

MIMBAR PENDIDIKAN:

Jurnal Indonesia untuk Kajian Pendidikan



Journal homepage: https://ejournal.upi.edu/index.php/mimbardik

Effectiveness of the Edugame-Based Problem-Based Learning Model in Improving Learning Outcomes in Pancasila Education

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ABSTRACT

Suboptimal student learning outcomes indicate a gap between expectations and reality, emphasizing the need for improvements in the learning process. This study aimed to examine the effectiveness of the edugame-assisted problem-based learning model in enhancing the learning outcomes of Grade V students in Pancasila Education at SDN 3 Karanggondang. A quantitative research method was employed using a pre-experimental one-group pretest-posttest design. Sampling was conducted through a saturated sampling technique, involving all fifth-grade students as the sample. Multiple-choice test instruments were used for data collection and underwent rigorous testing for validity, reliability, difficulty levels, and differentiation before being implemented as pretest and posttest assessments. Data analysis techniques included normality testing, a paired-sample t-test, and an ANOVA test. The results indicated that the average pretest learning outcome was 50.5, with a completeness rate of 11.1%. In the posttest, the average increased to 82.1, with a completeness rate of 85.1%. The normality test results for the pretest and posttest were 0.214 and 0.088, respectively, confirming that the data were normally distributed. Furthermore, the paired-sample t-test yielded a significance value (p) of 0.01 < 0.05, leading to the rejection of Ho and the acceptance of Ha, demonstrating the effectiveness of the applied model. The ANOVA test showed that the model contributed 66.3% to the learning outcomes. Therefore, it can be concluded that the edugame-assisted problem-based learning model is highly effective in improving the learning outcomes of Grade V students in Pancasila Education at SDN 3 Karanggondang.

ARTICLE INFO

Article History: Submitted/Received 30 Jan 2025 First Revised 06 Feb 2025 Accepted 17 Feb 2025 First Available online 01 Mar 2025 Publication Date 01 Mar 2025

Kata Kunci:

edugame; learning outcomes; problem based learning model; pancasila education.

1. INTRODUCTION

Classroom learning is an integral part of the educational process. It is an interactive process that takes place in a learning environment and involves three key aspects teachers, students, and learning resources (Widiyono, 2021). Pancasila Education is one of the essential subjects taught in elementary schools, playing a crucial role in enhancing students' awareness of Pancasila values, such as loving God, respecting others, understanding the rights and obligations of citizens, and shaping national identity (Efendi & Sa'diyah, 2020; Lubis, 2019; Magdalena et al., 2020). In practice, Pancasila Education often faces the significant challenge of low student interest in the subject. Students find the lessons boring and difficult to understand because they are taught theoretically without being connected to real-life contexts, resulting in low learning outcomes (Setyawan, 2022). In this context, the teacher plays a vital role as a facilitator, which is crucial for increasing students' understanding and interest in Pancasila Education by implementing creative and innovative learning models.

Learning models are designed to be easily understood by students (Ahyar et al., 2021). The design includes a learning approach that outlines objectives, stages, and effective classroom management, ensuring that students do not feel forced to learn. However, the implementation of learning models is often faced with challenges, such as the teacher's lack of understanding of the chosen model, the incompatibility of teaching modules, and variations in student abilities and interests. Additionally, the abstract nature of Pancasila Education material poses an obstacle (Aprima, 2023; Farhana et al., 2023). In practice, teachers often focus solely on completing the material using predominantly memorization and lecture methods, resulting in limited student engagement. Selecting the right model can help students easily understand the material and enhance their learning outcomes.

Learning success is characterized by measurable changes in learning outcomes at the end of the learning process (Lestari, 2020). Learning outcomes indicate the extent to which students understand the material and reflect the teacher's effectiveness in instruction. Pancasila Education learning outcomes encompass three competencies: civic knowledge (cognitive domain), civic disposition (affective domain), and civic skills (psychomotor domain) (Febriana, 2024). This study focuses on the learning outcomes of civic knowledge within the cognitive domain. According to Benjamin Bloom, indicators of cognitive learning outcomes relate to thinking, knowledge, and reasoning abilities, which include the ability to remember, understand, apply, analyze, synthesize, and evaluate (Talandung, 2023). tudent learning success can be categorized as follows: (1) maximum if the student masters all the material, (2) optimal if mastery is between 76% and 99%, (3) good if mastery is between 60% and 75%, and (4) less proficient if mastery is ≤60% (Haryanto, 2021). Thus, student learning outcomes reflect their level of understanding and serve as an indicator of learning success based on predetermined criteria.

