and which are not based on empirical data. An item is considered valid if its anti-image correlation is greater than 0.50 [15]. The anti-image values for the CT-Concept Content ecology multiple-choice instrument are shown in Table 6.

Table 6. Anti-Image Values of CT-Content Ecology Items (Multiple Choice)

No.	*Anti Image Correlation*	Decision	No.	*Anti Image Correlation*	Decision
1	0.579	Retained	11	0.528	Discarded
2	0.451	Discarded	12	0.617	Retained
3	0.604	Retained	13	0.517	Retained
4	0.581	Retained	14	0.633	Retained
5	0.564	Retained	15	0.662	Retained
6	0.642	Retained	16	0.464	Discarded
7	0.661	Retained	17	0.615	Retained
8	0.630	Retained	18	0.653	Retained
9	0.828	Retained	19	0.653	Discarded
10	0.619	Retained	20	0.723	Retained

Table 6 shows that the anti-image correlation values for 20 multiple-choice questions are greater than 0.5, indicating that these items are valid in terms of construct validity. However, items 2 and 21 have values below 0.5, rendering them invalid. The researcher selected the top 15 multiple-choice items for use in small and large-scale trials. The anti-image values for the CT-Content ecology essay questions are shown in Table 7.

Table 7. Anti-Image Values of CT-Concept Content Ecology Items (Essay)

Number	*Anti Image Correlation*	Decision
1	0.449	Discarded
2	0.519	Retained
3	0.538	Retained
4	0.619	Retained
5	0.707	Retained
6	0.593	Retained
7	0.671	Retained
8	0.465	Discarded
9	0.600	Retained
10	0.746	Retained

Table 7 shows that the anti-image correlation values for 8 essay questions are greater than 0.5, making them valid in terms of construct validity. Items 1 and 8, however, have values below 0.5, indicating invalidity. The researcher selected the top 5 essay items for use in small and large-scale trials. The anti-image values for the CT-Learning Tools Non-Scratch instrument are shown in Table 8.

Table 8. Anti-Image Values of CT-Concept Learning Tools Non-Scratch Items

No.	*Anti Image Correlation*	Decision	No.	*Anti Image Correlation*	Decision
1	0.605	Retained	16	0.372	Discarded
2	0.596	Retained	17	0.540	Retained
3	0.527	Retained	18	0.520	Retained
4	0.600	Retained	19	0.546	Retained
5	0.372	Discarded	20	0.538	Retained
6	0.647	Retained	21	0.525	Retained
7	0.576	Retained	22	0.270	Retained
8	0.594	Retained	23	0.366	Retained
9	0.624	Retained	24	0.519	Retained
10	0.639	Retained	25	0.646	Retained

No.	*Anti Image Correlation*	Decision	No.	*Anti Image Correlation*	Decision
11	0.725	Discarded	26	0.618	Retained
12	0.557	Retained	27	0.698	Retained
13	0.534	Retained	28	0.313	Discarded
14	0.527	Retained	29	0.520	Retained
15	0.526	Retained	30	0.542	Retained

Table 8 shows that the anti-image correlation values for 25 items are greater than 0.5, making them valid in terms of construct validity. Items 5, 11, 16, 22, and 28 have values below 0.5, indicating invalidity. The researcher selected the top 25 multiple-choice items for small and large-scale trials.

Reliability Test

The reliability analysis of CT-Content student test items was determined based on the Item Reliability and Person Reliability values to assess the consistency of student responses and the quality of test items in the instrument. An Item Reliability and Person Reliability score is considered reliable if it is greater than or equal to 0.70 [16]. The reliability analysis results are presented in Table 9.

Table 9. Reliability Scores of Research Instruments

Aiken's V Index				
Computational Thinking Dimention (CT)				
Content		*Concept*	*Practice*	*Perspective*
MCQ	Essay			
0.835	0.864	0.837	0.768	0.738

The reliability values show that the items have strong reliability across all test categories, as all values are above 0.70, indicating excellent reliability.

3.2. Discussion

The results from the study through the lens of four key dimensions namely CT Content, CT Concept Learning Tools, CT Perspective, and CT Practice which provide valuable insights for learning developing. These dimensions are essential for understanding how CT can be effectively taught and assessed across educational contexts as presented in Figure 2.

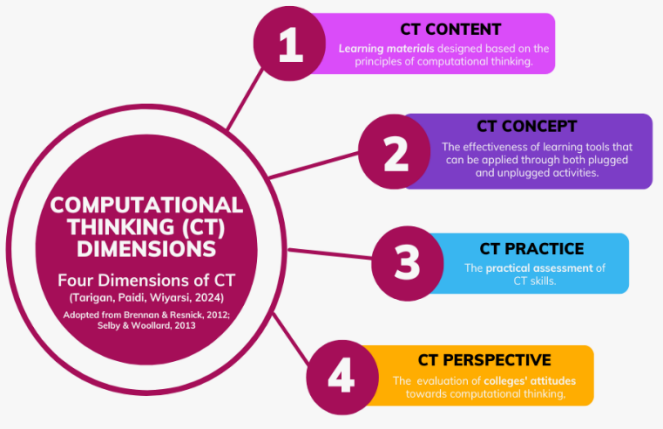


Figure 2. The Final Dimensions of CT

Detailed explaining the four dimensions for CT Content, CT Concept Learning Tools, CT Perspective, and CT Practice presented in Table 10.

Table 10. CT Dimensions

CT Dimensions	Description
Content	Assesses how well colleges comprehend the learning materials by designing tests grounded in computational thinking aspects.
Aspects assessed: Decomposition, Generalization/ Pattern Recognition, Algorithmic Thinking, Abstraction and Evaluation	
Concept Learning Tools	Assesses the effectiveness and usability of tools and resources used to teach and learn CT concepts. Concept Learning Tools are divided become two type activities namely plugged and unplugged activities. Plugged activities are learning activities use the programming or coding tools. In other hand, unplugged activities don't require colleges to use programming or coding tools.
Plugged-CT Learning Tools Aspects assassed: Conditional, Loops, Events (Object), Events Scenario, Events (Music/Sounds), Parallelism, Sequences (Text), Operators	
Unplugged-CT Learning Tools Aspects assessed Sequences, Simple Loops, Complex Loops, Conditional Statements, While Statements, Combinations	
Practice	Evaluates colleges' ability to apply CT in real-world problem-solving scenarios, including the practical use of CT skills.
Aspects assessed: Experimenting and Iterating, Testing and Debugging, Reusing and Remixing, Abstracting and Modularizing	
Perspective	Measures colleges' attitudes towards CT, including its relevance to their future careers and its perceived value.
Aspects assessed: Communication & Cooperativity, Algorithmic Thinking, Collaboration and Community Building, Context Creation & Problem Solving, Creativity & Critical Thinking	

The CT Content dimension emphasizes foundational knowledge through the application of CT principles such as abstraction, algorithms, decomposition, generalization, and evaluation (Selby & Woollard, 2013). The CT Learning Tools dimension addresses the tools and technologies that aid in learning CT, like Scratch. This dimension is particularly significant due to the wide array of tools, from beginner-friendly environments like Scratch to more sophisticated platforms such as Python (Grover & Pea, 2013; Yadav et al., 2014).

The CT Perspective dimension covers attitudes, beliefs, and opinions regarding CT. The lower validity and reliability scores in this area might suggest that the items in this dimension reflect more subjective aspects of CT, which can differ significantly among individuals (Brennan & Resnick, 2012; Selby & Woollard, 2013). This variability may be influenced by factors such as prior experience, teaching environment, or personal interest, leading to a broader range of responses. These findings imply that while CT Perspective is an important dimension, there is potential for improving how it is assessed to better capture the diverse viewpoints within the CT community.

Lastly, the CT Practice dimension evaluates the application of CT in real-world situations. This dimension effectively captures the practical skills and competencies that colleges gain through CT activities. It is critical because it represents learners' ability to translate theoretical knowledge into practical applications, a key goal of CT education. The importance of practice in CT education is well-documented, with Brennan and Resnick (2012) highlighting that the capacity to apply computational concepts in real-world contexts is a key measure of proficiency. This finding supports the notion that practical application is an essential aspect of CT, necessary for transforming theoretical knowledge into tangible skills.

4. Conclusion

This study successfully created and validated a comprehensive tool designed to assess CT skills across four critical dimensions: CT Content, CT Learning Tools, CT Perspective, and CT Practice.

Utilizing Aiken's V for content validity confirmed that the items in each dimension are highly relevant and effective for evaluating CT. Moreover, the high Cronbach's alpha values demonstrate the tool's reliability and consistency in measuring colleges' CT abilities. The outcomes of this research contribute significantly to the field of educational assessment by offering a validated framework for evaluating CT, which is essential in equipping colleges for the challenges of the digital era. The assessment tool not only evaluates colleges' understanding of CT concepts but also examines their ability to apply these concepts in real-world contexts and their attitudes toward CT. This comprehensive approach is crucial for fostering colleges' CT skills in a manner that is both practical and meaningful.

5. Limitations and Recommendations

Although the assessment tool developed in this study has shown strong validity and reliability, several limitations should be recognized. Firstly, the study involved a relatively small sample size of 150 colleges, which may limit the generalizability of the findings. Future research should involve a larger and more diverse sample to ensure that the results can be broadly applied.

Secondly, the variability observed in the CT Perspective dimension suggests that colleges' attitudes toward CT might be influenced by factors not fully captured in this study. Additional research is needed to investigate these factors and to develop more refined assessment tools that can account for individual differences in colleges' perceptions of CT.

Thirdly, the assessment tool primarily targets secondary school colleges with some prior experience in computing. Future studies should consider adapting the tool for younger colleges or those without prior experience in CT, to ensure the tool is inclusive and accessible to all learners.

In terms of recommendations, educators are encouraged to use this validated assessment tool to regularly evaluate and improve colleges' CT skills. The tool can help identify areas where colleges may require additional support or where the curriculum needs to be adjusted to better address colleges' needs. Additionally, integrating more practical problem-solving activities into the curriculum can help reinforce the CT skills assessed by the tool, ensuring that colleges are well-prepared for future academic and professional challenges.

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Analysis of the Need for Utilizing Android Game Media to Improve Arabic Grammar Skills of Madrasah Ibtidaiyah Students

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Abstract

This study analyzes the need for the use of Android game media to improve the Arabic grammar skills of Madrasah Ibtidaiyah students. Using a qualitative descriptive method, this study involved 43 respondents from Madrasah Ibtidaiyah Nurut Thulab and Hikmatun Najah. The data was collected through questionnaires and interviews, which analyzed smartphone ownership, duration of use, and students' learning patterns. The results showed that 100% of students own a smartphone and spend between 3 to 5 hours per day using it. Although students have not yet fully utilized smartphones for learning activities, Android-based educational games are expected to have an impact on student engagement, provide immediate feedback, and allow flexibility in learning. This study recommends the implementation of Android game media as a solution to improve the understanding of Arabic grammar in Madrasah Ibtidaiyah.

Keywords: Android game media, Grammatical skills, Arabic language, Madrasah Ibtidaiyah.

1. Introduction

Arabic has a very important role in Islamic religious education, especially in Madrasah Ibtidaiyah. This language is used in the Qur'an, the holy book of Muslims, so mastery of the Arabic language, especially in grammatical aspects such as Nahwu and Sharaf, is a must for Madrasah Ibtidaiyah students to be able to understand religious texts well (Nasarudin, 2022). However, the reality on the ground shows that learning Arabic, especially grammar, is still considered complicated and boring by many students. Teaching methods that tend to be traditional, focusing on memorization without applicative practice, are one of the causes of low motivation and students' ability to master Arabic grammar (Takdir, 2019; Hasani, 2018).

In today's digital era, technological developments present a great opportunity to increase the effectiveness of learning, including in language learning. One of the relevant innovations is the use of Android-based game media. With gadgets such as smartphones and tablets already common among students, these media can provide an interactive and engaging approach to the learning process. The use of digital media in language learning, especially Android games, can support students in understanding Arabic grammar in a more practical and fun way (Pachler, N., Bachmair, B., & Cook, 2014). This is important considering that students at Madrasah Ibtidaiyah often face difficulties in learning Nahwu and Sharaf, which are the basis for understanding sentence structure and Arabic rules (Shafri, Raup and Ismail, 2022).

Furthermore, research shows that mobile technology, including Android-based educational games, can improve students' learning motivation and academic outcomes (Papadakis, Kalogiannakis and Zaranis, 2018). Stockwell, (2013) emphasized that the use of information technology in language education has been proven to increase student engagement and accelerate the learning process. In addition, educational games also allow students to practice independently and repeatedly, according to their needs, thus improving their understanding of grammatical material (Connolly et al., 2012).

The use of smartphones in learning is not only limited to learning applications, but also provides ease of interaction between students and teachers through various communication platforms, such as instant messaging and video calls (Crompton, Burke and Gregory, 2017). This allows for more dynamic and collaborative interactions, which ultimately strengthens students' understanding of Arabic grammar. In addition, Ally and Prieto-Blázquez report, (2014) that mobile technology can be an effective solution in overcoming learning challenges in remote areas, where access to traditional educational resources is limited.

The flexibility of using smartphones in learning also provides significant advantages. Students can learn anytime and anywhere, according to their convenience. Annetta et al., (2009) showed that the use

of mobile educational games applications can increase students' motivation and interest in learning, which has a positive impact on the mastery of materials, including Arabic grammar. Thus, Android-based game media not only offers an interactive learning approach, but also provides more flexible and independent learning freedom (Hwang, Lai and Wang, 2015).

By looking at these various potentials, the development of Android game-based learning media is the most relevant solution to overcome the obstacles of learning Arabic grammar at Madrasah Ibtidaiyah. An analysis of the needs for the use of this media needs to be carried out so that it can be designed according to the needs of students, so that they can improve their ability to understand the rules of Nahwu and Sharaf more effectively. This game is expected to not only provide a more enjoyable learning experience, but also enrich the quality of learning by providing repetitive and contextual exercises, which are indispensable for overcoming difficulties in learning Arabic grammar.

2. Method

This research is a qualitative descriptive study that aims to describe the opportunities for using android games in the student learning process more clearly and in-depth. The identification process begins with observation to analyze needs, followed by the dissemination of questionnaires and the processing of data presented in a descriptive manner. The subjects of the study were 43 grade 5 students from Madrasah Ibtidaiyah Nurut Thulab and Madrasah Ibtidaiyah Hikmatun Najah.

The data collection method used includes questionnaires and interviews, with data analysis carried out descriptively through four stages: (1) data collection, (2) data reduction, (3) data presentation, and (4) conclusion drawn. Data was collected using two instruments, namely questionnaires and interview guidelines.

The questionnaire consisted of 4 indicators and 20 questions, covering smartphone ownership, duration of use, purpose of use, and learning patterns that support understanding Arabic grammar. Data reduction is carried out to filter information that focuses on core findings in the field, while data presentation displays descriptive results from questionnaires. The final stage is to draw conclusions to answer the opportunity to use smartphones in helping students understand Arabic grammar.

3. Results and Discussion

This study involved 43 respondents consisting of students of Madrasah Ibtidaiyah Nurut Thulab and Madrasah Ibtidaiyah Hikmatun Najah in Blora Regency, Central Java Province. The results of the study show that there are various opportunities to use Android game media in the learning process, especially to improve Arabic grammar skills. This opportunity is inseparable from the fact that the majority of students already have smartphones. One of the important factors in supporting Android game-based learning is the ownership of smartphone devices by students.

The number of students who have smartphones affects how much opportunity they have to use Android game media for learning. Based on the data shown in Figure 1, all students at Madrasah Ibtidaiyah Nurut Thulab and Madrasah Ibtidaiyah Hikmatun Najah (100%) already have smartphones. As a flexible technological device, smartphones are often used by students in their daily activities. Data on the duration of smartphone use shows that most students use these devices for 3 to 5 hours per day.

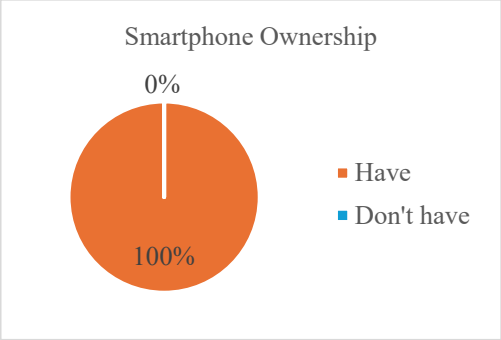


Figure 1. Percentage of students' smartphone ownership

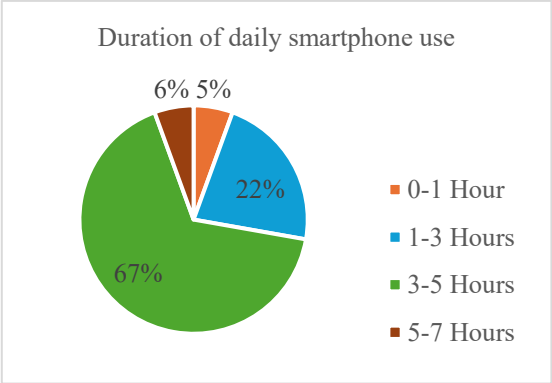


Figure 2. Percentage of Smartphone Usage Duration

The duration of use of this smartphone is presented in more detail in Figure 2. Based on the figure, only 5% (2 students) use smartphones for 0-1 hour per day, while 22% (8 students) use smartphones for 1-3 hours. Most students, i.e. 67% (24 students), spend between 3-5 hours per day using smartphones. There are also students who use smartphones for 5-7 hours, although the number is small, namely 6% (2 students).

From this data, it can be concluded that students in both madrasas use smartphones for a long time. This shows an opportunity to direct smartphone use to more positive activities, such as learning. Researchers then identified students' habits of using smartphones on a daily basis to find out how students use the device outside of school hours.

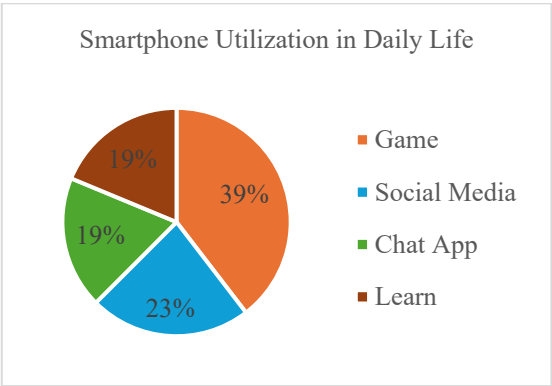


Figure 3. Smartphone use in daily life

The use of smartphones by students in more detail can be seen in Figure 3. As many as 39% of students use smartphones to play games, while 23% use them for social media. In addition, 19% of students use chat apps, and only 19% use smartphones to study. This data shows that students have not fully optimized the use of smartphones for learning activities. On the other hand, teachers have also not fully facilitated the use of smartphones as an effective learning medium, so the use of smartphones by students is still not focused on useful activities.

In learning Arabic, the majority of students (55.88%) admitted that they still use textbooks as the main media, while 20.59% use learning videos, 17.65% use learning applications, and only 2.94% use educational websites or digital modules. This shows that the potential of smartphones as a learning tool, especially for Arabic, has not been utilized to the fullest.

In addition, the researcher also identified students' learning patterns in improving Arabic grammar skills. The goal is to find out the extent of students' understanding of Arabic grammar. Detailed data on this can be seen in Figure 4. A total of 43.48% of students showed sufficient understanding of Arabic grammar, 29.06% were at a poor level, and 30.43% of students had a good understanding. This data indicates that some students still need to improve their grammatical skills.

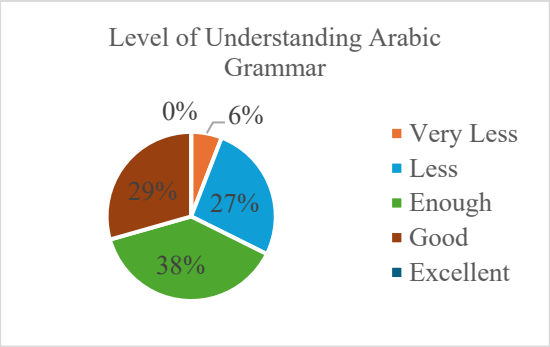


Figure 4. Level of Understanding of Arabic Grammar

Observations made on the Arabic learning process in the two madrasas show that so far learning is still using blackboard media, where students record the material written by the teacher. The lack of enthusiasm of students in understanding and listening to the material is also seen, which has an impact on their low grammatical skills. Although all students already have smartphones, only a few use them for learning purposes. This shows the need to optimize the use of technology in supporting the learning process in the classroom.

The use of technology, especially Android-based games, opens up new opportunities in the world of education at Madrasah Ibtidaiyah. Today's students are growing up in the digital era, where technology has become an inseparable part of daily life, including in play and learning activities (Prensky, 2000). Therefore, the use of Android game media as a learning aid not only attracts students' interest, but also provides a more interactive and fun method to understand material that is often considered difficult, such as Arabic grammar (Huizenga et al., 2009).

One of the main advantages of Android gaming media is its ability to increase student engagement during the learning process (Connolly et al., 2012). If in traditional methods, such as lectures or note-taking, students tend to be passive and less directly involved with the material, Android games present a much more interactive learning experience. Through games designed to teach grammatical concepts, students can actively participate in relevant exercises, quizzes, and simulations (Hwang, Lai and Wang, 2015).

This interaction has a positive impact on the gradual development of students' grammatical skills (Gee, 2007). For example, through game media, students can learn to distinguish types of words, understand sentence patterns, and get to know the rules of nahwu and sharaf in a more fun way. Well-designed games also provide immediate feedback, which is very useful in helping students understand their mistakes and improve comprehension independently.

In addition to its interactivity, the flexibility offered by Android games is also a great advantage. Students can study anytime and anywhere, according to their schedules and convenience (Sunday, Adesope and Maarhuis, 2021). This allows students to strengthen their understanding of Arabic grammar material outside of class hours, without always having to rely on direct instruction from the teacher.

With all this potential, the use of Android game media in learning Arabic, especially to improve grammatical skills, has a great opportunity to be applied in Madrasah Ibtidaiyah. Technology that is already familiar in students' daily lives can be used by teachers to create a more interesting, interactive, and effective learning atmosphere, which ultimately supports a significant improvement in students' academic abilities.

6. Conclusion

Based on this study, the use of Android game media in learning Arabic at Madrasah Ibtidaiyah shows significant potential to improve students' grammatical skills. With 100% of students owning smartphones and a fairly high duration of use, there is a great opportunity to direct the use of this technology to more rewarding learning activities. Although students currently still rely on textbooks and lack of optimization of smartphones for learning, the use of Android games can increase engagement and interactivity in the learning process. With good design, games can provide immediate feedback and allow students to learn flexibly, potentially supporting a better understanding of Arabic

grammar. Therefore, the implementation of Android game media needs to be considered to create a more effective and interesting learning atmosphere at Madrasah Ibtidaiyah.

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The Ethnoscience Study of "Batik Gentongan Tanjung Bumi Madura" and Its Integration in Science Learning Process

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Abstract

A branch of research called ethnoscience compares and contrasts scientific and indigenous knowledge. Ethnoscience investigates how various cultures see and engage with their surroundings. Madura is an Indonesian island off the coast of East Java that is renowned for its robust traditions, distinct culture, and resilient populace. Its generation-to-generation transmission of local wisdom is a testament to this rich tradition. Madura has a rich local wisdom, one of them is Batik. Batik is a traditional Indonesian textile art style with a rich history stretching back centuries. It is a laborious technique that entails first applying wax to the fabric and then dying it different colors. One of unique and well-known Batik in Madura is Batik Gentongan Tanjung Bumi. The objective of this research is to analyse the ethnoscience of Batik Gentongan Tanjung Bumi Madura and its integration into science learning process. This study qualified as qualitative research and it was carried out between June and September of 2024. The study was carried out using documentation techniques, interviews, and observation. The results showed that according from a scientific perspective, there is the integration between the scientific and indigenous knowledge of Batik Gentongan Tanjung Bumi Madura. It was also mentioned that science education can incorporate the ethnoscience of Batik Gentongan Tanjung Bumi Madura. The correlation between indigenous knowledge and scientific knowledge found in this study suggests that incorporating Batik Gentongan Tanjung Bumi Madura ethnoscience into science education is crucial because it is able to encourage students to actively learn scientific concepts and think critically about them. In conclusion, the integration between the scientific knowledge and indigenous knowledge of Batik Gentongan Tanjung Bumi Madura can be involved into science learning process to make the learning activities more meaningful.

1. Introduction

Learning science is the process of gaining information and comprehension about the natural world by experimentation, critical thinking, and observation. It is a cornerstone of education that fosters curiosity, problem-solving abilities, and a greater understanding of the world around us. Science learning consists of numerous steps as well as important components(1). Observation as the first step in any scientific investigation is to observe the world around us. It entails looking closely and paying attention to details. Questioning, in order to do scientific research, questions must be asked. It aids in problem identification and solution search. A hypothesis is a well-informed estimate derived from observations and past information(2). It acts as a springboard for further research. Furthermore, researchers can collect data and test theories by conducting investigations. Data analysis is the process of deciphering and comprehending the data that has been gathered from trials. Conclusion is identified whether or not the hypothesis is supported or disproved is determined by the analysis(3).

The study of native customs and knowledge is known as ethnoscience. It investigates the perceptions and behaviors of various cultures in relation to their surroundings. Ethnoscience is crucial to be involved in the science learning activities, since local wisdom and traditions are often passed down orally, and ethnoscience helps to ensure that they are not lost(4). Furthermore, communities depend on the preservation of cultural identity and legacy, which is aided by the ethnoscience(5). Indigenous knowledge is recognized and valued because of ethnoscience, which also works to protect it. By recognizing their knowledge and contributions to global understanding, it also gives indigenous populations more influence(6). In many ways, ethnoscience encourages cooperation between several fields, including science. It offers fresh viewpoints and methods for conducting study, enhancing our comprehension of the outside world. Ethnoscience can be studied in various local wisdoms, one of them is Batik.

Indonesian batik is a centuries-old traditional textile art style with a rich history. It is a laborious technique that entails first applying wax to the fabric and then dying it different colors. In some places

of the cloth, the wax functions as a resist, keeping the dye from soaking through. This produces elaborate designs and patterns that are exclusive to batik. Originating on the Indonesian island of Madura in East Java, Batik Madura is a unique kind of batik. Within the larger batik heritage, Madura batik stands out for its vivid colors, geometric patterns, and detailed motifs. There are the main attributes of Madura batik. Vibrant and contrasting hues like red, yellow, blue, and green are frequently used in Madura batik. Madura batik is known for its geometric designs, which include squares, triangles, diamonds, and other shapes. The patterns and colors are sometimes applied in layers, making the designs more detailed and elaborate. Rich color palettes were achieved by employing natural dyes obtained from living things in the traditional Madura batik process. In the Maduran culture, batik Madura holds great cultural significance and is frequently utilized as a marker of identity and for ceremonial purposes. One of well-known Batik Madura is Batik Gentongan Tanjung Bumi which is a very unique and historical batik in Madura.

One distinctive variety of batik comes from Madura Island in East Java, Indonesia is Batik Gentongan Madura which is originated in Tanjung Bumi district, Madura. It is distinguished by the way it is dyed, which entails soaking the fabric in natural colors in a big vat called a “Gentong”. A distinctive pattern and a rich, vivid color scheme are produced by this technique. Furthermore, the unique feature of Batik Gentongan Tanjung Bumi Madura is the color scheme which is resulted in two sides. By engaging the ethnoscience of Batik Gentongan Tanjung Bumi Madura in the science learning process, students can develop their critical thinking, and forge a closer connection between students’ identities and their educational experiences. Additionally, it is in line with the development of education, which emphasizes the different ways in which students can comprehend the science concepts. It also has to do with how students think and what they already know. Furthermore, ethnoscience can assist teachers in comprehending how students’ cultural origins may influence how they approach problem-solving, critical thinking, and decision-making(7).

The distinctiveness of different cultural views and knowledge structures is acknowledged by ethnoscience. By incorporating ethnoscience into the teaching process, educators can increase the cultural relevance of their curricula. The different viewpoints and types of knowledge that students bring to the classroom will be respected and valued as a result(8). When learning materials contain instances of the students’ own cultural knowledge and experiences, they are more likely to keep students’ attention and inspire them. According to ethnoscience, learning can be conducted more approachable and meaningful by relating it to students’ own cultural circumstances. Educators should engage the ethnoscience into their lessons as a valuable extra activity that complements popular science curricula and fosters students’ critical thinking(9). Since students can utilize common phenomena to understand science concepts on their own, ethnoscience is important to be involved in science education. Through understanding scientific principles connected with an ethnoscience perspective, students are able to apply critical thinking skills and make scientific connections. Ethnoscience emphasizes the historical and ecological contributions to society and can help students comprehend how society changes with various types of knowledge(10,11).

The ethnoscience of Batik Gentongan Tanjung Bumi Madura and its integration in the science learning process is the main aim of this research. Teachers can develop cross-disciplinary relationships, advance cultural awareness, and inspire students to critically and imaginatively consider the linkages between science, culture, and innovation by incorporating ethnoscience into science learning process. This activity can help students value the knowledge and customs of other communities while preparing them to interact with global concerns. Furthermore, analyzing the ethnoscience of one of the local diversity in Madura is crucial as a result.

2. Research Method

This study, which took place in June to September 2024, was classified as a qualitative research. Gathering and evaluating non-numerical data, such as information found in texts and explanations, is a key component of qualitative research. The purpose of this research was to comprehend societal ideas, beliefs, and knowledge. The qualitative investigation that was carried out comprised documentation, interviews, and observation. By documenting the steps involved in creating Batik Gentongan Tanjung Bumi Madura, observations were finished. People who stay in Tanjung Bumi Madura were individually asked a series of open-ended questions during one-on-one interviews. Additionally, the documentation was finished by gathering Batik Gentongan Tanjung Bumi Madura-related documents. The process of doing the qualitative research involved multiple stages, including 1) data preparation and organization, 2) data review and exploration, 3) data development, 4) findings assignment, and 5) conclusion

identification. The research findings were then subjected to a triangulation technique analysis, which is the process of using several data sources to produce a thorough conclusion. In order to reduce research bias and improve the validity of study findings, this triangulation procedure was carried out briefly. In addition, the triangulation method was applied to verify the validity of the data from one source by cross-referencing it. It might also aid in developing a thorough comprehension of the study questions. It is therefore anticipated that a variety of data would be utilised in order to settle on a single theoretical viewpoint that may address the research issues.

3. Results and Discussion

The ethnoscience study of Batik Gentongan Tanjung Bumi Madura and its integration into science learning process is the main focus of this research. There is a correlation between scientific knowledge and the indigenous knowledge gathered from society. Batik Gentongan Tanjung Bumi Madura is shown in Figure 1 below.



Figure 1. Batik Gentongan Tanjung Bumi Madura

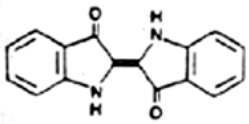
Batik Gentongan Madura which is originated in Tanjung Bumi district, Madura is distinguished by the way it is dyed, which entails soaking the fabric in natural colors in a big vat called a “Gentong”. Furthermore, a distinctive pattern and a rich, vivid color scheme are produced by this technique. Th other unique feature of Batik Gentongan Tanjung Bumi Madura is also the color scheme which is resulted in two sides. Batik Gentongan Tanjung Bumi Madura is produced in Tanjung Bumi district, Bangkalan, Madura, Indonesia. There is also the integration of indigenous knowledge and scientific knowledge of Batik Gentongan Tanjung Bumi Madura which is represented in Table 1.

Table 1. The Integration of Indigenous Knowledge and Scientific Knowledge of Batik Gentongan Tanjung Bumi Madura

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
Alecca' labun (soften the cotton cloth)	The process of giving medicine or chemicals to the mori cloth so that the cloth absorbs color more easily. Alecca Labun materials are mori cloth, Turkish red oil, NaOH, dempel oil, water, charcoal ash. The process carried out at the beginning of batik making so that the batik cloth easily absorbs color. Charcoal ash is rarely used due to limited materials. The	Mori cloth contains natural cellulose fibers derived from cotton that contain hydroxyl groups so that they are reactive with other chemicals. Fabrics, both natural and synthetic, are chemically polymers consisting of C, H, and O atoms with common functional groups being hydroxyl, carbonyl, amino, and ester. The fabric used is a type of mori cloth. Mori cloth has the highest absorbency(12).

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
	addition of charcoal ash gives a reddish color to the mori cloth. There are two types of cloth used, namely blong cloth, jempol cloth, and elar cloth, according to the batik maker, the type of cloth determines the quality of the batik. The elar type of cloth is primissima cloth.	
Nganji	*Nganji* is soaking the mori cloth in starch solution. This activity aims to make it easier to nyepat because the cloth is not easily folded because the cloth becomes stiffer and makes the wax stick more easily during the *Ngarèngrèng* and *Ngèssè'èn* process.	Starch (tapioca flour) comes from cassava. Cassava (*Manihot esculenta*) is a monoecious dicotyledonous plant that is grown for its highly digestible starch, which is contained in the roots of the tuber (cassava) which is mistakenly called a tuber as an annual shrub plant, cassava grows 1-4 m high with large palmate leaves with 5 to 9 leaf segments. Starch is made from tapioca flour, which is taken from cassava. Tapioca has 85% starch, 17% amylose, 0.1% fat, 0.10% protein, and 0.2% ash. Formed from amylose and amylopectin. Tapioca also has a fairly high swelling ability compared to similar products. Tapioca has a fairly strong and transparent gel characteristic that is very supportive as a component of filler and adhesive. Starch from flour consists of glucans, amylose, and amylopectin and consists of minor components such as lipids, proteins and phosphates(13).
Nyeput	Creating a motif on batik fabric using a pencil or other writing instrument. This stage is done to draw the Tanjung Bumi batik motif pattern.	-
Ngarèngrèng	The process of drawing batik patterns with wax using a canting tool. At this stage, drawing cloth with wax is done using a tool in the form of a canting. When it is going to be used, the canting is blown first. The tools used are canting, a frying pan, and a stove. Changes in substances occur in the process of drawing motifs with wax. Wax is a solid substance that will melt if heated on a frying pan and stove. In gentongan batik, the process of *Ngarèngrèng*	Changes in substances occur in the process of drawing motifs with wax. Wax is a solid substance that will melt when heated on a pan and stove. Wax is composed of long-chain fatty acid and alcohol compounds. Wax is hydrophobic so that it can block contact with hydrophilic dyes. Wax can be modified by mixing it with the desired ingredients so that the desired properties of the wax are obtained, such as resins that make it more adhesive, paraffin to regulate brittleness and animal fat to increase solubility(12).

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
	and coloring is done in two sides of the cloth.	
Ngèssè'èn	The process of filling the motif with the desired pattern.	-
Nyolèt  A brush used to help add color to fabric  Batik cloth that is ready to be given natural dye by brushing *(sekka')*	The dyeing stage is to give the desired color according to natural or synthetic dyes.	Coloring occurs when fabric molecules form chemical bonds with dye molecules. Organic dyes have chromophore groups whose chemical structure selectively absorbs visible light. In chromophore compounds, the conjugated system in carbon atoms is bound in single and double bonds. Functional groups have an important role in determining polarity, intermolecular and intramolecular bonds, pH, solubility, water solubility and chemical reactivity(14).
Nebbheng  Wax waste that can be melted again as *nebbeng* material	Applying wax to the part that has been made to etch wax on the batik cloth that should not be exposed to other colors (so that the resulting nyolet colors do not mix with each other) and do not mix with the base color of the batik during the nyellop process. The material that is wax (batik wax) in the nebbeng process uses batik wax waste. The addition of arpus is done so that the wax that has been etched into the cloth does not crack easily.	Wax has non-polar (hydrophobic) properties and dyes have polar (hydrophilic) properties. Therefore, the process of covering the coloring results with wax is carried out so that the existing colors do not mix with other colors. This technique also applies to natural dyes. *Gondorukem* helps the penetration of batik wax on the fabric and speeding up the freezing time in the process of making Batik(15).

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
 Arpus or gondorukem (*Resina colophonium*) which is the residue of pine (*Pinus merkusiii*)  The process of *nebbeng* *Nyellop*		
 tarum tree *Indigofera tinctoria*	Repeated dyeing of batik cloth to obtain the desired basic color of batik. This process uses synthetic or natural dyes. For gentongan batik, natural dyes are used from tarum plant leaves and mundu tree wood. Tarum plants provide indigo color, made by crushing tarum leaves then mixed with lime water so that sediment forms. This paste-shaped sediment is used as a dye by mixing it with water then putting it in a jar as a soaking material for cloth that will be given indigo color. The dye made from mundu bark to produce green is obtained by	*Indigofera tinctoria* or called as Ttarum plant is widely used as a source of blue dye. This plant contains indican glucoside (indoxyl-β-D-glucoside). After this plant is soaked in water, the hydrolysis process by enzymes will change indican into indoxyl (tarum-white) and glucose. Indoxyl can be oxidized into a blue substance called indigo. The structure of indigo is as follows  The next coloring material is from mundu tree (*Garcinia dulcis).* Chemical compound content of the genus *Garcinia* reveals the various chemical compounds contained in this plant such as xanthones, depsidones, benzophenones, steroids and

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
 lime water	boiling mundu tree bark and then adding alum to produce green.	terpenoids. The inner bark is thin with latex yellow. Based on biochemical analysis of mundu fruit flesh, there are chemicals such as ascorbic acid, phenols, and carotenoids(16,17). Carotenoids are pigments that naturally contained in fruits and vegetables that are yellow, pink, or red. This pigment is formed in chromoplasts that are distributed in fruit, leaves, flowers, stems, androots. There are two main classes of carotenoids, namely: carotenes (β-carotene and α-carotene) and xanthophyll which is a derivative of carotene. Zeaxanthin is a carotenoid pigment that belongs to the xanthophyll group and is yellow in color. Zeaxanthin is the main pigment of yellow corn, *Zeaxanthin mays* L., and has the molecular formula $C_{40}H_{56}O_2$. If alum is added to the yellow solution, the color will change to green. $[KAl(SO_4)_2.12H_2O]$. The material used to soak batik with tarum and mundu dyes is a jar made of clay. Clay or clay soil as a mixture of sand and dust particles with clay parts that have different characteristic properties in approximately the same size. One of the characteristics of clay particles is that they have a positive ion charge that can be exchanged. Clay material has good absorption of changes in humidity levels because clay has a very large surface area. Clay and clay soil have acidic pH characteristics. Clay is a complex silica hydraaluminum with the chemical formula $Al_2O_3.nSiO_2.kH_2O$. The dyes used are of two types, namely synthetic dyes and natural dyes. Synthetic dyes use naphthol or indigosol dyes, the dyeing process only takes a few moments, while natural dyes use materials from using barrels and are soaked in a period of at least approximately 6 months. The colors produced if using natural dyes are more durable and do not fade easily, but the obstacles faced by batik makers because they experience soaking for a long time, there is a possibility of a risk of tearing on the batik cloth(18–21).
 Tarum leaf dye paste ready to use		
 Mundu tree bark and alum		

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
 Mundu tree		
Nglorod	The process of removing the wax on batik by dipping it in hot water and then rinsing it until clean. In this nglorod process, hot water is added with starch water to make it easier to bind the wax that sticks to the fabric. There are even batik makers who use soda ash to make the *pelorodan* process easier.	The use of hot water makes it easier to remove the wax from the fabric. The increased water temperature causes the movement of molecules to become faster so that the bonds between molecules become weak and easily broken(22).
Nganji 	*Nganji* is soaking batik that has been dyed into a starch solution. Giving starch solution to the dyed cloth so that the batik cloth produced becomes stiff and becomes a characteristic if it is still new. Giving starch to the finished batik cloth according to the assumption of the community if given starch then the cloth will be stiff and look like a new item but this process is sometimes not done. Giving starch is so that the batik color does not fade quickly	In the batik process, starch solution is essential because it acts as a resist, keeping some parts of the fabric from dying. This makes it possible to create complex designs and patterns. With the use of a canting (a traditional wax instrument), starch solution is applied to the fabric in predetermined patterns. The starch creates a barrier that keeps the dye from getting to certain places. The intended patterns and motifs are produced on the batik fabric as a result(13,23).
Nyemmor	Dry the batik cloth under the sun and once	Heat transfer occurs by radiation. Heat transfer involves electromagnetic radiation which is energy as waves.

