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The Effect of The Problem Based Learning (PBL) Model with Tedido (Telinga Ding- Dong) Media on The Creativity and Science Learning Outcomes of Grade 5 Elementary School Students

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ABSTRACT: Science (IPA) learning in elementary schools still faces various challenges, particularly the low levels of students' creativity and cognitive learning outcomes. This condition is influenced by learning practices that tend to be teacher-centered and lack the use of interactive learning media that actively engage students. Therefore, innovative learning models supported by appropriate media are needed to create meaningful and student-centered learning experiences. This study aims to examine the effect of the Problem-Based Learning (PBL) model assisted by Ding-Dong (Tedido) media on the creativity and science learning outcomes of fifth-grade elementary school students. This research employed a quantitative approach using a quasi-experimental design with a non-equivalent control group post-test only design. The participants were fifth-grade students of SDN Jember Lor 02, divided into an experimental class and a control class. The experimental class was taught using the PBL model assisted by Ding-Dong (Tedido) media, while the control class received conventional instruction. Research instruments consisted of a creativity test measuring fluency, flexibility, originality, and elaboration, as well as a cognitive learning outcome test in the form of multiple-choice questions. Data were analyzed using prerequisite tests and the independent samples t-test. The results showed that students in the experimental class achieved significantly higher creativity scores and science learning outcomes compared to those in the control class. The findings indicate that the integration of the PBL model with Ding-Dong (Tedido) media effectively promotes active learning, enhances students' creative thinking, and improves their understanding of science concepts. Thus, the PBL model assisted by Ding-Dong (Tedido) media can be considered an effective alternative for improving creativity and learning outcomes in elementary science education.

KEYWORDS: Ding-Dong (Tedido) Media, Creativity, Learning Outcomes, Problem-Based Learning, Science (IPA)

INTRODUCTION

Education plays a strategic role in developing students' potential so that they are able to think critically, creatively, and adaptively in response to developments in science and technology. Law Number 20 of 2003 emphasizes that education aims to actively develop students' potential, not only in the domain of knowledge but also in attitudes and skills. Therefore, the learning process in elementary schools must be designed to provide meaningful learning experiences and encourage active student engagement. Science (IPA) learning in elementary schools has an important role in fostering scientific thinking skills and understanding basic scientific concepts from an early age. However, the reality in the field shows that science learning is still dominated by conventional, teacher-centered approaches, causing students to be passive and less involved in the learning process. This condition has an impact on the low levels of creativity and student learning outcomes (Ameliya et al., 2020).

Learning outcomes are defined as changes in student behavior that include the cognitive, affective, and psychomotor domains as a result of the learning process (Sujana, 2021). In addition, creativity is an important ability that needs to be developed in science learning, encompassing aspects of fluency, flexibility, originality, and elaboration. Creativity and learning outcomes are interrelated, as students who are actively and creatively engaged tend to have a better understanding of concepts.

One of the factors influencing the low levels of creativity and student learning outcomes is the use of less varied learning models and the minimal use of interactive learning media. One-way learning causes students to have limited opportunities to think critically, explore ideas, and connect science concepts with real-life problems. Therefore, innovative learning models are needed to accommodate these needs.

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Problem-Based Learning (PBL) is a learning model grounded in constructivist theory and oriented toward students. This model positions students as active subjects in the learning process through contextual problem-solving activities. According to Ardianti et al. (2022), PBL encourages students to identify problems, seek information, engage in discussions, and formulate solutions independently or collaboratively. Through these stages, students not only understand concepts but also develop creative thinking skills and achieve more optimal learning outcomes. One learning approach that has gained widespread recognition for its potential to improve the quality of education is the Problem-Based Learning (PBL) model. The PBL model emphasizes learning through authentic problems or simulations that encourage students to think critically, collaborate, and generate creative solutions. Various previous studies conducted over the past five years have reported that PBL can enhance critical thinking skills, learning motivation, and science learning outcomes at the elementary school level. Other recent studies indicate that PBL supports deeper conceptual understanding by engaging students in investigation-based and contextual problem-solving activities (Ramadhani & Shofiyah, 2023). Furthermore, several studies also suggest that PBL can have a positive impact on students' creativity when learners are given opportunities to explore ideas and propose multiple alternative solutions. Research on the integration of learning media within the context of PBL also shows that the use of appropriate tools can strengthen student engagement and understanding. In addition, several studies have examined the use of concrete and manipulative media in elementary school science learning, demonstrating improvements in student understanding as well as long-term concept retention (Sitepu et al., 2025).