Based on observations and interviews with the fifth-grade teacher of SDN 3 Karanggondang, it was found that the teaching process still relies on conventional methods, primarily lectures, and only utilizes the teacher's book and LKS, as these are easier to implement. Although alternative learning models have been attempted,

their implementation remains suboptimal due to a lack of understanding of the chosen model, time constraints, and variations in student characteristics. Additionally, students exhibit low motivation to learn, as evidenced by their tendency to engage in side conversations during lessons. This behavior stems from the unengaging delivery of material, making it difficult for students to understand the lesson. As a result, they often feel confused, passive, and reluctant to ask questions when something is unclear. According to Vogel and Schwabe, when students become confused or frustrated due to difficulty in understanding the material, their willingness to learn decreases, which can even lead to feelings of frustration or anger (Ismatunsarrah et al., 2020). Low comprehension of subject matter caused by low student motivation ultimately results in low learning outcomes. Based on the learning results of fifth-grade students in Pancasila Education, the average score was 62, with only 14.8% of 27 students meeting the KKTP threshold of 70, while 85.1% did not. According to Haryanto, a completeness rate of 14.8% falls into the 'low' category, indicating the need for improvements in the learning process.

The use of an edugame-based problem-based learning model in Pancasila Education can serve as an effective solution. Problem-based learning is an educational approach that supports students in developing their thinking skills by engaging them in collaborative and participatory problem-solving in real-world contexts (Musfiroh et al., 2024). Problem-solving exercises that encourage critical thinking have a positive impact on students' understanding of the material, their abilities, and their sense of accomplishment in learning. This model has been proven effective in increasing student engagement, with a significant rise from 34.9% to 77.6% (Mayasari et al., 2022). Student engagement plays a crucial role in successful learning, as it encourages students to ask questions and seek clarification on concepts they do not fully understand. Meanwhile, edugames integrate educational and entertainment elements, allowing students to strengthen their cognitive understanding in an engaging manner (Sappaile et al., 2024). Arious types of edugames can be incorporated into the learning process, such as simulation games, quiz games, puzzle games, and concrete object-based games. Selecting the appropriate edugame based on students' characteristics can help achieve learning objectives and create a meaningful learning experience. Combining edugames with a problem-based learning model has the potential to enhance students' motivation, foster critical thinking, and make the learning process more enjoyable and interactive, all of which positively influence student learning outcomes (Easter et al., 2022; Sinambela et al., 2022). Thus, the edugame-based problem-based learning model serves as an effective solution for improving Pancasila Education learning.

Consistent with previous research, the problem-based learning model has been proven to influence the improvement of learning outcomes, as indicated by the increase in pretest scores from 48.25 to 80.50 in the posttest, with a model effect of 71.7%. The acceptance of Ha and rejection of Ho indicate a significant relationship between problem-based learning and student learning outcomes in Pancasila Education (Rahman & Caturiasari, 2024; Widiyastuti et al., 2024). The integration of games in elementary school learning has a positive impact on students, enhancing their knowledge, problem-solving skills, communication abilities, and critical thinking skills. The application of the problem-based learning model combined with edugames has been shown to achieve an attainment rate of over 80%, supporting students' cognitive learning outcomes (Azhar et al., 2022; Fauzi et al., 2024). However, research on the effectiveness of the edugame-based problem-based learning model in the context of Pancasila Education in elementary schools remains limited, necessitating further investigation.

This study aimed to examine the effectiveness of the edugame-based problem-based learning model in improving learning outcomes in Pancasila Education at SDN 3 Karanggondang. It is hoped that this research will contribute positively to the development of innovative learning approaches that yield effective results, ultimately helping to enhance the quality of Pancasila Education, particularly for elementary school students.

2. RESEARCH METHODS

This study employs a quantitative research approach using a pre-experimental one-group pretest-posttest design, conducted on a single group without a control group (Arib et al., 2024). The research began by measuring students' initial learning outcomes through a pretest, followed by the implementation of an edugame-based problem-based learning model as a treatment. Subsequently, a posttest was administered to evaluate changes in student learning outcomes after the treatment.

