

Developing Teachers' Skills in Designing Project-Based Learning in the Merdeka Curriculum through Assembler Edu Training

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ABSTRACT: This study aims to identify and describe: (1) the level of teacher satisfaction with the introduction of project-based learning in the Merdeka Curriculum through Assembler Edu training; (2) the relevance of Assembler Edu training for project-based learning in the Merdeka Curriculum in relation to the teachers' primary responsibilities; (3) teachers' feedback on Assembler Edu training for designing project-based learning within the Merdeka Curriculum. The study is quantitative and employs descriptive analysis. The training was conducted to assist teachers in designing projects using Assembler Edu. Data analysis reveals a highly positive response from teachers towards the training. Teachers reported satisfaction with the Assembler Edu training and found it valuable for understanding their role as facilitators of the Pancasila Student Profile. Additionally, the training is relevant to teachers' needs and encourages them to implement project-based learning in alignment with the Merdeka Curriculum by utilizing Assembler Edu.

Keywords: Assembler Edu, Merdeka Curriculum, Project-Based Learning



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INTRODUCTION

Education in Indonesia currently faces increasingly complex challenges, particularly in adapting to global changes and the demands of the digital era (Rahmatullah et al., 2022). The Merdeka Curriculum, introduced as a response to these dynamics, brings a new approach requiring profound transformations in teaching and learning methods (Siswanto et al., 2024). According to Quratul & Adiyono (2023), this curriculum provides greater freedom for schools and teachers to innovate in their teaching, but also requires them to be more flexible and adaptive to the diverse needs of students. It emphasizes student-centered learning, where learners are expected not only to master academic knowledge but also to develop critical thinking, creativity, and independence in their learning (Putri, 2024).

A core component of the Merdeka Curriculum is the strengthening of the Pancasila Student Profile, which underpins the character education of Indonesian students (Masitah et al., 2023). This profile represents the national educational ideals focusing on developing individuals who are devout, morally upright, independent, creative, and cooperative. Additionally, students are expected to exhibit critical thinking and respect for Indonesia's cultural and social diversity (Susanti et al., 2023). The goal of

character strengthening is to produce individuals who are not only intellectually competent but also possess high moral values and social awareness, enabling them to contribute positively to the nation in various contexts, both local and global.

Achieving these national educational goals makes the role of teachers crucial. Teachers are no longer merely knowledge transmitters but also designers of effective and relevant learning experiences that develop students' character and competencies in line with the Pancasila Student Profile (Retnaningrum et al., 2023). Teachers must create learning environments that focus not only on academic aspects but also on reinforcing moral, spiritual, and social values reflected in the Pancasila Student Profile. According to Limbu (2024) and Pisriwati et al. (2024), this challenge demands that teachers be more creative and innovative in designing learning experiences that support the holistic development of students, addressing cognitive, affective, and psychomotor aspects.

One method deemed relevant and effective for achieving these goals is project-based learning (Maros et al., 2023; Ngereja et al., 2020). This method provides students with the opportunity to learn through real projects that require them to solve problems, collaborate, and apply knowledge in real-life contexts. By using this method, students are encouraged to think creatively and critically, develop teamwork skills, and enhance responsibility and independence in completing tasks. Alghiffari et al. (2024) explains that applying this method not only helps students understand concepts more deeply but also shapes their character according to the values in the Pancasila Student Profile, such as cooperation, creativity, and independence.

The main challenge for teachers is integrating the Pancasila Student Profile into project-based learning designs effectively (Utari & Afendi, 2022). Many teachers still struggle to align the values of the Pancasila Student Profile with the implementation of project-based learning methods in the classroom. This difficulty is linked not only to limited understanding of innovative teaching methods but also to technical skills in designing projects that accommodate character development in line with the Merdeka Curriculum demands. As a result, project-based learning implementations often fall short and fail to reflect a strong integration with character education objectives (Zhao et al., 2023).

Additionally, limited access to high-quality training is a significant barrier for teachers (Listyanti et al., 2024; Astiwi et al., 2024). Not all teachers have the opportunity to participate in training that enhances their understanding of innovative teaching strategies such as project-based learning (Meng et al., 2023; Molina-Torres, 2022). Even for teachers who grasp these concepts, the lack of guidance in applying theory to classroom practice often becomes a major obstacle. Consequently, many teachers feel unsure or lack the skills to design learning experiences that focus not only on academic content but also on strengthening student character through project-based learning. Therefore, it is crucial for teachers to master educational applications, such as using Assembler Edu.

Assembler Edu is a digital platform that leverages augmented reality technology to enhance the quality of learning. Various studies have shown that Assembler Edu is effective in creating an interactive and engaging learning environment. By utilizing moving animations and 3D visualizations, Assembler Edu helps students understand complex concepts more easily and attractively. Research by Zhong & Lyu (2022) and Al-Qora'n et al. (2023) indicates that using Assembler Edu in teaching can increase student motivation and engagement, especially in the context of project-based learning. This platform enables

teachers to design more varied learning materials and align them with the Merdeka Curriculum, making it a valuable tool in supporting the development of the Pancasila Student Profile and facilitating creative and effective learning.