Stages of producing Batik Gentongan Tanjung Bumi Madura	Indigenous Knowledge	Scientific Knowledge
 Drying batik that has been dyed	dry it is ready to be published in market.	

According to the findings, it is concluded that there is indigenous knowledge related to Batik Gentongan Tanjung Bumi Madura that are comprehended by people. Furthermore, the indigenous knowledge is correlated to scientific knowledge to know the true concepts of science. Ethnoscience is the study of indigenous knowledge and practices. In the context of Batik Gentongan Tanjung Bumi Madura, it explores the traditional knowledge and techniques used in its creation. This knowledge has been passed down through generations, reflecting the deep connection between the Madura people and their environment.

Batik Gentongan Madura, which has its origins in Tanjung Bumi area, is one unique type of batik that originates from Madura Island in East Java, Indonesia. It is identified by the method of dying, which involves immersing the cloth in organic hues within a large container known as a "Gentong". This approach results in a rich, bright color scheme and a unique design. Moreover, the two-sided color scheme that results from Batik Gentongan Tanjung Bumi Madura unique feature. Through the integration of the ethnoscience of Batik Gentongan Tanjung Bumi Madura into science education, students can enhance their critical thinking skills and establish a stronger link between their learning experiences and identities. Batik Tanjung Bumi Madura is also traditionally dyed using natural pigments derived from plants, resulting in a rich, earthy color palette. The dyeing process involves soaking the fabric in a large vat filled with the dye, allowing the color to penetrate deeply into the fibers. The patterns on Batik Gentongan Madura are often intricate and detailed, often featuring geometric shapes, floral motifs, or cultural symbols. Batik Gentongan Madura is an important part of Maduran culture and is often used for ceremonial occasions or as a symbol of identity(24,25).

Based on the integration between indigenous knowledge and scientific knowledge found in this study, it can be inferred that including Batik Gentongan Tanjung Bumi Madura ethnoscience into the science learning process is crucial. Integrating the ethnoscience into science learning activity can improve education by acknowledging indigenous knowledge, helping students develop their critical thinking skills, and fortifying the bonds between their identities and their educational experiences. It is consistent with a more thorough and all-encompassing teaching methodology that recognizes the various ways in which pupils understand the subject matter. Furthermore, it is also critical to comprehend students' thought processes and past knowledge.

4. Conclusion

The aim of this research is to analyse the ethnoscience of Batik Gentongan Tanjung Bumi Madura and its integration into science learning process. According to the findings, it showed that there is the integration between the indigenous and scientific knowledge of Batik Gentongan Tanjung Bumi Madura. It was also mentioned that science education can incorporate the ethnoscience of Batik Gentongan Tanjung Bumi Madura. The integration between indigenous knowledge and scientific knowledge found in this study suggests that involving the ethnoscience of Batik Gentongan Tanjung Bumi Madura into science learning process is important because it is able to encourage students to actively learn scientific concepts and think critically. Furthermore, the integration between the indigenous knowledge and scientific knowledge of Batik Gentongan Tanjung Bumi Madura can be involved into science learning process to make the learning activities more meaningful.

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GERMAN LEXICAL MEANING CONSTRUCTION IN CORPUS LINGUISTICS: A LINGUISTIC FEATURE OF LANGUAGE DATA

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Abstract

This study collaborates between linguistic elements and language used by humans with the help of sophisticated information technology-based tools with a linguistic corpus whose search method can reach all texts in the media. This study aims to describe the lexical construction of German and the semantic meaning contained in its lingual structure.

This research method is descriptive qualitative. This study uses a document study approach. Document study is an approach that emphasizes semantic and pragmatic analysis of written materials based on their context. The research data are in the form of German words, phrases, and sentences that are lexically constructed. The data collection technique uses a corpus [1], [2]. Data were collected from CQPWeb online which has millions of texts from various languages in the world. Data analysis uses corpus linguistics [3].

The results of the study showed that there were 1,203,976 words that still contained raw data. Based on the data, the construction of lexical meaning in the linguistic corpus was found to be 43,436 words and those containing linguistic features were 34,129 words. Semantic analysis of the lexical structure of the German language in the data provides the meaning that there is a type of lexical meaning construction in the corpus that is more flexible compared to linguistic features. In linguistic features, it is found much less than lexical meaning. Therefore, lexical meaning in corpus linguistics functions as language data. This study has a broader impact on lexical construction in German and the meaning contained in the lexical structure as a linguistic feature. In addition, the results of the study are expected to have an impact on the ability of students studying German to be able to examine a word, phrase, and sentence that is reviewed based on a more accurate German lexical construction.

Keywords: Lexical construction, corpus linguistics, linguistic features of language data

1. Introduction

The lexical meaning of the German language is found in linguistic units that possess lexical constructions and can take the form of words, phrases, or sentences with meanings beyond the basic components of their lexical structure. Lexical meanings can be composed of various regulated lexical combinations and have meanings that extend beyond their linguistic context [4], [5]. Lexical expressions are used to convey something indirectly to the interlocutor so that the context expressed through these meanings does not offend. By choosing lexical constructions to express something outside the linguistic context, communication becomes more acceptable and easier for the interlocutor to understand.

The search for terms with meanings related to objects, plants, winds, animals, and colors is typically conducted using encyclopedias or dictionaries. During the pandemic era, this shifted into a trend where searching for terms with lexical constructions no longer relied on traditional methods but rather on digital encyclopedias, accessible from anywhere and unrestricted by time.

In the post-pandemic era, education appears to be advancing further through hybrid learning. This study aims to collaborate linguistic elements and human language with advanced information technology tools and corpus linguistics, enabling searches across all texts available in online media worldwide. Therefore, this research aims to describe the lexical constructions of the German language and the semantic meanings embedded within its linguistic structures.

The research method used in this study is descriptive qualitative. This study adopts a document study approach, emphasizing semantic and pragmatic analysis of written materials based on their context. The research data consists of German words, phrases, and sentences with lexical constructions, analyzed through corpus linguistics. The data collection technique employs corpus analysis [1], [2]. Data were collected from CQPWeb online, which contains millions of texts from various languages worldwide. Data analysis utilizes corpus linguistics methodologies [3].

The research findings reveal different results compared to previous studies conducted by experts in exploring lexical constructions in corpus linguistics and the meanings embedded within them, which were not based on corpus linguistics analysis. In this study, the focus on lexical constructions in the German language has rarely been undertaken by researchers. Even if such analyses had been performed, they typically utilized semantic and qualitative descriptive analyses. Semantic analysis of German lexical structures within corpus linguistics has seldom been carried out by previous researchers. This highlights the novelty of this study.

Furthermore, this research is expected to have a broader impact on understanding lexical constructions in the German language and the meanings embedded within lexical structures as a linguistic feature. Additionally, the findings are anticipated to enhance the ability of students learning German to analyze words, phrases, and sentences from the perspective of German lexical constructions as a linguistic feature more accurately.

The goal is for the research findings to be widely disseminated, thereby contributing more broadly by offering insights that can be utilized by researchers, educators, and German language enthusiasts. Consequently, the dissemination of research findings will reach a wider audience and provide valuable contributions to the development of knowledge, particularly in the teaching and learning of the German language.

The semantic meaning found within the internal structure of a linguistic unit in the form of German lexical expressions, based on corpus linguistics, is intended to convey an individual's intention expressed in a language. Linguistic features, as language data, are found in the base form and additional words that complement nouns, providing meaning. A lexeme or morpheme does not yet possess meaning because it is not a linguistic data unit in lexical form. Linguistic units acquire meaning only after the base form and affixes combine to form a word. Semantic meaning refers to the lexical meaning understood as originating from the internal structure of the linguistic unit.

However, if the understanding of a word, phrase, or sentence arises from a structure outside its linguistic context, it is referred to as pragmatic meaning. For instance, the term 'drunk' may be replaced with the color 'blue' to signify intoxication. The function of terminology containing meaning is often used to soften the expression, ensuring it does not offend the listener [6], [7].

This research on lexical constructions in the German language focuses on the interpretation of linguistic corpora that possess semantic meanings, including both semantic preferences and semantic prosody. This focus is significant because previous studies have not conducted comprehensive research covering the preparation of corpus data, linguistic corpora, corpus analysis, and the interpretation of semantic and pragmatic meanings across all linguistic corpora. Earlier studies have primarily analyzed corpora based on collocation, frequency, concordance, trends, unique words, clustering, and annotation. As a result, previous research has not addressed corpus interpretation from the perspectives of semantic preferences and semantic prosody.

Thus, this study fulfills the novelty aspect in research. Moreover, this research is expected to impact its academic collaborators, particularly students in the German Language Education Department. Students are anticipated to develop the ability to analyze language based on the functional meaning of color-related expressions in German, resulting in a more accurate understanding of language semantics and pragmatics.

This is crucial, especially considering that during the pandemic, students had limited interaction with language preferences and meanings in their coursework due to restrictions to online platforms such as Zoom and assignment-based learning. Many students felt burdened by the extensive workload. With this research, it is hoped that students will no longer feel overwhelmed by tasks such as searching for words in dictionaries or encyclopedias for their meanings. Instead, they can engage in concrete interaction by performing linguistic corpus analysis using the online CQPWeb platform, which contains millions of linguistic corpora from various fields and languages. This tool can be utilized to deepen their mastery of the language they are studying. The CQPWeb platform belongs to prestigious

universities ranked among the top 100 World-Class Universities, such as Cambridge University, TU Dresden, and Heidelberg University.

The stages include 2022, which focuses on creativity and innovation enhancement, 2023, when research output and networking excellence should be achieved, 2024, when international recognition should be obtained; and by 2025, Universitas Negeri Yogyakarta (UNY), which has become a Public Service Agency University (PTNBH), is expected to be a world-class university. Furthermore, this research is aligned with the Research and Community Service Directorate (DRPM) of UNY's 2021-2025 Research Implementation Plan, with the main theme of Post-COVID-19 Pandemic Education. Therefore, this research proposal meets the requirements outlined in the National Research Master Plan (RIRN) issued by the Ministry of Education, Culture, Research, and Technology.

Based on the 2023-2026 Research Master Plan (RIP) of the Research and Community Service Directorate (DRPM) of UNY, the research implementation is set with three priority research focus areas, which include: Innovation and Development in the field of Education, Innovation and Development in the field of STEAM, and Development in the field of Inclusion and Vocational Studies, which are then translated into specific areas of study as shown in Figure 1. Practically, the results of this research make a positive contribution to the development of knowledge, such as in the field of linguistics. The research outcomes are widely accessible to academics, education practitioners, students, and the general public.

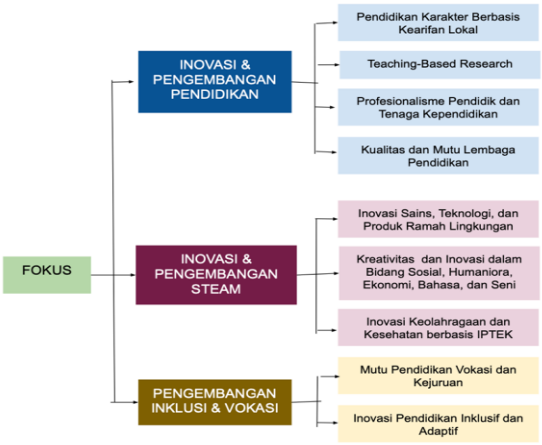


Figure 1. UNY 2023-2026 Priority Research Focus Areas and Research Scope

The research track record or roadmap of the researcher, which began with research at the Faculty of Language and Arts (FBSB), DRPM UNY, and Bima from 2017 to 2024, has resulted in research findings published in national journals Sinta 1 and Sinta 2, as well as in reputable international journals. The following outlines the research outcomes conducted by the researcher, which have been successfully published in accredited national journals and reputable international journals.



Figure 2. Researcher Roadmap

Based on the situational analysis, the research identifies several issues: (a) comprehensive studies on lexical constructions in German, particularly in interpreting linguistic corpora with a focus on semantic preferences and prosody, are lacking; (b) traditional methods of finding lexical meanings through encyclopedias and dictionaries are no longer relevant in the digital age, necessitating technology-based approaches such as CQPWeb; (c) during the pandemic, students experienced

limitations in linguistic interaction, resulting in a reduced understanding of language meaning from both semantic and pragmatic perspectives; and (d) previous research has primarily focused on frequency, collocation, and trends in linguistic corpora without delving deeply into semantic preferences and prosody. The research problems are: (a) how lexical constructions in German are represented in linguistic corpora; (b) the semantic preferences and prosodic semantics within German linguistic structures; (c) the academic contribution of introducing a new perspective to corpus-based studies; and (d) how students' ability to understand and interpret semantic and pragmatic meanings can be enhanced.

2. Theoritical Review

Lexical constructions that have semantic meaning are terms used to soften the meaning of language conveyed so that it does not offend the interlocutor when the term used contains elements of mockery or insult. Lexical structures are formulated with words that are combined into words, phrases, or sentences that have a meaning beyond their lexical meaning [5], [8]. The linguistic features of language data with lexical constructions appear to have meaning in their linguistic form, but in their preferential meaning, they carry a more refined meaning. For example, in Indonesian, to express that someone is angry and reckless, one might say, '*Dia wajahnya merah*' (His face is red). This expression is used to convey that someone is angry. In German, this can be expressed with the grammatical structure '*Er ist rotes Geschicht'*. In German, for example, '*Sie fährt mit dem Zug mit schwarzen*' (She rides the train as a black passenger) conveys the semantic meaning where '*schwarzen*' (black passenger) means someone who has not bought a ticket. The word '*schwarzen*' literally means black, but in this expression, it refers to a passenger who is traveling without a ticket.

Along with semantic meaning, there is also the meaning of words that come from terms used to express anger, disappointment, and annoyance by using the colors red, black, or sometimes dark. This indicates that Germans have a vocabulary to express emotions through colors, which has become a common practice, so the meaning beyond its linguistic context is called pragmatic meaning. Germans do not get angry when hearing insults because they function to soften words or phrases, even though the words or phrases might mean swearing as a form of grumbling or dissatisfaction with their surroundings, whether good or unpleasant [9]–[12]. Thus, semantic meaning emphasizes the lexical meaning obtained from the deep structure, while pragmatic meaning is derived from the outer structure of a linguistic expression.

To express something pleasant that aligns with expected outcomes, Germans use the expression '*der blaue Himmel'* (blue sky). This phrase means a beautiful and pleasant atmosphere, like a clear blue sky. Therefore, the study of color meanings in the German language is very interesting because it reveals the meanings contained within the colors used in expressions. For Germans, such expressions are considered positive and can have double meanings, especially if they are seldom heard. However, since Germans are known for being sociable and valuing harmony in interactions, if they do not understand what their conversation partner means, they will remain silent and ask for clarification of the intended meaning. Thus, the conversation partner will explain the semantic preferences and prosodic semantics within the grammatical structure that forms the phrase or sentence.

In the German language, as stated in Langenscheid (2024), there are eight expressions that have specific meanings beyond their grammatical context, (1) *Orthonymische Redewendung* (orthonymic), (2) *Allusive Redewendung* (allusion), (3) *Gestische Redewendung* (gesture), (4) *Remotivierbare Redewendung* (remotivating), (5) *Metaphorische Redewendung* (metaphoric), (6) *Situationelle Redewendung* (situational), (7) *Emotionelle Redewendung* (emotional), and (8) *Einschätzende Redewendung* (evaluative). These expressions have meanings beyond their lexical elements. This is due to the role of words, phrases, or sentences that become constituents within grammatical structures and lose their original meaning due to their usage. Meaning is often formed without a specific intention, sometimes as a result of repeated usage by people, becoming a habit ingrained within individuals and their communities. As a result, the language environment becomes accustomed to these expressions, no longer considering the use of color meanings as necessarily negative or positive. Sometimes, on the contrary, these color meanings take on positive connotations, softening the expressions used.

Semantics related to meaning, when traced based on the meaning of a word or phrase, will have various forms and interpretations, as Kridalaksana (2013) states, connotative meaning is an aspect of the meaning of a word or group of words that is based on the feelings or thoughts that arise or are triggered in the speaker (writer) and the listener (reader). This is also reflected in the statement that

connotative meaning is the meaning that emerges behind the cognitive meaning [15]. This cognitive meaning exists within the components of the word or phrase in all sentences. This implies to us that words or groups of words have external meanings, which can have meanings according to the meanings of the words or word groups and even have meanings beyond their linguistic context.

Regarding meaning, according to the theory of meaning by Ogden and Richards, there are three elements: symbol, object, and referent. The symbol is related to linguistics or language, such as words, phrases, and sentences, while the object refers to the experiences of the language user, and the referent contains the concepts or thoughts present in the speaker's mind. This is supported by experts [16]–[18].

Talking about lexical construction, there is still much debate among experts. This is due to the interpretation of a word, a group of words, or even a sentence. The meaning of a word or a group of words and phrases sometimes changes depending on the one who gives the meaning and the user, sometimes going beyond its linguistic context. However, on the other hand, it is claimed that a word or phrase can have many meanings depending on the speaker or language user and their interlocutor. As long as there is no communication breakdown, the language will continue to function well as a tool for communication. Therefore, semantic meaning is very closely related to cognitive semantics. Cognitive semantics refers to meaning found in external structures, making it easier for readers to understand. If there is meaning in internal structures, this causes difficulties in interpreting it because it is affected by the culture and customs of the language's community. Therefore, foreign language learners often encounter difficulties because they are used to understanding texts and contexts without fully understanding the surrounding context. Learners must not only study the language, but also the culture, as it is the culture that shapes the language and its development along with cultural progress.

In this research, what is interesting to examine is the semantic analysis which includes various levels of its hierarchy. This means that corpus-based analysis is not only about identifying concordance, collocation, colligation, and frequency, but also about understanding semantic preferences and semantic prosody, which are often overlooked by researchers because it is considered difficult and time-consuming to analyze these levels. In addition to using semantic analysis, pragmatic analysis is also employed, which looks at language from various perspectives to ensure the analysis is targeted and involves different linguistic elements.

This research is clearly a study that has novelty in its approach because it not only analyzes the linguistic context of the corpus but also integrates branches of semantics and pragmatics in analyzing a corpus of data regarding the meaning of color types in German and their equivalents in Indonesian. Below is a flowchart of the research process to help readers better understand, particularly the theoretical foundations used and the steps involved.



Figure 5. Flowchart of Research for Professor Assignment (Penugasan Guru Besar) 2024

3. Method

This research originates from the main issue, which is the limited understanding of lexical meaning constructions in the German language, particularly involving semantic and pragmatic analysis. Additionally, the limited utilization of corpus linguistics as a systematic method for examining meaning in a broader context presents its own challenges. This issue is exacerbated by the lack of resources and research utilizing large-scale corpora to explore deep meanings in phrases or sentences in the German language.

As a solution, this research proposes a corpus-based approach by utilizing the CQPWeb EuroParl: German Version platform to collect data. The analysis is conducted using semantic preferences and semantic prosody methods to understand both the explicit and implicit meanings of German lexical constructions. Validation is carried out through intra-rater and inter-rater assessments to ensure the reliability and accuracy of the analysis results. With these steps, this research not only addresses the need for in-depth analysis of lexical meanings but also utilizes modern technology to improve the efficiency and accuracy of linguistic research.

The results of this research are expected to make both practical and theoretical contributions, such as the development of teaching materials, meaning analysis guides, and serving as an academic reference in the fields of linguistics and the humanities. The corpus-based analysis offered in this research may also serve as a research model for other languages, opening opportunities for cross-linguistic and cross-cultural studies.

The results of this research are intended for academics, such as lecturers, researchers, and students specializing in linguistics, particularly corpus analysis, semantics, and pragmatics. Furthermore, education practitioners, such as German language teachers, can use the research results to develop technology-based teaching methods. The general public with an interest in linguistic studies and cross-cultural communication also forms part of the target audience for this research.

This research is a qualitative descriptive study. The study uses a document analysis approach on the meanings of color terms in German and Indonesian. The research data consists of linguistic corpus meanings in the German language. The instrument for this research is the researcher themselves, as the researcher is both the planner, corpus data collector, and corpus analyst. Thus, the researcher is referred to as a human instrument. Data collection techniques involve corpus linguistics sourced from CQPWeb EuroParl: German Version. Subsequently, all corpus data containing the keyword meanings in German are searched.

The object of this research is the linguistic units that construct lexical meanings in German. The subject data is all the corpus containing the lexical meaning constructions in German corpus linguistics. Data analysis uses corpus linguistics and semantic analysis to examine the forms and meanings contained within the corpus data.

The validity of the research data is ensured through intra-rater and inter-rater assessments. The steps are as follows: First, the corpus data is searched using the keyword meanings in German and Indonesian. Second, the researcher carefully, clearly, and accurately describes the data so that the results reflect the data under study. Third, the researcher interprets the semantic and pragmatic meanings of the obtained corpus data. Fourth, the corpus data concerning meanings in German is presented and explained. Fifth, the research report is prepared, and an academic article is written to be submitted to a reputable international journal. The stages of corpus analysis are explained in the following diagram.

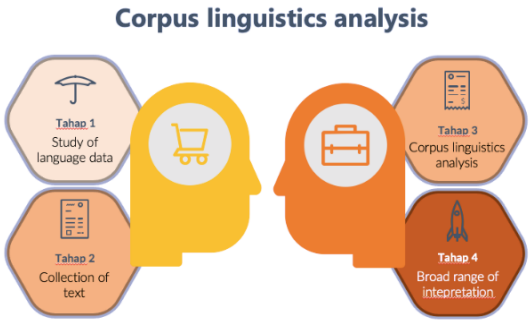


Figure 3. Stages of Linguistic Corpus Analysis

The corpus data regarding lexical meaning constructions in German within corpus linguistics can be described through its analysis. The levels of analysis have implications for the results obtained. The results of this study involve various levels of meaning, including collocation, colligation, semantic preferences, and semantic prosody [19]–[21]. The following diagram presents the corpus analysis from various levels of analysis, which will later serve as the basis for the analysis.



Figure 4. Levels of Corpus Analysis

Corpus-based analysis must prepare the necessary tools, including computers, internet network, software, and brainware. Brainware refers to the research team that has extensive experience in conducting linguistic corpus analysis. In 2021, the team carried out two major studies, one of which was an international collaboration with Universiti Kebangsaan Malaysia on a corpus for tourism. This demonstrates that the research team possesses sufficient competence and experience to carry out research under the 2022 higher education research excellence scheme. The basis for this consideration is that the research will produce a scientific paper that will be published in a reputable international journal indexed in Scopus or WoS. The target journal is the International Journal of Corpus Linguistics, accessible at https://benjamins.com/catalog/ijcl. This journal holds a Q1 ranking in Scopus and an impact factor of 0.60 in Web of Science. Therefore, the journal is highly credible and prestigious.

Below are the steps that will be carried out, starting from preparation to analysis and interpretation of the corpus data into a final outstanding research result. The analysis includes the preparation of everything needed to conduct the research. From corpus data, linguistic corpus, processing the corpus into annotated data, and the next step is interpreting the corpus into concrete results. This step is the process of finding meaning in the German language using linguistic corpus analysis. The interpretation of the corpus data uses semantic preferences and prosodic semantics for each keyword entered into the corpus linguistics software system. The database is based on CQP Web version EuroParl: German Version, which contains millions of articles encompassing various types of discourse. Based on the keyword, which is the type of color in German used in idioms, hundreds of related phrases and sentences will be retrieved. From these phrases and sentences, 10 phrases and sentences that represent meanings in both German and Indonesian will be selected. In this way, thousands of meanings that use color types will be identified, and the meaning contained in these words, phrases, or sentences will be explored.

The corpus analysis steps above represent concrete actions to carry out the analysis. All corpus database entries will be well recorded on the display as a result of entering the keyword related to meaning in German. Based on the keyword, thousands of phrases and sentences will be generated, from which 10 categories of animal names will be selected for analysis of their semantic preferences and prosodic semantics. If the meaning found is still considered inaccurate, it will be followed by a pragmatic analysis involving grammatical elements that have been linguistically arranged to understand both the explicit and implicit meanings in the grammatical structure.

Evaluation is conducted based on success indicators, such as the availability of relevant corpus data, analysis that results in valid findings about lexical meaning, and the preparation of a scientific article according to the standards of a reputable journal. The research process is monitored at each stage, from data collection to analysis. The analysis results are validated by a team of experts and through the peer review process. Success is measured by the article's acceptance in the target journal, accompanied by proof in the form of publication or article revision. Follow-up actions include preparing recommendations for further research and disseminating the results through national or international seminars.

4. Results and Discussion

This study follows the research steps outlined in the methods section for the process of collecting and analyzing linguistic data, focusing on lexical constructions in the German language. The results of its implementation are described in this section.

The data used in this study was collected through CPQWeb Europarl, which generated more than 1,200,000 raw words. This corpus serves as a basis for identifying words with lexical constructions relevant for further analysis.

Of the total words found, 43,436 words have lexical constructions that can be analyzed. These constructions include various linguistic elements, such as collocations and word combinations that have specific meanings within sentence contexts.

The study also analyzes important linguistic features in understanding the interaction of lexical meaning. Collocation and semantic prosody are the main focuses, aiming to explore the relationships between words that appear together and how they form meaning within sentence structures.

One of the activities conducted is evaluating semantic preferences, which involves examining how certain words appear more frequently in specific contexts, influencing the interpretation of meaning in German.

The results of this analysis aim to enrich the understanding of lexical structure and meaning in German, as well as contribute to the teaching and learning of German, particularly in terms of semantic analysis and sentence structure.

The main focus of this study is to analyze how these linguistic features interact with lexical meaning in German, which may include collocations, semantic prosody, and semantic preferences found in the data. These findings provide new insights into lexical constructions in German through corpus linguistic analysis, which has previously been rare, especially involving semantic and qualitative descriptive analysis.

This study successfully identified lexical constructions in German found in the linguistic corpus collected from online data sources via CPQWeb Europarl: German Version. This corpus contains more than 1,203,976 raw words, of which 43,436 words were found to have lexical constructions that can be analyzed. Of these, 34,129 words serve as important linguistic features for interpretation in this study.

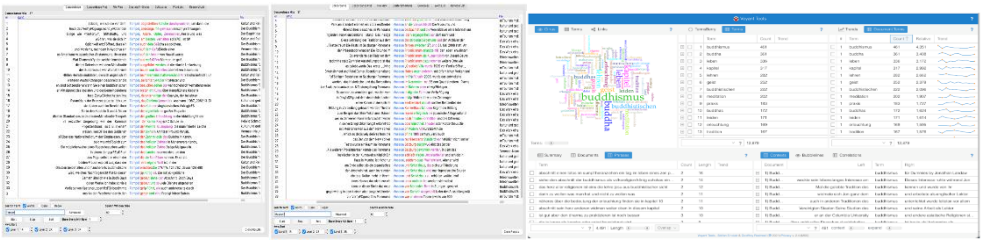


Figure 6. Language Data (total 1,203,976 words, meaning 43,436 words, linguistic features 34,129 words)

This study successfully achieved its goal of exploring and analyzing lexical constructions in the German language with a focus on linguistic features obtained from corpus data. The data collection process, based on lexical meaning in the linguistic corpus, provides significant insights into how the German language forms meaning based on the existing linguistic features. The analysis conducted using the linguistic corpus allows the researcher to assess linguistic patterns in a broader and more objective context. By using tools like Voyant Tools, the researcher can visualize the data and uncover linguistic patterns that may have been overlooked in manual analysis.

However, despite the positive results of this study, there are several aspects that need improvement. One of these is the limitation in the variety of data used. Relying on a single linguistic corpus may not fully represent the entire lexical construction in the German language, as dialectal variation, register, and social context in everyday language are not entirely represented. Additionally, the processing of large and complex data requires more time and precision. Although analytical tools help accelerate the process, a deep understanding of these tools is also crucial to optimize their use.

This study is supported by several factors, such as access to a wide and diverse linguistic corpus, the use of advanced technology like Voyant Tools for data analysis, and the researchers' sufficient linguistic knowledge regarding lexical constructions. The researchers' commitment to following a systematic methodology also contributed to the smooth progress of this study. On the other hand, the main limiting factor is the lack of data variation, as it only includes certain texts and does not fully represent the entire lexical construction in the German language, as well as the complexity involved in processing such large data. Additionally, the use of advanced analytical tools requires a deeper understanding to be fully optimized. Limited resources, both in terms of time and expertise, also posed a challenge in this study. Nonetheless, the supporting factors have made a significant contribution to the progress of this research, and the development of a broader corpus and improved skills in using analytical tools in the future will be invaluable for further research.

7. Conclusion

This study shows that lexical constructions in the German language focus on the interpretation of linguistic corpora, where the linguistic features within the corpus become important language data. The language data obtained from the lexical meaning in the linguistic corpus provides a clear picture of how linguistic features play a crucial role in shaping lexical meaning in the German language. The process of interpreting lexical meaning heavily relies on the context and structure within the corpus, offering deeper insights into the use of the German language in various communication situations.

Based on this study, it is hoped that future research will develop larger and more diverse linguistic corpora, which can expand the understanding of lexical constructions in the German language, including variations in its usage. This research is expected to make a significant contribution to the field of German language teaching, particularly in helping students understand how lexical meanings are formed and used in real-life contexts, enriching their learning experience.

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Library User Competencies and Information Literacy in Yogyakarta's Public and Private Schools

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Abstract

The purpose of this Community Service program is to promote the Library Competency Standards and Information Literacy Proficiency Standards. These information literacy skills support library users to become competent library users according to the indicators described in 2020. This indicator is adopted from the "School Library Skills Continuum" developed in Canada and the United States, specifically by the American Library Association and the Association for Educational Communication and Technology. It refers to the Information Literacy Skills Continuum, which outlines the progression of information literacy skills for students from Kindergarten to Grade 12 (the entire span of primary and secondary education). Students and librarians need to understand these two indicators of library competence in library use.

The dissemination of these two standards was conducted in 2019 and 2020, but with a limited sample of librarians and library supervisors as participants. However, it turns out that the school library supervisor's lack sufficient understanding of these two types of user competency indicators. As a result, in 2024, the participants are limited to librarians to ensure that the feedback gathered from this socialization process, which resembles a survey, represents a well-informed understanding. This feedback will then be used to propose *Hak Kekayaan Intelektual* (HKI), or intellectual property rights, and subsequently, the indicators can be implemented in school libraries across the Special Region of Yogyakarta. The target participants are teachers from early childhood education (PAUD), elementary schools (SD), and secondary schools (SLTA, including high schools and vocational schools) in the Special Region of Yogyakarta. A total of 231 standard indicators for user competency and 146 standard indicators for information literacy need to be studied by librarians and discussed to determine whether fundamental changes to the concepts of these two types of standards are necessary within the Indonesian context.

The problem formulation addressed in this Community Service Program (CSP) focuses on two key issues. First, how to ensure that librarians at the levels of early childhood education (PAUD), elementary schools (SD), junior high schools (SLP), and senior high schools (SMA/SMK), both public and private, understand the competencies of library users and students' information literacy competencies. This is crucial as these indicator concepts were not fully comprehended during activities in 2019 and 2020, due to the absence of these standards in Indonesia. Therefore, fostering understanding and consolidation is necessary. Additionally, in the second activity, efforts must be made to establish indicators tailored to Indonesia's context for these two standards. In the subsequent phase, research on their implementation needs to be conducted.

Keywords: user competency, information literacy competency, indicator, librarian, school library supervisor.

1. Introduction

The Program for International Student Assessment (PISA) assesses the knowledge and skills of 15-year-old students in math, reading and science [1], [2]. The test explores how well students can solve complex problems, think critically and communicate effectively. It provides insight into how well education systems prepare students for real-life challenges and future success. Indonesia participated for the first time in PISA in 2001. Figure 1 shows the development of Indonesia's participation in PISA from 2001 to 2022.

The white dots in Figure 1 represent estimates of average performance that are statistically insignificant above/below the PISA 2022 estimates. The black line represents the best fit trend. An interactive version of this figure is available at https://oecdch.art/a40de1dbaf/C108. Source: OECD, PISA 2022 Database, Tables I.B1.5.4, I.B1.5.5, and I.B1.5.6.

Average results in 2022 decreased compared to 2018 for math, reading and science. Overall, the 2022 results are among the lowest ever measured by PISA in all three subjects, on par with results observed in 2003 for reading and math, and in 2006 for science. Although results from some earlier assessments were higher than those observed in the early years, these gains were reversed by the declines observed from 2015 onwards.

Over the latest period (2018 to 2022), the gap between the highest-scoring students (top 10%) and the lowest-scoring students (bottom 10%) narrowed in math, while the gap did not change significantly in reading and science. In math, high-achieving students became weaker, while performance did not change significantly among low-achieving students.

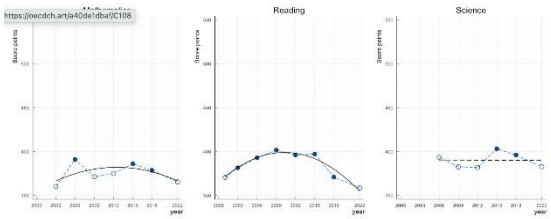


Figure 16. Development of Indonesia's Participation in PISA from 2001 to 2022

Compared to 2012, the proportion of students scoring below the basic proficiency level (Level 2) increased by five percentage points in math; increased by 19 percentage points in reading; and did not change significantly in science.

By comparing results internationally, Indonesian policymakers and educators can learn from the policies and practices of other countries. See Figure 2 for Indonesia's average performance in math, reading and science in PISA 2022, the OECD average and selected comparator countries.

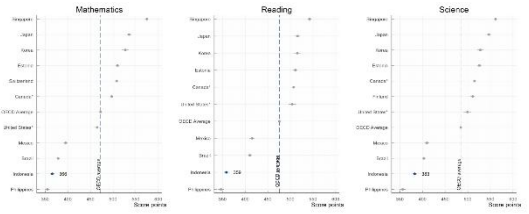


Figure 17. Indonesia's average performance in math, reading and science in PISA 2022

Students in Indonesia score below the average of the Organization for Economic Co-operation and Development (OECD) countries in mathematics, reading, and science. A smaller proportion of students in Indonesia, compared to the average in OECD countries, achieve the highest performance levels (Level 5 or 6) in at least one subject. At the same time, a smaller proportion of students compared to the OECD average reach the minimum proficiency level (Level 2 or higher) in all three subjects.

About 25% of students in Indonesia reach Level 2 or higher in reading (OECD average: 74%). These students are able to identify the main ideas in moderately long texts, find information based on explicit criteria, even if somewhat complex, and reflect on the purpose and structure of texts when explicitly directed to do so. The percentage of 15-year-old students reaching the minimum proficiency level in reading (Level 2 or higher) ranges from 89% in Singapore to 8% in Cambodia.

In Indonesia, almost no students achieve a score at Level 5 or higher in reading (OECD average: 7%). These students can comprehend long texts, understand abstract or counterintuitive concepts, and distinguish between facts and opinions based on implicit cues related to content or information sources.

Reading skills receive special attention because all other skills are built on the foundation of reading. If reading skills are low, subsequent skills may not develop well, as the foundation of various competencies is reading. From Figures 1 and 2, it is evident that Indonesia's PISA results rank low. So, what is the connection to the standardization of library user competencies? School librarians and library teacher mentors need to understand the indicators for standardizing library user competencies in

utilizing libraries for reading activities. Students must be trained to be independent and disciplined in their behavior and actions when using library facilities at school or other areas.

Furthermore, in the 4.0 and 5.0 Era, students must be digitally literate. The combination of knowing how to use reading facilities and being digitally literate forms the foundation for students to develop other competencies in adapting to their environment, from early childhood education (PAUD) to adolescence in senior high school.

In this regard, librarians and library mentors need to understand the indicators of library user competence and information literacy competence standards. However, initially, the socialization has been emphasized for librarians because they have received education on libraries and their intricacies. Since these two competence indicators have not yet been implemented in Indonesia, it is expected that with their professional skills, librarians can determine the appropriate indicators for the educational context in Indonesia. These indicators can be modified according to the needs and the foundational knowledge that librarians have gained from their education. The second set of standards indicators can be seen in the Appendix.

Students must know the competencies expected of them when using library facilities and how they can access books based on the information literacy they understand in today's digital era. Librarians or library mentors must teach the competencies that students need to know in order to become proficient library users and master information literacy, thereby supporting their learning process. With the ability to utilize library facilities responsibly and mastering information literacy, it is hoped that students will enjoy reading, develop curiosity, and understand the purpose of PISA testing. With this awareness, students are expected to understand the importance of participating in PISA and take responsibility as Indonesian students by mastering reading skills well, which will, in turn, support proficiency in other subjects, such as mathematics and science, within the PISA context.

In this regard, librarians and library mentors need to understand the indicators of library user competence and information literacy competence standards. However, initially, the socialization has been emphasized for librarians because they have received education on libraries and their intricacies. Since these two competence indicators have not yet been implemented in Indonesia, it is expected that with their professional skills, librarians can determine the appropriate indicators for the educational context in Indonesia. These indicators can be modified according to the needs and the foundational knowledge that librarians have gained from their education. The second set of standards indicators can be seen in the Appendix.