Table 1. Research Design						
Group	Pretest	Treatment	Posttest			
Experiment	01	х	02			

(Source: Sugiyono, 2022)

Description:

O1 : Pretest score as the initial data before treatment

X : Treatment using the edugame-based problem-based learning model

O2 : Posttest score as the final data after treatment

The research was conducted at SDN 3 Karanggondang, focusing on Pancasila Education lessons with the material Cultural Diversity of Indonesia. The population in this study consisted of Grade V students, with a saturated sampling technique used, meaning all members of the population were included as samples. This technique is appropriate for populations of fewer than 30 individuals (Amin et al., 2023). The research sample consisted of 27 fifth-grade students, including 16 male students and 11 female students. Tests were used as a data collection technique to measure student learning outcomes. The test instrument consisted of 25 multiple-choice questions, with a scoring system of 1 point for each correct answer and 0 points for each incorrect answer. Before administering the test, its validity was examined. The test was considered valid if, at a significance level of 0.05, the calculated r-value > r-table value. Furthermore, reliability was tested using Cronbach's alpha. If the

Cronbach's alpha value > 0.60, the test met reliability criteria. In addition to validity and reliability, maintaining a balanced level of question difficulty is crucial for producing high-quality assessments. The analysis of question difficulty levels, based on Magdalena et al. (2021), is used to classify question items into the following categories:

Table 2. Criteria	for Question	Difficulty	Level
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Interval	Interpretation			
0,00-0,30	Difficult			
0,30-0,70	Medium			
0,71-1,00	Eas			

The next test analysis involves evaluating the differentiation of test items. This analysis is conducted to determine the ability of questions to distinguish between students with different levels of understanding. The differentiation index is categorized based on the following criteria (Son, 2019)

No	IDP	Interpretasi			
1.	Negative sign	No differentiating power			
2.	0.00 ≤ D < 0.20	Must be replaced			
3.	0.20 ≤ D < 0.40	Simply			
4.	0.40 ≤ D < 0.70	Good			
5.	0.70 ≤ D ≤ 1.00	Wearable			

Table 3. Criteria for Question Item Power

Data analysis employs inferential statistical techniques, which involve analyzing sample data to draw conclusions about the population from which the sample was taken (Sutopo & Slamet, 2017). Data processing is conducted using the Jamovi application and includes a normality prerequisite test using the Shapiro-Wilk test to determine whether the data distribution is normal. To assess the effectiveness of Pancasila Education learning outcomes before and after the implementation of the edugame-based problem-based learning model, the Paired Sample T-Test is used for hypothesis testing. The treatment is considered effective if the significance value is < 0.05, whereas a significance value > 0.05 indicates no significant effect (Jauhari et al., 2024). Additionally, the ANOVA test is used to compare the means of two or more groups, aiming to determine whether there is a significant effect of variable (X) on variable (Y) (Waluyo et al., 2024).

3. RESULTS AND DISCUSSION

Research Results

SDN 3 Karanggondang was selected as the research location, with grade V students as the sample. This study aims to assess the effectiveness of the edugame-based problem-based learning model in improving the quality of student learning outcomes in Pancasila Education. The research was conducted in several stages. In the initial stage, the multiple-choice test was first administered to grade VI students before being given to grade V students. The test data were then analyzed using several statistical tests, including validity, reliability, difficulty level, and item differentiation, with the help of the Jamovi application. The validity test was conducted using a significance criterion of 0.05, where an item was considered valid if the calculated r-count > r-table value. Since the number of students involved in the test was 10, the r-table value was set at 0.632. The validity analysis showed that 25 out of 30 items had an r-value greater than 0.632, indicating that these items were valid. However, five items numbers 17, 21, 24, 27, and 28 were deemed invalid and excluded as they did not meet the validity criteria. Following the validity test, the 25 valid items were subjected to a reliability test. The results showed a Cronbach's alpha value of 0.969 > 0.60. Based on this result, the test items were determined to have a high level of reliability and internal consistency.