METHOD RESEARCH

This study employs a quantitative approach with a Quasi-Experimental design, specifically utilizing the Non- equivalent Control Group Design. The research was conducted at SD Negeri Jember Lor 02, Patrang District. The population subjects include all fifth-grade students, with the sample divided into two groups: Class 5A as the control group applying conventional learning, and Class 5B as the experimental group utilizing the Problem-Based Learning (PBL) model integrated with Tedido media. This design was selected to allow for a systematic comparison of learning outcomes between groups and to identify the instructional impact of the proposed learning model (Fadli, 2021).

Data collection was carried out through creativity instruments and science achievement tests which were developed based on learning objectives and were validated before use. Student creativity is measured through performance-based assignments and observation sheets with aspects including originality, flexibility and fluency of ideas, while science learning outcomes are assessed using post-test instruments. The feasibility of the instrument has gone through validity tests, namely content, construct and empirical as well as reliability tests. For data analysis, this research used SPSS 25.0 software, starting with the normality test, followed by the Independent Sample T-test hypothesis test.

RESULTS

Data collection was conducted using creativity instruments and Science achievement tests, which were developed based on learning objectives and validated prior to administration. Student creativity was measured through performance-based tasks and observation sheets, covering aspects of originality, flexibility, and fluency of ideas, while Science learning outcomes were assessed using a post-test instrument. The instrument's feasibility was ensured through validity testing—comprising content, construct, and empirical validity—as well as reliability testing. For data analysis, this study utilized SPSS 25.0 software, beginning with normality tests and followed by hypothesis testing using the Independent Sample T-test

Tabel 1 Perbandingan Nilai Kreativitas

Statistical Data	Post-Test	
	Experiment	Control
Highest Score	100	100
Lowest Score	63	56
Mean	84	76

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Based on Table 1, the statistical data for the students' creativity post-test is presented in the descriptive statistics table. In the experimental class, the highest score achieved by students was 100, while the lowest score was 63. The mean score for student creativity in the experimental class was 84. Meanwhile, in the control class, the highest score achieved was also 100; however, the lowest score was lower than that of the experimental class at 56, with a mean score of 76. The following Table 2 below illustrates the comparison of learning outcomes at the post-test stage.

Tabel 2 Perbandingan Nilai Kreativitas

Statistical Data	Post-Test	
	Experiment	Control
Highest Score	100	100
Lowest Score	62	52
Mean	85	76

Based on the descriptive statistical analysis of the students' post-test learning outcomes, the results show that in the experimental class, the highest score achieved was 100, while the lowest score was 62, with a mean value of 85. Meanwhile, in the control class, the highest score was also 100, but the lowest score was notably lower at 52, with a mean value of 76. This difference in mean values indicates that, descriptively, students' learning outcomes in the experimental class were higher than those in the control class. Furthermore, the higher minimum score in the experimental class suggests that the Problem-Based Learning (PBL) model, supported by Tedido media, is effective in helping students achieve a more equitable and consistent understanding of the material.

1. Analysis of the Influence of the PBL Model with Tedido Media on Student Creativity

The prerequisite tests conducted in this study included normality testing of the post-test data for both the experimental and control classes. Once the data were confirmed to meet the assumption of normality, hypothesis testing was subsequently performed using the Independent Sample t-test.

Normality testing was carried out to determine whether the post-test data for creativity and learning outcomes in the experimental and control groups were normally distributed. This was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests with a significance level (α) of 0.05. Data are considered normally distributed if the obtained significance value (p-value) is greater than 0.05. The results of the normality test can be seen in the following figure:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
KREATIVITASKONTROL	.186	28	.015	.953	28	.237
KREATIVIVITASEKSPERIMEN	.170	28	.038	.931	28	.067

a. Lilliefors Significance Correction

Figure 1 Uji Normalitas Post-Test Kreativitas

The results of the Shapiro–Wilk test indicate that both groups—the control class and the experimental class—have significance values (Sig.) greater than 0.05. Specifically, the control class obtained a Sig. value of 0.237, while the experimental class recorded a Sig. value of 0.067. Since both significance values are > 0.05, it can be concluded that the creativity data for both groups follow a normal distribution. The Independent Sample T-test was subsequently conducted to determine the difference in mean scores between the two sample groups: the experimental class and the control class. The results of this hypothesis testing are presented in the figure below:

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Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
NILAIPOSTEST	Equal variances assumed	.198	.658	3.086	54	.003	8.286	2.685
	Equal variances not assumed			3.086	53.724	.003	8.286	2.685

Figure 2 Hasil Uji *Independen Sample T- Test* Kreativitas

Based on Figure 2, the results of the Independent Samples T-test for the creativity post-test show a t-value of 3.086 with 54 degrees of freedom (df) and a 2-tailed significance of 0.003. The significance value of 0.003 is smaller than the 0.05 alpha level ($\alpha < 0.05$$), indicating that there is a significant difference between the mean post-test learning outcomes of the experimental and control groups. The mean difference obtained is 8.286, further demonstrating that the average creativity in the experimental group is higher than that of the control group.