The research aims to address several key issues related to library user competence and information literacy standards in the context of secondary education in Daerah Istimewa Yogyakarta (DIY). The primary research questions are as follows, (1) How is the standardization of library user competence accepted among educators in DIY? (2) What aspects of library user competence are not understood or applied by teachers and library users in high schools and vocational schools? (3) What are the attitudes of teachers and library users in private high schools and vocational schools towards the draft of library user competence standards? (4) What are the views of teachers and library users in high schools and vocational schools regarding the Indonesian translation of library user competence standards in terms of their relevance to students in the DIY region? (5) What are the opinions of high school and vocational school teachers regarding the Indonesian translation of information literacy competence standards in terms of their relevance to students in the DIY region? (6) What are the opinions of librarians regarding the Indonesian translation of information literacy competence standards in terms of their relevance to students in the DIY region? (7) How can teachers and library users in private high schools and vocational schools be educated about the library user competence standards translated into Indonesian in terms of their relevance to students in the DIY region? (8) How can teachers and library users in private high schools and vocational schools be educated about the information literacy standards translated into Indonesian in terms of their relevance to students in the DIY region? (9) How can librarians and library mentors in private high schools and vocational schools be provided with the experience and resources to design and implement activities that enhance their professional competencies as librarians, library user competence, and student information literacy in their respective schools?

The formulation of the issues in this Community Service Program (PkM) is based on three focal points: (a) the Indonesian translation of the library user and information literacy competence drafts, (b) the opinions of teachers and librarians in private high schools and vocational schools in Daerah Istimewa Yogyakarta (DIY), who are relatively unfamiliar with these issues, and (c) the implementation

of these issues in private high schools and vocational schools in DIY, where these matters are rarely addressed.

Therefore, the research questions for this study are formulated as follows:

a. How can librarians and library mentors in private high schools and vocational schools in DIY be made to understand the competencies of librarians, library users in senior secondary education (SLTA), and students' information literacy competencies?
b. How can librarians and library mentors in private high schools and vocational schools in DIY be provided with experiences that enable them to design and implement activities aimed at improving their professional competencies as librarians, as well as the library user competence and students' information literacy in their respective schools?
c. How can librarians and library mentors in private high schools and vocational schools in DIY be provided with experiences that enable them to implement the planned activities for improving their professional competencies as librarians, as well as the library user competence and students' information literacy in their respective schools?

Therefore, the research questions for this study are formulated as follows:

a. How can librarians and library mentors in private high schools and vocational schools in DIY be made to understand the competencies of librarians, library users in senior secondary education (SLTA), and students' information literacy competencies?
b. How can librarians and library mentors in private high schools and vocational schools in DIY be provided with experiences that enable them to design and implement activities aimed at improving their professional competencies as librarians, as well as the library user competence and students' information literacy in their respective schools?
c. How can librarians and library mentors in private high schools and vocational schools in DIY be provided with experiences that enable them to implement the planned activities for improving their professional competencies as librarians, as well as the library user competence and students' information literacy in their respective schools?

The objectives of this Community Service Program are as follows:

a. To provide librarians and library mentors in private high schools and vocational schools with an understanding of librarian competencies, library user competencies in senior secondary education (SLTA), and students' information literacy competencies.
b. To offer librarians and library mentors in private high schools and vocational schools the experience needed to design and implement activities that enhance their professional competencies as librarians, as well as improve library user competence and students' information literacy in their respective schools.
c. To equip librarians and library mentors in private high schools and vocational schools with the necessary experience to implement planned activities aimed at improving their professional competencies as librarians, as well as developing library user competence and students' information literacy in their schools.

This program seeks to strengthen the capacity of librarians and teachers in private high schools and vocational schools to better support the development of information literacy and library skills among students, contributing to a more effective educational environment.

This Community Service activity offers two main benefits: (1) providing information to teachers and librarians about the standardization of library users and information literacy standards for the development of literacy competencies among high school and vocational school students, and (2) equipping teachers and librarians with the necessary skills regarding their roles and responsibilities as library users and librarians.

The issues in this service program are addressed through several stages as follows. First, providing information to participants about their roles and responsibilities as librarians. This is important because many librarians (especially in private schools) work without standard job descriptions. The team has identified two valid sources that have been used in various countries and adopted by the government (the School Literacy Movement from the Ministry of Education and Culture and the National Library), namely the School Library Skills Continuum [2] and the Information Literacy Skills Continuum: K-12 from Information Power: Building Partnerships for Learning by the American Association of School Librarians and the Association for Educational Communications and Technology.

Second, the team translated the materials so that librarians could understand them [3]. The team also conducted a pilot reading session to find the alignment of the above literacy standards with the

conditions in Daerah Istimewa Yogyakarta (DIY) [4]. The materials were shared with participants beforehand so they could study them prior to the activity.

Third, the team conducted a socialization session for librarians and library mentors. The issue of socialization was addressed through training on understanding and implementing library user competencies and information literacy skills for senior secondary education. Training was chosen as a form of socialization for the following reasons, (1) it provides knowledge, (2) it gives participants experience in designing activities, and (3) it offers all participants the opportunity to implement their designs.

The target audience for this Community Service program from the Center for Creativity, Literacy, and Lifelong Learning includes librarians and library mentors at private high schools and vocational schools in Daerah Istimewa Yogyakarta. The number of participants is set at 30-40 people. Participants are selected by distributing information about this program to the principals of private schools. Subsequently, the principals of private high schools and vocational schools with libraries will register their librarians and library mentors. Each district/city is allotted 10 schools, ensuring that the service program is distributed evenly and that a representative sample is achieved for the socialization of the discussed standards.

2. Method

The methods used in this community service program are tailored to its specific objectives and are outlined as follows:

a. Lecture Method

In the lecture format, librarians and library mentors receive explanations about the school literacy movement, the 15-minute daily reading habit, and the two types of competencies that high school and vocational school students must master: library user competencies and information literacy competencies. The presentation is delivered in two languages, the original standard in English and its translation in Indonesian. Given the pandemic situation that prevents face-to-face meetings, the lecture is delivered via a webinar. Additionally, WhatsApp groups are utilized for distributing written materials, discussions, and audio recordings, considering the participants' busy schedules, especially when they are engaged in accreditation tasks at their respective libraries.

b. Question and Answer

During the question-and-answer session, participants ask questions about topics they do not understand, and the community service team provides answers.

c. Testing Method

Librarians and library mentors take a test to assess their understanding of the material provided.

d. Focus Group Discussion

Librarians and library mentors are separated into groups and engage in discussions about the actions they need to take as librarians and library mentors to ensure that high school students, as library users, master both library user competencies and information literacy competencies.

e. Assignments

Librarians and library mentors create plans for activities they will implement in their schools to help students master library user competencies and information literacy. Over the course of 2–4 weeks, participants implement their planned activities in their schools and report the results.

f. Presentation

Participants present the outcomes of their applied tasks as librarians and library mentors.

Evaluation is also planned. Evaluation is based on indicators measuring the extent to which the community service goals are achieved. Two types of evaluation are employed.

a. Product Evaluation

Product evaluation uses two main indicators: (a) Participants can complete a test as librarians and mentors regarding students' competencies as library users and in information literacy, and (b) Participants can complete tasks as librarians and library mentors at their respective high schools and vocational schools.

b. Meaningfulness Evaluation

Meaningfulness evaluation uses three indicators: (a) The relevance of the lecture content concerning librarian competencies, library user competencies, and information literacy competencies; (b) The significance of the tasks given to participants, and (c) The relevance of the tasks given to students as library users.

Table 6. Schedule of Community Service Activities

Activities	Location	May	June	July	August	Sep,	Oct.
Proposal Preparation	UNY						
Community Service Preparation	UNY						
Coordination with MKKS (Association of Private High School Principals)	Online						
Participant Registration	Online						
Materials from the Service Team	Online						
Material Test	Online						
Focus Group Discussion for Tasks	Online						
Tasks	Online						
Task Implementation	Online						
Participant Reports	Online						
Participant Presentations	UNY						
Activity Evaluation	UNY						
Report Preparation	UNY						

Note: UNY stands for Yogyakarta State University.

3. Results and Discussion

This community service activity was attended by librarians from 21 vocational high schools (SMK) and 3 senior high schools (SMA) in the Special Region of Yogyakarta. However, the number of participants from SMK was significantly higher than that from SMA. This imbalance was due to school activities at the SMA level, which always coincided with the evaluation activities. Nonetheless, the overall quality of the community service activity was not affected by the imbalance in participation between SMK and SMA. The activities were carried out over one semester, combining both face-to-face (offline) and online sessions. This approach was chosen due to the busy schedules at both SMK and SMA, leading the community service team to opt for a blended delivery method, both offline and online.

This community service activity was carried out in two stages: face-to-face and online via Zoom. This approach was intended for time and energy efficiency. The first meeting was held offline at SMK Ma'arif 1 Wates, starting from 09:00 to 15:30 Western Indonesia Time (WIB). The opening ceremony was delivered by the Head of the Community Service Team, followed by remarks from the Principal of SMK Ma'arif 1 Wates, who also officially opened the event. The event then proceeded with the first and second sessions of the material presentation, followed by a visit to the SMK Ma'arif 1 Wates Library.



Figure 18. Documentation of Activity

Out of the 42 participating schools, a combination of SMK and SMA schools filled out the indicators for the Standardization of Library User Competencies and the Standardization of Information Literacy Skills. Six schools did not fill out the indicator sheet, namely SMK Ma'arif 1 Temon, SMK Muhammadiyah Gamping, SMK Muhammadiyah Minggir, SMA Ma'arif Wates, MA Ma'arif Nurul Haromain, and MA Ma'arif Nurul Haromain. The findings on the Standardization of Library User Competencies can be seen in the following Table 2.

Table 7. Findings on the Standardization of Library User Competencies.

School Name	Percentage of Compliance of each grad		
	X	XI	XII
SMK Muh, 2 Playen	31,68	32,30	29,19
SMK Ma'arif Wonosari	31,68	27,95	34,16
SMK Ma'arif 1 Temon	**0**	**0**	**0**
SMK PI Ambarukmo	40,37	36,65	50,93
MA YAPPI Gubukrubuh	69	36,65	47,83
SMK Muh, Gamping	**0**	**0**	**0**
SMK Ma'arif Semanu	29,81	34,16	49,07
SMK Pariwisata	42,86	34,78	46,58
SMK Cokroaminoto Pandak	34,78	26,71	21,74
SMK IT Al-Furqon Sanden	40,37	49,07	49,07
SMA Pemb, 1 Wonosari	33,54	30,43	33,54
SMK Muh, 1 Playen	49,07	46,58	52,80
SMK Al-Hikmah Karangmojo	26,09	21,12	18,01
SMK Ma'arif 1 Kretek	41,61	48,45	34,16
SMA Pemb, 2 Karangmo-jo	34,16	40,37	45,58
SMK Pemb, Karangmojo	40,37	43,48	48,45
SMK Kesehatan Binatama	37,89	35,40	53,42
SMK Diponegoro Depok	32,92	37,27	48,45
SMKS Kesehatan Cipta Bhakti Husada Yogyakarta	13,66	14,91	15,53
SMK Muh, 2 Sleman	34,16	35,40	47,83
SMK Muh, Minggir	**0**	**0**	**0**
SMK Ma'arif Al-Munawwir Krapyak	19,25	29,81	49,07
SMK Ma'arif 1 Nanggulan	30,43	27,33	31,06
SMK Ma'arif Playen	24,22	38,51	50,31
SMK Ma'arif 2 Temon	13,66	48,45	44,72
SMK Ma'arif 1 Wates	46,58	**52,80**	**56,52**
SMA Ma'arif Wates	**0**	**0**	**0**
SMK Ma'arif 2 Wates	**52,17**	**57,14**	**55,90**
SMK Ma'arif 1 Yk	49,07	52,17	55,28
SMK Ma'arif Nurul Haromain	*46,58*	0	0
SMA Sunan Kalijogo	36,65	42,86	42,86
MA Ma'arif Nurul Haromain	**0**	**0**	**0**
SMK Ma'arif 2 Sleman	37,89	39,13	46,58
SMK YAPPI Wonosari	**50,31**	49,07	46,58
SMK Pemb, Dlingo	**0**	**0**	**0**
SMK Muh, 4 Yk	33,54	32,92	**46,69**
SMK Pelita Bangsa	0	0	*37,27*
SMK Kesehatan Bantul	44,10	0	0

The percentages above represent the number of indicators that align with the Library Competency Standardization indicators. The maximum number of indicators met was not consistently achieved for each class level; at least the maximum for some reached above 70 indicators. On the other hand, there are schools that only filled out one class, and six schools that did not submit any data. This situation needs to be discussed in the subsequent activities.

Based on the data, 42 schools attended the socialization, both in-person and online. However, among this number, there were some that did not fill out the Information Literacy Competency Standardization indicators. Four schools did not fill out the indicators: SMK Al-Hikmah Karangmojo, SMK Muhammadiyah Minggir, SMA Ma'arif Wates, MA Ma'arif Nurul Haromain, and SMK Pembangunan Dlingo. Meanwhile, three schools only filled out one school level: SMK Muhammadiyah Gamping and SMK Ma'arif Semanu.

Table 8. Findings of Information Literacy Standardization

School Name	Percentage of Compliance		
	X	XI	XII
SMK Muh, 2 Playen	7,43	8,11	11,49
SMK Ma'arif Wonosari	**87,84**	87,16	**93,24**
SMK Ma'arif 1 Temon	**81,76**	**82,43**	**80,41**
SMK PI Ambarukmo	**84,46**	89,19	**89,86**
MA YAPPI Gubukrubuh	64,86	**105,41**	**82,43**
SMK Muh, Gamping	41,22	0	0
SMK Ma'arif Semanu	53,38	0	0
SMK Pariwisata	**87,84**	**91,89**	**93,24**
SMK Cokroaminoto Pandak	56,76	**67,57**	**72,30**
SMK IT Al-Furqon Sanden	5,41	3,38	0,68
SMA Pemb, 1 Wonosari	45,27	54,73	75,00
SMK Muh, 1 Playen	**77,70**	**93,24**	56,76
SMK Al-Hikmah Karangmojo	*0*	*0*	*0*
SMK Ma'arif 1 Kretek	6,08	5,41	2,03
SMA Pemb, 2 Karangmo-jo	39,86	74,32	90,54
SMK Pemb, Karangmojo	70,27	74,32	81,08
SMK Kesehatan Binatama	54,05	57,43	65,54
SMK Diponegoro Depok	71,62	84,46	83,11
SMKS Kesehatan Cipta Bhakti Husada Yogyakarta	36,49	35,14	37,84
SMK Muh, 2 Sleman	**87,84**	98,65	102,03
SMK Muh, Minggir	0	0	0
SMK Ma'arif Al-Munawwir Krapyak	8,78	24,32	41,22
SMK Ma'arif 1 Nanggulan	32,43	33,78	33,78
SMK Ma'arif Playen	**78,38**	81,76	82,43
SMK Ma'arif 2 Temon	4,73	6,08	74,32
SMK Ma'arif 1 Wates	**74,32**	78,38	82,43
SMA Ma'arif Wates	*0*	*0*	*0*
SMK Ma'arif 2 Wates	14,86	0	0
SMK Ma'arif 1 Yk	28,38	52,70	28,38
SMK Ma'arif Nurul Haromain	**77,03**	0	0
SMA Sunan Kalijogo	6,76	7,43	9,46
MA Ma'arif Nurul Haromain	*0*	*0*	*0*
SMK Ma'arif 2 Sleman	**85,14**	93,24	**95,95**
SMK YAPPI Wonosari	6,08	6,76	7,43
SMK Pemb, Dlingo	*0*	*0*	*0*
SMK Muh, 4 Yk	16,22	21,62	43,92
SMK Pelita Bangsa	58,11	60,14	66,89
SMK Kesehatan Bantul	2,03	1,35	1,35

4. Conclusion

Based on the PkM activities that have been carried out, the following conclusions can be made.

The PkM activity has provided an understanding for librarians and library supervisors at private high schools (SMA) and vocational high schools (SMK) about librarian competencies, student library user competencies, and information competencies for senior high school students;

The PkM activity has given librarians and library supervisors at private SMA and SMK the experience to design and implement activities aimed at improving their competencies as librarians, library user competencies, and information competencies for students in their respective schools; and

The PkM activity has provided librarians and library supervisors at private SMA and SMK with the experience to implement plans to improve their competencies as librarians, library user competencies, and information competencies for students in their respective schools.

However, the outcomes of this PkM activity are still at stage (1), where librarians and library supervisors are becoming familiar with both

standardizations. There are still challenges because both standards are entirely new topics for them. Some technical terms have not been fully understood, making this activity a new experience for

teachers who are also assigned additional responsibilities as school library heads. Furthermore, stage (3) needs to be carried out in subsequent PkM activities. Additionally, understanding was hindered when discussions were held online due to the large number of indicators (61, 86, and 146), and ideally, these discussions should be done collaboratively within the school team.

Based on the findings from this PkM activity, the following steps are needed for future activities Research related to both librarian standards, data should be based on intensive observations for at least one month, conducted either in person or online; special treatments should be provided based on the individual needs of each librarian; and a standardization model for Indonesia needs to be developed for SMA/MA and SMK, as the needs of these two types of schools are likely to differ.

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SCIENTIFIC WRITING TRAINING FOR HIGH SCHOOL TEACHERS IN IKIP VETERAN III TAMBAKROMO GUNUNGKIDUL

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Abstract

This study examines the effectiveness of scientific writing training activities attended by 42 teachers from various schools, including IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. The training was conducted in four meetings followed by online mentoring for six months. The strategies applied include introducing ideas, learning sentence structure, and constructing sentences with good cohesion and coherence. The evaluation of activities was carried out in three steps, consisting of (1) evaluation of teacher participation, (2) preparation of scientific writing drafts according to the field of study, and (3) preparation of scientific papers in accordance with journal objectives. The results showed a significant increase in teachers' understanding and writing skills from the first to the fourth meeting, with the percentage of success reaching 80% at the last meeting. The results indicates a significant increase in teachers' understanding and writing skills from the first to the fourth meeting, with the percentage of success reaching 80% at the last meeting. The results of scientific writing training illustrate that teachers have been able to understand the basics of writing scientific articles, determine themes and titles based on the issues raised, formulate problems, write introductions and methodologies, compile results, discussions, and formulate conclusions. Although there were challenges in writing, this training proved effective in improving teachers' professional competence. This training is expected to contribute to supporting teachers in producing quality scientific papers and strengthening their position as professional educators.

Keywords: training, writing scientific papers, professional competence, teachers

1. Introduction

Writing scientific papers is an important skill that every teacher should have to put their ideas and research results into writing. However, this activity has never been done systematically in schools, so many teachers consider it essential to receive the required training [1], [2]. This information was obtained from students who had done a community service program (KKN) in the village and was also conveyed by teachers during the reunion of the Faculty of Language and Cultural Arts (FBSB), where they wanted a resource person from Yogyakarta State University (UNY) to provide training in scientific writing.

According to these problems, Community Engagement Team (PkM) for Professorial Assignments (Penugasan Guru Besar) team propose solutions, including 1) problem solution by providing training and guidance to partner schools on how to compose a proper and correct sentence in accordance with Indonesian principles, 2) solution to the problem of preparing scientific papers by providing training and guidance to affiliated school on how to prepare drafts of scientific papers from the results of research that has been carried out in the previous year, and 3) solution to the problem of writing ideas and ideas into a writing by providing training and guidance to affiliated school on how to properly and correctly use reference tools so that they can implement these tools. Reference tools are also part of the application of Science and Technology (IPTEKS). With reference tools teachers can quickly find bona fide and correct reference sources that can be referred to in their writing. Teachers do not necessarily have to read heavy book works. However, teachers need to search for reading sources through these reference tools, especially those sourced from international journals.

Based on the problems and solutions described, a Community Service activity was proposed at IKIP Veteran III Tambakromo High School, Gunungkidul, and was attended by teachers from various subjects. The 2024 PkM was attended by teachers not only at IKIP Veteran III Tambakromo High School, but also at Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. Teachers who follow are also not restricted to teachers who teach German, but teachers

who teach various subjects. This training aims to provide scientific writing skills, so that teachers are expected to produce quality writing that is ready to be submitted to accredited national journals or reputable international journals. Thus, it is expected that this training can have a positive impact on teachers who have not previously received training on scientific writing.

The method of this training of scientific writing, thus teachers must have previous research results so that teachers can write ideas and ideas from the research results. The training was held twice offline and continued with online assistance. The time spent organizing the activity was 6 months as it takes a long time to develop a scientific paper. Thus the teachers have the opportunity to write ideas and ideas into writing. The strategy for achieving success was carried out through training in writing basic ideas and ideas into writing. Then the training continued to organize a good and proper sentence structure. This is followed by training to construct sentences that have cohesion and coherence correctly.

Progress in writing scientific papers is largely determined by the results that can be achieved properly in daily activities. Teachers who succeed in pouring their ideas and ideas into writing that has excellent quality can be produced by their success in the transfer of knowledge [3]–[5]. Academic achievement does not only rely on the transfer of knowledge, but also the transfer of value that is needed by teachers. This is closely related to character education which relies heavily on the success of the learning process and the transfer of value [6]. The success of character education can be a great asset in improving the image of good education in the country. The number of juvenile delinquency, wild races, and brawls between students is a blurry portrait in the world of education. With the application of a learning model that integrates all existing components can minimize the juvenile delinquency. Schools that are strict in supervising and protecting their students can at least reduce the negative excesses that arise. The role of parents is certainly no less important to help educate their children towards a better education. The project method provides space for teachers and students, and between students to build more intimate communication. With good intimacy, it facilitates effective value transfer.

This PkM engagement was carefully prepared by the team. In accordance with the agenda agreed by the affiliated schools, including SMA IKIP Veteran III Tambakromo Gunungkidul so that the material provided is in line with the needs of the teachers. Training is provided by lecturers who are competent in the field of writing scientific papers to teachers. This PkM engagement's affiliated school also provided some important information that was useful for developing an activity plan from start to finish.

This PkM engagement is a form of implementation of Three Pillars of Higher Education of Yogyakarta State University in empowering the community in the educational field. Therefore, training activities for teachers are required. This activity is included in the category of lecturers who carry out off-campus programs, which is in accordance with the IKU (Key Performance Indicators) demands launched by the Ministry of Education and Culture and Research so that lecturers and students are able to play an important role both in the industry and society. In addition, this program supports lecturers' work in providing guidance, mentoring, and services to the community in schools. This PkM program is in line with the Yogyakarta State University Strategic Plan 2025.

Thus, this program can be a mutually beneficial cooperation for both sides. UNY was able to assign lecturers to the community to help the school's needs. The school is helped by the continuous training, not only carried out once or twice, but regularly and systematically for one semester. In addition, lecturers' off campus programs also involve students, thus providing real experience of the school situation, and students are expected to prepare themselves before entering the world of work.

2. Literature Review

Scientific papers contain an exposure to a problem or phenomenon scientifically carried out by researchers. Through scientific papers, a phenomenon can be presented logically and systematically to the reader. Scientific papers are generally written to find answers about something and to prove the truth about something contained in the object of writing. Thus, scientific writing often raises certain themes, problems, and actual phenomena [7], [8].

Writing scientific papers requires a proper structure and the usage of formal language to express and organize logical arguments [9]. The arguments in scientific papers are coherent and supported by reliable data. This is necessary to produce writing that can be accounted for [10]. Writing scientific papers also requires critical skills in analysis, synthesis, and processing information. Compiling scientific writing thus requires gradual steps and must be ensured according to the rules of scientific

writing [11]. In general, experts formulate scientific writing consists of several stages and needs repeated practice, starting from formulating topics, writing methodologies, to discussing results [12]. In addition, discussion and feedback are necessary in writing scientific papers to optimize scientific writing and and encourage authors to revise drafts of scientific papers substantially before submitting them for review in the targeted journal [13], [14].

A professional teacher must have competencies that support education and instructional tasks. One important aspect of this competency is the ability to write and publish scientific papers, which plays a role in developing teacher professionalism. Therefore, writing scientific papers is one form of innovation that can improve professionalism in the teaching profession [15]–[17]. Scientific papers are sequentially organized starting from the background, methodology, results, discussion, and conclusion [18], [19].

Findings from several previous studies indicate that the comprehension and ability of teachers in writing scientific papers is not considered optimal [1], [2], [20]. This capability is not optimal due to factors such as lack of motivation, opportunity or time to write, difficulty finding data, lack of diligence in utilizing technology, lack of references, group activities in the field of scientific work are still lacking and the reach of agencies that support to facilitate is still lacking [21]. In addition, factors such as the lack of facilities to conduct research in schools, limited reference sources, and the absence of a special allocation of funds for research affect the not optimal understanding and ability of teachers in writing scientific papers [16].

There are various ways to help improve teachers' competence in writing scientific papers. One of the ways is through scientific writing training. Scientific writing training is effective in increasing teachers' understanding and ability to produce good scientific work [17], [22], [23]. The success of a training certainly cannot stand alone, but must be maximized by the role of the organizing work unit and the activeness of each participant in the training. The potential of teachers to develop themselves in conducting research and producing scientific work needs to be facilitated and given assistance [22].

Project-based learning is one of the innovative learning models characterized by student-centered and can be chosen and used by teachers as an alternative to provide new colors in learning that generally tends to be conventional [24]. The focus of project-based learning aims to enable learners to develop their knowledge and skills through a structured inquiry process and produce a product. This is different from traditional learning which generally only provides memorized theories. Through project-based learning, learners acquire meaningful and long-term knowledge and skills [25]. Correspondingly, there are five distinctive features of project-based learning, 1) PBL projects as the main underlying framework for learning activities, 2) focusing on meaningful problems that encourage students to engage deeply in learning, 3) PBL engages students in constructive inquiry, allowing them to explore and construct knowledge through hands-on experience and investigation, 4) these projects are student-run to a significant degree, encouraging learners to have control over the learning process, and 5) PBL is realistically designed to address real-world challenges [26]. With these principles, PBL in several studies has been proven to increase the effectiveness of learning in terms of student activeness and participation, to improve critical thinking skills [27]–[30].

3. Method

The Scientific Writing Training Program was attended by 42 teachers from various schools including IKIP Veteran III Tambakromo High School as a partner school, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School. Scientific writing training was carried out twice offline followed by online assistance. The total implementation time is 6 months to provide enough time in writing scientific papers. The training strategy applied is writing training with ideas and ideas, learning good and correct sentence structures, and composing sentences that have cohesion and coherence. The implementation design of this scientific writing training program is shown in Table 1.

Table 4. Program Implementation Plan

Meeting	Topics of Focus	Method
1st	Basic understanding of scientific article writing.	Presentation with Discussion and Question and Answer (Q&A) Session
2nd	Determining theme, problem formulation, and writing introduction and methodology.	

3rd	Preparation of results, discussion, and conclusions.
4th	Presentation of teachers as participants. Giving good feedback on articles made by participants.

The evaluation design of this scientific writing training program is carried out in three steps, namely; (1) evaluation of teacher participation in participating in offline training on scientific writing, (2) preparing scientific writing drafts in accordance with the subjects taught by each teacher, so that teachers focus and can better master their fields, and (3) designing and writing good and correct scientific **papers** in accordance with the target journal objectives. This program was carried out by a team of 6 members, consisting of 3 lecturers and 3 students from the PkM team. The data in this study were obtained from observations and projects.

4. Results and Discussion

The scientific writing training was conducted in four meetings, each of which had a different topic of focus to improve teachers' writing skills. The results of each training implementation for each meeting are shown in Table 2.

Table 5. Results of Scientific Writing Training

Meeting	Topics of Focus	% Level of Teacher Understanding
1st	Basic understanding of writing scientific articles through Powerpoint presentations.	25% of teachers are able to understand how to write articles well.
2nd	Discussion of title selection, problem formulation, and writing of introduction and methodology.	50% of teachers have been able to carry out writing according to the established criteria.
3rd	Discussion of the preparation of results, discussion and conclusions part of an article.	60% of teachers have succeeded in meeting the expected target criteria.
4th	Presentation by the teacher as a participant and providing feedback on articles written by participants.	80% of teachers successfully achieved completion in writing scientific articles.

Based on the implementation of training activities, the results were obtained as in Table 1. In the first meeting, the training focused on the basic understanding of writing scientific articles through Powerpoint presentations. In the first meeting, it was concluded that only 25% of teachers were able to understand how to write articles well. Meeting 2 discussed the selection of the title, formulation of objectives, and writing the introduction and methodology. In meeting 2, it can be concluded that 50% of teachers have been able to carry out writing according to the established criteria. In meeting 3, participants were taught how to compile the results, discussions, and conclusions. As a result, 60% of teachers managed to meet the expected criteria targets. At the 4th meeting as the last meeting, teachers had the opportunity to make presentations and receive feedback on the articles they had written. At the 4th meeting, it can be concluded that 80% of teachers managed to achieve completion in writing scientific articles.

The results indicated that before the training on scientific writing was held for 42 teacher participants, teachers' understanding and ability to write scientific papers were considered to be not optimal. Gradual improvement in understanding of article writing started to develop at each training meeting. By meeting 4, 80% of the teachers were able to write and present their articles. This finding is in line with previous studies that have revealed the problem of not optimizing the ability of teachers to write good scientific papers [1], [2]. This finding also supports previous research findings on the effectiveness of training in helping improve article writing skills [17], [23].

Findings from the training showed significant improvement in teachers' ability to write scientific papers, with 80% of teacher participants achieving a better ability to construct logical and coherent arguments by the fourth meeting. This finding is relevant to the guidelines [9], which emphasize the importance of understanding good structure and logical argumentation in scientific writing. However, this improvement is not only caused by the understanding of the structure and principles of scientific

writing, but also supported by the active role of the PkM team and teacher as participants in the training. This is in line with the opinion of [22] which suggests that training must be supported by the active role of the organizing work unit and the participation of attendees. The potential of teachers to develop themselves through research and writing scientific papers needs to be facilitated and assisted optimally. When compared to the findings of [12], this training has emphasized gradual stages in the development of scientific writing skills, which proves that a systematic approach in teaching scientific writing can have positive results. However, the improvements recorded from meeting 1 to meeting 4 are restricted to basic skills such as paragraph coherence, and the ability to organize scientific work according to the right stages and sequence, while more complex aspects such as critical analysis, literature synthesis, and finding reference sources still need to be expanded. In this training, to support and facilitate teacher participants in finding reference sources, teacher were also introduced to reference tools. In meeting 4, teacher had the opportunity to present their scientific work for further feedback. Providing feedback in writing scientific papers has an urgency that is in line with the opinion of [13] to optimize scientific writing and encourage participants to substantially improve scientific papers before submitting them for review in the targeted journal.

The scientific writing training program attended by teachers from IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School is a concrete example of this effort. This training was carried out by a team of 6 members, three lecturers and three students from the PkM team. The lecturers involved are experts in scientific writing and have served as Editor in Chief in reputable international journals indexed by Scopus Q2. This mentoring by experienced professionals is essential to help teachers produce good quality scientific papers. The implementation of this training is thus also relevant to the challenges faced by teachers, such as lack of skills in utilizing technology, lack of references, and lack of group activities in the field of scientific writing, as well as the reach of supporting institutions [21]. In this training, the utilization of technology in the form for reference tools is introduced to teachers to facilitate the process of writing scientific papers. The training materials were designed with a presentation approach equipped with relevant materials, making it easier to convey information to participants. This can be seen in Figure 1, which shows the interaction and involvement of participants during the training session.

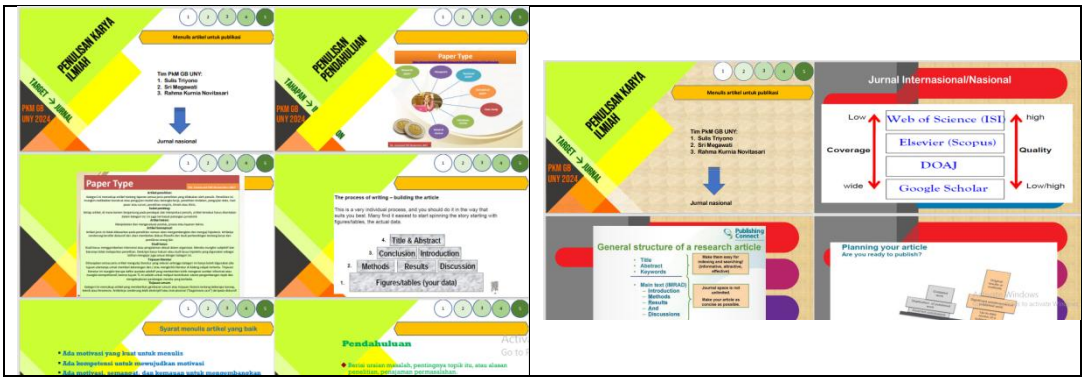


Figure 1. Training Materials for Writing Scientific Papers and Using Reference Tools

Based on the data from the training on scientific writing attended by 42 teachers, there was a significant increase in their understanding of scientific article writing from each meeting, from meeting 1 to meeting 4. This increase is a reflection of the theoretical framework of project-based learning that emphasizes a student-centered approach. In this study, the teacher are the center of focus of the learning. For example, in the first meeting, where teachers were introduced to the basic understanding of scientific article writing, it was found that only 25% of the participants showed a good comprehension. This reflects the initial challenges faced by teachers who are writing scientific articles for the first time. Nevertheless, with structured guidance, the teachers are expected to be able to investigate more deeply about scientific writing, in line with experts who explain that project-based learning provides opportunities for learners to explore knowledge through a process of inquiry [24]. In addition, as with the results from the second meeting, when the focus shifted to selecting the title, formulating the objectives, and writing the introduction and methodology, there was an increase to 50% of teachers who could carry out the writing according to the good criteria. This shows that the project-based

approach can strengthen students' understanding of the material being taught. Experts [25] have underlined that project-based learning focuses on developing meaningful knowledge and skills, not just memorized theory, but practical. At the third meeting, progress was seen with 60% of the teachers able to fulfill the criteria in preparing the results, discussion and conclusion of the article. The findings show that project-based learning provides not only theoretical knowledge but also practical skills that can be applied. This means that the implementation of this training is in line with the third feature of PBL, where teachers engage in constructive inquiry, allowing them to explore and build knowledge through direct experience and collaboration with fellow participants [26]. At the fourth meeting, 80% of teachers finally managed to achieve comprehension in writing scientific articles. This is in line with previous research findings that have indicated the effectiveness of project-based learning in supporting the success of the learning process [27]–[30]. Thus, this training provides a space for teachers to put theory into practice.

Although there was a significant improvement in participants' understanding and writing skills from the first to the fourth meeting, there were some difficulties experienced by teachers. Most teachers were writing scientific articles for the first time, so they needed time to adapt to the correct format and writing techniques. In addition, there were also teachers who showed high enthusiasm and motivation to learn even though they had never written an article before. One participant even had previous experience in writing scientific articles, which gave inspiration to her colleagues.

This PkM program aims to provide training and guidance to teachers in partner schools, especially in writing scientific papers. This is necessary since one of the advantages of teacher competence is that they are able to implement their professional knowledge into quality scientific writings. In addition, by training in writing scientific papers, it is expected that teachers can be trained to write scientific papers properly. The benefit of this PkM program is that it helps teachers improve their writing quality and writing competence, especially in the aspects of critical thinking, creativity, and innovation through intensive training and mentoring by the PkM team.

5. Conclusion

The scientific writing training conducted for 42 teachers from various schools indicated its effectiveness in improving their understanding and skills in scientific writing. Through four meetings that focused on various aspects of scientific writing, there was a significant increase in the ability of participants, as measured by the evaluation results which showed that 80% of teachers managed to achieve mastery in writing scientific articles at the last meeting. The results of scientific writing training attended by teacher participants from IKIP Veteran III Tambakromo High School, Muhammadiyah Ponjong High School, and Taman Dewasa Tambakromo Junior High School illustrate that teachers have been able to understand the basics of writing scientific articles, determine themes and titles based on the issues raised, formulate problems, write introductions and methodologies, compile results, discussions, and formulate conclusions.

The application of a project-based learning approach provides a strong framework, allowing participants to actively engage in inquiry and writing practice. By focusing on the student-centered aspect, teachers are encouraged to gain knowledge and skills through hands-on experience, allowing them to put theory into practice more effectively. Although there were some challenges faced, especially for first-time teachers, the enthusiasm and motivation of the participants showed a high desire to learn and develop. Therefore, this activity not only improves teachers' professional competence, but also contributes to academic development in the educational environment. This training activity is expected to contribute to supporting teachers in producing quality scientific papers, as well as strengthening their position as professional educators.

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The Patterns of Family Communication in Fostering Resilience in the Digital Era

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Abstract

The research aims to investigate communication patterns in Javanese families to build resilience in the digital era. The study uses qualitative research methods in which the subjects were determined through purposive sampling, namely 5 families in Yogyakarta, Indonesia. Data collection uses in-depth interviews and observation, while data analysis uses Interpretative Phenomenological Analysis. The results of this research are as follows: Javanese family communication patterns in the digital era through parents as role models through setting examples in increasing spirituality and positive habits, parents need responsive digital skills. Resilient family patterns in raising children in the digital era need to be built by: a) building humanistic dialogue, respecting each other, listening and responding to each other, and making them comfortable, not stressed and afraid in the process. Then this process can be developed in the family in the digital era. b) democratic-contextual, in facing challenges and crises in the family, parents also need to develop a democratic parenting style that suits the needs of each child.

Keywords: communication patterns, Java family, resilience, digital era

1. Introduction

Family resilience is a combination of individual characteristics, relationship patterns, and interactions between members of the family so resilience is formed from strong and positive relationships in the family [1]. The ability to adapt and perseverance of each individual in facing various challenges in life requires the involvement of the role and function of the family system as an inseparable unit of society. The family plays an important role in determining how individuals can recover after facing various challenging life experiences. In building relational resilience, the family forms stronger bonds and becomes a solution in facing future challenges [2].

The family is the first and foremost determining element for the success of childcare, this strategic position can be realized if the family can carry out its roles and functions well and as one of the participatory elements in the development of the social environment of society active strength during a crisis, where this condition allows the family to function again as before the stressor or crisis was experienced [3]. The perspective of family resilience is to recognize each other's strengths, be able to be dynamic, and maintain a balanced relationship to deal with conflicts that arise so that the problems that arise become strengthening for family resilience [4].

Parents in the family have a main position as an intermediary function in society. The family is a bridge between the individual and culture where through the family children can learn about life values, social roles, social norms, and customs that apply in society [5]. This means that the family environment is the first place where children learn to interact, a mediator in the child's care and development in the future.

The characteristics of a patriarchal family are quite typical in Javanese families where men are in a higher position than women and develop harmonious behavior and mutual respect. Rukun is defined as a state of harmony without disputes and contradictions, while respect means awareness of one's position and duty to create a harmonious unity [6]. It is the process of interaction between parents and children within The Javanese family that forms a Javanese ideal that upholds the important principles of etiquette, respect, and harmony. This respectful attitude is divided into Javanese concepts, namely *wedi, isin,* and *sungkan*. Teaching etiquette is visible in that etiquette which includes uploading, *suba-sita*, manners, smooth speech, noble morals, and good manners [7].