The next analysis involved testing the difficulty level to evaluate the test questions in terms of their complexity. The results showed that 25 items had a difficulty level ranging from 0.400 to 0.800, classifying them as medium to easy. As a result, no questions needed to be eliminated for being too difficult. The final test analysis focused on the discriminating power of the questions. The results indicated that 13 questions had a discriminating power between 0.724 and 0.956, categorizing them as usable, while 12 questions fell into the good category with a discriminating power of 0.660. This differentiation allowed for a clear distinction between students with high and low levels of understanding. After undergoing a series of tests, all 25 items were deemed suitable for use as pretest and posttest questions to measure the learning outcomes of fifth-grade students in Pancasila Education lessons.

The second stage of this study involved conducting a pretest on 27 fifth-grade students to measure their initial learning outcomes before the treatment. The pretest results, which showed low scores, indicated the need for intervention to enhance student understanding. The next stage involved implementing the edugame-based problem-based learning model as a treatment, focusing on the topic Cultural Diversity of Indonesia in Pancasila Education. The treatment was conducted over four sessions, with researchers using a different edugame in each session: Cultural Ladder Snakes,

Guess the Culture Card (TEKABU), Cultural Monopoly, and Cultural Diversity TTS. The treatment captured students' interest, as evidenced by their enthusiasm during the learning process. Students were actively engaged in understanding cultural diversity, which was reflected in their interactions throughout the learning activities. As the final stage of the research, a posttest was conducted after the treatment to measure changes in student learning outcomes. The results are presented in the following table:

	Pretest	Posttest
Minimum	24	64
Maximum	76	96
Mean	50.5	82.1

The learning outcomes of fifth-grade students, as shown in the table, indicate a significant improvement. This is evident from the increase in the average posttest score, which reached 82.1, compared to the pretest score of only 50.5. In the pretest, the highest score recorded was 76, while the lowest was 24, with a mastery percentage of only 11.1%. After the treatment, there was a substantial improvement, with 23 students achieving mastery, resulting in a mastery percentage of 85.1%. The highest posttest score was 96, and the lowest was 64. The analysis results confirm that implementing the edugame-based problem-based learning model in Pancasila Education significantly enhances student learning outcomes. The next stage of data analysis, conducted using the Jamovi application, included a normality prerequisite test, a paired sample t-test hypothesis test, and an ANOVA test. The normality prerequisite test was performed using the Shapiro-Wilk test, as the sample size (N) < 50. This test aimed to determine whether the data was normally distributed. The analysis results are presented in the following table.

Descriptives		
	Pretest	Posttest
N	27	27
Missing	0	0
Standard deviation	13.5	8.90
Shapiro-Wilk W	0.950	0.934
Shapiro-Wilk p	0.214	0.088

Table 5. Shapiro Wilk Normality Test Results

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The Shapiro-Wilk normality test determines that the data is normally distributed if p > 0.05, while the data is not normally distributed if p < 0.05. Based on the table, the Shapiro-Wilk normality test confirms that both the pretest and posttest data meet the criteria for normal distribution, with p-values of 0.214 and 0.088, respectively both of which are greater than 0.05. Hypothesis testing was conducted

using the paired sample t-test. The decision-making criteria for this test are as follows Ho is accepted and Ha is rejected if the significance value is > 0.05, indicating that the model has no significant effect on student learning outcomes. Ho is rejected and Ha is accepted if the significance value is < 0.05, meaning that the edugame-based problem-based learning model is effective in improving learning outcomes. The test results are presented in the following table:

Table 6. Paired Samples T Test Results

Paired S	amples T-T	est									
									95% Conf	ïdence Interval	
			statistic	Df	Р	Mean Difference	SE difference	Lower	Upper		Effect Size
Pretest	Posttest	Student's t	-26.0	26.0	< .001	-31.6	1.21	-34.1	-29.1	Cohen's d	-5.00

Based on the results of hypothesis testing using the paired sample t-test, the significance value (p) of 0.01 is < 0.05, indicating that Ho is rejected and Ha is accepted. This confirms that the edugame-based problem-based learning model is effective in improving the learning outcomes of grade V students in Pancasila Education. Following this, an ANOVA test was conducted to determine whether the independent variable (X) had a significant effect on the dependent variable (Y). The results of the ANOVA test are presented in the following table:

Table 7. ANOVA Test Results

ANOVA - hasil belajar								
	Sum of Squares	Df	Mean Square	F	Р	η²p		
Model	13443	1	13443	102	<.001	0.663		
Residuals	6833	52	131					

The results of the ANOVA test show that the F value is (1, 52) = 102 with p < 0.01 and a partial eta squared ($\eta^2 p$) of 0.663. This indicates that the edugame-based problem-based learning model (variable X) has a significant influence on students' Pancasila Education learning outcomes (variable Y), with a model contribution of 66.3%. Therefore, it can be concluded that this model is effectively applied in the learning process.