Given these factors, there is a need for Assembler Edu training for teachers. This training is specifically designed to help teachers develop skills in designing projects aligned with the goals of strengthening the Pancasila Student Profile. With a comprehensive approach, Assembler Edu provides teachers with thorough knowledge and practical skills in using technology and effective teaching strategies. Through this training, teachers can design project-based learning that not only aligns with national curriculum standards but also integrates Pancasila values such as cooperation, independence, and creativity into every project they create.

METHOD

This study falls under the category of descriptive quantitative research. The primary focus of this research is to evaluate the level of teacher satisfaction, the relevance to teachers' duties, and feedback from teachers regarding the Assembler Edu training conducted online by 30 teachers from SMA Muhammadiyah Mlati, aimed at enhancing teachers' skills in designing project-based learning in accordance with the Merdeka Curriculum. The study also aims to gather students' opinions on the relevance of the training to teachers' roles and functions, as well as to collect feedback from teachers about the conducted training. The training was conducted using the G-meet application, and at the end of the training session, participants were asked to complete an assignment via G-Form. The instrument used in this study is a questionnaire. To analyze the satisfaction and relevance of the training according to teachers, data was analyzed descriptively by counting the number of teachers for each response option provided. Additionally, feedback data was analyzed using Jupyter Notebook.

RESULT AND DISCUSSION

In this training, teachers used Assembler Edu to enhance their skills in designing project-based learning in line with the Merdeka Curriculum. The study aims to evaluate teacher satisfaction, the relevance of the training, and to gather feedback from teachers. The analysis results for these three aspects are outlined as follows.

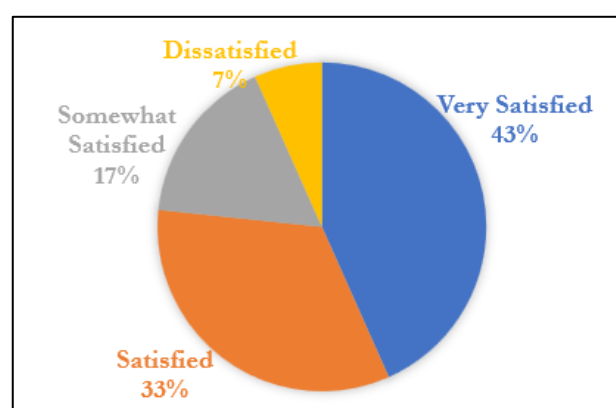


Figure 1. Teacher Satisfaction Survey Results

The analysis of data regarding teacher satisfaction with the training reveals results as shown in Figure 1. From the figure, it is observed that 43% of teachers felt very satisfied, 33% satisfied, 17% somewhat satisfied, and 7% dissatisfied with the use of Assembler Edu. The high level of satisfaction among the majority of teachers indicates that the Assembler Edu training, conducted to enhance skills in designing project-based learning in accordance with the Merdeka Curriculum, is considered very effective. Teachers believe they successfully implemented the Merdeka Curriculum through project-based learning, making the learning activities engaging and enjoyable, which allowed students to stay focused and appreciate the learning process from start to finish.

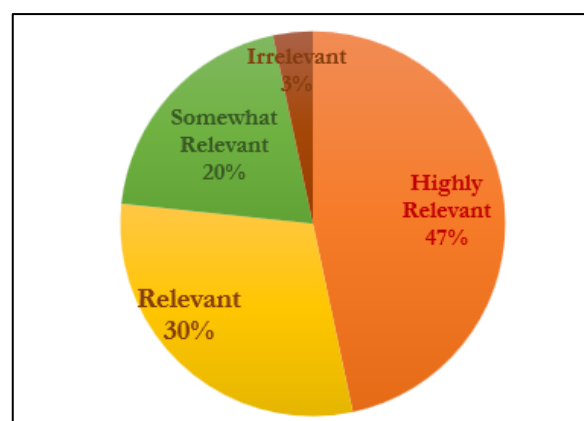


Figure 2. Training Relevance Survey Results

The analysis of the relevance of the training material is illustrated in Figure 2. This figure reveals that 47% of teachers find the training material highly relevant, 30% find it relevant, 20% find it somewhat relevant, and 3% find it irrelevant to their roles and functions as educators. The high relevance level indicates that the Assembler Edu training aligns well with the teachers' and students' roles as Pancasila learners. The training effectively supports the development of the Pancasila learner profile, such as independent learning, as it is conducted online. Despite this, students are able to engage in the learning process effectively. In addition to analyzing satisfaction and relevance, this study also evaluates feedback from teachers regarding the training conducted. The feedback data from participants were analyzed using the Wordcloud library in Python 3.7 with Jupyter Notebook. The results of the feedback analysis are presented in Table 1.