Javanese families maintain their Javanese personality in current global conditions and are still being tested because the current global situation is different from cultural cross-over events in the past. The revolution in the fields of technology, transportation, telecommunications, and tourism that came to Indonesia, especially Java, had a direct impact on the implementation of resilience and resilience strategies for the Javanese community. The ideal Javanese personality characteristics are old age, need, and tough face greater challenges, namely how capable psycho-cultural values are of being a pillar of defense and family resilience.

Javanese culture is still very attached to noble speech which contains wisdom and values for people's lives to create a harmonious life between individuals and their environment [8]. The characteristics of Javanese society are being open-minded (*nrimo*), sincere, and never giving up in facing difficulties and life. These problems are necessary to maintain self-resilience in this current era characterized by advances in digital technology. In Javanese philosophy, he also introduced the attitude that nothing is in chaos, which is accepting one's situation without depending on other parties, not showing an attitude of giving up, giving a sign of being lazy about the situation but continuing to fight and try to improve one's life [9].

The Special Region of Yogyakarta has inherent uniqueness and is not shared by other regions as stated in Law Number 13 of The Year 2012. Yogyakarta is a *Swatantra* Region or Special Region. The people of Yogyakarta believe that they see and recognize the Sultanate and Pakualaman as part of Javanese culture and a symbol of patronage. Both remain central, especially in the cultural realm and this is the general picture of Yogyakarta society. Javanese society is known for living with respect and harmony, maintaining harmony and social harmony. The principle of respect is used in interacting in society under social rules, then the principle of harmony is used to avoid conflict and maintain harmony in relationships. Javanese families develop parenting styles so that children become *njawani* where children can position themselves according to their position and are good at controlling themselves [11].

Family resilience is a combination of individual characteristics, relationship patterns, and interactions between members of the family. So resilience is formed from strong and positive relationships within the family. The fundamental difference between individual resilience and family resilience lies in the source of the concept of resilience. Individual resilience is rooted in the perspective of human life development and focuses on how individuals become resilient in the face of life's difficulties and challenges. When family resilience is rooted in a positive perspective and sees the family as a collective unit of many individuals who interact with each other and have their strengths [12].

The phenomenon of families where husband and wife both work in the public sector or are called dual career families shows that two individuals are committed to work or career and together build and maintain family conditions. The characteristics of a dual-career family are when the husband and wife are both in a professional environment, have career advancement, and have responsibility for caring for children and family duties [13]. Families with dual careers have a very unique and challenging situation. This challenging situation is related to the difficulties between husband and wife who both work in dividing their time between work demands and household (family) matters, the frequency and resolution of the conflict which is again likely to be related to issues regarding childcare, family management and financial management [14].

Communication patterns within the family can facilitate the family's expectations for being united and flexible so that it can achieve the functions of the nuclear family, whereas good communication within the family can help the family achieve family functions and meet the needs of the family members [15]. Subcomponents of the communication process are clarity, open sharing of emotions, and collaborative problem-solving. The following is an explanation of each subcomponent of the communication process. It was found that clarity of communication is important for the functioning of a family. It refers to the message sent clearly and consistently, both in words and attitudes, as healthy as awareness of it requires to explain the response has a double meaning making meaning, sharing emotions, and informing decisions to be made [16].

The process of development of Yogyakarta society towards cultural influences from abroad could be a process leading to a cultural vacuum that failed to be filled by elements of Indonesian culture that had developed and in this condition Javanese identity became blurred. The era of development also brings other implications such as shifts in traditions, and developments in the needs of city residents. The context that occurred when this research was conducted, where child-rearing patterns have also experienced changes and social interactions have been influenced by various contemporary social cultures that are completely digital [17].

2. Method

The main topic of research is the resilience of Javanese families in childcare in the digital era. In this study, researchers adopt a qualitative research approach, especially a phenomenological approach that mainly aims to understand social life and the meaning that people attach to their daily lives, transforming life experience into the essence of textual expression in such a way that texts formed from the construction of experience can simultaneously relive reflectively and realize something meaningful.

Primary data in the study were obtained through in-depth interviews with 5 family representatives of Javanese family characteristics. Family characteristics selected through purposive sampling techniques include 1) husbands and wives native to Java (Yogyakarta); 2) having adolescent children aged 12-18 years; 3) living in Yogyakarta, Indonesia; 4) experiencing crises and challenges. Data collection using in-depth interviews, observation, and documentation. Data analysis in this study through thematic analysis which is the main analytical approach used in Interpretative Phenomenological Analysis, where this analysis is to understand.

3. Result and Discussion

a. Communication Process

Based on problems in parenting in the digital era, the most important problem is the communication process between parents and children. The communication process in the digital era that occurs between parents and children has changed to interaction and communication mediated by information technology.

The following are strategies for building communication processes within the family. Building family communication in the digital era is the key to not putting pressure on the child and parents to understand the child's needs. Children are given gadgets because of the demands of today's society, but the use of gadgets is still limited, such as use for playing games and social media. With children holding gadgets when children are outside the home or school they can still communicate, but direct communication when at home and gathering together must still be maintained. In this digital era, parents must limit their children's use of gadgets. If there is a family problem, everyone must know so that there is openness. Parents also need to educate and provide understanding to children regarding the rules for using gadgets, so that children can use gadgets wisely.

The communication processes in the digital era that occur between parents and children have changed in interactions and communications mediated by information technology. The family has an important role in building effective direct communication so that all family members who are actively involved can feel a very strong relationship and need each other. Parents need to spend a lot of time with their children to build effective communication. and positive dialogue. This process can work if both parents have an attitude of being willing to listen and understand themselves that we also want to be heard.

b. Family Supervision

To develop family parenting strategies in the digital era, several efforts can be made, one of which is by monitoring family buildings which are carried out by: 1) children are always given supervision, in the sense of continuing to control excessive cellphone use or being given time in use and turning off the wifi network at certain times at home. 2) There needs to be understanding and understanding for children when using cell phones excessively. 3) routinely monitor children's cell phones, for example when children are playing or sleeping, so parents can continue to monitor their children's activities. 5) When it's time to pray, parents remind children to stop playing on their cell phones. For boys, it's better to just play at home, with their friends going home, so their parents can also supervise them, let alone worship from home. 6) Children are given responsible freedom, meaning that children are not under control but are given freedom but not unlimited freedom, but remain within a corridor that does not violate religious or state orders. 7) Establish closeness with children, with parents who are close to their children, it is hoped that parents will find it easier to control or supervise gadget use, children's interactions, and children's problems.

Parents need to approach their children and make them like friends so that children are more open and have nothing to worry about. is covered up so that when children have problems, he hopes that children will tell themselves so that parents can provide solutions and good direction. 8) Utilize gadgets to monitor, one of which is using the Go Food app to order food so that they can keep track of their children when staying at a friend's house. In this way, parents can feel calm because the child is actually at the intended location and the

child does not feel that the child is being watched by his parents. The child feels happy because more food is received from his friends.

In this case, the dialogue relationship that will be created between parents and children is that parents need to be willing to break away from the space of domination from high authority. The family needs to create a space of equality between parents and children, that children are not weak creatures but that children also have potential that must be developed. Through humanist dialogue between parents and children, the relationship built between the two can provide an open space for communication to occur. Resilient families have several characteristics that are based on clarity and consistency in conveying information and opinions openly to express their emotions and can find solutions to problems collaboratively.

In building a sense of affection between family members, what is done is to fulfill the child's needs so that the child has the same rights in meeting his needs, taking time to gather with family. This is done even if it is just talking, or asking about activities while at school to find out about the child's condition. Apart from that, if there is a dispute between children, the data is discussed and resolved when gathered together so that the children can deal with the problems they face well, without holding grudges and hostility. Apart from that, parents also always ask how their child is doing, when they are going home, whether they have eaten or not, and how they are today. Like things that will make children feel cared for and get love from parents so that indirectly they can bring up a sense of caring and affection among family members.

Parenting strategies in families in the digital era can also be carried out through enforcing family rules. Children are not restricted to being inside the house all the time, but children are allowed to go play outside the house. House with the conditions they have to say goodbye to their parents. Children are constantly reminded not to violate religious or state rules. Children are given freedom but still have to understand the rules that are mutually agreed upon within the family. Children can also help with work or activities from their parents at home, such as taking care of shops, cleaning the house, and activities according to the child's abilities and potential.

Apart from that, parents need to direct the use of digital devices and media more clearly, by managing time for using gadgets, parents direct them with effective communication in providing time for how long and when to use them. There needs to be an agreement on the use of digital devices between parents and children, providing a duration of time or making a schedule for children to use gadgets at home.

Maintaining communication between parents and children is one indicator of creating resilience in the family. An open communication process and fostering positive dialogue can provide a good experience for children. Giving an example: When advising or directing children, parents should also do so so that children can easily accept and do what they are directed to. Maintaining communication with children is important so that parents can monitor and know their children's conditions when they are outside the home. Parents also get children used to saying goodbye when leaving the house, as a form of control and supervision of children. Parents know where their children go, with whom, and at what time they come home. This becomes a good habit in building communication within the family.

Communication strategies are needed in raising children in the digital era of the Javanese family is an adaptive communication strategy, where parents build communication that is fun and by the needs of today's children, more flexible And there is NO distance in communication with children. In this strategy, parents listen again to what the child is saying, then provide assistance and direction from what is being said. When children face problems, parents must also be able to provide consideration of solutions so that children can create this strategy, which calls for openness, equality, trust, and a strong sense of togetherness, which will be a strategy that suits the digital era society. Several efforts to overcome problems in building communication in the digital era faced by 5 families in the city of Yogyakarta include 1) building a positive attitude towards parenting problems, 2) utilizing technological advances to improve children's achievements, 3) being flexible and open to children's attitudes, 4) provide opportunities for children to explore, 5) do not force children's wishes, 6) provide insight and understanding for children.

Every family tries to create good communication patterns, but some things are experienced in some families. The problems that are often faced in families based on the results of interviews are that when faced with children who are less open with their father, children are afraid to tell stories, children have difficulty communicating directly, and children have difficulty organizing and forgetting. Time while playing online games. In the digital era like now, various problems must be resolved immediately. Open-mindedness is a

source of family communication that runs well and is full of warmth. Comfort and trust are very necessary to build family communication patterns in the digital era. It is necessary to build a dialogical relationship between parents and children so that children feel heard directly and can become partners in telling many things.

Parenting strategies in providing love to children in every family can be seen by providing attention, giving appreciation, being a good listener, accepting what they are, doing justice to all children, meeting their needs, and never forcing children. Several of these methods are used in building parenting strategies for Javanese families. Parents have different ways of giving love. Children growing up in the digital era need optimal love. The role of parents is to provide love and attention. Therefore, the existence of technology does not rule out the possibility that children will seek attention outside the home, one of which can be through gadgets.

Every family must have experienced difficult situations in the family, its meanings related to the critical meaning of situations faced. Families have ways of interpreting crises faced. The family develops an attitude of truly accepting what happens in life, an attitude full of simplicity, always grateful, trying, optimistic, and oriented towards the future. The process of grouping all formulated meanings into categories that reflect the unique structure of the theme group. It is carried out after all the meanings have been formulated.

In this digital era, it certainly makes it easier to access information or courses, therefore parents need to know their children's talents and interests so they can be developed. From the results of interviews conducted with 5 Javanese families, the problem faced by Javanese families in parenting patterns between parents and children is in building communication and open relationships between the two. Parents who have desires that do not necessarily conform to their children's expectations, for example, relate to the use of gadgets as a way of communication. Based on this problem, parents need to build strategic communication with their children through a dialogue process, not only asking questions but parents also listening to what is happening within the child. Apart from that, parents also need to build a feeling of open relationship between parents and children which is based on a sense of affection, trust, and responsibility so that good relationships between each other are established, the family is a humanistic relationship.

Furthermore, the problem of Javanese families in caring for children in this digital era is a lot of communication problems between parents and children and a lack of openness in establishing a relationship between the two. Parents have a very important role in efforts to rebuild the role of the family in establishing communication patterns and instilling Javanese values in children. Parents need to manage it appropriately and utilize technology for positive purposes, parents need to learn to adapt the way they educate their children so that they are more acceptable.

It is important to protect children from the negative influence of gadgets and how to deal with children who cannot be separated from gadgets. How to educate children in the digital era is a process of mentoring and dialogue in building emotional bonds by providing provisions that include teaching, guidance, and knowledge about children's morals, morals, and character by utilizing digital systems for everyday life. The following are the research results depicted in the following chart regarding the issue of parenting through communication within the family. Problems that are often faced based on research results from the child's side include: children are less open about their feelings towards their parents, children are easily influenced by the media, and children are less social. From the parent's perspective, it is difficult to transport anything to their children. Because children have their views, the mother's dominance in parenting, and the father's minimal role in parenting, parents find it difficult to supervise cell phone use outside the home. The following figure shows some phenomena of problems in communication.

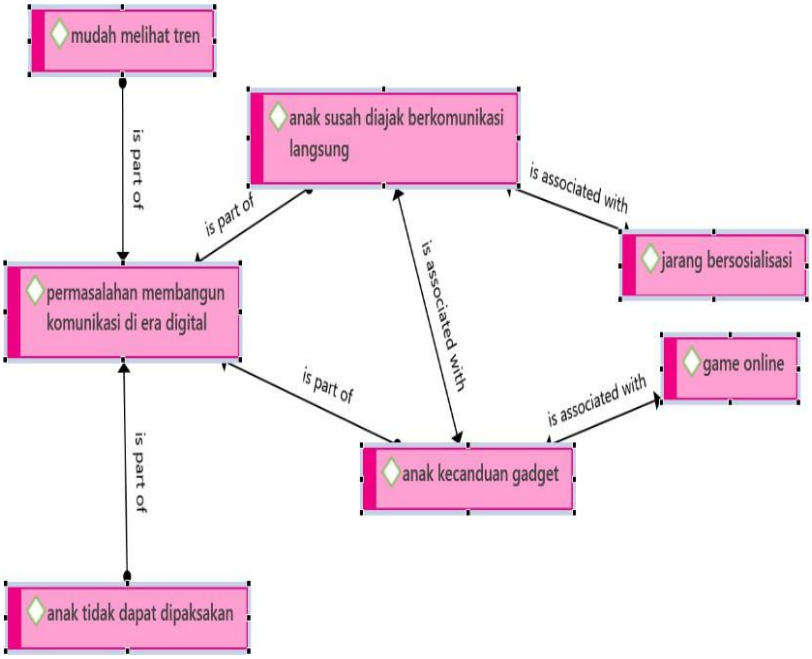


Figure 1. Communication Problems

Based on the phenomena that occurred in these 5 families, the main problem and problem in raising children in the digital era is the communication process between parents and children. The communication process in the digital era that occurs between parents and children has changed to interaction and communication mediated by information technology. The following figure shows a strategy for building communication processes in families based on phenomena that occur in these 5 families.

Another way, the communication strategy needed in raising children in the digital era from Javanese families is an adaptive communication strategy, where parents build communication that is fun and appropriate to the child's character. Currently, the need is more flexible And there is NO distance in communication with the child. In this strategy, parents listen more to what the child says and then provide reinforcement and direction for what is said. When children face problems, parents must also be able to consider solutions so that children can make their own decisions regarding the problems they face.

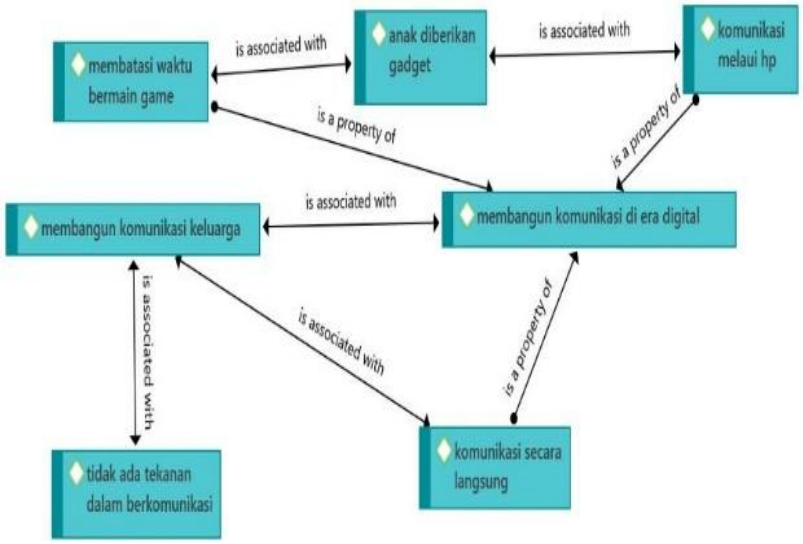


Figure 2. Communication building

Some efforts to overcome the problems in building communication in the digital era faced by Javanese families in the city of Yogyakarta include 1) building a positive attitude towards parenting problems, 2) utilizing technological advances to improve children's achievements, and 3) being flexible and open to child attitude, 4) give children the opportunity to explore, 5) don't force their wishes, and 6) provide understanding and comprehension for children.



Figure 3. The process of building communications

Based on this, the symptoms appeared in 5 families, he explained that in the digital era, the problem of children who were reluctant to communicate and be open with their families also emerged. Therefore, as a parent, you can encourage your children to be open towards their family. So when children face problems, parents know so they can direct and help find solutions. For children to have good behavior, as a parent it is not enough to direct them, but as a parent, you must also encourage and set an example. By inviting and by giving examples directly, it is hoped that children can follow and carry out what their parents direct.

Utilizing technological advances to help children and encourage increased children's achievements. Some Javanese values that are still being developed by families in the rearing of children include politeness, respect, polite speech, respect for elders, respect, hard work, helping each other, and consultative discussion. Politeness and speaking etiquette are highly emphasized in Javanese communication families. Family members are taught to avoid harsh or insulting words in conversations that occur between parents and their children. It is important to remember that culture and communication norms may vary among Javanese families based on social background, religion, and place of residence.

Symptom communication that occurs in 5 families can be explained through the principles used in building family resilience, namely through contextual democratic patterns. It can be explained that the democratic contextual pattern is a pattern used to maintain family resilience. Contextual democracy gives children more freedom, such as expressing their opinions, feelings and desires to learn to be able to respond to other people's opinions. The family's attitude and behaviour towards the child's hopes, desires and needs is always open, supportive and guiding the child. Family resilience can be seen as a unity of life events so that

each family can bounce back when facing problems or crises. Every family can adapt to any conditions and can interpret every event that occurs so that when it happens again the family quickly gets back on its feet.

Based on phenomena that occurred in 5 families, it was found that through developing responsive digital parenting, critical thinking can be fostered in children. This means that, amidst the proliferation of information, children can develop critical thinking skills. However, he pointed out that parenting styles have changed very significantly due to technological advances. Therefore, critical thinking and being critical are important for children. In the digital era, Javanese families are faced with new challenges in raising children. Children are more vulnerable to being exposed to digital media which is not always positive. The use of gadgets and internet access also presents new challenges in controlling the information children receive.

Javanese families need to overcome these challenges wisely and creatively. The digital era has had a significant influence on Javanese families. Changes in lifestyle, consumerist culture, and social relationships dominated by social media can affect interactions and communication between family members. Javanese families need to be aware of potential negative impacts and try to maintain togetherness and traditional values.

Based on the results of data analysis related to problems that occur in Javanese families in building family resilience, *first*, the process of interaction and communication between parents and children is less intense, this happens because children do a lot of activities outside the home which are quite time-consuming, they come home from school on in the afternoon and when I got home it was time to open the gadget. And play matches by opening social media, YouTube and others. That night the children were busy preparing to go to school tomorrow, many were already sleeping in their respective rooms. This causes interactions and relationships between parents and children to become less intense.

Second, the relationship pattern between parents and children is less open, this is because the relationship between children and parents is physically closed but not closed at heart. Parents don't have much time to sit together listening to their children's stories because they are busy with their work when their children are busy with school routines and interacting with gadgets. Apart from that, the problem that occurs is that children are quick to follow and imitate any trends and information from social media.

4. Conclusion

What is new in this research is the discovery of Javanese families' resilience patterns in raising children in the digital era. Communication patterns consist of family belief patterns, family communication patterns, and family organization patterns. The Javanese family's communication process in the digital era is through responsive digital parenting, where parents become adaptive figures who adapt to technology, realizing that children grow up in a society where technological development is very rapid. Parents must have a very open mind to all the changes that occur. Being a parent who can help overcome the problems faced by children means that parents must be more alert and responsive to all of them when they occur. Parents must also be responsive in responding to things their children say so that children feel comfortable when they are with their parents.

Parents are good role models and role models for children at home, parents' attitudes and speech will be imitated by children, the way we talk, give attention, and love, and the way parents discuss and find solutions to the problems they face. Parents also need to consistently get used to good behaviour based on noble Javanese cultural values, such as *rukun, ewuh pekewuh*, *lembah manah*, no being chaos, food, *andhap ashor*, *tepo sliro*. Democratic-contextual, in facing challenges and crises in the family, parents also need to develop democratic parenting patterns that suit the needs of each child.

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CATALOGYLING OF TRADITIONAL WEAVING FROM THE SPECIAL REGION OF YOGYAKARTA AND CENTRAL JAVA

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Abstract

Traditional weaving is a cultural heritage rich in historical, aesthetic, and symbolism values, especially in the Special Region of Yogyakarta (DIY) and Central Java. This article discusses the development of a catalog of traditional weaving as an effort to preserve and document the variety of weaving that is at risk of extinction due to modernization. The research method used is development research with a qualitative and quantitative approach, involving observation, interviews, and documentation in the Gamplong and Troso weaving centers. The resulting catalog includes information on motifs, manufacturing techniques, materials, and philosophical meanings of woven fabrics, and is equipped with high-quality visualizations. The results of the study indicate that the cataloging not only functions as documentation, but also as a tool to support the economic sustainability of craftsmen and cultural promotion. Thus, this catalog is expected to increase appreciation for the diversity of Indonesian culture in the textile sector, as well as make a significant contribution to the preservation of cultural heritage.

Keywords: cataloging, traditional weaving, cultural preservation, Special Region of Yogyakarta, Central Java.

1. Introduction

Traditional weaving is a cultural heritage that is rich in historical, aesthetic, and symbolism values. In Indonesia, the art of weaving has been passed down from generation to generation, especially in areas with strong cultural traditions, such as the Special Region of Yogyakarta (DIY) and Central Java. Woven works from these two regions are known to have their own uniqueness, from the manufacturing techniques, motifs, to the philosophy contained therein. However, along with the development of the times and the increasing production of modern textiles, the existence and recognition of traditional weaving are increasingly marginalized. Many types of weaving are at risk of extinction or losing adequate documentation [1].

Establishing a comprehensive database is key to maintaining knowledge and facilitating innovation, making traditional weaving relevant and sustainable amidst the changing culture of each community, making weaving not only a functional product, but also a valuable work of art. In DIY and Central Java, traditional weaving distinguishes itself through its unique characteristics, including colors that reflect everyday life. Preserving traditional weaving in these two provinces is realized through efforts to promote and instill cultural values in future generations. Despite the influence of modernization in the weaving industry, efforts to preserve the authenticity of tradition remain the focus. Establishing a comprehensive database is key to maintaining knowledge and facilitating innovation, making traditional weaving relevant and sustainable amidst the changing times.

Cataloging traditional weaving is important as an effort to preserve and redevelop this cultural heritage. Through a comprehensive catalog, various elements of traditional weaving from DIY and Central Java, including types of fabrics, manufacturing techniques, motifs, and their history, can be systematically documented and accessed by various groups, including the general public, researchers, and art and culture practitioners [2]. In addition, this cataloging is also expected to support the development of a culture-based creative economy, considering the potential of traditional weaving as a product with high value both in terms of culture and commerce.

The existence of cataloging or database will provide better accessibility of information, facilitating the search and dissemination of knowledge related to traditional weaving. This is not only useful for the preservation of cultural heritage, but also acts as a guide for craftsmen to maintain the authenticity of traditional

techniques and motifs that have been passed down from generation to generation. Researchers can also use this database as a basis for further studies on the development and changes in the world of weaving [3].

In addition, through cataloging, we can collect in-depth information about the types of traditional weaving. The presence of this source of information also supports innovation in the weaving industry. Craftsmen can draw inspiration from traditional motifs to create new designs that still respect cultural roots. The existence of this database also facilitates the development of woven products that are more relevant to the modern market, making the weaving industry more dynamic, sustainable, and able to face changing times. Thus, the creation of a database and accessibility of information is a strategic step to maintain the sustainability and value of traditional weaving in DI Yogyakarta and Central Java. Thus, this effort can make a significant contribution to maintaining the sustainability of Indonesia's cultural heritage, while providing economic support to traditional weaving artisans in DIY and Central Java.

This study aims to compile a catalogue of traditional weaving from DIY and Central Java, and to analyze the role of this catalogue in preserving tradition, supporting further research, and promoting economic sustainability for craftsmen. By understanding the important elements of weaving, from motifs, techniques, to socio-cultural contexts, it is hoped that this study can make a significant contribution to maintaining Indonesia's cultural diversity. Furthermore, this study will also examine how local factors such as traditional wisdom and social change influence the development of traditional weaving in the DIY and Central Java regions.

2. Method

The method used in developing the catalog of traditional woven fabrics of the Special Region of Yogyakarta (DIY) and Central Java is research and *development* with qualitative and quantitative approaches. This study aims to produce a comprehensive and easily accessible catalog, which includes information on motifs, colors, techniques, and the socio-cultural context of traditional woven fabrics in both regions. The use of development methods allows researchers to integrate field data obtained through observation, interviews, and documentation with a systematic cataloging method.

This research was conducted in two main locations that represent the diversity of traditional weaving, namely: the Gamplong weaving center in Sleman Regency, DIY, which is famous for its lurik weaving and the Troso weaving center in Jepara Regency, Central Java, which is the center of ikat woven fabric production. The subjects of this research were craftsmen, business owners, and related parties such as textile curators, academics, and local policy makers who play a role in the preservation and development of traditional weaving. In the process of developing the catalog, various data collection techniques were used, including: observation, in-depth interviews, and documentation.

Documentation data collection was carried out through taking photos, videos, and collecting archives related to the history of weaving in DIY and Central Java. This documentation is important to support the results of interviews and observations, as well as to provide complete visualization in the catalog.

Catalog Development Procedures

1. Textile Data Collection

The first step in developing the catalogue was the collection of textile data which included: 1) collection of motifs and colors, that is, every motif found in the Gamplong and Troso weaving centers was documented with a detailed description of its symbolic meaning, history, and function in society; 2) the techniques and processes of making woven fabrics, including the tools and materials used, were also documented to show the variety of weaving techniques; and 3) information on raw materials (cotton yarn, silk, etc.) and natural dyes used by craftsmen was recorded to understand local factors that influence the final product.

2. Data Classification and Categorization

After the data is collected, the next process is to classify woven fabrics based on: motifs and patterns based on the shape and variation of the motifs produced, classification based on weaving techniques (lurik, ikat, songket), and social context , namely woven fabrics used in traditional ceremonies, everyday clothing, or for certain events are categorized contextually.

3. Catalog Design Development

The development of the catalog design is done by combining visual elements such as images, colors, and layouts that facilitate access to information. The catalog is equipped with a description of each woven fabric, including information on manufacturing techniques, motifs, colors, and functions. In addition, the catalog is

also designed with a user-friendly interface to facilitate academics, craftsmen, and the general public in accessing information about woven fabrics.

Initial validation was carried out by textile and cultural experts to ensure that the information presented in the catalogue conformed to scientific standards and local traditions. Input from experts was used to correct inappropriate technical descriptions and classifications.

Qualitative descriptive approach . Data obtained from observations, interviews, and documentation were analyzed to find patterns in weaving techniques, motif variations, and local influences on the final results of woven fabrics. This analysis aims to provide a comprehensive picture of the weaving tradition in DIY and Central Java, as well as how catalogs can be used to support the preservation of these traditions. The analysis was conducted thematically and visually.

Thematic analysis was conducted to identify key themes emerging from interviews and observations, such as the symbolism of motifs, dyeing techniques, and traditional values associated with woven fabric production. Visual analysis was conducted to evaluate the aesthetic beauty and techniques of woven fabric production recorded in the catalog. The results of this analysis helped in determining the visual format of the catalog, to make it more attractive and informative.

The final stage is the compilation of a catalog in printed and digital form. The resulting catalog will contain complete information about DIY and Central Javanese woven fabrics, complete with high-quality images and easy-to-understand descriptions. This catalog is expected to be an important reference for academics, designers, and the wider community to understand, preserve, and develop traditional weaving.

3. Results and Discussion

Result

The developed catalog presents a visualization of each woven motif in the form of high-resolution photos that show details of the motif, texture, and coloring of the fabric. Each photo is supported by a technical description that includes the manufacturing process, history of the motif, and cultural meaning contained in each fabric. In this case, the cataloging aims not only to document visually, but also to describe the cultural elements and techniques involved in the production of the woven fabric. The importance of this cataloging lies in its ability to document cultural wealth that is at risk of extinction. Cataloging is an important step in cultural preservation, because it helps document and facilitate access to information for the general public and academics. The results of this study also strengthen the view that digital cataloging can be one solution in efforts to preserve cultural heritage that is increasingly threatened by modernization and globalization [3].

The process of cataloging traditional weaving varieties in the Special Region of Yogyakarta (DIY) and Central Java was carried out through a series of stages involving field observations, interviews with craftsmen, and literature studies. This comprehensive approach includes identifying weaving techniques, motifs, materials, and the history of each type of weaving. One of the efforts made was collecting data directly from weaving production centers such as Sleman, Jepara, and Klaten. Visual documentation in the form of photos and videos of the weaving process was also produced to complete the cataloging.

Catalog development considers several important aspects, namely **Color** , **Typeface** , **Image** , **Shape and Space** , and **Layout** . The color selection is adjusted to create an elegant impression and is relevant to the identity of traditional weaving. The typeface chosen is a serif font that reflects a classic and traditional impression, in line with the catalog theme. The images displayed must be able to strengthen the visual narrative, especially by displaying details of the motifs and weaving techniques. The shape and space in the design are considered so as not to give a monotonous impression, so that the entire catalog looks proportional and harmonious. Finally, the layout is arranged to make it easier for readers to access information, with an arrangement that unites image and text elements aesthetically.

Catalog development includes three main aspects, namely **Cover Design** , **Table of Contents** , and **Content of Woven Decorative Varieties** originating from the Special Region of Yogyakarta (DIY) and Central Java. The cover design was developed to display elegant and representative visuals of traditional woven fabrics, reflecting the richness of local culture. The table of contents is arranged systematically to facilitate reader navigation in finding important information related to weaving. Meanwhile, the content of woven decorative varieties includes details of motifs, manufacturing techniques, and philosophical meanings

contained in each work, providing a comprehensive picture of the richness of weaving traditions in both regions.

Cover Design

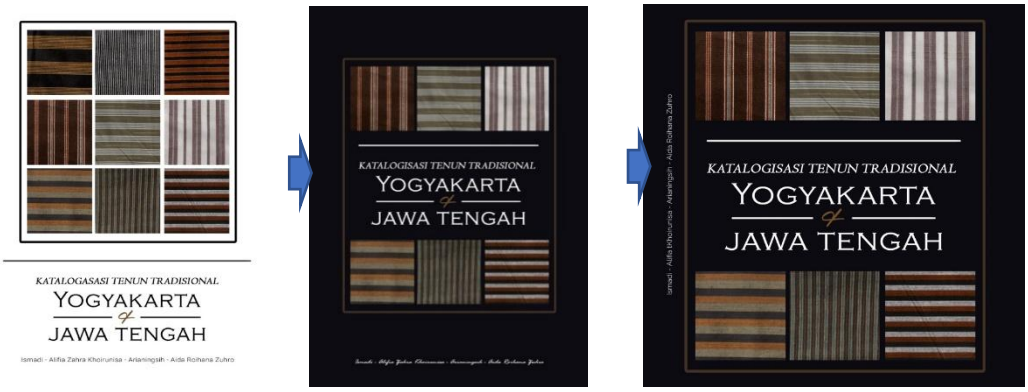


Figure 1. Cover Development

Color: In the development of the catalog design, cover 1 initially used white as the background, with the aim of creating a clean and minimalist look. However, to highlight a more elegant impression and provide a close visual connection with traditional woven fabrics, the background color was changed to black on covers 2 and 3. Black was chosen because it can create a strong contrast with other elements such as motifs and texts, and provides a more luxurious and formal feel, in accordance with the character of woven fabrics which are full of cultural and aesthetic values.

Typeface : On the catalog cover, the serif font type was chosen because this font is known to be able to give an elegant and traditional impression. The serif typeface also adds a more refined and classy visual dimension, in line with the traditional woven theme that is being conveyed. This choice has been approved by the reviewer, confirming that the font type used is indeed appropriate in supporting the overall design of the catalog. Image : The cover design displays woven fabric motifs arranged vertically and horizontally to avoid a monotonous impression, and to provide more dynamic visual variations. Shape and Space : The box border shape and box image were chosen to show the unity of the geometric motif, which visually reflects the regular pattern of traditional woven fabrics.

Layout : On cover 1, images and text are placed separately, while on covers 2 and 3, images and text are combined in the middle, giving the impression of unity between visuals and written information. This unified placement of text and images is expected to create a harmonious and attractive composition. In terms of size, catalog covers 1 and 2 use A4 paper format, but in the final design, the size is changed to 20x20 cm (square) to produce a more elegant and different impression, emphasizing the exclusivity of the catalog itself.

List of contents

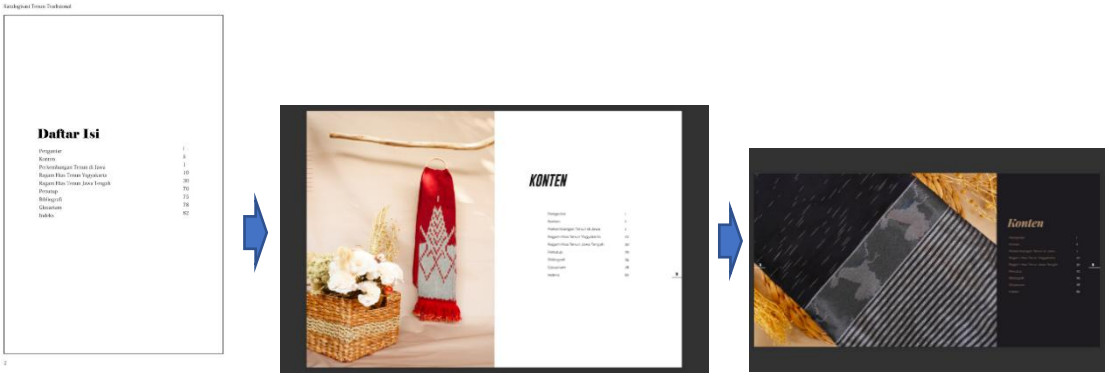


Figure 2. Table of Contents Development

Color : In terms of color, sample 1 shows a simple shape without the addition of other accents, giving a minimalist appearance but tends to be too plain. The reviewer then suggested adding object accents that can better describe the contents of the catalog. In its development, in sample 3 , the cover background was changed from white to a dark color, which gives a more elegant and classy impression. This change makes the overall appearance more attractive and in harmony with the contents of the catalog, while providing a stronger contrast to other visual elements.

Typeface : there is no change in the use of fonts from sample 1 to sample 3, the type of font used from the beginning is in accordance with the design composition and color choices. The reviewer also assessed that the font used was appropriate, creating the appropriate arrangement and color harmony , so that no changes were needed. Image : in sample 1 there are no image objects or photos used, while in sample 2 and sample 3 image objects are included. The addition of this image has been adjusted to the arrangement of relevant colors and objects, creating a better visual balance and enriching the overall design.

Form and space : in sample 1 , the design gives the impression of being limited by only a simple frame. Sample 2 has developed, but in its visual language it still looks broken and has not yet united harmoniously. In contrast, sample 3 shows a better unity, where the elements of form and space appear more unified and produce a more balanced visual impression. Layout : in sample 1 , the layout tends to consist of one component that gives a traditional, but somewhat rigid impression. Meanwhile, the layout in samples 2 and 3 gives a more classic, elegant, and aesthetic impression, especially with better alignment of image, text, and space elements.

Decorative Woven Content

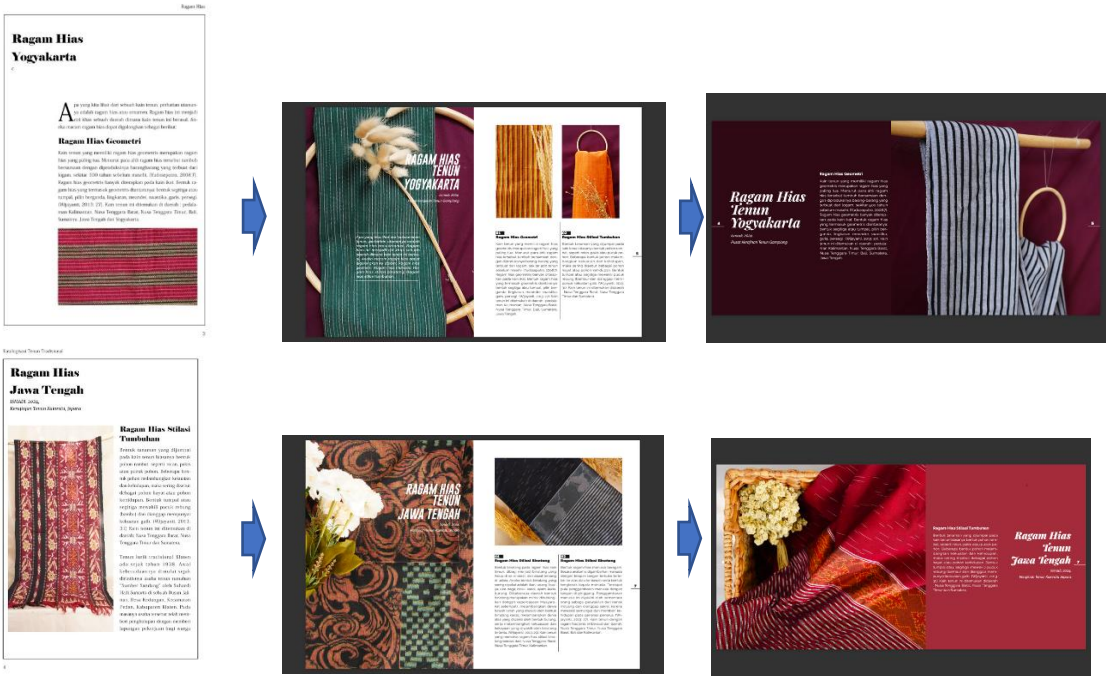


Figure 3. Development of Woven Decorative Content

Color : sample 1 shows a monotonous and simple impression with colors that are less eye-catching. The reviewer wants more details on the woven form displayed, so that the design looks more alive. In samples 2 and 3 , the color composition has been improved with better content alignment. The colors used in sample 3 give a more dynamic and elegant impression, making the catalog design more attractive while blending with the theme of the woven fabric that is being promoted.