Discussion

The results of the research indicate that the edugame-based problem-based learning model is effectively applied in Pancasila Education to improve the learning outcomes of fifth-grade students at SDN 3 Karanggondang. The educational games used in this study Cultural Ladder Snakes, Guess the Culture Card (TEKABU), Cultural Monopoly, and Cultural Diversity TTS. This effectiveness is demonstrated by the completion rate, which reached 85.1%, with posttest scores significantly higher than the pretest. These findings align with previous research by Amalia et al. (2020), which showed that applying ethnoscience-based problem-based learning models in science education had a positive impact, with a completion rate of 85%. While their study

focused on an ethnoscience approach in science lessons, this research used edugames to support Pancasila Education learning. Asrifah et al. (2020), found that the application of a problem-based learning model in education resulted in an effect size of 0.42, indicating a significant influence on Pancasila Education learning outcomes. Furthermore, Hidayati et al. (2024), reinforced the effectiveness of the problem-based learning model in Pancasila Education, as evidenced by an increase in student completeness from 27% in the pre-cycle stage to 46% in cycle I, and finally to 81% in cycle II. In this study, the implementation of the problem-based learning model successfully achieved the expected targets and effectively improved student performance.

The application of edugames in learning has a positive impact on learning outcomes while also fostering student interest and active involvement. Research by Nura (2024), supports the findings of this study, stating that the use of edugames such as Wordwall and Rotating Wheel in Pancasila Education encourages students to be more actively engaged rather than passively listening to the teacher's explanations. Students' activeness is reflected in their participation in answering questions and solving problems. The significant improvement in learning outcomes after the implementation of edugames further proves their effectiveness, as evidenced by an increase in scores from 49.63 in the pretest to 84.63 in the posttest. Similarly, research by Bakhsh et al. (2022), highlights that implementing games in the learning process is an effective strategy to enhance student engagement and problem-solving skills. In line with this, research by Fasha et al. (2024), demonstrates that edugames developed using Android Studio Kotlin and Java enhance learning experiences by ensuring quality through alpha and beta testing, which resulted in a satisfaction level of 90.2%. This indicates that edugames can improve students' understanding of learning materials. Additionally, research by Priante & Tsekouras (2025), supports these findings, stating that incorporating games in learning significantly enhances students' motivation, concentration, and enjoyment. This, in turn, has a positive impact on students with lower academic performance by supporting their learning outcomes. Furthermore, research by Boom-Cárcamo et al. (2024), reinforces these results by demonstrating that the combination of gamification with problem-based learning is a highly effective instructional technique. This approach significantly improves students' average performance by creating an engaging, motivating, and rewarding learning experience.

Overall, based on various studies, the edugame-based problem-based learning model has been shown to not only improve learning outcomes but also enhance student motivation and active participation, making it an effective strategy for Pancasila Education. The advantages of implementing this model in the present study include its innovative and engaging approach, with an effect size of 66.3%, as evidenced by the significant improvement in students' Pancasila Education learning outcomes.

4. CONCLUSION

The implementation of the edugame-based problem-based learning model in Pancasila Education has proven to be highly effective in improving the learning outcomes of fifth-grade students at SDN 3 Karanggondang. This effectiveness is reflected in the significant increase in the average posttest score 82.1 compared to the pretest score 50.5. The results of the paired sample t-test confirmed the model's effectiveness in enhancing learning outcomes, while the ANOVA test demonstrated a significant impact with an effect size of 66.3%. Beyond improving academic performance, this learning approach also fostered an engaging classroom environment and promoted active student participation, as evidenced by the increase in student mastery rates from 11.1% in the pretest to 85.1% in the posttest. Therefore, it can be concluded that the edugame-based problem-based learning model is a highly recommended strategy for enhancing Pancasila Education learning outcomes in elementary schools.

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