***2.* Analysis of the Influence of the PBL Model with Tedido Media on Student Learning Outcomes**

The prerequisite tests conducted in this study included normality testing of the post-test data for both the experimental and control classes. Once the data were confirmed to meet the assumption of normality, hypothesis testing was subsequently performed using the Independent Sample t-test. Normality testing was carried out to determine whether the post-test data for creativity and learning outcomes in the experimental and control groups were normally distributed. This was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests with a significance level of 0.05. Data are considered normally distributed if the obtained significance value is greater than 0.05. The results of the normality test can be seen in the following figure:

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	KELAS	Statistic	df	Sig.	Statistic	df	Sig.
HASILBELAJAR	kelas kontrol	.145	28	.134	.963	28	.415
	kelas eksperimen	.166	28	.046	.960	28	.342

a. Lilliefors Significance Correction

Figure 3 Uji Normalitas *Post-Test* Hasil Belajar

The results of the normality test using the Shapiro–Wilk technique indicate that the learning outcome data for both groups are normally distributed. This is confirmed by the significance values (Sig.) exceeding 0.05, where the control class obtained a value of 0.415 and the experimental class reached 0.342. Meeting this normality assumption serves as the basis for employing parametric statistical analysis, specifically the independent samples t-test. The assessment of treatment effectiveness in the experimental group was conducted through measured statistical analysis as an empirical foundation to determine the differences between groups for hypothesis testing. The Independent Sample T-test data are presented in Figure 4.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
HASILBELAJAR	Equal variances assumed	1.743	.192	-3.145	54	.003	-9.071	2.885
	Equal variances not assumed			-3.145	49.853	.003	-9.071	2.885

Figure 4 Uji *Independent T-Test Post-Test* Hasil Belajar

The Independent Samples T-Test was utilized to analyze the difference in mean learning outcomes between the control and experimental classes following the instructional intervention. Prior to the primary analysis, the assumption of homogeneity of variance was tested using Levene's Test for Equality of Variances. A significance value of 0.003 indicates that the variances of

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the two groups are homogeneous, thereby fulfilling the prerequisite for parametric analysis. Consequently, the interpretation of the mean difference in learning outcomes refers to the 'Equal variances assumed' row.

The test results show a significance value of < 0.001, which is well below the $\alpha = 0.05$ threshold. This provides strong statistical evidence that there is a significant difference in mean learning outcomes between the two groups. The mean difference indicates that the student learning outcomes in the control class are lower than those in the experimental class

DISCUSSION

Based on the results of the hypothesis testing, the implementation of the PBL model integrated with Tedido media is proven to have a significant influence on increasing both student creativity and cognitive learning outcomes compared to the control class. The superiority of the experimental class is driven by the synergy between the learning model and the media as follows:

- Tedido media functions as an interactive learning tool capable of presenting problems concretely, attractively, and enjoyably. Through visual displays, point systems, and immediate feedback via the 'Tedido' sound, this media encourages active student engagement in the learning process. This makes learning more meaningful as students do not merely receive information but are directly involved in the process of testing ideas and problem-solving.
- The Problem-Based Learning (PBL) model provides a systematic framework by utilizing real-world problems as the starting point for learning. Through the stages of problem orientation, group discussion, investigation, presentation of results, and reflection, students are trained to think critically, creatively, and collaboratively.
- The integration of the PBL model and Tedido media aligns with constructivist theory, which posits that knowledge is actively constructed by students through learning experiences and interaction with their environment.

CONCLUSION

The implementation of the Problem-Based Learning (PBL) model assisted by Tedido (Telinga Ding-Dong) media has a significant positive influence on both the creativity and Science learning outcomes of fifth-grade elementary school students. The integration of problem-oriented learning activities with concrete and contextual media creates an active and meaningful learning environment, which encourages students to think creatively, participate collaboratively, and understand Science concepts more deeply. Students taught using the PBL model supported by Tedido media demonstrated higher creativity scores and better academic achievement compared to students receiving conventional instruction. Nonetheless, this study has several limitations, including the research location and the relatively limited sample size, which may affect the generalizability of the findings

SUGGESTIONS

Teachers are encouraged to continuously develop the implementation of the Problem-Based Learning (PBL) model integrated with Tedido (Telinga Ding-Dong) media, as it is proven to create meaningful learning and foster active student engagement. Schools should support innovative learning by providing adequate facilities and enhancing teacher competencies to ensure that curriculum implementation is optimized and aligned with student needs. Future researchers are suggested to develop Tedido media across more diverse subject matter, variables, and instructional designs to further improve the quality of education.

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