Typeface : the fonts used in sample 1 to sample 3 show significant differences in displaying impressions. In sample 1 , the font gives a calm and simple impression, resembling the softness of finished fabric, with a feminine feel. However, in sample 2 , there is a change in the font in the title that gives a more assertive and strong impression, making the design bolder. On the other hand, sample 3

again presents a font that shows a feminine impression, but this time it is more elegant and exclusive, reflecting the luxurious and classy nature of woven fabric.

Image : sample 1 looks monotonous because the image is not styled or arranged attractively. Sample 2 and sample 3 are better, but in sample 2 , the impression given is too busy with too much visual content displayed. This makes the design look less focused. Therefore, the reviewer suggests the design of sample 3 , where the focus is directed at only one type of fabric in one content, so that it is clearer and more focused.

Form and space : in sample 1 and sample 2 there is an impression that the elements of form and space do not blend with the description given, so that the design looks separate and incomplete. However, in sample 3 , these elements are more unified, creating a more cohesive and balanced appearance.

Layout : the layout has undergone significant development from sample 1 to sample 3. In sample 1, the impression given is very simple and does not describe the catalog content. Sample 2 shows improvement, but the design feels unfocused because too many elements are displayed, making the content less detailed. Sample 3 is a better component, because the product photo layout is prioritized and clear, so the catalog design looks more focused, elegant, and effective in conveying information.

Discussion

In developing catalog design, color plays a very significant role in determining the atmosphere and impression created by the overall design. Initially, cover 1 used white as the background with the aim of creating a clean, minimalist, and neutral appearance. The use of white usually gives a modern and simple impression, but reviewers consider it less representative of the elegant values that are intended to be conveyed in traditional woven catalogs. Finally, on covers 2 and 3, the background color was changed to black. Black gives an elegant, luxurious, and formal impression, which is very suitable for highlighting the aesthetic value of traditional woven fabrics that are rich in cultural and philosophical values. In addition, the contrast produced between black and other visual elements, such as motifs and text, provides a bolder and more prominent appearance. This is supported by the theory that black is often chosen to create a dramatic and prestigious impression in visual design [5].

The choice of font type or typeface also affects how the design is perceived visually. On the catalog cover, a serif font was chosen, because this font character is often associated with an elegant and traditional impression. Serif typefaces have small lines at the end of each letter, which adds a classic and luxurious feel. The use of this serif font aims to strengthen the traditional impression that is intended to be displayed, considering that traditional woven fabrics themselves are full of historical value and local philosophy. The choice of this typeface is considered appropriate by the reviewer and does not require further changes. The reviewer believes that the serif typeface provides a smoother and more professional visual dimension, in line with the catalog theme [6].

The visual design of the woven fabric motif is another important element in the catalog design. On cover 1, the woven fabric motif is arranged in a monotonous manner, lacking dynamic visual appeal. However, on covers 2 and 3, the woven fabric motif is arranged vertically and horizontally, to create more dynamic variations and avoid a monotonous impression. This arrangement provides visual variations that are not only attractive, but also maintain the identity and distinctive patterns of the woven fabric. Thus, the design is able to reflect the regularity and beauty of traditional weaving.

Geometric shapes are an important concept in designing visual layouts. On the cover, box borders and box images are used to display a harmonious unity of form. The use of this box shape is intended to unite visual elements and written information in a balanced way, creating an orderly and cohesive impression, reflecting the geometric patterns of traditional weaving itself.

The layout of the catalog cover also underwent significant changes. On cover 1, images and text were placed separately, giving the impression of isolation between the visuals and the information displayed. However, in covers 2 and 3, the layout was changed by combining text and images in the middle, creating a unified impression. This change created harmony between the visuals and the written narrative, making the design more cohesive. In addition, the change in format size from A4 paper on covers 1 and 2 to 20x20 cm (square) in the final design, aims to create an exclusive, different, and more elegant impression. This more compact size provides a more artistic and attractive appearance for the catalog [7].

In developing a catalog table of contents, every visual element such as color, typeface, image, shape, space, and layout plays an important role in creating an attractive and informative impression. Design adjustments are made gradually from sample 1 to sample 3, with a focus on improving the visual impression to match the overall theme of the catalog.

The use of color in sample 1 is very simple, with a white background without additional accents. Although this appearance gives a minimalist impression, the reviewer considered that this design was too plain and less able to reflect the contents of the catalog visually. According to color theory in graphic design, visual elements that lack contrast can make the design look boring and not attract the audience's attention [5]. In sample 3, the background color was changed to a more elegant dark color. This change not only adds aesthetic value to the table of contents, but also creates a stronger contrast with the text and other visual elements, making the table of contents stand out more and harmonize with the theme of the traditional woven catalog.

The use of typeface remains consistent from sample 1 to sample 3. The type of font used has been carefully selected from the beginning to create harmony with the design and color composition. The reviewer considers that the typeface used is in accordance with the catalog concept, because it is able to give an elegant impression without having to make further changes. Choosing the right font is very important in design, because it can affect how information is received by the audience. According to research, serif typefaces are usually chosen to create a formal and traditional impression, which is suitable for cultural themes such as traditional weaving [6].

In sample 1, there are no image or photo elements used, which makes the design look too simple and less visual. As it develops, sample 2 and sample 3 begin to include images or visual objects that are relevant to the contents of the catalog. This addition helps enrich the visual content and creates a balance between text and images. The use of images in design is very important to strengthen the message and help the audience understand the content better [7]. The images in sample 3 have been adjusted to the color palette and theme of the catalog, creating a more dynamic and informative composition.

In sample 1, the table of contents design only uses a simple frame that gives a limited impression. Sample 2 shows development with the addition of better visual elements, but overall it still looks disjointed. Sample 3 successfully combines elements of form and space more cohesively, producing a more complete and harmonious visual impression. According to Wheeler [8], good spatial arrangement can help create a sense of order and make the design easier for the audience to understand.

The layout underwent significant changes from sample 1 to sample 3. In sample 1, the layout looked traditional but somewhat rigid, with elements that did not support each other. Sample 2 showed improvements in terms of component arrangement, but reviewers felt that the design still needed to be refined to achieve better balance. Sample 3 finally produced a more classic and elegant layout, with more orderly and aesthetic placement of image elements, text, and space. A good layout can help convey information more clearly and effectively, as well as improve the reader's visual experience [9].

In developing the content of woven decorative motifs in the catalog, each visual element must be able to represent the aesthetic and cultural values of the woven fabric itself. Color, typeface, image, shape, space, and layout are key elements that need to be considered so that the catalog content can appear harmonious and informative.

The use of color in design greatly affects how the content is received by the audience. In sample 1, the use of color is considered monotonous and simple, less able to attract the attention of readers. The reviewer suggested that the details in the woven form be improved, so that the content looks more alive. In samples 2 and 3, there is an increase in the composition of more dynamic colors. Sample 3 specifically presents a color palette that gives an elegant impression and blends with the theme of traditional woven fabrics, so that the catalog design becomes more attractive. According to color design theory, the right use of color can influence the perception and emotions of readers towards the content displayed [5].

The choice of font or typeface also plays an important role in creating a certain impression on the catalog content. In sample 1, the font used gives a calm and simple impression, resembling the soft texture of finished fabric, with a feminine feel. However, in sample 2, there is a change in the font in the title section which produces a more assertive and strong impression, making the design appear bolder and more striking. On the other hand, sample 3 again presents a feminine font , but this time with a more elegant and exclusive touch, reflecting the luxurious nature of woven fabric. Choosing the right typeface is very important in conveying the desired visual message [6].

Images are also a crucial element in a catalog. In sample 1, the images are not well styled so they look monotonous. Samples 2 and 3 show significant improvements, but sample 2 is considered too busy because it displays too many visual elements. The reviewer suggests focusing on just one type of fabric, such as in sample 3, which displays images more focused and clear, creating a more focused and easy-to-understand design. Research on visual design states that good visual focus can increase the audience's appeal and understanding of the content [7].

In sample 1 and sample 2, the reviewer found that the elements of form and space did not blend with the description given, creating a disjointed impression of the design. However, in sample 3, the elements of form and space blended more harmoniously, creating a more cohesive and balanced appearance. Good spatial arrangement between text and images is essential in creating a pleasing and easy-to-read visual impression [8].

The layout also experienced significant development from sample 1 to sample 3. In sample 1, the layout was considered very simple and unable to describe the catalog content effectively. Sample 2 showed improvement, but because it displayed too many elements, the impression created was less focused and the details were lost. Sample 3 was chosen as the best layout, because the product photo layout was prioritized and the display was clearer, so that the overall catalog design looked more focused, elegant, and effective in conveying information. A well-organized layout helps increase the effectiveness of delivering visual messages in design [9].

As an affirmation, the development of the catalog from sample 1 to sample 3 shows significant evolution in terms of the use of color, typeface, image, shape, space, and layout. Each element is optimized to create a more elegant, structured visual impression, and in harmony with the traditional weaving theme. Thus, the final design is not only able to present information clearly, but also provides an aesthetic visual experience and is in accordance with the cultural character that is intended to be highlighted.

4. Conclusion

The catalog development process showed significant improvements in the use of color, layout, and visual elements from sample 1 to sample 3. The final design successfully created a more elegant and structured visual impression, in line with the theme of traditional weaving. This catalog serves as a comprehensive documentation of the variety of traditional weaving, including manufacturing techniques, motifs, materials, and philosophical meanings. This is an important step in preserving Indonesia's cultural heritage. The catalog design not only conveys information clearly, but also provides an aesthetic visual experience, reflecting the cultural character that is intended to be highlighted. This catalog can support economic sustainability for traditional weaving artisans by providing a solid database for further research and cultural promotion. Through cataloging, Indonesia's cultural diversity in the textile sector, especially weaving, can be better appreciated and recognized by the wider community, both domestically and abroad.

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IMPLEMENTATION OF INDEPENDENT CURRICULUM IN SOCIAL STUDIES LEARNING AT JUNIOR HIGH SCHOOL MUHAMMADIYAH 2 YOGYAKARTA

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Abstract

The Ministry of Education and Culture has implemented a curriculum renewal known as the Merdeka curriculum. There are several changes in this new curriculum compared to the previous curriculum. In learning, especially social studies learning, there are changes in content standards, process standards, and assessment standards. Schools as one of the educational institutions have an important role in implementing the independent curriculum. Social Studies learning has changed, including strategies for differentiated learning, integrating the dimensions of the Pancasila student profile, and diagnostic assessments to determine differences in student learning styles. This research was conducted at Junior High School Muhammadiyah 2 Yogyakarta with a descriptive qualitative research type. Respondents in this study were Social Studies teachers and students. The data analysis technique used by Milles Hubberman , namely an interactive analysis technique with stages of data collection, reduction. Data presentation and conclusions. Data validity uses triangulation, namely sources and techniques. The results of the study showed that Character values appear in discovery learning practices and group discussions. This method is preferred by students because they can directly explore all their potential through projects. The focus of social studies learning in the curriculum independence : Human and changes , Social changes , Cultural diversity , Local wisdom. Problems and solutions are Limited face-to-face time, Social studies material tends to be very broad, Improved infrastructure, Stable internet access and Accommodating room for active learning.

Keywords : *curriculum, social studies, school, Merdeka Curriculum*

1. Introduction

Change Curriculum 2013 towards Curriculum Freedom there is a number of change elements . Structure The curriculum in the Independent Curriculum is based on three thing , namely based on competence , flexible learning , and Pancasila character .

Improvement accompanied curriculum with change structure eye lessons , changes system learning , and changes to the assessment system always relate with various aspect in system education . Teacher, head school , time , source learning , and means infrastructure school is related elements direct with implementation Independent Curriculum . If change curriculum No accompanied by with repair means infrastructure , access source easy and quality learning , and improvement competence as well as change teacher *mindset* , then effort improvement quality education only vain just .

As Anita Lie (2012) explained that success a curriculum is a long process , starting from crystallization various ideal ideas and concepts about education , formulation design curriculum , as well as facilities and infrastructure , governance implementation curriculum , including learning , assessment learning , and preparation educators and staff education .

One of steps taken by the government in frame prepare educators and staff education in implementation Independent Curriculum is with provide education and training in the early stages .

One of school who carries out The Independent Curriculum is Muhammadiyah 2 Middle School Yogyakarta. Muhammadiyah 2 Middle School Yogyakarta has means adequate infrastructure adequate . Besides room class , other facilities owned school in support learning .

Term curriculum basically first time used in the world of sports in ancient Greek times . Origin origin he said is from the word *thief* and *curere* , which means distance or the path that must be taken by athletes runner (Sanjaya, 2008: 3). The same thing was also expressed Seodijarto (2008: 141) defines curriculum with the way to go taken participant educate For reach objective an educational program .

From to two definition This can interpreted that curriculum a the path to be taken taken by participants educate in it consists of from various education programs or eye subject / field studies along with Contents lessons . Dewey (Allan, 2012: 3) explains that *curriculum is a continuous reconstruction, moving from the child's present experience out into that represented by the organized bodies out truth that we call studies ...*

the various studies ... are themselves experience – they are that of the race .

Meaning curriculum above indicates that , everything form activities carried out student both in class , environment school , or outside school provided Still in teacher supervision , that is curriculum . Likewise , activities students at home like do Work Home , come along Work devotion , practice plant flowers in the yard home , walking around the garden look for plants .

Hasan classifies understanding curriculum based on four dimensions or method views , namely : *1) curriculum as an idea, 2) curriculum as plan written , 3) curriculum as activities , and 4) curriculum as* results (2007: 7). From the definition above There is two implied thing in it . *First ,* is the existence of a program or desire . *Second ,* is experience Study form experience real or practice real . Then when curriculum considered as experience or all over activity students , for understand curriculum school , no Enough only with see document curriculum as a written program , will but also how the learning process works which is conducted participant educate good at school or outside school . Including activity *ko* and extra curricular , the implementation of which influenced by various existing instrumental input elements in system education .

Objective from study implemented For describe : (a) planning learning Independent Curriculum , (b) implementation learning Independent Curriculum , (c) implementation evaluation Independent Curriculum , and (d) factors inhibitors and supporters implementation learning in frame implement Independent Curriculum in implementation learning at Muhammadiyah Middle School Yogyakarta.

2. Method

Study This use approach qualitative with type study qualitative descriptive . Research This take data with Respondent namely the Social Studies Teacher of Muhammadiyah 2 Yogyakarta Middle School. The data collection technique used interviews and documents . Instruments study use questionnaire and document list. Data analysis techniques using analysis Milles Hubberman interactive that is data collection , reduction , data presentation and conclusion . Data validity using Triangulation source .

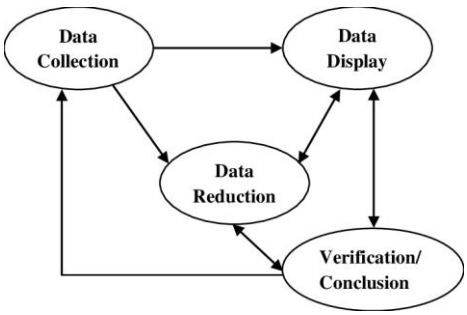


Figure 1. Analysis Techniques Milles Hubberman Interactive (2018)

3. Results and Discussion

In social studies learning at SMP Muhammadiyah 2 Yogyakarta, it is carried out with characteristics social studies learning with values character more appeared and participants educate in implementation curriculum independent more Lots practice and dig sources material with discussion Group , Participants educate Can dig source knowledge with experience direct .

Method *Project Based Learning* more like liked compared to with other methods because participant educate can explore all over potential self past project.. Characteristics social studies learning values character more appeared and participants educate on curriculum independent more Lots practice and dig sources material with discussion group , participants educate Can dig source knowledge

with experience direct . Project Method more happy , in grade 9. Project based learning method is more liked participant educate Because can explore ideas, concepts and works .

Learning with ICT *(Information and Communication Technolog y)* more liked participant educate especially at Muhammadiyah 2 Middle School Yogyakarta, it is true There is class ICT specific .

The main focus in learning social studies in the Independent Curriculum is humans and change , Change Social in society , diversity culture , wisdom Local , Because this become foundation For build teak self Gotong royong nation still need improved its implementation .

Sub- subject skills social studies lessons that discuss economy (entrepreneurship) is very skillful liked by participants educate that is including : exhibition results , market day. In addition it is also a very important public speaking skill needed in the eyes social studies lesson .

Method learning that is unique to implementation Independent Curriculum social studies learning, namely Work Group , Discussion , Interview to Society about change social .

Bait feedback made during implementation learning IPS for example on the material problem humans and change There is cases in daily life , asked back and asked reflection . How prevention related with the social problems that occur

Obstacle Curriculum freedom in the eyes social studies lesson is time look at very face limited , social studies material tends to be very wide , Support which is needed to be able to implement the Independent Curriculum optimally is Support : party school support facilities infrastructure , internet access , room more wide For formation classroom learning .

4. Conclusion

Character values appear in discovery learning practices and group discussions. This method is preferred by students because they can directly explore all their potential through projects. Students prefer learning with ICT, especially since there is a special ICT class at school. The main focus in social studies learning in the Independent Curriculum is humans and change , Change Social in society , diversity culture , wisdom Local , Because this become foundation For build teak self Gotong royong nation still need improved its implementation

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DIGITAL ARCHIVE MANAGEMENT TRAINING AS A FORM OF DIGITAL TRANSFORMATION IN SINDUADI VILLAGE THROUGH COMMUNITY EMPOWERMENT

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Abstract

The Community Service Program (PKM) was designed to provide the residents of Gemawang Hamlet, Sinduadi, Mlati, Sleman with essential knowledge and skills in archive management. Conducted on August 11–12, 2024, this program aimed to address the challenges faced by members of the Gemawang PKK (Family Welfare Movement) in organizing and maintaining family documents, both physically and digitally. The program utilized various methods to ensure effective learning, including lectures, which provided a fundamental understanding of archival concepts and their significance; practical training, which focused on the proper management of physical and digital archives; and Q&A sessions, which allowed participants to discuss and resolve issues related to document management. Held at Gemawang Hamlet Hall, the training was attended by 30 participants, all of whom demonstrated an improvement in their archival management skills. The effectiveness of the program was evident in the participants' performance, as reflected in their test scores, with an average pre-test score of 75.4 and a post-test average of 87.5. This increase indicates the positive impact of the training in enhancing the participants' understanding and competency in family archive management.

Keywords: Archive Management, Family Archiving, Archive Digitization

1. Introduction

The community service program is planned to be implemented in Sinduadi Village, specifically in Gemawang Hamlet. Gemawang Hamlet consists of six neighborhood units (RTs), each of which has PKK (Family Welfare Movement) cadres actively supporting the Hamlet Head in administrative tasks, especially during inter-village competitions at the district level. Additionally, these cadres regularly organize health programs for toddlers and the elderly and collaborate with local community health centers (Puskesmas). Beyond healthcare, they are also involved in social activities such as social assistance programs (bansos), direct cash assistance (BLT), and educational aid (KIP). To effectively manage these initiatives, accurate and well-organized documentation is crucial, particularly for collecting and maintaining identity documents (KTP and KK). While this may seem straightforward, document management remains a major challenge, impacting public service efficiency and community welfare in Gemawang.

This initiative addresses two key problems. First, the PKK cadres' capacity in archive management is still limited. Many cadres lack proper knowledge of how to store and organize documents in accordance with archival principles, leading to disorganized files that are difficult to retrieve. In some cases, important documents go missing, and when cadres need to request them again from residents, they may not always be available, causing service delays. Second, the lack of understanding of digital archiving is another pressing issue. While many cadres own digital devices that could facilitate the digitization process, their limited knowledge prevents them from adopting archival awareness as a standard practice.

To address these challenges, we will provide intensive guidance to raise archival awareness and train residents in proper archive management. Once the cadres understand the fundamentals of archiving, they will be encouraged to practice document digitization. This initiative is expected to enhance document accessibility, ensuring that necessary records can be retrieved quickly and efficiently. Ultimately, this program aims to empower PKK cadres in Gemawang Hamlet to carry out their community responsibilities more effectively and efficiently.

Archives are records of activities or events in various forms and media, in line with the development of information and communication technology, created and received by government institutions, local governments, educational institutions, businesses, political organizations, community organizations, and individuals in the course of societal, national, and state life (Law No. 43 of 2009 on Archives). Every activity, whether by an organization or an individual, generates archives as evidence or a source of memory. Proper management of archives enables their rapid retrieval. The family environment, as the smallest unit in society, produces and requires archives in many activities. Family archives are created starting from the moment a husband and wife pledge to marry.

The event of marriage results in the Marriage Certificate, which becomes a vital archive within the family environment. Subsequently, various other family archives are created, such as birth certificates for family members, and archives related to the education of family members (e.g., report cards, diplomas, certificates of achievement, etc.). Archives also arise in relation to employment (e.g., appointment letters, promotion letters, and other documents), health-related archives (e.g., medical records, BPJS cards, patient cards, etc.), ownership-related archives (e.g., land certificates, house certificates, Vehicle Ownership Books or BPKB, and other proof of ownership), banking archives (e.g., bank books, credit cards, ATM cards, loan agreements, deposit receipts, etc.), and routine payment archives (e.g., subscription payment receipts for newspapers, electricity, water bills, etc.), among many others. Therefore, family archives must be properly managed.

Archive management is a task or activity related to the management of archives, which includes recording, controlling, distributing, storing, maintaining, supervising, transferring, and destroying (Sumartini, 2014). This definition of archive management is related to office administration activities. However, this archive management can also be applied to the management of family archives in a simpler form. The principle of simplicity in managing family archives aims to involve all family members in the process (Suliyati, 2019). The most important factor in family archive management is fostering awareness among family members to manage their archives efficiently and effectively, so they can meet the need for the availability of the right and timely archives.

According to the Republic of Indonesia Law No. 43 of 2009, Chapter 1, Article 1, Clause 3, several definitions of archives and types of archives are as follows: 1) dynamic archives are those used directly in the activities of the archive creator and stored for a certain period, 2) vital archives are those whose existence is a fundamental requirement for the operational continuity of the archive creator, cannot be renewed, and cannot be replaced if damaged or lost, 3) active archives are those that are frequently or continuously used.

Archives are records of activities or events in various forms, created and received by individuals or institutions, and serve as evidence or memory. Proper archive management ensures efficient retrieval. In the family context, archives are created through milestones such as marriage certificates, birth certificates, educational documents, health records, and ownership proofs. Effective management of family archives, though simpler than office administration, requires family members' involvement. Key factors include fostering awareness for efficient management, so archives are readily available when needed.

According to Indonesian Law No. 43 of 2009, archives are classified into: 1) dynamic archives, used in the creator's activities and stored for a period; 2) vital archives, crucial for operational continuity; and 3) active archives, frequently used.

In this context, various documents owned by individuals as family members can be categorized into active archives, dynamic archives, and vital archives as follows.

Table 1. Types of documents in the archive cluster

No.	Type of Archive	Types of Documents
1	Active Archive	Identity card (KTP), Driver's license (SIM), Vehicle registration number (STNK), ATM card, BPJS card, etc.
2	Dynamic Archive	Employee card, Student card, School card, Loss report, Police clearance certificate (SKCK), Exam result certificate (SKHU), etc.

No.	Type of Archive	Types of Documents
3	Vital Archive	Family card (or C1), Birth certificate, Marriage certificate, Death certificate, Land certificate, Building certificate, Diploma, Purchase invoice, Taxpayer identification number (NPWP) card, etc.

Source: Sugiyanto, S., Dorojati, R., Sulistiana, U., & Tiurmida, N. (2020)

In the context of state life, all documents listed in Table 1, if lost or damaged, can be replaced with a certificate. Vital documents, such as family cards, property deeds, marriage certificates, and death certificates, are universal documents owned by every family. Given the numerous documents produced by individuals and families, it is crucial for each family member to understand the value of archiving (Sri Sulasmi, 2014). Therefore, family archive literacy should be provided to all families. If a family member struggles to find one of these documents, it could lead to other problems.

Families, as producers of archives, must demonstrate this through the marriage process. Before the sacred "marriage contract" ceremony, the groom and bride must meet administrative requirements, such as obtaining a recommendation letter from the local neighborhood (RT) and community (RW) heads. To obtain this recommendation, the couple must present their Identity Cards (KTP) and Family Cards (KK). KTP shows personal documents, and KK shows family documents. After the marriage ceremony, the couple receives a new document: the marriage certificate. The recommendation serves as a legalized document in the village office, then taken to the Religious Affairs Office (KUA) to register the marriage. Once a new family is formed, each spouse brings various personal documents like driver's licenses (SIM), ATM cards, diplomas, etc. Over time, the new family will have children, and parents are required to provide a birth certificate for their child. As the child enters school and completes educational milestones, they start producing their own documents.

On the other hand, a thriving family experiences growth in economic, social, and religious aspects, and many families, whether new or old, will expand their household facilities by purchasing a house, car, etc. This purchase automatically adds to the family's document collection. Apart from the documents mentioned, the dynamics of family life involve regular document production, which may be monthly, semesterly, yearly, every four years, or every five years. The phases of document production types for families are presented in the following table.

Table 2. Types of Family Documents Based on Production Time

No.	Production Time	Document Name	Description (Document Group)
1.	Once in a lifetime (Permanent)	- Family Card - Birth Certificate - Death Certificate - Kindergarten, Elementary, Middle School, High School Diplomas - Civil Servant (CPNS) Appointment and Employment Decision	Population Documents Population Documents Population Documents Education Documents Civil Servant Documents
2.	Once in a lifetime (Non-permanent)	- Marriage Certificate (Can be issued more than once) - Divorce Certificate (Can be issued more than once) - University Degree	Typically issued once for marriage/divorce and once per education level.
		- Vehicle Purchase Invoice - Building Permit - Proof of Electricity Connection - Proof of Telephone Connection - Land Deed - Work Experience Certificate	1 invoice for 1 purchase. 1 permit per house, 1 meter for electricity/telephone. Agrarian documents.
3.	Every five years	- Identity Card (Before e-ID) - Passport	Population Documents Immigration Documents
4.	Every four years	- Vehicle Tax (Vehicle Plate Number Change)	Vehicle Tax
5.	Every year	- Proof of Property Tax Payment - Proof of Vehicle Registration (STNK) Payment	Property Tax Documents Vehicle Registration Documents

No.	Production Time	Document Name	Description (Document Group)
6.	Every six months	- Proof of Tuition Payment - Public Transport Vehicle Inspection (Kir) - Student Report Card - University Exam Results Certificate	For university students For kindergarten through high school
7.	Every month	- Salary Slip - Proof of Postpaid Electricity Payment - Proof of Postpaid Telephone Payment - Proof of Water Bill Payment - Proof of Home Internet Payment - Proof of School Tuition Payment	For Employees For PLN, TELKOM, PDAM Customers For Education Purposes

Source: Sugiyanto, S., Dorojati, R., Sulistiana, U., & Tiurmida, N. (2020)

The implementation of archival awareness in family life is based on the understanding of the documents produced by each family, as shown in Table 2. Families can manage these documents following archival storage theories, applying the principles of centralization and decentralization. Centralization involves storing documents like family cards (KK), birth certificates, land titles, etc., in one place for the whole family. Decentralization means each individual family member keeps personal documents such as ID cards (KTP), driving licenses (SIM), and passports.

It is essential for each family member, especially adolescents, to know the location, quantity, care instructions, validity, and purpose of these documents, as well as specific document numbers, such as family card numbers, phone accounts, vehicle registration numbers, etc. Proper management of these documents enhances the family's ability to support ongoing activities and prepares them for future needs.

According to John Sincair (1998) and Ali & Asrori (2010), these documents have various values: academic, authority, economic, solidarity, aesthetic, and religious. These values contribute to the family's decision-making and unity. Sri Sulasmi (2014) emphasized that family archival practices help avoid issues like document duplication, forgery, or fraud. Properly stored and protected documents serve as legal, economic, educational, and privacy tools.

Schaefer and Rober (1998) noted that family members who commit to archiving documents responsibly are upholding fundamental ethical principles. Teaching children about their documents, including which are personal and which are family-related, helps instill responsibility and understanding of the consequences of losing or damaging important records. As families in Indonesia embrace archival values, they may be recognized as "archivist families," which symbolize trust, responsibility, and a strong cultural and religious foundation.

2. Method

The implementation method for this program was carried out in the form of structured training, conducted in three stages. First, participants received theoretical material on family archiving. Second, they were guided in organizing and classifying family archives. Third, they practiced digital archiving under supervision.

The training was conducted in-person, adhering to strict health protocols. The first session was held at Gemawang Hamlet Hall, RT02, Sinduadi, Mlati, Sleman, with 50 PKK cadres as participants. On the first day, the session focused on theoretical material regarding the importance of family archive management. The second day consisted of intensive and flexible practical sessions, where participants practiced manual archive organization with direct mentoring from lecturers and students involved in the program. The objective was for at least 80% of participants to successfully create a structured manual family archive.

The program's partner organizations contributed by providing a conducive training space and coordinating participants. The program's effectiveness was evaluated through observation and surveys. Observation assessed participant engagement and the final outcome of their manual family archives, while surveys gathered feedback via questionnaires regarding training effectiveness and mentoring quality.

Key evaluation aspects included participant satisfaction with the material delivery, the effectiveness of mentoring, their level of understanding, and their success in applying the practices learned.

Additionally, students involved in the program took on multiple roles, including serving as moderators, event MCs, communication facilitators between participants and trainers, and documentation coordinators. On the mentoring day, both lecturers and students acted as mentors, overseeing and correcting participants' archiving practices to ensure successful implementation.

3. Results and Discussion

The program was carried out in two phases. The first phase focused on delivering materials about family archive management. On the first day, 33 participants from seven households attended the session. Overall, the community service activity ran smoothly, received positive feedback, and was beneficial to the participants. They actively engaged in the discussion and attentively followed the material presentation.



Figure 1. Documentation of the Training Activity
Source: Personal Document

Before the material was delivered, the PKK (Family Welfare Movement) cadres took a pre-test, resulting in an average score of 75.4. After receiving the training, their scores increased to 87.5, indicating the success of the program implemented by the UNY community service team. This result also demonstrated the relevance and usefulness of the training materials for the needs of the Gemawang residents.

The second phase of the program focused on practical training in digital archiving. Participants were instructed to prepare their devices and install necessary applications such as camera apps and CamScanner. Additionally, they were asked to bring documents like their National Identity Card (KTP) and Family Card (KK) for the practical session. The participants worked in small groups of four to five members, practicing scanning and uploading documents to Google Drive. The session was conducted smoothly and met the community's needs. This was confirmed by Mrs. Nila, the Head of the PKK in Gemawang, who stated, "This activity is highly beneficial for us, as every year we participate in an administrative organization competition at the district level."

The implementation of the program was influenced by several supporting and inhibiting factors.

Table 3. Analysis of Supporting and Inhibiting Factors

No.	Aspect	Description
1.	Supporting Factors	1. There is a collaboration agreement between the Community Service Team and Gemawang Village. 2. Easy communication and coordination between the Community Service Team and the Gemawang Village representatives. 3. The training material aligns with the needs of the Gemawang community. 4. High enthusiasm from participants to understand the concept and importance of family archive management.

2.	Inhibiting Factors	1. The limited number of invited participants prevented the knowledge and expertise from being shared with the entire Gemawang community. 2. The differences in participants' ages and professional backgrounds led to significant variations in understanding, as older participants required a different approach in presenting the material.
3.	Solutions	1. The student team assisted in guiding and supporting participants during the archiving practice. 2. It is necessary to invite relatively younger cadres to facilitate regeneration and ensure the sustainable transfer of knowledge.

Based on the program implementation, the UNY Community Service Team conducted an evaluation to enhance future activities. It was determined that archival skills among PKK cadres should be monitored periodically to ensure continuous learning and improvement. Additionally, knowledge transfer should be prioritized for younger cadres, as most of the trained participants were elderly. Looking ahead, future community service programs are recommended to focus on “Digital Archival Information Systems” and “PKK Archival Management” as training topics. These initiatives aim to further enhance the effectiveness of community service programs, ensuring a sustainable and impactful learning experience for the Gemawang community.

4. Conclusion

The implementation of the off-campus lecturer activity titled "Digital Archive Management Training as a Form of Digital Transformation in Sinduadi Village Through Community Empowerment" was deemed successful. The success of the program is demonstrated by the notable increase in participants' scores, from an initial pre-training average of 75.4 to a post-training average of 87.5. Positive feedback from participants, indicating that the training materials were beneficial and aligned with the needs of the PKK mothers in Gemawang Hamlet. High enthusiasm and active engagement from participants throughout the training program conducted by the UNY Community Service Team.

Based on the successful implementation of the digital family archiving training, it is essential to ensure positive follow-up actions for both the community and the team. The success of this program was supported by several factors, including the established collaboration agreement, effective communication, the relevance of training materials to community needs, and the strong enthusiasm from both the UNY Community Service Team and the residents of Gemawang Hamlet.

For future initiatives, it is recommended to establish a dedicated team in each RT (neighborhood unit) and RW (community unit) to serve as role models for document archiving. These designated role models should consistently share their knowledge with residents in their respective areas. Additionally, further efforts should be made to involve young community members as key drivers of socialization and support for PKK members in implementing proper archiving practices.

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THE ACTUALIZATION OF TRAINING TRANSFER OF THE TRANSFORMATIONAL TEACHER PROGRAM

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Abstract

This research aims to identify the actualization of training transfer of the Transformational Teacher Program (TTP) from the perspective of the TTP alumni. This research uses a qualitative approach with a phenomenological method. The research subjects were the TTP alumni elementary, middle and high school teachers, school principals and approach alumni colleagues. Data was collected through Focus Group Discussions (FGD) and semi-structured individual interviews. Data were analyzed using thematic analysis techniques. The validity of the data uses source triangulation and researcher triangulation. The research results show that there are six actualization of training transfer of the TTP, which can be classified: 1) learning practices, 2) school management and culture, 3) initiative and leadership, 4) knowledge dissemination, (5) collaboration between teachers, and 6) resilience and work spirit.

Keywords: training transfer, the Transformational Teacher

1. Introduction

The impact of training usually targets productivity, profit, quality including customer satisfaction, innovation, and staff performance [1]. In the context of Indonesia which has diverse geographical conditions and educational decentralization, the impact of teacher training is also expected to narrow the gap in education quality, especially teacher quality and student learning outcomes [2]. The gap in education quality is still a classic problem in Indonesia: 1). one of the variables causing the gap in education quality is geographical location, and 2) access to technology and infrastructure, for example, is part of this variable.

Educational inequality is also still found in the Special Region of Yogyakarta Province. This region is one of the provinces in Indonesia that experiences regional disparities due to uneven development [3]. Development of infrastructure is generally prioritized in areas with high density. According to the BPS report, the percentage of poverty in the Special Region of Yogyakarta is contributed by 11.03% by urban communities and 15.12% from rural areas [4]. In the field of education, disparities in educational facilities such as computers and teacher welfare are still found in the five regions in the Special Region of Yogyakarta; Yogyakarta City, Sleman Regency, Bantul Regency, Gunungkidul Regency, and Kulon Progo Regency [5].

Previous research recommends that policy makers need to consider variations in conditions or location contexts with teacher professional development [6]. Several studies have attempted to explore the impact of TTP on improving the quality of schools/education, including the effectiveness of TTP in junior high schools [7] and in senior high schools [8]. Both studies had a single research object, or one school. Previous research that examines the impact of TTP within the district/city or provincial scope is still very limited. One of them is research in Lombok Regency which uses a quantitative approach with the aim of evaluating the TTP program [9].

This research is different from previous studies that also discussed TTP and its impacts. This study seeks to better see and hear the perspectives and experiences of TTP alumni teachers in implementing the learning outcomes they obtained through TTP. The purpose of this study is to to identify the actualization of TTP from the perspective of TTP alumni

Research on the impact of teacher training with attention to regional context is important because it can provide recommendations for policy makers on training formats that are not only in line with national goals but also local contexts. Previous research in China found differences in needs orientation between urban and rural teachers [10].

2. Method

The research subjects were TTP alumni elementary, middle and high school teachers, school principals and approach alumni colleagues. Data was collected through Focus Group Discussions (FGD) and semi-structured individual interviews. Data were analyzed using thematic analysis techniques. The validity of the data uses source triangulation and researcher triangulation.

3. Results and Discussion

Based on interviews, the forms of the TTP alumni transfer training are quite diverse. In general, six themes were found to be related to the TTP transfer training, namely related to: 1) learning practices, 2) school management and culture, 3) initiative and leadership, 4) knowledge dissemination, 5) collaboration between teachers, and 6) resilience and work spirit.

a. Learning Practice

The data presentation for the first theme, namely learning practices, is as follows.

1) Differentiated Learning

The informant explained that the form of implementation of TTP results that they had followed was to carry out differentiated learning and involve the surrounding environment. An interview with informant 1's leader, informant 2, confirmed the findings in an individual interview with informant 1 that he had practiced this in his school. With this method, students are treated differently according to their abilities and needs. Informant 2 assessed that the implementation of differentiation by informant 1 had been successful and was seen from the practices carried out in the classroom, where teachers could accommodate the individual differences of each student. The same thing was also found in informant 3. Informant 3 highlighted that one important aspect of TTP is differentiated learning, which allows teachers to create a learning ecosystem that suits the needs of each student, thus providing a more personal and effective impact on the teaching and learning process.

2) Contextualization of Learning with the Surrounding Environment

The learning practices affected by TTP are also felt in terms of utilizing the surrounding environment as a learning resource. Informant 3, informant 4, informant 1 explained their experiences in this regard. Rivers and other natural potentials along with micro-industries around the school are utilized by teachers as learning resources and become an integral part of the learning process. Informant 4, for example, provided a concrete example of how learning can be contextualized with the local environment. He invited students to leave the classroom and visit coconut sugar craftsmen, who are often the students' own parents. During the visit, many aspects of the lesson can be learned, including how subjects such as mathematics can be applied in the context of calculating coconut sugar production. This shows that the contextual approach provides students with direct learning experiences that are closely related to their daily lives, making learning more relevant and interesting.

b. School Management and Culture

The data exposure for the second theme in the formulation of the problem of the form of training transfer is school management and culture. The following is the explanation.

1) Changes in Discipline and Work Culture

The implementation of TTP in school management and culture appears to be the richest compared to other areas in this research. There are four sub-themes, namely: a) changes in discipline and work culture, b) curriculum development, c) involvement of school committees and the community in school management, and d) development of school programs.