Table 1. Frequently Occurring Keywords

Keywords	Total
motivated	8
lesson	5
Beneficial	3
interesting	4
merdeka curriculum	1
technology	4
knowledge	5

Based on Table 1, the ranking of keywords most frequently used by participants in providing feedback on the training is displayed. The most frequently mentioned word is 'motivated', cited 8 times. The next most frequent words are 'lesson' and 'knowledge', each mentioned 5 times; 'interesting' and 'technology', each mentioned 4 times; and 'merdeka curriculum', mentioned once. The analysis from Table 1 indicates that the training using project-based learning, aligned with Kurikulum Merdeka and utilizing Assembler Edu, is highly valued and beneficial. The training also offered new insights into the use of augmented reality to identify and highlight elements of the Pancasila Learner Profile. Consequently, Assembler Edu training is considered engaging, motivating students to remain focused, and encouraging teachers to continuously develop and innovate with Assembler Edu.

The combination of satisfaction and relevance analysis results shows that using Assembler Edu in project-based learning, aligned with merdeka curriculum, is highly appropriate. Merdeka Curriculum provides flexibility for teachers and students in conducting learning activities both inside and outside the classroom (Kamila & Agus, 2023). Varied learning approaches can prevent student boredom, while teachers can implement various teaching models suited to the material and students' abilities, such as project-based learning. This method requires teachers to use projects as a medium for teaching material, where students are encouraged to explore, evaluate, and complete projects independently (Suartama et al., 2022). This approach also fosters student independence, making them more active and creative.

This study demonstrates that implementing project-based learning in Assembler Edu training enhances student enthusiasm, in line with findings by Savitri & Susanti (2024) and Pisriwati et al. (2024), who reported increased student independence, activity, and creativity. Additionally, the use of Assembler Edu in learning is highly regarded for its effectiveness in enhancing knowledge. The application is easily accessible and user-friendly, leveraging interactive animations to deliver content, which helps engage students. Students also showed enthusiasm for participating in future project-based learning activities using Assembler Edu, due to the augmented reality features that facilitate understanding through relevant moving images. These findings align with research by Osman et al. (2023), Rosyidah et al. (2023) and Safitri et al. (2023), indicating that augmented reality in Assembler Edu can enhance students' learning motivation in a more interactive and engaging manner.

Although the use of augmented reality (AR) technology like Assembler Edu offers various advantages in facilitating students' understanding of complex material through interactive visualization, several limitations must be considered. First, not all schools have adequate technological infrastructure, such

as devices that support AR and stable internet access, which may hinder equal implementation across classrooms. Second, teacher training in the use of this technology requires time and resources, and not all teachers may possess sufficient technological skills, potentially limiting the effectiveness of AR-based instruction. Additionally, the success of this method relies heavily on students' readiness and interest in technology, which may vary among different groups. Another aspect to consider is the potential for distraction or over-reliance on technology, which could reduce focus on developing non-technological skills. Furthermore, the evaluation of AR use requires more detailed mechanisms to assess its holistic impact on students' academic achievement, rather than just their enthusiasm or engagement in learning.

CONCLUSION

Based on the analysis results, it can be concluded that teachers are satisfied with the Assembler Edu training. This satisfaction is reflected in the majority of teachers' responses in the post-training questionnaire, with 43% of teachers feeling very satisfied and 33% feeling satisfied with the training. Additionally, teachers also assessed that the training content is relevant to their roles and responsibilities as educators, with 47% finding it very relevant and 30% finding it relevant. Teachers consider the training to be highly beneficial and motivating for their continuous learning and knowledge enhancement. This conclusion indicates that the study can serve as a reference for teachers to implement project-based learning in alignment with the Merdeka Curriculum. Such learning can assist students in analyzing problems and finding more effective solutions. Furthermore, teachers can use Assembler Edu to create more varied and engaging learning activities, enabling students to focus better and become more involved in the learning process.

The use of augmented reality (AR) technology like Assembler Edu should be more widely integrated into the Merdeka Curriculum, particularly for complex subjects that require visualization, as the AR features in Assembler Edu help students grasp concepts through interactive and engaging visual media. To ensure its effectiveness, teachers should receive specialized training to apply this technology in project-based learning, enabling them to design creative and relevant projects that enhance student engagement. The implementation of Assembler Edu-based projects should also focus on fostering student creativity, independence, and activity by providing opportunities for students to explore solutions on their own. Regular evaluations of Assembler Edu's use should be conducted through satisfaction surveys and analyses of students' improved understanding of the taught material. Additionally, schools need to improve their technological infrastructure, including access to devices and stable internet networks, to ensure that all students can use the technology without technical barriers.

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