2) Curriculum Development

One of the major changes that occurred in the school was the improvement of discipline and work culture. Informant 5 explained that informant 1 as a TTP alumni invited many students and teachers to improve discipline. Informant 5 described informant 1 often discussing with him and other teachers about the condition of the school that still needed to be strengthened in terms of learning and work discipline. informant 1 did not work alone but also consulted with his leader at that time, namely informant 2. Informant 5 as a colleague of informant 1 even stated that there was a major change in terms of discipline in the school.

"Then the changes in the school are also many, not just changing but together improving student discipline, our discipline when working, and so on. The changes are very big, Ma'am" (Informant 5)

The work paradigm in schools is also affected by the implementation of asset-based thinking as part of improving school culture. Through this approach, informant 3 as an informant who is now a principal at an elementary school said he created the "Dream Class" program which provides space for students to share their hopes for the school and their ideals. This shows how the new school culture is more centered on the needs and potential of students.

Other applications are found in terms of curriculum development. TTP alumni teachers are not only involved in curriculum development in their own schools but also in other schools in their area. For example, during the transition from the Curriculum of 2013 to the Emancipated Curriculum (the Curriculum of 2021). TTP alumni actively play a role as resource persons and provide suggestions regarding curriculum development in schools. At his school, an informant with the informant 4 who is currently an elementary school principal explained that he encourages teachers to be able to develop creative learning resources and not rely on Student Worksheets. He wants teachers to utilize autonomy in designing teaching preparations to be more relevant and contextual to the school situation and student needs.

1) Increasing the Involvement of School Committees and the Community in School Management

The next aspect of school management and culture that is also an area of teacher transfer training is the involvement of the committee and the community. Informant 6 as informant 3's colleague strengthened the results of the previous interview that the involvement of the school committee has become more active since informant 3 finished participating in TTP. Informant 3 often communicates with the committee to get support in various school activities. Recently, informant 3 also proposed the physical construction of the school to the Bantul Education Office so that the school received assistance in procuring class 6 rooms and a library.

2) School Program Development

The next sub-theme found was the development of school programs. Two informants explained their experiences in developing more innovative school programs in terms of school promotion and parental involvement in teaching. Holding a literacy competition for kindergarten children was one of the school's promotional strategies and was proven to increase student enthusiasm. Another informant with the informant 7, who is a teacher at the junior high school level, explained that he adopted various practices from TTP to create structured and incidental programs. He developed the Parent Teaching Program that already existed in his school to be more structured and routine.

c. Initiative and Leadership

The third theme, namely initiative and leadership. The following is the explanation.

1) Initiative to Develop New Programs in Schools

Of the 12 informants, half of them have been appointed as principals in the last 1-2 years. Although they have not been appointed as principals, many teachers feel that they have received an injection of leadership skills and knowledge from TTP. Two informants who stand out in terms of initiative and leadership are informant 3 and informant 1. Informant 3 is a female teacher at an elementary school who is now the principal of an elementary school, while informant 1 is a male teacher at a junior high school located in a hilly area.

Informant 3's initiative was highlighted by his former leader, informant 8. Informant 3 used his experience and knowledge from TTP to initiate the "*PELUK*" (Siluk Elementary School Literacy Week) program. This program aims to attract new students by involving kindergarten students in various literacy activities. This program shows how post-TTP teacher initiatives can contribute to increasing student numbers and strengthening the relationship between schools and the surrounding community. Informant 1 was described by his colleagues and former leaders as a teacher who actively introduced more interactive learning methods that were in accordance with students' needs. Informant 1 himself admitted that he often initiated initiatives to demonstrate good practices that were then seen and appreciated by his colleagues. This became the basis for the development of programs in schools that were fully supported by the principal and other teachers.

2) Leadership in Learning Communities

In addition to standing out in terms of initiative, participation in TTP makes alumni take on the role of pioneers in their communities. Teachers who participate in TTP play an important role in sharing the knowledge and experience they have gained with fellow teachers in their own schools. Informant 3, for example, leads joint community of practice (CoP) every Friday. In this CoP, teachers are given the opportunity to take turns as resource persons, which provides them with the opportunity to share knowledge and experience. This is as stated by a colleague from ES as follows:

"Every Friday we have the CoP, then we take turns with the CoP" (Informant 7)

Informant 8 as informant 3's former leader reinforced this by telling that informant 3 led the creative process in making videos with the teacher community at school. Informant 3 not only provided direction, but also provided creative ideas for making videos that involved the entire school community. Not only at school itself, informant 3 became a resource person in various activities outside of school, such as in school clusters or groups. Informant 8 as informant 3's former leader explained:

"Apart from school, informant 3 is also often a resource person in clusters and shares her knowledge with other schools" (Informant 8)

In addition to informant 3, all informants including informant 1 and informant 9 also often become resource persons in dissemination related to differentiated learning. This activity is not only held in schools, but also involves local education supervisors. This shows how teachers can lead change in learning communities and help their colleagues to develop their competencies. Informant 2's former leader reinforced this.

"Informant 1 has conducted dissemination related to differentiated learning with supervisors, and we facilitated the activity at school" (Informant 2)

Based on a search of news documents, informant 1 as the head of the TTP community in Kulon Progo Regency is also actively mobilizing its members to carry out social services in the educational environment, one of which is a program to drop clean water to schools experiencing drought due to minimal rainfall

d. Dissemination of Knowledge

Dissemination of knowledge and good practices is carried out by TTP alumni through coaching and dissemination. This is very crucial because the goal of TTP itself is to form learning leaders who implement independent learning and mobilize the entire education ecosystem to realize student-centered education. Thus, the mobilization of learning communities for teachers in schools and in their regions has a very expected impact. After implementing the nine-month of the Transformational Teacher Education Program (TTEP), teachers can become the Transformational Teachers and carry out their roles in their respective schools and regions. Teachers do not receive funds to disseminate or share their knowledge, skills, and experiences after participating in and graduating from the TTEP. This research limits the dissemination of knowledge by TTP alumni after that period.

The prominent role assigned to TTP alumni is to conduct outreach. After participating in TTP, teachers are often asked to be resource persons in various schools and learning communities. SW as a teacher and vice principal at a junior high school, shared that after participating in TTP, he practiced *coaching* in supervising learning at school. He explained that the coaching he received from TTP was very useful for assisting teachers in improving performance and providing evaluations of learning. Direct informal consultations are also provided by TTP alumni.

e. Collaboration between Teachers

TTP alumni teachers apply the results of training by collaborating on teaching techniques. The following is an example of an interview excerpt:

"After becoming a TTP, his abilities began to emerge, his abilities in IT... with guidance from informant 3, with collaboration with friends, I think that until now I have benefited" (Informant 8)

"Incidentally, at our previous school, there were 3 GPs, so we were able to collaborate to share what knowledge we had gained from this the Transformational Teacher" (Informant 10)

f. Resilience and Work Spirit

The form of TTP transfer training is not only in the form of physical work but also positive work emotions. Even though there are challenges such as high workloads and facility constraints, teachers who take part in TTP show resilience and commitment to continue implementing the results of the training. They continue to carry out their teaching duties even though they are faced with multitasking and a high physical workload, and show a strong emotional attachment to their school environment.

1) Resilience at Work

"But I persisted because I knew that what I was doing was my responsibility to the school and the children" (Informant 11)

"I really applied the knowledge I gained from TTP for 9 months... I practiced it in my new elementary school. We really started from zero rupiah because the available funds were very limited" (Informant 3)

"Informant 3 always gives feedback, 'Well, like this, Miss, I've already done it, but it's okay, it's okay, just take it slow together while studying" (Informant 6)

2) Spreading Work Spirit

"He divides his time between TTP duties and other tasks with enthusiasm and without complaint" (Informant 12)

"I honestly see his enthusiasm that will spread to his friends. But if there is no concrete example, it is a bit difficult. So there must be a role model" (Informant 2)

4. Conclusion

The research results show that there are six actualization of training transfer of TTP, which can be classified: 1) learning practices, 2) school management and culture, 3) initiative and leadership, 4) knowledge dissemination, (5) collaboration between teachers, and 6) resilience and work spirit. These classifications highlight the multifaceted nature of training transfer and underscore the importance of a supportive environment in enhancing educational outcomes.

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ENHANCING TEACHERS THROUGH CLASSROOM ACTION RESEARCH AT MIDDLE SCHOOLS IN TAMBAKROMO, PONJONG, GUNUNGKIDUL, DIY, AND SURROUNDING AREAS

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Abstract

Teachers play a core role when it comes to the education process. As an educator, teachers are required to have academic qualifications, competence, be physically and mentally healthy, and have the ability to fulfill national education goals. This is as stipulated in the 2005 Teachers and Lecturers Act. Teachers are required not only to have teaching qualifications but also to have the ability to plan and conduct research, as well as follow-up. Classroom Action Research as a research method is one of the competencies that teachers are required to have (Herman, 2017). This research needs to be planned, conducted and followed up. In addition to positively impacting future learning, it also increases teacher productivity. However, one of the problems faced by teachers at Taman Dewasa Junior High School Tambakromo, Ponjong, Gunungkidul is the limited ability to conduct Classroom Action Research, including in planning, implementing, and following up. Therefore, the program partners in this project are teachers of Taman Dewasa Tambakromo Junior High School, Ponjong District, Gunungkidul Regency. The problems to be addressed through the proposed program are training and mentoring in planning, implementing, and following up on Classroom Action Research. Planning includes identifying problems faced in teaching and learning and efforts made to solve these problems, searching for relevant references. The next activity involves mentoring the implementation of Classroom Action Research (CAR) in the field and reporting on the CAR, as well as follow-up actions. The follow-up may include drafting a brief article.

Keywords: training and mentoring, teachers, Classroom Action Research

1. Introduction

"Education is an investment for the future", is the spirit of Yogyakarta State University in its commitment to build the nation. Among the efforts made is to train professional teachers. Professionalism is closely related to the quality, quality and conduct that characterize a profession or the characteristics of a professional person (KBBI, 2020). The main duties of professional teachers are regulated by legislation. Law Number 14 of 2005, Article 1, Chapter on General Provisions, states that teachers are professional educators whose primary duties are to educate, teach, guide, direct, train, assess, and evaluate students in formal early childhood education, primary education, and secondary education (Sekretariat Negara, 2005). Like other professions, educators are also required to work professionally.

One issue faced by teachers at Tambakromo Adult Park Junior High School, Ponjong Subdistrict, Gunungkidul Regency is the limited number of research activities or programs conducted, including research planning and follow-up actions. On the other hand, the ability to conduct research is one of the tasks of teachers to develop themselves and their learning. Learning development based on reflection on the shortcomings of previous learning is an effective and efficient way to improve the quality of learning. This good quality of education needs to be pursued, because it will have a positive impact on improving the competence of students. Therefore, the competence of teachers in this school needs to be improved through training and mentoring in planning, conducting and following up on Classroom Action Research. Competence in conducting Classroom Action Research enhances teachers' professionalism. As mentioned above, classroom action research is research conducted by teachers in their own classrooms through self-reflection, with the aim of improving the teaching and learning process that teachers manage. In addition, activities in this Community Partnership Program can also support the transformation of higher education through Key Performance Indicators (KPI) 2 and 5.

The Mitra of this Community Partnership Program is the teachers of SMP Taman Dewasa Tambakromo, Ponjong District, Gunungkidul Regency. The results of initial observations and interviews with one of the coaches at this school, most teachers have not been able to conduct Classroom Action Research comprehensively. In other words, the research activities are planned through reflection on problems in the class taught by the teacher, carrying out Classroom Action Research, making reports and follow-up.

There are a total of approximately 15 teachers in this school and its vicinity. The majority of these teachers have never conducted Classroom Action Research. However, these teachers have a strong willingness to learn and try to conduct Classroom Action Research. This type of willingness needs to be supported, because it will have a positive impact on teachers and students. The Community Partnership Program team intends to support the teachers' interest through training and mentoring activities in planning, implementing and following up on Classroom Action Research.

2. Literatur Review

The law's requirement for teachers is professionalism. The indicator of professionalism can be measured from several aspects, including the competencies possessed by a teacher. The teacher competencies in question include 1) pedagogical competence, 2) personality competence, 3) social competence, and 4) professional competence.

Pedagogical competence is the teacher's ability to manage lessons in the classroom, including preparing learning tools, implementing and evaluating learning processes. This competency must be mastered by teachers to improve the learning process in the classroom. Pedagogic competence can be improved through various means, including attending training, educational symposiums, scientific meetings or seminars, mentoring, and various teacher professional development programs. Personality competence is closely related to the ability of a qualified personality. Indicators of this competency include a stable personality, maturity, wise attitude, and authoritative performance. The teacher's personality is a role model for students. Social competence is an ability that educators must have. This competency is needed by teachers, one of which is to communicate and interact effectively and efficiently with the community inside and outside the school (Sudrajat, 2024; Usman, 2002, p. 143). Professional competence is the ability to master learning materials comprehensively, approaches strategies, methods and techniques of teaching that are appropriate and make the material delivered easily understood by students (Alma et al., 2010, p. 142).

One of the problems faced by teachers at Tambakromo Junior High School, Ponjong District, Gunungkidul Regency is that most of them have never conducted Classroom Action Research, both in planning (proposal), implementing and making reports, as well as following up after research and making reports. Meanwhile, according to experts, Classroom Action Research is beneficial for solving problems in learning. In detail, the benefits of Classroom Action Research for teachers are 1) teachers gain experience and the ability to solve problems they encounter in the class they teach, 2) teachers are able to improve their professionalism, 3) teachers can directly improve their knowledge and skills through the stages carried out in Classroom Action Research, including planning programs, implementing learning according to plans, observing their own learning, and reflecting as material for developing the next plan, and 4) teachers can increase self-confidence as a positive impact of mastering the stages in Classroom Action Research, and the ability to solve problems (Daryanto, 2011).

There are several Classroom Action Research Models (Arikunto, 2011) that have been created by several experts, including Kurt and Lewin model (1946), Kemis and Taggart model (1988), Elliot model (1991), Mac Kernan model (1991), and Ebbut model (1985).

3. Method

The stages of conducting this Classroom Action Research training are preparation and planning, implementation and evaluation (Murdjito, 2012). The following are the actions taken at each stage.

a. Preparation and planning stages

At this stage, the Community Partnership Program team conducted an interview with one of the school principals to identify the problems faced by the teachers. From this interview, it was recognized that not all teachers had the ability to conduct Classroom Action Research. Furthermore, the

Community Partnership Program team coordinated with the teachers to learn about their availability to collaborate with the team to carry out training and mentoring in Classroom Action Research.

b. Implementation stage

At this stage, the Community Partnership Program team carried out several further steps. These steps consisted of 1) coming to the school and conducting face-to-face Classroom Action Research training, 2) through zoom assisting teachers in making proposals, 3) through zoom assisting teachers in implementing Classroom Action Research, and 4) through zoom assisting teachers in implementing follow-up actions.

c. Evaluation stage

The evaluation stage is the final stage. In the evaluation stage, follow-up actions were carried out by coming to the school to assist the teacher in checking the research report and conducting follow-up actions. In this follow-up action, teachers attempted to draft an article even though it was only in the first step, in the form of points that would be implemented. After that, one of the teachers presented the results of the paper.

4. Results

The results of the implementation in the Classroom Action Research training for teachers at each stage can be described in this section.

The preparation and planning stage proceeded well, as expected. At this stage, the team managed to conduct an interview with one of the school managers, Mr. Drs. Nurjito, whose residence is not located far from the school. This activity was carried out on February 5, 2024 to identify the problems faced by teachers. It was found that not all teachers had conducted Classroom Action Research. In addition, it is also known that in addition to teaching at this junior high school, some teachers also teach at Tambakromo High School, which is one foundation with this junior high school. Thus, although the number of teachers was around 30, only about 10 teachers conducted Classroom Action Research in the junior high school and were divided into 2 groups. However, during the training, junior and senior high school teachers participated together. Next, the team coordinated with the Principal and the teachers to find out the willingness of the teachers to cooperate with the team to carry out training and mentoring for Classroom Action Research. At this stage, the Principal was also willing to be invited to make a collaboration for the Implementation Agreement (IA) with the Community Partner Program team.

The implementation phase progressed well. When the team members first came to the school and conducted the Classroom Action Research training, they were warmly welcomed by the principal and teachers. At this event, the enthusiasm of the teachers was apparent. The event began with remarks from the Principal and the Team Leader of the Community Partnership Program. The training participants and the Community Partnership Program team were introduced. After that, the Community Partnership Program team opened the training activities by giving teachers the opportunity to reflect on the problems they often encounter when carrying out their lessons. Some teachers shared the situations they faced, which had the potential to be researched through Classroom Action Research. The Community Partnership Program team then presented the Classroom Action Research and the Classroom Action Research proposal.

The second meeting was conducted through zoom. This activity focused on assisting teachers in making proposals. Teachers were divided into groups, each consisting of five people. In addition to mentoring through zoom, teachers and the Community Partnership Program team also created a communication room in wa. This space is also a place to collect products from teachers, including Classroom Action Research proposals and reports, including initial article drafts as plans.

The third meeting was also conducted through zoom, focusing on refining the proposal and collecting proposal products. In this session there was one proposal that teachers had collected, the other two proposals were 75% done.

The fourth meeting was conducted through zoom. This activity focused on discussions regarding the readiness of teachers to carry out Classroom Action Research in their respective classes. At this meeting one of the teachers shared that the implementation of Classroom Action Research would be carried out after the school semester break. The teacher team tried to prepare themselves to carry out

this Classroom Action Research. The Community Partnership Program team provided motivation through the WhatsApp group.

In the fifth meeting, the Community Partnership Program team began to assist teachers in implementing Classroom Action Research through the WhatsApp group. Teachers are welcome to ask anything and anytime, if they encounter obstacles or ensure the stages carried out by teachers in Classroom Action Research. Classroom Action Research is conducted in at least one cycle, which consists of lesson planning, implementation and observation, and reflection.

In the sixth meeting through zoom, the team assisted teachers in making reports. The teachers were also have the chance to communicate with the team in the WhatsApp group.

In the seventh meeting, also through zoom, the team assisted teachers in planning and implementing follow-up actions. One group had planned to make a draft article, and another group made points for an article to be made eventually. Further mentoring was done through the WhatsApp group.

At the evaluation stage, the team visited the school to assist teachers in reviewing the research report. In this event there were 2 groups that were ready to submit research papers and 1 group that was ready with an initial article draft. On this occasion, in addition to the teachers and the team discussing about the review of the proposal, one of the groups (represented by one of the teachers), presented the draft article.

5. Conclusion

The earnestness of the teachers in producing the products is one of the benchmarks of the success of this training. In addition, all teachers' responses regarding the benefits they felt from the training were also a criterion for the success of the training. Teachers explained that their knowledge and skills in conducting Classroom Action Research increased, especially teachers who had never conducted Classroom Action Research. Teachers who have never conducted Classroom Action Research in this junior high school are around 60%. In addition, teachers also explained that the product of the Classroom Action Research can be used as a document to prove the teacher's work achievement. Teachers realize that the ability to conduct research and research results as a form of effort to improve teacher professionalism.

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The Effect of Fiber Composition Variations on the Impact Strength of Polyester Composites Reinforced with Coconut Coir Fiber and Cantula Fiber

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Abstract

In an effort to enhance sustainability and reduce negative environmental impacts, the development of renewable materials has become a primary focus in various industries. One solution is to reduce the use of synthetic fibers, which are difficult to degrade and expensive, by replacing them with natural fibers. This study focuses on analyzing the variation in composition of coconut coir fiber and cantula fiber in the production of polyester composites. The research method applied is experimental, with a matrix-to-fiber ratio of 70% to 30%. The fiber composition variations between coconut coir and cantula fibers are 10% : 20%, 15% : 15%, and 20% : 10%, which will be evaluated using impact tests, micrograph tests, and SEM tests. The goal of this research is to determine the best fiber composition for impact strength. The results indicate that the highest impact strength was achieved with a fiber composition of 20% coconut coir fiber : 10% cantula fiber, reaching 24.907 MPa. Micrograph and SEM images of the impact test fractures revealed several defects that corresponded with the impact strength, where higher impact strength resulted in fewer defects on the fracture surface.

Keywords: Composite, cantula fiber, coconut coir fiber, impact test, polyester

1. Introduction

Efforts to enhance sustainable resources and reduce negative environmental impacts have made the development of renewable materials a primary focus across various industries [1]. Furthermore, the demand for renewable raw materials continues to rise [2]. One approach is to reduce the use of synthetic fibers, which can be replaced by natural fibers. Synthetic fibers have been difficult to degrade, causing pollution in the environment and being costly, while natural fibers are renewable, biodegradable, inexpensive, and abundant [3]. Natural fibers derived from renewable sources have a smaller negative impact compared to petroleum-based materials [4]. There is an increasing interest in natural fibers in the polymer sector due to heightened concerns about the environment and the global energy crisis [5]. This rising interest in natural fibers is also attributed to their ability to meet the economic demands of the industry [6]. Several natural fibers that have the potential to serve as substitutes for synthetic fibers include coconut coir fiber and cantula fiber.

Coconut coir is a byproduct of the coconut processing industry and constitutes the highest percentage of waste generated from this process. Indonesia, as an archipelagic country located in the tropical region, plays a key role as a global coconut producer. With a total coconut plantation area reaching 3.76 million hectares and an estimated total production of around 14 billion coconuts, there is significant potential to utilize coconut coir fiber as an alternative to reduce dependence on synthetic fibers. The characteristics of coconut coir fiber, combined with Indonesia's tropical environment, are expected to facilitate the reduction of synthetic fiber use through the utilization of coconut coir fiber as a replacement.

Cantula fiber, as one of the natural fibers, offers several advantages that can positively impact various industrial sectors. This fiber is widely found in Indonesia. The potential of cantula fiber as a reinforcing material in composite manufacturing has become a focus of research due to its unique properties. This fiber is known for its high strength, lightweight, and ability to withstand pressure and tension [7]. These advantages make cantula fiber an attractive option for application in various industries, including biocomposite manufacturing. Biocomposites are composites that consist of one natural fiber and a matrix [8]. One commonly used matrix is polyester. Polyester is an unsaturated synthetic resin formed by the reaction of organic acids and polyhydric alcohols [9].

There is high demand for polymer matrix composites in various fields [10]. However, they still have many shortcomings, such as the mixture composition between the fibers and the fibers that will be used

to make composites with the matrix. Research on coconut coir fiber and cantula fiber composites has been extensively conducted; however, studies on the combination of the two have not yet been performed. Therefore, specific research is necessary to determine the effective fiber composition to produce superior natural fiber composites. The aim of this study is to obtain the best fiber composition for the impact strength of the composites.

2. Material and Methods

Composite Materials

Composites are materials formed from the combination of two or more materials through a heterogeneous mixture, where the properties of each constituent material differ. From this mixture, a composite material is produced that possesses the combined properties and characteristics of its forming materials. The properties of composite materials are influenced by their constituent materials due to the non-homogeneous mixing process, allowing for the design of the desired strength of the composite material by adjusting the composition of the constituent materials. The characteristics of composites can also be tailored by controlling the shape, size, distribution, and bonding between the constituent materials [11].

The bonding between the components can affect the properties of the composite, such as strength, toughness, durability, fatigue resistance, water absorption, and environmental degradation [12]. Composites are used because the desired characteristics of a material cannot be achieved by the constituent materials when they stand alone. Composites are formed by aligning strong and rigid reinforcing materials within a binding material known as the matrix [11]. Therefore, the main components of a composite are divided into two parts: the matrix (binder) and the reinforcement/filler (reinforcer/void filler). Natural fiber composites represent one alternative that can meet the criteria for materials needed today and have been widely used as substitute materials for plastics, wood, iron, steel, and concrete. Natural fiber composites consist of natural fibers as reinforcement and a matrix as the binder [13].

Coconut Coir Fiber

Coconut coir fiber is a crucial component of the coconut fruit, offering a variety of excellent characteristics. Coir constitutes approximately 35% of the total weight of the coconut, comprising fibers and cork that are interconnected. In this composition, fibers serve as the primary contributor, accounting for about 75% of the total weight of the coir.

The physical characteristics of coconut coir fiber are particularly notable, especially regarding strength and moisture resistance. The superior strength of this fiber is attributed to its rich chemical composition, which includes cellulose, hemicellulose, and lignin. Among these components, cellulose dominates, contributing approximately 49.62% of the total composition of coconut coir fiber. The high cellulose content provides the fiber with exceptional mechanical strength, making it a highly advantageous choice for various construction and manufacturing applications.

Each coconut contains about 525 grams of fiber, while cork contributes 175 grams to the total weight of the coir. The utilization of coconut coir fiber is not only based on its robust physical strength but also on its support for sustainability principles. With its high cellulose content and mechanical advantages, coconut coir fiber presents an attractive raw material for various industries. This demonstrates significant potential in the development of construction and manufacturing products that are not only reliable but also environmentally friendly.

Cantula Fiber

Cantula fiber is a type of natural fiber that possesses a range of advantages, including high mechanical strength. This fiber is renowned for its strength, lightweight nature, exceptional durability, and eco-friendly properties. With a relatively high cellulose content, cantula fiber has great potential as a reinforcing material in composite manufacturing.

In general, the chemical composition of cantula fiber shows a cellulose content ranging from 64.21% to 65.50%, lignin content around 7.88% to 9.43%, hemicellulose content between 3.37% and 8.41%, and moisture content approximately 13.57%. These constituents endow cantula fiber with superior characteristics for various industrial applications.

The high mechanical strength is one of the main distinguishing features of cantula fiber. Its tensile strength and pressure resistance make it an ideal choice for producing materials requiring high structural

integrity. Additionally, its lightweight nature makes cantula fiber suitable for applications where weight is a critical factor, such as in the manufacturing of lightweight vehicles or outdoor equipment. Composites reinforced with cantula fiber offer high strength and good energy absorption capabilities, making them suitable for various applications.

Unsaturated Polyester Resin (UPRs)

Unsaturated Polyester Resin (UPRs) is characterized as unsaturated due to the presence of double bonds in its main chain (the primary carbon chain). This resin is formed through the reaction of polyols (polyhydric alcohols), which are organic compounds with multiple alcohol or hydroxyl functional groups, with unsaturated acids. Polyesters are dissolved in a reactive vinyl monomer, such as styrene, to achieve good solution viscosity. The resin is cured using free radical catalysts, with a specified drying time determined by the decomposition rate, allowing for accelerated drying by increasing the temperature [14]. The mechanism of chemical bonding in Prepolymer Polyester can be observed in Figure 1.

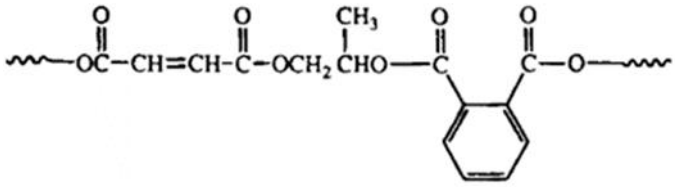


Figure 1. Prepolymer Polyester [14]

The crosslinking reaction that occurs between unsaturated polymers and unsaturated monomers transforms a low-viscosity solution into a three-dimensional network system. The density of crosslinking can affect the modulus, glass transition, thermal stability, and the impact and energy of failure. Generally, polyesters exhibit good resistance to corrosion, chemicals, and environmental conditions. When used as a matrix in composites, polyesters can enhance tensile and flexural strength values [9]. Additionally, polyesters have advantages over other thermosetting resins, as they do not require high-pressure molding equipment. Therefore, polyesters are frequently employed as resins in composite manufacturing, and they are relatively inexpensive compared to other types of resins.

Chemical Treatment

Alkali treatment is one of the most commonly used chemical methods for removing lignin, wax, and oils that cover the outer cell walls of natural fibers [15]. The chemical treatment applied to the surface of natural fibers allows for the production of superior fibers that can be used to form composite materials [16]. A study has demonstrated that after alkali treatment, the cellulose strength reaches its maximum, while the content of hemicellulose, lignin, and wax decreases [17]. Alkali treatment also increases the surface roughness of the fibers, thereby enhancing the bond between the polymer and the fibers [18]. Additionally, it effectively reduces water absorption, improves the moisture resistance of the composites, and minimizes the decline in tensile strength [19]. Fibers that are not treated with alkali exhibit suboptimal bonding between the fibers and the matrix in hybrid composites compared to alkali-treated fibers [20].

The alkali treatment frequently employed by several researchers utilizes sodium hydroxide (NaOH) due to its ease of processing, low cost, and satisfactory results [21]. Hot water and a 10% concentration of sodium hydroxide (NaOH) result in improved mechanical strength because of enhanced adhesion between the matrix and the fibers [22]. In some fibers, this treatment can improve the tensile and flexural properties of the resulting composites [23]. The following schematic illustrates the alkali treatment process for fibers:

$$\text{Serat} - \text{OH} + \text{NaOH} \longrightarrow \text{Serat} - \text{O}^{-}\text{Na}^{+} + \text{H}_2\text{O}$$

3. Research Methodology

Coconut coir and cantula fibers were cleaned and cut into 4 cm lengths. An alkali treatment was conducted using a 10% NaOH solution for 1 hour to remove lignin and hemicellulose. The fibers obtained from the soaking process were rinsed with a 2% acetic acid solution to neutralize the pH. The neutral coconut coir fibers were then oven-dried at 110ºC for 4 hours. Once dry, they were removed

from the oven. Subsequently, the mixing of the two fibers was carried out according to the composition variations listed in Table 1.

Table 1. Variations in Fiber Composition

Symbol	Polyester (%)	Coconut Coir Fiber (%)	Cantula Fiber (%)
CCF 20% : CF 10%	70	20	10
CCF 15% : CF 15%	70	15	15
CCF 10% : CF 20%	70	10	20

The hand lay-up method was chosen for the fabrication of the composite specimens due to the low viscosity of the polyester matrix, which is around 250-350 cP. This viscosity allows for good distribution of the matrix around the fibers, resulting in uniform distribution and minimizing the likelihood of defects in the specimens.

The specimen fabrication process began with preparing a glass mold, the base of which was coated with astralon and wax. The polyester, mixed with a catalyst in a 1:100 ratio according to standard practices, was poured into the mold. The weight fraction used was 30% fibers and 70% polyester.

To ensure that the fiber mixture was evenly distributed within the composite, the fibers were arranged uniformly across the surface of the mold before the polyester was poured. After pouring the polyester, it was adjusted for even distribution. To seal the surface of the composite, the astralon coated with wax was placed on top, followed by a glass sheet to cover the entire composite surface.

The glass mold was then weighted down to prevent shifting and left for 6 hours to allow it to harden completely. Once hardened, the specimen was removed and cut to the dimensions required for the ASTM D5941 impact test specimens.

4. Results and Discussion

Impact Test

The results of the impact test show a clear trend, where the increase in the proportion of cantula fiber in the composite tends to cause a decrease in impact strength. Conversely, a higher composition of coconut coir fiber results in better impact strength values. To clarify the results obtained from this impact test, a graph is presented below illustrating the relationship between the variations in the composition of coconut coir fiber and cantula fiber with the resulting impact strength. This graph will provide a more comprehensive visualization of how each composition affects the impact strength of the composite, allowing the trends of decrease and increase to be seen more clearly.

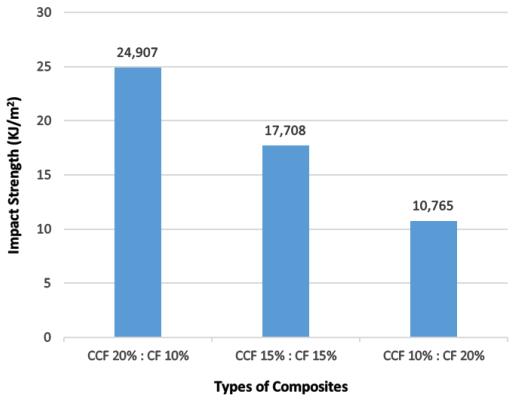


Figure 2. Average Impact Test Values Graph

Based on the results of the tests conducted on the coconut coir fiber and cantula fiber composites, the impact strength values show variations that depend on the composition of the two types of fibers. The average values of the three composition variations tested indicate that as the percentage of cantula fiber in the composite increases, there is a decrease in impact strength. This phenomenon can be explained by the mechanical properties of each fiber, where coconut coir fiber tends to have better impact strength compared to cantula fiber, which may be structurally stiffer but less capable of absorbing impact energy.

The highest impact test results were obtained at a composition of 20% coconut coir fiber and 10% cantula fiber, with an average impact strength value of 24.907 KJ/m². This combination provides an

optimal balance between the flexibility and stiffness of the material, allowing the composite to absorb impact energy more effectively.

Conversely, the composition with a higher percentage of cantula fiber, namely 20% cantula fiber and 10% coconut coir fiber, resulted in the lowest impact strength, with an average of 10.765 KJ/m². This indicates that adding a large amount of cantula fiber can reduce the material's ability to withstand impact energy, likely due to the more brittle nature of the fiber.

From these test results, it can be concluded that variations in fiber composition significantly affect the mechanical performance of the composite, particularly in terms of impact strength. The right fiber combination is crucial for optimizing material properties according to specific application needs, especially for applications requiring high impact resistance.

Microphoto Test

The microstructure of the composite plays a crucial role in determining mechanical properties, including impact strength and damage resistance. Microphotos provide a visual representation of fiber distribution within the matrix, the bonding between fibers, and the presence of voids or micro-defects that may affect the overall material performance. By examining the microstructure, it is possible to identify the failure mechanisms that occur in the composite during testing, including areas where fibers and matrices may experience defects. The results of these microphotos will help understand how the interaction between the fibers and the matrix influences the overall impact strength of the composite. Figure 3 shows the microphoto results of several samples that have been analyzed.

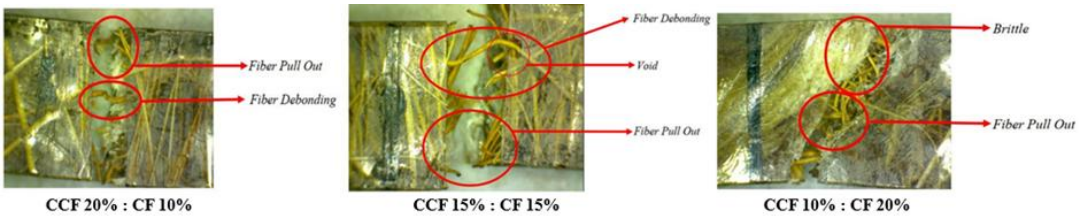


Figure 3. Microstructure of Composites

Figure 3 displays the microphoto test results from the fracture area produced after the impact test. This microphoto clearly shows several types of micro-defects that occurred in the composite material, such as fiber pull-out, fiber debonding, voids, and indications of brittle fracture. Each type of defect significantly affects the performance of the composite, including its mechanical strength and ability to withstand impact loads.

In the composite with a composition of 20% coconut coir fiber (CCF) and 10% cantula fiber (CF), it is observed that the level of damage is lower. This indicates that this composition provides a more optimal interaction between the fibers and the matrix, resulting in a stronger bond, so the fibers do not easily pull out when subjected to impact loads. With a stronger bond between the fibers and the matrix, the composite is better able to absorb impact energy without experiencing significant structural damage.

Conversely, in the composite with a composition of 10% CCF and 20% CF, more severe damage occurs, with fiber pull-out being uniformly distributed across the fracture surface. Fiber pull-out is a phenomenon where fibers are pulled out from the matrix without breaking, indicating that the bond between the fibers and the matrix is very weak. This weakness in bonding causes fibers to easily detach from the matrix when subjected to impact loads, ultimately reducing the composite's ability to effectively withstand shock loads. Voids formed during the manufacturing process also exacerbate this condition, as the presence of empty spaces in the material tends to become starting points for cracks and accelerates the material failure process.

This phenomenon emphasizes that the weaker the bond between the fibers and the matrix, the more susceptible the composite is to impact damage. In the case of composites with a higher percentage of cantula fiber, the bond formed between the fibers and the matrix is not optimal, causing the composite to be more prone to breaking or damage when subjected to shock loads. Therefore, optimal fiber distribution and strong bonding between the fibers and the matrix are crucial factors in determining the impact strength of the composite.

In conclusion, the results of this microphoto analysis indicate that the higher the impact strength of a composite, the fewer defects appear in the fracture. Good mechanical strength is closely related to the quality of the bond between the fibers and the matrix, as well as the minimization of micro-defects such

as voids and fiber pull-out. This analysis reinforces the importance of selecting the appropriate fiber composition to ensure optimal composite performance in applications requiring impact resistance.

SEM Test

The analysis of the SEM test results is used to obtain a more detailed view of the surface microstructure of the composites, specifically in the fracture area after the impact test. SEM technology allows observation at a microscopic level with high resolution, enabling clear identification of various types of defects, as well as the surface characteristics of the fibers and matrix.

In this study, SEM images serve to provide deeper insights into the failure mechanisms of coconut coir fiber and cantula fiber composites after the impact tests. By analyzing the SEM results, it is possible to verify the phenomena observed in the microphoto tests, such as fiber detachment from the matrix, the formation of cavities, and the fracture patterns that occur. Additionally, the SEM results will help identify the microstructural factors contributing to the mechanical performance of the composites, including how the bonding between the fibers and the matrix plays a role in energy absorption during impact. Figure 4 shows the SEM photo results that depict in detail the surface microstructure of the composite material after the impact test.

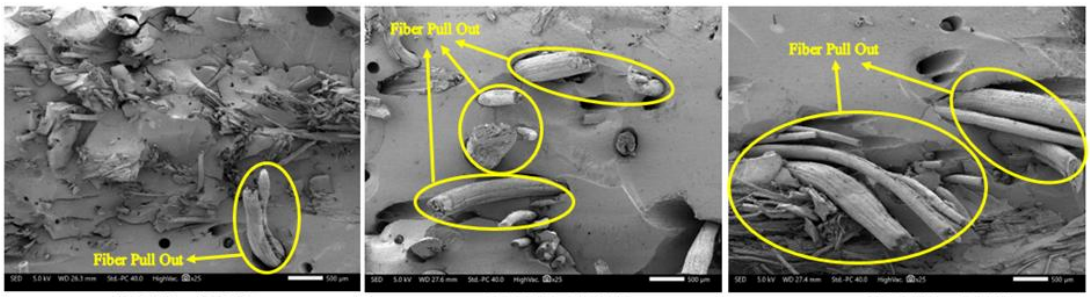


Figure 4. SEM of Composites

Figure 4 presents the SEM photo results of the impact test fracture at 25x magnification. In this image, the phenomenon of fiber pull-out is clearly visible, occurring in various types of tested composites. Fiber pull-out is a common failure mechanism in composites, where fibers fail to maintain their bond with the matrix and are pulled out without breaking. This provides significant insight into the quality of the interaction between the fibers and the matrix in the composite material.

In the composite with a composition of 20% coconut coir fiber (CCF) and 10% cantula fiber (CF), the SEM photo shows that the fiber pull-out phenomenon occurs the least. This indicates that the bond between the fibers and the matrix is better and stronger in this composition, meaning that the fibers remain anchored in the matrix when the material is subjected to impact loads. This composite structure can distribute impact energy more evenly, resulting in relatively less damage. The minimal fiber pull-out also suggests that this composite material has better impact properties, as the fibers effectively function as reinforcements in the matrix.

Conversely, in the composite with a composition of 10% CCF and 20% CF, the SEM results show the highest number of fiber pull-outs, with the pulled fibers appearing longer. This phenomenon indicates that the bond between the fibers and the matrix in this composition is far from optimal. Significant fiber pull-out and long pulled fibers demonstrate that the fibers do not play a maximal role in strengthening the matrix, as the impact energy cannot be effectively absorbed by the composite. Fibers that are pulled out from the matrix reflect a failure of adhesion between these two components, ultimately reducing the overall mechanical strength of the composite.

These micro-defects, particularly fiber pull-out, make the composite more susceptible to damage when subjected to impact loads. Fibers that easily detach from the matrix lead to quicker failure because the impact energy cannot be efficiently distributed throughout the material. In other words, the weaker the bond between the fibers and the matrix, the more likely the material is to fail, especially under dynamic loading conditions such as impact.

The SEM results reveal a clear relationship between impact strength and the level of defects in the fracture. Composites with higher impact strength, such as the composition of 20% CCF and 10% CF, exhibit fewer defects, while composites with lower mechanical strength, like 10% CCF and 20% CF, experience more defects. This emphasizes the importance of good control over the interaction between

the fibers and the matrix in the composite manufacturing process to ensure stronger materials that can withstand impact loads.

5. Conclusion

Based on the results and discussion, this research yields several conclusions as follows:

1. The highest impact strength is observed in the composite of 20% coconut coir fiber and 10% cantula fiber, with a maximum impact strength value of 24.907 MPa.
2. The lowest impact strength is found in the composite of 10% coconut coir fiber and 20% cantula fiber, with a maximum impact strength value of 10.765 MPa.
3. The micrograph and SEM images of the impact test fractures reveal several defects that correspond to the impact strength, where higher mechanical strength results in fewer defects on the fracture surface.

Acknowledgments

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The Influence of Perceived Value and Satisfaction on User Loyalty Towards E-service Among Vocational Undergraduate Students at UNY

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Abstract

The development of technology in education brings significant changes in academic services for students. Various information related to academic services is accommodated through university e-service services. The optimization of e-service is represented by student loyalty in using university e-service. This study investigates the model of student e-service usage loyalty based on perceived value and satisfaction. The research involves 100 student respondents and tests hypotheses using partial least squares (PLS). Respondents were asked to fill out a questionnaire that had been distributed previously. There are 13 statements filled in by respondents to reflect the measurement of each variable. The results indicate that perceived value and satisfaction influence the loyalty of Vocational Undergraduate Students at UNY toward e-service usage.

Keywords: *loyalty, perceived value, satisfaction.*

1. Introduction

User loyalty will be achieved if user needs and user satisfaction are fulfilled [1]. Loyalty also represents the willingness to use a service in the long term [2]. Specifically, antecedents of loyalty include perceived value, satisfaction, and culture [3, 4]. Based on that, some key factors of user loyalty are meeting user needs and user satisfaction.

Research on user loyalty is conducted to examine user loyalty towards products or services that have long been among the public amidst other competitors [5]. Such loyalty will be reflected in the perceived benefits by users, satisfaction, and willingness to use the product or service compared to others [5]. Therefore, specifically, this research tests the perception of value and satisfaction toward user loyalty based on the research of Diallo, Diop-Sall [4]. Perception of value builds someone's mindset about the perceived benefits of a product or service [6]. Perceived value has a positive impact on user loyalty [4, 7, 8]. This study argues that an individual's perception of the value of a product or service, which provides greater benefits compared to others, will affect user loyalty. Therefore, this study examines the influence of perceived value on user loyalty.

User satisfaction builds an individual's mindset about their experience with a product or service [6]. User satisfaction has a positive impact on loyalty [4, 8, 9]. This study argues that a person tends to be loyal to a product or service if it provides a good experience or a pleasant impression. Therefore, this study examines the influence of satisfaction on user loyalty.

This study refers to the research by Diallo, Diop-Sall [4] on the antecedent model of user loyalty, which includes perceived value and satisfaction. This research expands on their study to enhance the generalization of the results in a different context, namely the use of academic e-service. The empirical research approach is expected to provide additional insights, perspectives, and both theoretical and practical contributions for academics and non-academics alike. Specifically, this study aims to advance knowledge, particularly in the field of behavior. For researchers, the results of this study are expected to serve as additional references for future research. This study is also expected to provide insights into university academic service management.

2. Literature Review

2.1 User Loyalty

Loyalty is the relationship between a user and a product, which can be specifically identified through repeated behavior or usage of the product [10]. Loyalty also represents a commitment to continue using a product despite external situational influences that might potentially cause users to switch to another

product [1]. Specifically, loyalty is the willingness of consumers to continue subscribing in the long term, to use the product repeatedly, and to voluntarily recommend it to their peers [11, 12]. Various variables that influence loyalty include service, perceived value, satisfaction, culture, commitment, and trust [3, 4, 10].

Loyalty can be created from several variables, including the creation of value and satisfaction [13]. User loyalty can be built through the stages of creating value for users, which involves providing comfort and service to users, leading to satisfaction, repeat usage, and recommendations to others [13].

User loyalty is influenced by the mindset regarding a product, which is based on perception and the level of satisfaction experienced by an individual [6]. Additionally, cultural factors also affect a person's mindset, ultimately influencing their behavior [3]. Service, perceived value, satisfaction, and culture are important factors in user loyalty [3, 4].

2.2 The Relationship Between Perceived Value and User Loyalty

The relationship between perceived value and user loyalty varies and is influenced by time orientation [4]. Previous research indicates evidence that perceived value has a more significant impact on user loyalty compared to other variables such as trust and commitment [8]. Additionally, various studies demonstrate that perceived value significantly affects user loyalty [14-16]. The relationship between perceived value and loyalty is highly dynamic and warrants further empirical investigation [17].

Perceived value can be based on perceived usefulness in the Technology Acceptance Model (TAM), which explains how a technology can provide more value than alternative methods for the same task [18, 19]. Technology that provides greater value or benefits to an individual will influence their attitudes and intentions towards that technology [20]. This suggests that someone who perceives increasing value or benefits from the technology they use will also have increasingly positive attitudes and intentions towards that technology.

This study argues that an individual's perceived value influences the loyalty of undergraduate students at UNY to use e-services due to the perceived benefits they experience. According to TAM, the higher the perceived benefits someone experiences, the higher their perceived value of a service used. This shapes a person's attitude and intention to reuse e-service offerings, thereby increasing user loyalty as well.

In addition, based on the theory of goal and action identity perception, perceived value in this study can be classified as achieving the most optimal goal from an activity [21]. Sirdeshmukh, Singh [21] explain that perceived value can be understood as a person's motivation influencing their intention to be loyal or disloyal to a product or service perceived to provide the most optimal benefits. Students who perceive greater benefits from using e-services compared to other services are likely to exhibit higher loyalty. Therefore, this study proposes the following hypothesis:

H1: Perceived value has a positive influence on the loyalty of undergraduate students at UNY to use e-services.

2.3 The Relationship Between Satisfaction and User Loyalty

The relationship between satisfaction and user loyalty is influenced by societal conditions, national factors, and applicable regulations [4]. Previous research provides evidence that satisfaction is a critical factor affecting loyalty [8, 22-24]. Previous studies examining the relationship between satisfaction and loyalty recommend further investigation due to the numerous influencing factors and varied outcomes [8]. Research on the relationship between satisfaction and user loyalty is also classified based on satisfaction assessment through affective and cognitive dimensions [25]. According to Kotler and Keller [1], user satisfaction specifically approximates pleasure or disappointment with a product or service based on expected expectations from that product or service. Individuals who feel satisfied tend to be loyal to the product or service, while those who are dissatisfied tend to switch products or services [1]. The higher someone's satisfaction with a perceived service, the higher their loyalty to it.

This study argues that student satisfaction with e-service provision influences user loyalty. Satisfied individuals tend to be loyal to the product or service, while those who are dissatisfied are likely to switch or discontinue using the service. This is because the individual experiences positive outcomes or impressions from using the e-service. Therefore, this study proposes the following hypothesis:

H2: Satisfaction has a positive influence on the loyalty of undergraduate students at UNY to use e-services.

This research model illustrates the antecedents of user loyalty to e-services among undergraduate students at UNY. The study examines the influence of perceived value and satisfaction on user loyalty [4]. Specifically, the research model is depicted in Figure 1.

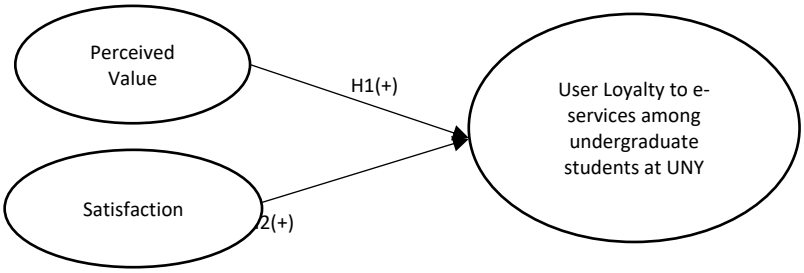


Fig 1. Research Model

3. Research Methodology

3.1 Research Design

This study employs a quantitative approach through a survey conducted among students. The sample for this research consists of students in the Yogyakarta region. The sampling technique used in this study is simple random sampling, which provides an equal chance for all respondents to be randomly selected and mutually exclusive. The data analysis technique Structural Equation Modeling using Partial Least Squares (SEM-PLS) is employed to conclude the hypotheses outlined. This study utilizes SEM-PLS for data analysis because it can elucidate indicators that form a latent variable used in this research. The study is conducted over a duration of six months.

3.2 Operational Definition and Measurement of Variables

This study uses three main variables: perceived value, satisfaction, and loyalty. Loyalty is the relationship between a user and a product, specifically identified through repeated behavior or usage of the product. Perceived value is an individual's mindset about the perceived benefits of a product or service. User satisfaction is an individual's mindset about their experience with a product or service. All variables are measured using a Likert scale ranging from 1 to 5, where 1 indicates "strongly disagree" and 5 indicates "strongly agree."

3.3 Questionnaire Development

This study adopts a research questionnaire previously used by researchers in a different research setting. The questionnaire is based on previous research. The perceived value and satisfaction questionnaires are based on Chen et al. [42], while the loyalty questionnaire is based on Niu & Mvondo [41] through the following stages: 1) systematic literature review, 2) translation and adaptation, and 3) validity and reliability testing. The systematic literature review stage is the initial phase of selecting and exploring research instruments that are suitable and relevant. Translation is conducted for instruments originally in languages other than Indonesian. The translated results are then adapted to fit the research context. The final stage involves validity and reliability testing. Validity testing begins with face validity, involving experts in information systems and management accounting. The face validity results are then piloted with a subset of randomly selected respondents to test validity and reliability. In summary, the research instrument framework is presented in Table 1.

Table 9. Instrument Framework

Variable	Questionnaire Items / Indicators	References
Loyalty	L1 I intend to continue using e-services regularly in the future. L2 I intend to increase my use of e-services in the future. L3 I will say positive things about e-services to others. L4 I will strongly recommend others to use e-services.	Niu & Mvondo [41]
Perceived Value	PN1 I am very happy spending time interacting with e-services. PN2 I feel very valuable spending time interacting with e-services.	Chen et al [42]

Variable	Questionnaire Items / Indicators	References
	PN3 I feel very valuable to spend effort to interact with e-services.	
	PN4 Interacting with e-services is worth my time.	
	PN 5 Interacting with e-services is worth my effort.	
Satisfaction	K1 Overall, I am very satisfied with the e-service.	Chen et al [42]
	K2 Overall, I am very pleased with the e-service.	
	K3 My expectations for the e-service are fulfilled.	
	K4 I would recommend this e-service to a friend.	

3.4 Population and Sample

The population of this study is all undergraduate students. The study surveys undergraduate students at UNY in Yogyakarta. The sampling technique used in this research is simple random sampling, which provides an equal opportunity for all respondents to be randomly selected and mutually exclusive [27].

There are several ways to determine sample size. Pallant [27] recommends that sample size can be determined based on the number of indicators and constructs. This study has a total of 13 indicators and 3 constructs. Therefore, a sample size of 65 is appropriate (i.e., 13 * 5). Gefen, Straub [28] and Kock and Hadaya [29] use the minimum sample size estimation method in PLS-SEM based on the assumption that the sample size should be greater than ten times the maximum number of inner or outer links leading to latent variables in the model. This study has a maximum of 3 inner or outer links pointing to latent variables. Therefore, a total sample size of 30 is appropriate (i.e., 3 * 10).

3.5 Data Analysis Technique

All hypotheses of this research are tested using the Structural Equation Modeling (SEM) approach through the Partial Least Squares (PLS) method. This study utilizes Smart PLS 3, developed by Ringle, Wende [30] to estimate measurement and structural models for hypothesis testing in decision-making. Partial Least Squares (PLS) have been employed to examine the cause-and-effect relationships among latent variables proposed in this study. PLS is a variance-based analysis that allows for minimizing the required sample size [31]. Ho, Ang [32] describe the advantages of using PLS. First, PLS can estimate model size in terms of validity and reliability. Second, by using latent constructs as indicators, PLS can generate a structural model that functions to test the strength of hypothesized relationships. Temme, Kreis [33] explain that PLS can provide better actual values than OLS. PLS is a suitable analytical tool for understanding complex phenomena and extending theories beyond established ones [34]. This study uses interval data to measure all research variables, and PLS can analyze interval data [35]. When analyzing data with PLS, it is important to assess the measurement model before evaluating the structural model [36]. Hulland [37] suggests testing measurement and structural models separately and simultaneously. In summary, the testing procedure based on the PLS approach applied in this study is presented in Figure 2.

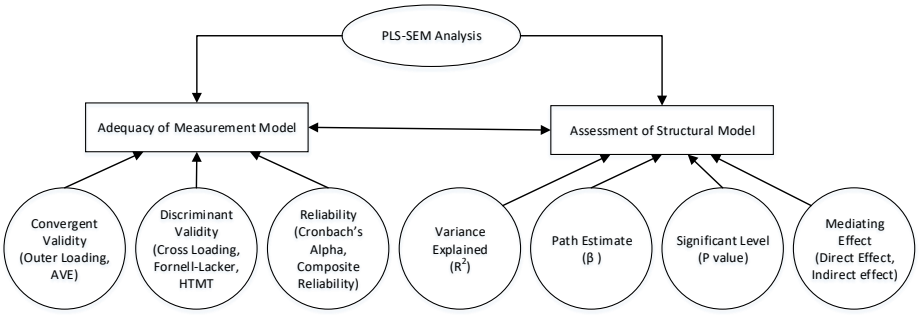


Fig 2. Procedure and Stages of PLS Testing

In conducting tests using variance-based structural equation modeling approaches (such as Partial Least Squares), technically there are at least four approaches to measure interactions between variables: the product indicator approach, two-stage approach, hybrid approach, and orthogonal approach [26]. Each approach treats the indicators of latent variables differently. The moderation and interaction testing in this study employs the moderation model approach in PLS, following the method proposed by Becker and Hair, Hult [36].

4. Research Finding

The respondents of this study consist of 100 undergraduate students from the Vocational Faculty of UNY. The majority of respondents are male, totaling 64 respondents (64%), while female respondents total 36 (36%). The age distribution of respondents is approximately 18-21 years old, comprising 30 individuals; 22-24 years old, comprising 15 individuals; and 25-27 years old, comprising 55 individuals. Table 2 summarizes the demographic profile of the respondents.

Table 2. Respondent Demographics

No.	Characteristics	Respondents	Total	
1	Gender:	Male	64	64.00 %
		Female	36	36.00 %
	Total:		100	100.00 %
2	Age:	18 - 21 years	30	30.00 %
		22 - 24 years	15	15.00 %
		25 - 27 years	55	55.00 %
		>24	0	0.00 %
	Total:		100	100.00 %

Source: Data analysis results (2024)

This study employs a two-step analysis procedure: first, a measurement model to evaluate the validity and reliability of the instruments, and second, a structural model to test relationships between variables or hypotheses [39]. The study tests construct validity and reliability using loading factor values, AVE (Average Variance Extracted), and composite reliability [40].

Based on the results of the measurement model testing, it can be explained that several indicators meet validity criteria (i.e., loading factor values above 0.7 and AVE above 0.5). The perception value construct has five indicators, the satisfaction construct has four indicators, and the loyalty construct has four indicators. The measurement model results show that the composite reliability values for each construct are above 0.7, indicating that the measurement instruments used in this study are reliable. The summary of validity and reliability results is presented in Tables 3, 4, and 5.

Table 3. *Loading Factor*

No.	Variable	Indicator	Value
1	Perceived Value	PN1	0.867
		PN2	0.903
		PN3	0.937
		PN4	0.878
		PN5	0.893
2	Satisfaction	K1	0.946
		K2	0.938
		K3	0.898
		K4	0.928
3	Loyalty	L1	0.903
		L2	0.769
		L3	0.922
		L4	0.893

Source: Data analysis results (2024)

Table 4. AVE

No.	Variable	Value
1	Perceived Value	0.802
2	Satisfaction	0.861
3	Loyalty	0.763

Source: Data analysis results (2024)

Table 5. *Composite Reliability*

No.	Variable	Value
1	Perceived Value	0.953
2	Satisfaction	0.961
3	Loyalty	0.928

Source: Data analysis results (2024)

The structural model is used to test research hypotheses [40]. This study tests the structural model using bootstrapping with 500 subsamples to estimate the significance of hypotheses using Smart PLS 3 analyses. Tables 6 and Figure 3 illustrate the results of the research hypothesis testing.

Table 6. Hypothesis Testing

Hypotheses	Relationship	*Original sample*	*T-Statistic*	*P-Value*	Results
H1	Perception of value on loyalty	0.373	2.983	0.003	Significant
H2	Satisfaction on loyalty	0.534	4.837	0.000	Significant

Source: Data analysis results (2024)

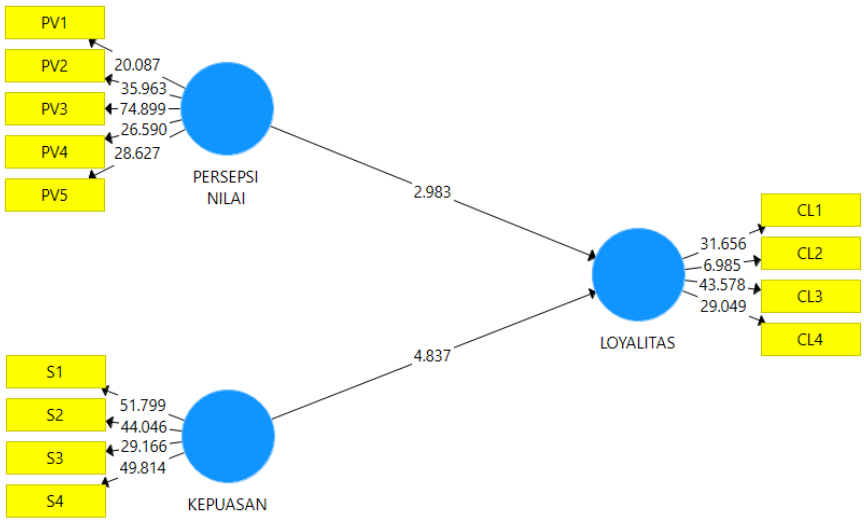


Fig 3. Structural Model

The original sample indicates the direction of relationships in the study, whether positive or negative [40]. Hypothesis testing is indicated by comparing the t-table and t-statistics. If the t-statistic is higher than the t-table value, then the hypothesis is supported at a 95% confidence level or alpha of 5%. The critical t-table value for a two-tailed hypothesis is > 1.96 [40].

H1 states that perception of value positively influences the loyalty of undergraduate students to the use of e-services at UNY. The research results indicate that perception of value has a positive influence on loyalty with a t-statistic (2.983) > t-table (1.96) and a p-value of 0.003, significant at α = 5%. H2 states that satisfaction positively influences the loyalty of undergraduate students to the use of e-services at UNY. The research results indicate that satisfaction has a positive influence on loyalty with a t-statistic (4.837) > t-table (1.96) and a p-value of 0.000, significant at α = 5%.

5. Discussion

In general, this study examines the influence of perception of value and satisfaction on user loyalty, specifically in the context of undergraduate students' loyalty towards using e-services at UNY. Specifically, the study demonstrates that overall, the hypotheses are significantly supported.

Previous research has shown evidence that perceived value has a more significant impact on user loyalty compared to other variables such as trust and commitment [8]. Additionally, various studies indicate that perceived value significantly influences user loyalty [14-16]. The relationship between perceived value and loyalty is dynamic and requires empirical examination [17]. Perceived value can be based on perceived usefulness in the Technology Acceptance Model (TAM), which describes how technology can provide more value than alternative methods for the same task [19, 20]. Technology that offers more value or benefits to an individual will affect their attitudes and intentions towards that technology [19, 20]. This suggests that someone who perceives greater value or benefits from the technology they use will also have a higher or more positive attitude and intention towards that

technology. This study argues that an individual's perceived value influences the loyalty of undergraduate students to the use of e-services at UNY due to the benefits perceived by users. Based on TAM, the higher the perceived benefits, the higher the individual's perception of the value of a service used. This shapes an individual's attitude and intention to use e-service and increases user loyalty accordingly.

Furthermore, based on goal perception and identity action theory, perceived value in marketing research can be classified as the optimal achievement of a goal from an activity [21]. Sirdeshmukh, Singh [21] explain that perceived value can be described as a motivation that influences an individual's intention to be loyal or not towards a product or service perceived to provide the most optimal benefits. This study supports the first hypothesis. The study argues that an individual's perceived value influences the loyalty of undergraduate students' use of e-services at UNY due to the perceived benefits by users. Moreover, the higher the perceived benefits, the higher an individual's perception of the value of the service used, which encourages their attitude and intention to reuse e-service, thus increasing user loyalty.

Previous research has also shown that satisfaction is a crucial factor influencing loyalty [8, 22-24]. The relationship between satisfaction and loyalty is categorized into affective and cognitive dimensions [25]. According Kotler and Keller [1], satisfaction is approximated as the pleasant or unpleasant experience with using a product or service. Someone who is dissatisfied with a product or service is unlikely to reuse it [1]. The level of satisfaction indicates the level of user loyalty. This study supports the second hypothesis. The study argues that an individual's satisfaction with a product influences the loyalty of undergraduate students' use of e-services at UNY. Someone satisfied tends to be loyal to the product or service, while dissatisfaction may lead to switching products or services. This is because the person gains a positive experience or impression from using the e-service.

Based on the findings, this study demonstrates that perceived value and satisfaction significantly influence the loyalty of undergraduate students' use of e-services at UNY. The results indicate that e-service users perceive benefits from the provided services. They also have positive experiences with the e-service, suggesting that these factors influence e-service user loyalty.

6. Conclusion, Limitations, and Research Recommendations

The problem addressed in this research is the phenomenon of user loyalty, specifically in the context of academic services used by UNY students, namely e-service. Research on user loyalty has been extensive, but little has specifically examined user loyalty in academic service contexts for students. The findings of the study conclude that perceived value and satisfaction significantly influence the loyalty of vocational undergraduate students UNY towards e-service usage.

The topic of this research focuses on the significant influence of perceived value and satisfaction on user loyalty towards e-service usage among vocational undergraduate students UNY. Challenges in this study include data collection processes, data analysis, and hypothesis development. The strengths of the research lie firstly in addressing a relevant research problem in the current context, and secondly, in developing variables that influence user loyalty. However, weaknesses include the relatively small data and sample size. Despite these challenges and limitations, the study provides valuable insights, particularly in the field of academic services, specifically in understanding user loyalty. Future research could replicate this model in other sectors with larger datasets or samples. Additionally, future studies could explore different factors influencing user loyalty, such as cultural variables as suggested by Parida and Sahney [3].

This research is expected to provide recommendations for both academic and non-academic circles, particularly in examining user loyalty. For the academic field, this study is anticipated to contribute additional empirical findings and developments in user loyalty, particularly in the field of marketing management. In the non-academic sector, this research is expected to serve as literature for business practitioners, especially in studying factors influencing user loyalty. Specific recommendations for academic services include considering policy adjustments to enhance user loyalty and focusing on service excellence, user experience, and cultural characteristics. This research, if related to the Sustainable Development Goals (SDGs), intersects with SDG 4, which focuses on quality education. Continuing education aims to ensure quality education by providing lifelong learning opportunities for everyone [43]. Effective e-services support good learning by facilitating learning activities with systematic services. Additionally, this study provides recommendations for universities. Firstly, it offers empirical evidence on factors influencing user loyalty, specifically perceived value and user satisfaction. Secondly, it provides insights for academics to study and develop research on user loyalty topics.

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Content Analysis of Marketing Communication Strategies on TikTok in Public Universities in Yogyakarta

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Abstract

TikTok, as a short-video-based social media platform, has experienced rapid growth since its launch in 2016. This platform has become one of the most popular applications globally, with a diverse user base, including the younger generation. One of the uses of TikTok in the educational sector is as a marketing communication strategy for higher education institutions. This article employs a descriptive qualitative approach by analyzing the five most liked content on TikTok. The selection of content focuses on two universities in Yogyakarta: Gadjah Mada University (UGM), one of the leading universities in Indonesia, and Universitas Negeri Yogyakarta (UNY), a prominent educational institution. UGM and UNY utilize TikTok to attract prospective students. Through these contents, the universities can establish a more relatable image with the younger generation, reach potential students, and promote education in a creative and innovative way. Both UGM and UNY have specific points of interest to attract new students through their TikTok accounts. UGM highlights student actors on its TikTok account and emphasizes various study programs as content. Similarities between UGM and UNY's TikTok accounts include the highest number of likes for content related to new student admissions and graduation. These contents are appropriately targeted according to the segments and positioning built by both universities.

Keywords: *UGM, UNY, TikTok, AIDA, Marketing Communication*

1. Introduction

One of the social media platforms, TikTok, has rapidly grown to become an integral part of daily life, particularly among the youth. TikTok has been recognized as one of the most successful applications globally, with over 1 billion downloads worldwide (Batubara, 2020). The platform offers short, interactive video content. According to studies by Shutsko (2020) and Meriç & Çakici (2024), TikTok is not only used for entertainment purposes but also serves as an effective marketing communication tool. This has prompted many educational institutions to leverage TikTok as part of their communication strategies, including for branding, promoting study programs, and reaching prospective students.

Gadjah Mada University (UGM) and Universitas Negeri Yogyakarta (UNY) have utilized TikTok as part of their marketing communication strategies. UGM, with its global reputation, uses the platform to share educational content, information about academic programs, and campus life. Meanwhile, UNY, which focuses on education, explores TikTok to strengthen its image as an educational institution. In addition to using TikTok for marketing communication, UNY also uses the platform for educational purposes, such as uploading tutorial videos, learning tips, and inspiring content.

TikTok, as a marketing communication tool, serves various purposes, including attracting new students. Additionally, TikTok provides educational, informative, and entertaining content. Every year, UGM and UNY successfully attract students and capitalize on the opportunities TikTok offers. Based on this overview, this article will analyze how important messages are communicated through the AIDA model. The aim of this article is to conduct a content analysis of the marketing communication strategies on TikTok at UGM and UNY.

2. Methods

This article employs a qualitative methodology with a focus on content analysis. The research aims to understand how TikTok is used as a marketing communication tool at Gadjah Mada University (UGM) and Universitas Negeri Yogyakarta (UNY) by analyzing the five most-liked TikTok content from each university. This content analysis method is combined with the application of the AIDA (Attention, Interest, Desire, Action) theory to identify the effectiveness of the communication strategies used in these TikTok posts.

The data sources are derived from the official TikTok accounts of UGM and UNY, specifically the content uploaded between January and June 2024. Based on these uploads, five posts with the highest number of likes were selected for analysis. Data was collected from documentation of user interactions (views, likes, comments, and shares) for each content. In analyzing the content through the AIDA theory, the study will focus on the number of likes, comments, and the relevance of the content to the marketing communication objectives. Additional data from relevant literature studies were also used in this research. Data analysis was performed through thematic analysis using the AIDA theory as a framework. Each TikTok content will be evaluated based on the four stages of AIDA to determine how well the content influences the audience.

The selection of the five best-performing contents is based on several criteria. First, considering the Engagement Rate, which includes user interaction levels, such as the number of likes, comments, and shares. Second, the Relevance of the Content, assessing how well the content aligns with the university's mission. Third is Creativity and Visualization, evaluating how engaging the content is and how it uses TikTok features such as filters, music, or visual effects that make it stand out. Lastly, Public Response, which looks at the positive feedback from users showing interest and engagement with the university after viewing the content.

The AIDA theory is used to analyze how TikTok content from UGM and UNY attracts attention, generates interest, and engages TikTok users. AIDA (Attention, Interest, Desire, Action) was first introduced by Elias St. Elmo Lewis, a pioneer in advertising and marketing, in the late 19th century. Lewis developed this model to describe the stages consumers go through in the process of purchasing a product or service. AIDA includes:

a. **Attention**: Efforts to capture the TikTok user's attention towards the product or service in an appealing or striking way. This stage focuses on how the TikTok content from UGM and UNY successfully grabs the audience's attention. Aspects observed include the use of eye-catching visuals, appealing music, and optimal video duration.
b. **Interest**: Maintaining the user's interest by providing relevant and engaging information. The article will explore how the narrative, messaging, and interactive elements in the video spark the audience's curiosity to learn more about the university.
c. **Desire**: Creating a desire for TikTok users to want the product or service offered by the UGM and UNY TikTok accounts. This stage assesses whether TikTok users develop a desire to engage further with the university.
d. **Action**: Encouraging TikTok users to take action, such as applying for admission to UGM and UNY.

3. Results and Discussion

Higher education marketing faces new challenges and opportunities, particularly with the rise of popular social media platforms like TikTok. As one of the leading video-sharing platforms, TikTok offers innovative ways for universities to reach and capture the attention of prospective students. This study explores the marketing communication strategies employed by universities in Yogyakarta, namely Gadjah Mada University (UGM) and Universitas Negeri Yogyakarta (UNY), through TikTok content analysis using the AIDA model (Attention, Interest, Desire, Action). By analyzing each stage of this model, patterns in TikTok content used by UGM and UNY to build brand awareness are revealed, providing insights into how to design effective TikTok content in higher education.

Several factors serve as indicators of achieving brand awareness goals using social media, including the number of likes, followers, hashtags, and viewers, followed by an increase in interest. The interest actions in this research refer to the number of students who eventually enroll as new students at both Gadjah Mada University (UGM) and Universitas Negeri Yogyakarta (UNY). As outlined previously, the objects of this research are the five most-liked content posts from the official TikTok accounts of UGM and UNY, taken on June 9, 2024. The results of the analysis of TikTok content from UGM and UNY using the AIDA stages are presented as follows:

3.1. Attention

In this stage, UGM and UNY build audience awareness through their official TikTok accounts @ugm.id and @unyofficial, as indicated by the number of followers and total likes as shown below:

Table 1. Number of Followers and Total Likes on the TikTok Accounts of UGM and UNY

University	Followers	Total Likes
UGM	448.6K	11.8 M
UNY	26,1K	1,3M

Table 1 illustrates how UGM and UNY strive to increase their visibility and attractiveness among TikTok users. These figures reflect a high level of engagement and significant potential influence in capturing the audience's attention. The high engagement rate also indicates how effective their content is in drawing in the audience and fostering a closer connection, which is crucial in digital marketing strategies in today's era.

3.2. Interest

Interest is a crucial stage in the content creation process. The produced content needs to have strong appeal for the audience. Therefore, content creators must actively seek innovative ideas to create videos that are not only entertaining but also capture the audience's attention without making them feel bored. At this stage, content creators need to explore various topics to maintain diversity and freshness in the content they present. This approach ensures that the content encourages the audience to stay engaged and return for more in the future.

The diversity of TikTok content from UGM and UNY is also reflected in the five most popular posts, as outlined in the following tables:

Table 2. Diversity of UGM TikTok Content

No	Populer Content	Description
1	UGM Students Joking	Depicts UGM students joking with a unique style
2	UGM Graduation Ceremony	Shows the moment of UGM graduation (Graduated by the Rector, and by Mother)
3	UGM Graduation Ceremony	Expressing gratitude to Mother during graduation
4	New Student Welcoming at UGM	Showcases the activity of welcoming new students
5	Congratulations to New UGM Students	Congratulates students who are officially new

Table 3. Diversity of UNY TikTok Content

No.	Populer Content	Description
1	Promoting the Diversity of UNY's Study Programs	Students dance: 2 females and 1 male (representing health studies) vs. 1 male and 1 female (representing traditional medicine studies) followed by an interview with students from the traditional medicine department

No.	Populer Content	Description
2	Promoting the Diversity of UNY's Study Programs	Content featuring students sharing facts about UNY
3	Dance with Viral Sound Background	Shows five people wearing UNY's official uniform dancing
4	Call to Register as a UNY Student	A persuasive content encouraging registration for UNY
5	Viral UNY Lecturer	Features a UNY lecturer who went viral

Overall, both tables show that the diversity of content produced by UGM and UNY's TikTok accounts attracts the audience not only through visual representations of campus moments but also by showcasing the uniqueness of each university. This creates distinct appeal for students, prospective students, and the general public.

3.3. Desire

Desire is the third stage, where potential consumers develop a desire to own a product or service. At this stage, the service providers, in this case, UGM and UNY, need to build a stronger emotional connection with potential students, assuming they are already interested in studying at these universities. To turn this interest into a desire to study at UGM or UNY, it is crucial to emphasize the advantages these institutions offer (Yupitrani and Putri, 2023).

Based on data collected on June 9, 2024, five TikTok posts with the highest number of likes from Gadjah Mada University (UGM) are as follows. The content tends to feature internal campus information, activities, or experiences. For instance, the post with the highest likes, 3.2M, shows a UGM student joking with a distinctive tone, style, and manner of speaking. Additionally, the second and third highest posts feature UGM students during the graduation ceremony. The fourth and fifth highest posts display content regarding the welcoming of new students to UGM. While the fourth-highest post discusses UGM's anticipation for prospective new students, the fifth post congratulates those who officially became new students.

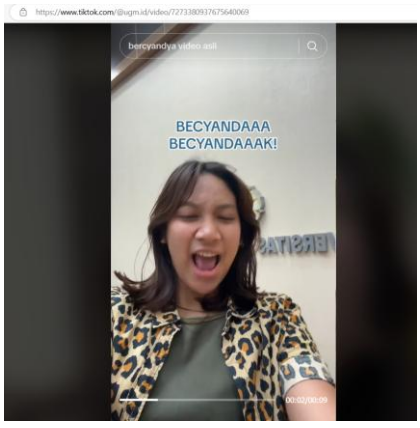


Figure 1. The Most Liked Content at UGM on June 9, 2024, titled "Beercyaandyaa" by Abigail Manurung (Source: TikTok account @ugm.id)

Next is the official TikTok account of Universitas Negeri Yogyakarta (UNY). The first and second most liked posts, with 203.5K and 196.2K likes, are about promoting the diversity of study programs at UNY. This contrasts with the general content uploaded by Universitas Gadjah Mada (UGM), where UGM's most liked posts are still dominated by specific activities or moments. In contrast, the most

liked content on UNY is centered on introducing its study programs. Meanwhile, the third most liked post begins to feature content set to a viral soundtrack, *Munaroh - Trio Ubur Ubur*, showcasing five people wearing UNY's official attire dancing. Furthermore, the fourth most liked content is a persuasive post encouraging people to register as UNY students. Finally, the fifth most liked post returns to the uniqueness of UNY, highlighting a viral UNY lecturer..

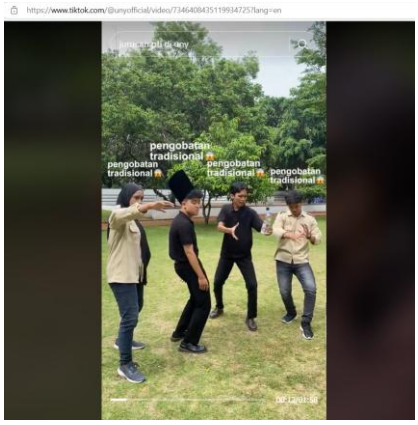


Figure 2. The Most Liked Content at UNY on June 9, 2024, about the Indonesian Traditional Medicine Study Program (Source: TikTok account @unyofficial)

3.4. Action

Entering the final stage of AIDA, which is the "Action" phase, this stage occurs when prospective new students finally make a decision and take action to apply to UGM and UNY. Students who are already registered at both universities have access to the student accounts of both UGM and UNY. At this stage, the service providers, UGM and UNY, facilitate the process of how prospective new students can easily register or enroll at these universities.

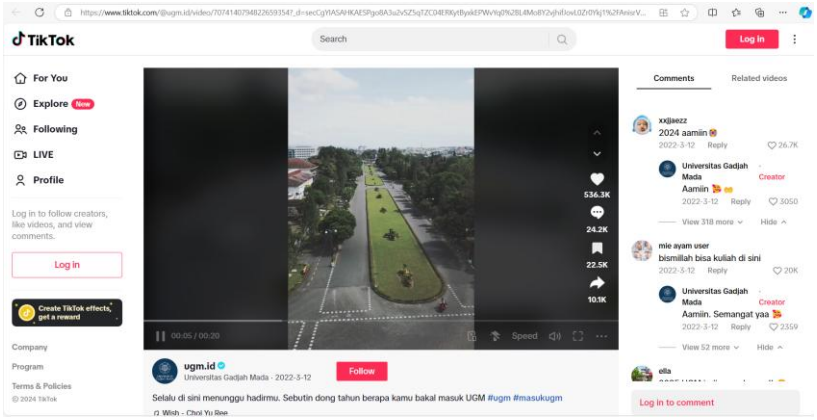


Figure 3. UGM Content Asking "When Do I Enter UGM?" (Source: TikTok account @ugm.id)

Referring to the five most-liked posts on UGM's TikTok account, there has not yet been a detailed explanation regarding how to apply for admission to UGM as a new student. Some members of the public may assume that the information about new student registration is already available on the official UGM website. A quick glance at **Figure 3** also reveals that there are no top comments from the audience asking for detailed information about the registration process, such as from the account @xxjjaezz, who wrote, "2024 aamiin 😭," or @mieayamuser, "bismillah bisa kuliah di sini" (may I study here, amen), which was acknowledged by UGM's official TikTok account. Additionally, the most popular comments, such as "2025 UGM jadi punyaku yaa!! 👀 🤍 " (2025 UGM will be mine!!) written

by @ella, or "2025 UGM jadi punyaku yaa!! 🥹💚" by @viraa, do not ask about the technicalities of becoming a new student, but instead express their hopes to be admitted to the university.

Turning to Universitas Negeri Yogyakarta (UNY), as mentioned earlier, among the five most-liked posts on the UNY TikTok account, there is a preview of the Indonesian Traditional Medicine Study Program, which also provides prospective new students with education regarding available programs at UNY. Furthermore, in the fourth most-liked post, there is content inviting the use of campus facilities, which was met with varied responses from the audience, including comments about the ATM at Plaza UNY, Plaza UNY itself, and the use of golf carts. Additionally, there were inquiries about when new student registration begins, written by @Capricorn ♥, which was responded to by UNY with, "You can register through the SNBP path, kak 🥹 for SNBT and independent selection, please wait for further information 🥹." While this question wasn't the top comment, it was still addressed by UNY, making it easier for prospective new students to obtain the information. The post is shown below:

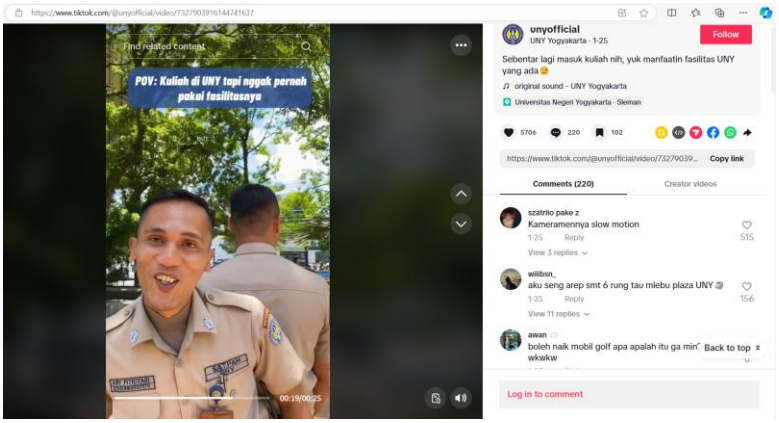


Figure 4. UNY Content Inviting Use of Campus Facilities (Source: TikTok account @unyofficial)

4. Conclusion

Overall, both the UGM and UNY TikTok accounts have their respective advantages or Points of Interest (POI) that can attract prospective new students to apply to these two universities. UGM emphasizes the unique characteristics of its student actors, which can capture the audience's attention, while UNY highlights the diversity of its study programs, which is not commonly found in all educational universities. Additionally, both universities share common ground with the most-liked content related to graduation moments and new student admissions. Based on these similarities, it can be concluded that the high number of likes on both accounts also represents the strong interest of the audience in applying to these universities.

Based on the above explanation, the author concludes that the AIDA model (Attention, Interest, Desire, Action) has been effectively applied to the content displayed on both UGM and UNY's TikTok accounts, making the promotional content more targeted and purposeful. Moreover, these contents align well with the segmentation and positioning strategies developed by both universities. Furthermore, both university accounts also encourage viewers to visit their respective official websites for those interested in becoming part of the student body at UGM or UNY.

Acknowledgement

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PREVENTION OF STUNTING IN THE BETENG VILLAGE COMMUNITY TOWARDS HEALTHY AND QUALITY FAMILIES

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Abstract

This service activity aims to provide education about preventing and overcoming stunting as well as knowing the supporting factors and obstacles in implementing education to the Beteng village community. The implementation method is through interactive lectures, questions and answers, and discussions. The target groups are pregnant women, breastfeeding mothers, couples of childbearing age, babies and toddlers. The service stages begin with preparation, implementation and evaluation of activities. Data collection was carried out using questionnaire techniques and participant satisfaction sheets. Data were analyzed using qualitative descriptive techniques. The results of the outreach activities show that: The Beteng village community has understanding, knowledge and ways to prevent and overcome stunting cases. Several supporting factors include the availability of facilities and expert health workers adequate stunting, village officials and the target group community are very enthusiastic. The obstacles include determining the schedule for implementing activities, and the busyness of students in arranging work program time so that it does not conflict with this extension activity.

Keywords: *prevention, control, stunting, family, healthy, quality*

1. Introduction

Stunting is still a serious health problem in Indonesia, especially in rural areas. This condition is characterized by impaired child growth that causes height to be lower than the standard for their age. Stunting is not only a physical problem, but also has an impact on cognitive development and child productivity in the future. Therefore, efforts to prevent stunting are very important as part of realizing a healthy and prosperous family.

Many things affect the occurrence of stunting, including lack of nutritional intake from the womb to the age of two years so that it can affect growth hormones and the risk of infection in children [1]. In addition, Low Birth Weight (LBW), not providing exclusive breastfeeding (six months) are also factors causing stunting [2]. Environmental hygiene factors such as the use of clean water to meet daily needs that are still lacking and poor environmental sanitation are also factors causing stunting. In addition, cultural factors or community traditions, especially in rural areas that still practice early marriage, also affect the incidence of stunting [3]. This happens because of the lack of understanding of mothers about health and nutrition before and during pregnancy and after the mother gives birth [4]. One form of effort in preventing and overcoming stunting is by conducting counseling activities [5].

Preventing stunting in rural communities has its own challenges, considering that access to adequate health and nutrition information is often limited. For this reason, the involvement of various parties is needed, starting from the government, health workers, to the community itself in a joint effort to prevent stunting. Through nutrition education, improving the quality of maternal and child health services, and healthy lifestyles in the family, it is hoped that stunting can be minimized, so that a healthy and productive generation is created in the future. This article will discuss how to educate rural communities to increase awareness of the importance of preventing and overcoming stunting, increase knowledge about how to take preventive and overcoming stunting cases, and identify factors that are supporting factors and obstacles in implementing prevention and overcoming stunting cases in rural communities. This discussion is more directed at preventing and overcoming stunting towards healthy and quality families. Counseling activities through lecturer service activities outside the campus, collaborating with KKN students in Beteng Village, Jatinom District, Klaten Regency, Central Java.

Stunting cases in rural communities are still relatively high, especially in Klaten Regency until 2023, it is still relatively high. According to data released by the Head of the Social Service for Women's Empowerment, Child Protection, Population Control and Family Planning (Dissos P3APPKB) Klaten,

M Nasir (2023), explained that until the end of 2023 the prevalence rate of stunting in Klaten was 14.63 percent [6].

On the other hand, referring to Presidential Decree No. 7/2021, the target for stunting prevalence in 2024 is targeted to be below 14%[7]. Specifically in Beteng Village, Jatinom District, based on the results of observations and interviews with the Head of Beteng Village, Mr. Prapto Sugiyarto, information was obtained that stunting cases in Beteng Village are still quite concerning. It was stated that one of the hamlets in Beteng Village, based on reporting from the Head of the local Posyandu, at least in early 2024, there were more than 20 cases of stunting.

As an effort to reduce stunting cases, Beteng Village has budgeted for a program to improve the health of residents, one of which is reducing stunting cases. Most people are still unfamiliar with stunting. Residents do not fully understand the occurrence of stunting cases. Understanding of preventing stunting cases among most residents is still very low. Therefore, counseling on stunting prevention is very important to be socialized to village residents, especially in Beteng Village.

The acceleration program to reduce stunting in the current Jokowi administration, led by Dr. Hasto Wardoyo, Sp.OG (K) as the Head of the National Population and Family Planning Agency (BKKBN) is prioritizing the acceleration program to reduce stunting cases in Indonesia. According to the Decree of the Minister of Health Number 1995/MENKES/SK/XII/2010 concerning Anthropometric Standards for the Assessment of Children's Nutritional Status, the definition of short and very short is the nutritional status based on the Length Index for Age (PB/U) or Height Index for Age (TB/U) which is the term stunted and severely stunted [7]. According to Nirali, I.A. (2021), it is explained that stunting is a condition of failure to thrive in children under five years of age (toddlers) due to chronic malnutrition which is characterized by their length or height being below standard [8]. A child is classified as stunted if their length or height is below minus two of the standard deviation (-2SD) of the length or height of children of the same age. Why is stunting important? Because it has the potential to disrupt human resource potential and is related to health levels, even child mortality. Based on data from the 2021 Indonesian Toddler Nutritional Status Survey, the prevalence of stunting is currently still at 24.4 percent or 5.33 million toddlers. The prevalence of stunting has decreased from previous years [9].

Although the stunting rate has decreased, this figure is still considered high, considering that WHO targets the stunting rate to be no more than 20 percent. In early 2021, the Indonesian Government targeted the stunting rate to drop to 14% in 2024. In his program, the head of the BKKBN is ready to work hard to achieve the target of reducing the prevalence of stunting to 14% as mandated by President Jokowi. According to the Head of the BKKBN, it was said that one thing that must be understood together is that stunting can be overcome so that it does not become stunting or corrected in the first 1000 days of life. Thus, when a baby is born up to 2 years old, modifications and interventions can still be carried out so that it does not become stunted.

As an effort to reduce stunting cases, Beteng village has budgeted for a program to improve the health of residents, one of which is reducing stunting cases. Most people are still ignorant about stunting. Residents do not fully understand the occurrence of stunting cases. Understanding of preventing stunting cases for most residents is still very low. One form of effort in preventing and overcoming stunting, according to Hidayat, et al. (2022). by conducting counseling activities [5]. Counseling activities on preventing and overcoming stunting are very important to be socialized for village residents, especially in Beteng village, Jatinom District, Klaten Regency. Although the stunting rate has decreased, the figure is still considered high, considering that WHO targets the stunting rate to be no more than 20 percent. In early 2021, the Indonesian Government targeted the stunting rate to drop to 14% in 2024. In his program, the head of the BKKBN is ready to work hard to achieve the target of reducing the prevalence of stunting to 14% as mandated by President Jokowi. According to the Head of BKKBN, it was said that one thing that must be understood together is that stunting can be overcome so that it does not become stunting or corrected in the first 1000 days of life. Thus, when a baby is born up to 2 years old, this can still be modified, intervention so that stunting cases do not occur.

2. Method

Within the framework of problem solving, through this community service activity, the Community Service Team collaborates with KKN students, conducts counseling, and provides education to the Beteng village community on how to prevent and overcome stunting. The method used uses counseling techniques given to the target group of the village community. The target groups in this

counseling are pregnant women, breastfeeding mothers, toddlers, and women of childbearing age in Beteng village.

Through collaboration with the Beteng village PKK management, medical personnel from the local Health Center, and KKN students in Beteng village, community counseling activities on stunting prevention and control can be carried out systematically, neatly, coordinated and together. Counseling is carried out in several stages, starting from preparation, implementation, and evaluation.

a. Activity Preparation

Preparatory activities are carried out by recording data on target groups that will be invited to the stunting prevention and control counseling activities. This data collection involves the local village government by considering the target conditions and the number to be invited. The Community Service Team contacts prospective resource persons to provide counseling materials and provide activity assistance. Determine and set the location of the activity and prepare the equipment and materials that will be used in this activity. Arrange the schedule of activities, starting from the opening, implementation and documentation of activities and their results properly. Prepare instruments to measure the level of achievement of outreach activities, measure the satisfaction of the target group, and the activeness of the target group in participating in a series of community service programs.

b. Implementation of Activities

The implementation of stunting prevention and control activities is carried out using the counseling and mentoring method. There are two resource persons who provide stunting counseling materials, namely material on prevention and control by local health center doctors, and material on healthy food and balanced nutrition, delivered by a nutrition expert resource person from the local health center health workers. In the second activity, participants were given nutritious additional food, especially for pregnant and breastfeeding mothers and toddlers.

c. Evaluation of Activity Implementation

Evaluation activities are carried out in order to see the extent of the implementation of the activities. What things can be implemented well, and what things have not been implemented as planned. Conducting an evaluation of the use of the activity budget and analyzing what factors are the supporting power and at the same time the obstacles experienced in implementing the activity. The evaluation needs to be carried out comprehensively. Also conducting a follow-up plan for the sustainability of healthy living behavior of the target group. Data collection was carried out through a questionnaire, consisting of a questionnaire sheet and a participant satisfaction evaluation sheet for the overall counseling activity. The data that had been collected was analyzed using qualitative descriptive analysis techniques.

3. Results and Discussion

The community service activities that had been carried out, in general, had gone well with satisfactory results, especially for the target group. The community service activities held in Beteng Village, Janinom District, Klaten Regency can be grouped into two activities, namely counseling activities, and activities to provide food as additional nutrition for breastfeeding mothers, pregnant women and toddlers.

Before this Community Service program activity was carried out, there were several important preparations that were made beforehand. Preparations start from preparing the stunting counseling program, aligning the perceptions of the members of the Community Service Team, both lecturers and KKN students for the implementation of this stunting counseling activity. Determining the date of the program implementation, the location of the activity, and contacting competent resource persons to provide counseling materials on stunting.

The resource persons who were brought in to provide material on stunting counseling were three health workers, namely two experts from the local Health Center, namely doctors and nutritionists, and one assistant midwife from Beteng village who has been actively on duty to oversee public health in Beteng village. In addition to these preparations, the Community Service Team always coordinates with the village government, especially with the Head of Beteng Village.

This community service activity was attended by 70 people, including a number of students who were carrying out KKN and the Beteng village apparatus. The Beteng Village Assistant Health Center Midwife and the two invited resource persons were all able to attend and provide counseling materials

according to the planned time. Furthermore, participants were given a questionnaire to answer several questions that were grouped.

Table 1. Percentage of achievement of Community Service activities in Beteng Village

No	Activity Aspects	Mean Score	Percentage (%)	Category
1	Preparation of activities	3.73	90.92	Very Good
2	Implementation of activities	3.61	90.28	Very Good
3	Results of activities	3.65	91.28	Very Good
	Average results	3.66	90.82	Very Good

In addition to obtaining data on the achievement of community service activities, participants were asked to fill out a satisfaction sheet for the implementation of this activity. Based on the results of data analysis, the level of participant satisfaction was obtained with an average score of 3.78 out of a maximum score of 4.

Prevention and control of stunting is an educational activity that aims to increase public awareness of the importance of child nutrition, maternal and child health, and efforts that can be made to prevent and overcome stunting. As explained above, stunting is a condition in which a child has a height lower than the standard for his/her age due to chronic malnutrition from in the womb until the child is two years old. Therefore, efforts are needed to suppress that stunting not only affects the child's physical growth but also cognitive, motoric, and long-term productivity development. In the discussion of the results of this activity, it can be discussed in three main stages, namely preparation, implementation and results of the activity. The initial steps in implementing community service activities start from the preparation stage. Activities carried out include: Initial coordination with KKN students in Beteng village, coordinating with village officials and medical personnel from the local Public Health Center (PUSKESMAS) to determine the place and time of implementation, counseling speakers, committees, consumption, and preparation of supporting facilities. Qualitatively based on the assessment of the participants, the preparation carried out by the Team/Committee as explained in Table 2, in advance obtained a level of achievement of 90.92%, with a very good category. This means that everything that was prepared to organize counseling activities on the prevention and control of stunting in Beteng village was mature, and ready to be implemented by the PkM Team and the committee. However, on the other hand, there were still weaknesses, especially in coordinating to determine the time of implementation, because in that atmosphere it was approaching the 79th anniversary of independence. However, with the alertness of the students and the Team as a whole by working hard, helping each other and working together well, the activity could take place according to plan. The Community Service Team and the committee were greatly assisted in preparing the stunting counseling activities carried out by Beteng village, because they received full support from the Head of the Jatinom Klaten PUSKESMAS.

The next step is the implementation of counseling on the prevention and control of stunting. This activity was carried out in Beteng Jatinom Klaten village, precisely on Saturday, August 10, 2024. The location of the activity was carried out at the Beteng Village Hall meeting hall. The capacity of the meeting hall can accommodate approximately 60-80 people. The counseling activity on the prevention and control of stunting was attended by approximately 50 people, plus 20 students who were carrying out KKN in Beteng village. The total number of participants who attended, including students and village officials, was 70 people, consisting of 44 invitees from the target group of the activity, 20 KKN students from UNY and 6 KKN students from UNDIP. The material presented in the counseling activity was presented by two speakers. The first material, about Improving nutrition for pregnant women, babies and toddlers, and all participants with the speaker Mrs. Amalia, A.Md. (Gymologist) from the Jatinom Klaten Health Center. Furthermore, the second material was delivered by Dr. Fitri Maryani. Health promoter of Jatinom Health Center, with material on Prevention and handling of stunting.

The implementation of the Community Service program carried out in Beteng Village, Jatinom Klaten has taken place according to plan. Based on the assessment of the participants, the implementation of counseling activities on prevention and handling of stunting as explained in Table 2, in advance, the level of achievement reached 90.28%, with a very good category. This can be interpreted that the implementation of Community Service activities with the theme of prevention and

handling of stunting in Beteng Village has been carried out very well. However, there are some obstacles in its implementation. This is understandable, because there are several activities that have not been carried out optimally, such as in the distribution of invitations to participants, it turned out that 100% could not attend.

Overall, the counseling activities carried out were able to run well and successfully. All resource persons were able to attend the invitation of the Team/Committee according to plan. The resource persons have presented their materials well, and are very useful for the participants. Participants who attended were able to follow the material provided by the resource person well, and a very lively dialogue took place. Many of the participants asked questions to the resource person to obtain clarity and completeness of the material they received. After the presentation of the material and discussion, the committee distributed a questionnaire to be filled out by the participants. The questionnaire asked about the activities of this Community Service activity KKN PK from the preparation, implementation and results of the activities obtained by the participants. In addition to gaining knowledge about.

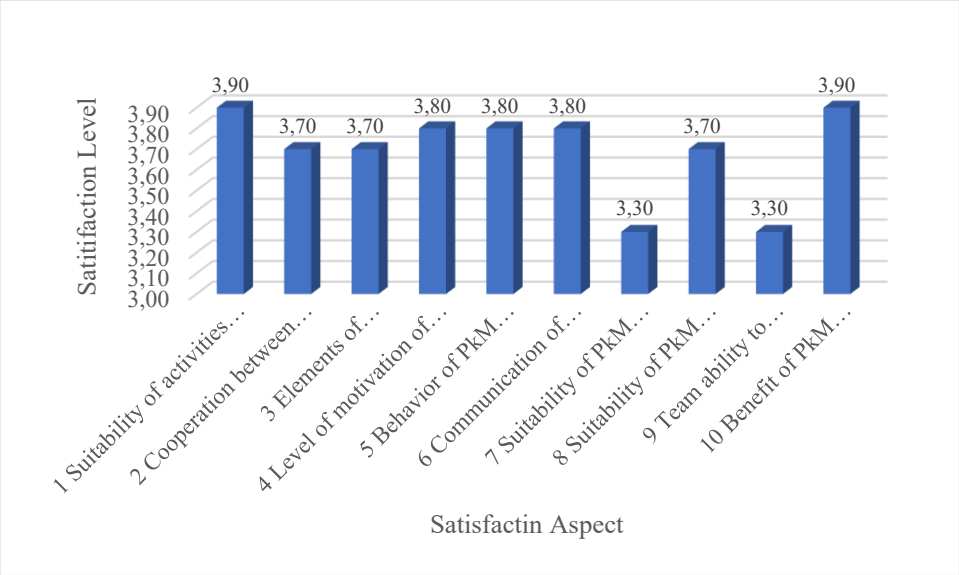


Figure 1. Profile Image of Participant Satisfaction in Community Service Activities

Based on the image above, the highest level of satisfaction is in the aspect of the suitability of community service activities with community needs. The lowest level of satisfaction according to participants is in the aspect of the suitability of time and the ability of the Community Service Team to encourage participant independence with a score of 3.30 each. This figure is actually still in the good category, but this is still a note to get attention.

An important thing that cannot be forgotten in stunting counseling activities is the need to analyze the factors that influence success as well as the factors that become obstacles in this activity. The supporting factors in this stunting counseling activity include: the availability of funds and supporting facilities provided by the University to carry out this community service activity, so that the program can be implemented properly. There is synergistic cooperation between the Community Service Team and various related parties, such as village officials, health workers, community leaders and very responsive target groups.

The obstacles in this community service activity include, first, in terms of determining the time for implementing the community service activity. The time available is very tight to carry out community service activities, some parties are busy with preparations for activities approaching August 17, 2024. However, with hard work and smart work driven by the Head of Beteng Village and the Head of the Community Service Team along with KKN students, the existing obstacles can be overcome properly. Second, student involvement has not been maximized, because there are several students who have KKN work programs (Proker) that are at the same time. However, with a persuasive approach, the student's proker activities can be rescheduled, so that all KKN students can participate in it in full. Third, obstacles in terms of presenting resource persons/experts who will provide stunting counseling

materials, due to the limited number of health workers from the local health center. However, these obstacles have been overcome through intensive coordination between the Community Service Team and related parties. Conclusion

Based on the results and discussion of the counseling and prevention of stunting carried out through Community Service activities in Beteng Village, it can be concluded that: The Beteng Village community has better knowledge and awareness of stunting prevention and prevention measures, as an effort to create a healthy and quality family. The Beteng Village community has knowledge on how to take preventive and preventive measures against stunting cases from an early age. Several supporting factors that make this community service activity run well include: the role of the university which provides program funding facilities, the cohesiveness of the Team/committee and the students involved have worked hard. Support from related stakeholders such as village government officials and local community leaders who have helped, both in terms of ideas, energy and other facilities so that this community service activity can run well, as expected. The obstacles in this community service activity include determining the schedule for counseling activities, student involvement has not been maximized, and limited health workers to provide stunting counseling materials. However, these obstacles have been overcome through intensive coordination between the Community Service Team and related parties.

Acknowledgements

We would like to express our gratitude to the SRPM leadership and staff who have facilitated this community service activity, so that it can be implemented as expected. Also to the village apparatus and the Beteng village community who have worked together, collaborating well so that the stuinting counseling event can run well and provide benefits to the target group community in Beteng village.

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DEVELOPMENT OF INTEGRATIVE HOLISTIC TEACHING MATERIALS TO STIMULATE CHILDREN'S COGNITIVE DEVELOPMENT DURING THE TRANSITION PERIOD FROM KINDERGARTEN TO ELEMENTARY SCHOOL

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Abstract

Learning activities during the transition period need special attention because students who take part in learning in the early grades of elementary school are still at an early age. This research aims to describe learning activities that stimulate numeracy literacy in a holistic, integrative manner in children during the early childhood education-elementary school transition period. This research uses qualitative methods with case studies in 4 kindergarten and 6 elementary schools in the Special Region of Yogyakarta. Data collection methods used interviews and observation while data analysis used Miles and Hubberman. The research results show that numeracy literacy learning in elementary schools begins with the introduction of numbers, some of which do not use three-dimensional or loose part media. The abilities of early childhood are still in the process of recognizing abstract things so that not many elementary school children in the early grades are able to count and write correctly. Numeracy literacy learning in kindergarten uses concrete and dimensional three media so that children can easily understand the concepts introduced by the teacher. This is a joint challenge between elementary school and kindergarten teachers to guide children in the early childhood education-elementary school transition period with holistic integrative learning so that children's high-level thinking abilities develop optimally.

Keywords: integrative, holistic, cognitive, transition period.

1. Introduction

The Fun PAUD to SD Transition Movement is a joint movement that underlies the transition of PAUD students to SD / MI / equivalent in a fun way and starts from the new school year [1]. The transition period is a period of transition from education in kindergarten to elementary school to facilitate students to adjust to learning patterns in kindergarten with learning patterns in elementary school so that it is fun for children [2]. The government through PP No. 2 of 2018 and clarified in the 2019 Technical Guidelines for Pre-Primary Assistance provides guidance for the community to provide a strong foundation so that children feel happy learning in elementary school. Early childhood in group B kindergarten at the age of 5-6 years experiences a concrete learning process and stimulates all aspects of child development including aspects of religious and moral values, cognitive, language, motor and social emotional.

The results of interviews with elementary school teachers in Sleman in 2023 that there are elementary school children who do not follow learning in kindergarten so that many children still have difficulty recognising numbers, letters and very limited spatial abilities. Limited spatial abilities result in children having difficulty distinguishing the letters b, d, p, g, k and so on because they do not fully recognise right and left and up and down. The transition period is very important to pay attention to by providing special skills so that children can pass the transition period pleasantly [3]. One of the special skills that can be introduced to children is the introduction of literacy and numeracy so that children can easily follow learning in primary school.

Numeracy literacy skills are part of cognitive abilities. The cognitive development of children aged 5-6 years in Developmentally Appropriate Practice (DAP) includes actively building their own understanding of concepts and operations such as cause and effect, numbers, classification, seriation,

and logical reasoning [4]. Early childhood children who have good scientific reasoning, can identify the problems faced, can explain the learning activities carried out so that it is easy to find solutions if they encounter difficulties in solving learning problems [5]. Kindergarten children who have scientific reasoning skills will be better prepared to follow learning at the elementary level which requires more reasoning or cognitive abilities in learning activities.

The purpose of this research is to develop appropriate teaching materials in the transition period of kindergarten children to elementary school. The second objective is to find out the teaching materials for kindergarten and elementary school children according to the current Merdeka Curriculum.

Based on the above problems, the researcher aims to realise sustainable education from the pre-school level to the elementary school level through the development of integrative holistic teaching materials to stimulate children's cognitive abilities in the transition period. One of the abilities that children master when entering elementary school includes the ability to read, write and count [6]. These abilities are closely related to literacy and numeracy skills. Early childhood children are active learners, who construct meaningful knowledge through interactions with adults, peers and the environment and by solving conflicts and problems [7]. Early childhood has different characteristics from adults where they undergo a period of very rapid growth and development and become a fundamental basis for further developmental processes [8]. Early childhood has characteristics that are active, dynamic, have a high sense of curiosity, like to imitate happy to play and creative [9].

The criteria for early childhood according to the statement in the National Academy of Early Childhood Programs (NAEYC) are children aged 0-8 years. At this time children are very quick to absorb information and knowledge so they need many opportunities and stimulation to optimise their abilities. Early childhood according to Motessori is in a golden age where at this time there is a sensitive period that easily receives stimulus from the environment both intentionally and unintentionally [10].

Teachers and parents need to understand the developmental changes that occur in early childhood from birth to 8 years of age and this requires continuous learning support [4]. Experiences in learning that occur through play can help children build knowledge according to their creativity and make children more independent in facing challenges [10]. Opportunities and experiences in various aspects of development provided in early childhood can be a provision for life at a later age. Early childhood that has a lot of experience in exploring is proven to have the ability to think critically and be able to solve problems according to their cognitive abilities [11].

Early Childhood Cognitive Development

One of the aspects of development developed in kindergarten is the aspect of cognitive development. Cognitive development is related to the development of human thinking [12]. As expressed by Gagne that cognitive is a process that occurs internally in the centre of the human nervous system that is thinking. Cognitive development refers to changes in thinking, or cognition, resulting from the interaction that occurs between the biological nature of the child and his experience in several social, cultural, and physical environments. Vygotsky emphasised the importance of social interaction with abilities that fall within the child's zone of proximal development (ZPD) [13]. Within this zone of teaching and learning, rich interactions accompanied by reinforcing known environmental cues enhance cognitive development. The quality of care experiences that are unique to the needs of children while in early childhood education institutions is very significant in stimulating children's cognitive development.

A person's cognitive function throughout the age is shown from the process of intellectual growth (brain growth and development) which is influenced by individual psychological characteristics [14], [15]. Early childhood cognitive development is initially influenced by the experience of interaction in the home environment then extends to other experiences in the community and school [16]. Children's cognitive abilities are often identified from the ability to concentrate when doing activities. Cognitive development is also influenced by nutrition and the intensity of stimulation obtained at home [17]. Thus parents and teachers can observe cognitive development through observations of direct interaction at home and at school.

Cognitive development can theoretically be predicted from prior knowledge, motivation, executive function, self-regulation and socioeconomics through opportunities, trends and antecedents [18]. It cannot be denied that economic factors and parents' prior knowledge of early childhood education also determine how much type and intensity of cognitive stimulation is given to children.

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The stages of cognitive development according to Piaget's theory are:

1) Sensorimotor stage, age 0 - 2 years.

At this period, the child's ability is limited to reflex movements, early language, present time and close space only.

2) Pre-operational stage, age 2 - 7 years.

This period the ability to receive stimuli is limited. Children begin to develop their language skills, although their thinking is still static and cannot yet think abstractly, the perception of time and place is still limited.

3) Concrete operational stage, 7-11 years old

At this stage, the child is able to complete the tasks of combining, separating, arranging, lining up, folding and dividing.

4) Formal operational stage, 11-15 years old.

At this time, children are able to think at a high level, able to think abstractly [19].

Thus it can be seen that children who sit in kindergarten are in the preoperational phase. A phase of cognitive development characterized by the functioning of the ability to think symbolically. The reflection of this thinking ability can be seen from the child's ability to mentally imagine the objects around him. The ability to think intuitively and centred on the child's own perspective or egocentric. In line with this, conversion ability also develops, namely the ability to understand changes related to number, size, shape, volume and field.

According to Piaget, quoted from Developmentally Appropriate Practice in Early Childhood Programs (1997), children aged 6-7 years are in the concrete pre operational period. This means that children at this age should still experience preschool education. The cognitive development of children aged 6-7 years is at a more developed level where they are able to think reasoning and logic, can think cause and effect along with the explanation and are able to classify and sort more complex objects. Children aged 5-7 years have the ability to think about solving problems. At the end of 6 years of age, children have started to be able to read, write and count [12].

In the aspect of cognitive development, early childhood is expected to be able and have the ability to think logically, think critically, think critically, be able to give reasons, be able to solve problems, and find causal relationships in solving problems faced [20].

2. Method

This research uses a qualitative approach with a case study technique. This technique was chosen because it is most suitable for researching various problems related to Early Childhood Education, so that they can be investigated in depth and detail. Through case studies, information was obtained about the understanding of the PAUD-SD transition period, the learning process, learning media and how primary school teachers teach grade 1 and 2 primary school children in the transition period.

Some of these aspects may directly or indirectly affect children's development during the transition from early childhood education to primary school. Information was obtained from teachers and principals from 2 kindergartens and 5 primary schools in 5 districts in Yogyakarta, Indonesia. In-depth interviews with principals and teachers allowed for deeper and more detailed exploration of the data. Detailed and in-depth qualitative analyses can provide a great deal of insight despite the small number of cases [21]. Each subject involved in this study was interviewed in a different place and time to avoid feelings of discomfort between subjects. In determining research subjects using the case study method, the researcher considers the criteria for selecting research subjects.

Purposive sampling technique was used to determine the research subjects. Then, the specific criteria were as follows: (a) teachers teach in group B kindergartens; (b) teachers teach in grade 1 and 2 elementary schools which are the transition period of PAUD to elementary schools; (c) teachers have been teaching for at least more than one year, and (d) selected teachers teach in elementary schools in Sleman, Gunungkidul, Bantul, Kulon Progo and Yogyakarta City districts. Teachers were around 30-45 years old when collecting the sample. These participants came from both private and public institutions.

Data Collection Methods: Data were obtained using in-depth interviews conducted over 1 month and observations. The first interview lasted for 150 minutes. During the interview, the researcher asked several questions about the study with the previously described objectives, namely to find out more about the development of learning media during the PAUD to SD transition and how SD teachers teach grade 1 and 2 children who are still in the PAUD to SD transition period. Further data was collected through observations at the institution to find out how kindergarten and primary school teachers teach children in the transition period. The research instruments used interview guidelines and observation

guidelines that were validated by two experts beforehand. Both experts were from the PAUD department. The interview guideline was used to obtain information related to learning in children in transition. The indicators of the interview guideline include: 1). How do you understand the PAUD-SD transition?; 2). How do you prepare for the transition of PAUD-SD children?; 3) What are the preparations in SD that are done to face the transition?; 4) What activities have been done to stimulate numeracy and science literacy in students?; 5) What media have been used to stimulate numeracy and science literacy in students?; 6) What media will be developed to improve children's understanding of numeracy and science literacy in children during the PAUD-SD transition?.

The results of the interviews and observations obtained were analyzed qualitatively with the interactive analysis model of Miles, Huberman and Saldana (2014), namely data collection, data condensation, data presentation, and conclusion drawn. The validity of the data used is source triangulation.

3. Results and Discussion

Results

Primary school teachers' understanding of the PAUD-SD transition period is the transition from early childhood to primary school. This transition period is the foundation phase where learning in early grade elementary school is not much different from learning in kindergarten because many children still cannot read and write. During this transition period, children are made comfortable following learning so that children can gradually read, write and count and learn to independently do every activity.

Preparations made by kindergarten teachers to assist children in the transition period include stimulating children to do daily activities more independently, stimulating children to count, introducing the concept of numbers, introducing geometric shapes, introducing the concept of addition and subtraction, arranging blocks to introduce letters and words. Preparations made by elementary school teachers include preparing learning media in a concrete form, and delivering learning with games so that children are not bored. Elementary school teachers can seek information about learning in kindergarten to understand how kindergarten children think during the PAUD-SD transition period which still has limitations in their thinking abilities.

Preparations made by teachers at school in facing the transition period include conducting briefings for teachers, holding regular student guardian meetings, holding a foster brother program that can provide direction and reduce bullying behaviour. Other elementary school teacher preparations include assigning tasks to help parents at home that motivate children to be more independent and responsible. Teachers can set up a literacy corner so that children are stimulated to read and write.

Previous activities to stimulate language literacy include the sambel terasi programme (while learning to recognise literacy), the City library programme in schools, the numeracy literacy programme is carried out by giving loose parts to recognise words and other concepts through play activities, teachers collaborate with parents to teach numeracy literacy, science literacy and language literacy. This collaboration is also carried out by kindergarten teachers to familiarise children with literacy before entering primary school.

Learning media that have been introduced in the PAUD-SD transition period include media from used items, and loose parts. Kindergarten teachers provide learning media that are closest to the children. Concept introduction utilises videos related to a topic. Experiments and projects are also used as learning media through fun activities.

Primary school teachers can create media for literacy walls, market day activities, independent entrepreneurship, saving movements, scout barns and infaq programmes. There are also teachers who accumulate reading and writing by guiding children to hold pencils properly and correctly, making scratches on paper and in the sand.

Learning media that teachers will develop in the PAUD-SD transition period include making Beringin Jurang which introduces numeracy literacy, teachers make bear trees, make magic bags, mini aquariums and so on. Guru SD yang awalnya belum memahami sepenuhnya mengenai masa transisi PAUD ke SD pada akhirnya menjadi mengerti dan termotivasi untuk melakukan inovasi dalam pembelajaran literasi numerasi dan sains.

The media developed by teachers is in the form of 3 dimensions to stimulate high-level thinking in early childhood. So that the child's ability is increasing step by step. Through playing with 3-dimensional media, children more easily understand the concept of counting and how to write numbers and letters correctly. The 3-dimensional media developed by elementary school teachers to stimulate numeracy literacy of elementary school children can be seen in the following figure 1:



Figure 1. Learning media used by elementary school teachers

Numeracy and science literacy stimulation learning media in the form of 2 dimensions was developed to make it easier for children to understand the concept of numbers, the concept of counting and understanding plants as one of the living beings created by God Almighty. Concrete media in the form of 3 dimensions will make learning activities more meaningful and elementary school teachers will find it easier to teach because elementary school children can think at a high level and be creative.



Figure 2. 2-dimensional numeracy literacy stimulation media

Discussion

Learning

in the transition period from early childhood education to primary school has received attention from the government because children in grades 1 and 2 are still in the early childhood range. Many primary school teachers still do not understand that the ability of grade 1 and 2 children is still lim

ited because of their age development, not because of their low ability. Early childhood development is still limited so that many children in grades 1 and 2 cannot write letters and numbers properly. The results of this study provide insight for primary school teachers to provide learning media that make it easier for children to understand learning concretely. School support for grade 1 children in this transition period can be provided in the form of positive motivation at the beginning of entering grade 1 SD will provide comfort and enthusiasm for learning [22]. Family support for children before entering primary school is needed to prepare children to face the demands of primary school which are different from the demands in kindergarten [23]. The results of an interview with one teacher from a public primary school stated that primary school teachers who can teach primary school children properly and correctly are teachers who have a primary school teacher education background. Elementary school teachers with educational backgrounds other than PGSD have poor teaching abilities

in terms of knowledge and behaviour. The quality of knowledge and skills of kindergarten and elementary school teachers is determined by the quality of study at PGPAUD and PGSD where students learn to care for children, learn learning strategies and other skills that support their abilities when they become PAUD teachers and elementary school teachers [24]. Elementary teachers need to prepare learning materials and media that can help children understand number concepts, counting concepts, word concepts and sentences. These basic skills are needed for early grade elementary school children to be more confident in participating in classroom learning where the material is developed from the material when the child is in kindergarten. The curriculum in kindergarten includes life skills, social-emotional skills such as coping, resilience skills, academic learning such as language and maths which are different from the material in primary school. Full assistance to children in the transition period can determine success in later education, especially academic ability and achievement [25]. Teacher preparation in dealing with children during the transition from early childhood education to elementary school includes education in college that is in line with elementary school education, experience in assisting children during the introduction period at the beginning of elementary school and establishing relationships with parents to play an active role in school activities. Children in grade 1 are mostly required to be able to read, write and count which in turn becomes the basis for understanding learning materials in the next grade. Similarly, children in Japan are taught Japanese language, social studies, arithmetic and science when they enter grade 1 [26]. Nakamichi's research results are almost the same as the conditions of grade 1 elementary school children in Indonesia, but learning materials in the transition period in Japan are delivered in the form of games initiated by the children themselves. Thus, children participate in learning happily without pressure.

Research on the transition from early childhood education to primary school shows that the activities that teachers can do in stimulating numeracy literacy in students include using LKS, thematic books from the Education Office and loose parts around the school. This statement is in line with the results of Nakamichi's research to introduce numeracy using picture cards, miniature animals then some of the picture cards and miniatures are added up or sorted [26]. Learning activities during the transition period need the attention of parents and teachers because during this period children adapt more to follow the rules in elementary school which require children to be able to sit quietly for some time, be able to carry out teacher instructions, be able to return their own toys and so on [27]. Grade 1 elementary school children who are able to manage themselves are mostly able to adapt to school activities so that children are not easily stressed.

The PAUD-SD transition period is closely related to children's readiness to enter school (school readiness) where it is associated with children's Executive Function. School readiness is the ability of children to control their own thoughts, actions, and emotions as well as those involving others [28]. The ability of children to adapt to elementary school and the support of teachers at school in dealing with children in transition is the key to educational success so that learning activities and children are well understood.

4. Conclusion

Research on the development of learning media during the PAUD-SD transition period in the D.I Yogyakarta region can stimulate children's cognitive development, especially numeracy literacy and language literacy. Elementary teachers' assistance to children in the foundation phase or in the transition period can provide meaningful support for children so that children are more independent and easily receive information from teachers about concepts in numeracy literacy.

Children's skills in emotional self-regulation and mind control to be able to follow the rules and be able to complete tasks according to the teacher's direction. Learning in kindergarten is prepared to get children better prepared for the challenges and roles in primary school.

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