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The Effect of the Problem-Based Learning (PBL) Model on Student Learning Outcomes in the IPAS Subject for Fourth-Grade Students at SD Negeri 091262 Karang Sari

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ABSTRACT

This study aims to determine the effect of the Problem-Based Learning (PBL) model on students' learning outcomes in the IPAS subject for fourth-grade students at SD Negeri 091262 Karang Sari. This research is motivated by the low student learning outcomes in the IPAS subject, caused by the use of less varied learning models that remain teacher-centered. The research method used is a quantitative approach with an experimental research design. The research design applied is a one-group pretest-posttest design. The population consists of all fourth-grade students at SD Negeri 091262 Karang Sari, with a sample of 25 students. Data collection was conducted through multiple-choice tests that had been tested for validity and reliability. The results indicate that there is a significant difference in learning outcomes between the pretest and posttest. This is proven by hypothesis testing using the paired samples t-test, where the calculated t-value (32.047) is greater than the t-table value (2.067), so Ha is accepted and Ho is rejected. It can be concluded that the Problem-Based Learning (PBL) model has a significant effect on students' learning outcomes in the IPAS subject for fourth-grade students at SD Negeri 091262 Karang Sari.

INTRODUCTION

Education plays a crucial role in shaping the quality of human resources. Through education, students are not only equipped with academic knowledge but also guided to develop attitudes, values, and behaviors aligned with social norms. Quality education is expected to produce satisfactory learning outcomes while simultaneously building character and preparing students mentally for a better future (Amallia & Unaenah, 2018).

Schools as educational institutions should ideally serve as centers of education, socialization, and transformation. A quality school is one that functions effectively as a medium of education emphasizing teaching and learning activities as a place for socialization among students, and as a venue for positive behavioral transformation. Teachers are the primary drivers in the learning process and their performance is a key indicator of educational quality.

Research conducted by Suprapmanto (2024) through observations and interviews with fourth-grade teachers at several elementary schools found that students' difficulties

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in IPAS (Natural and Social Sciences) were caused by external factors, including monotonous teaching methods, inappropriate and conventional learning models, and unappealing instructional media. Novita and Elfrianto (2024) similarly noted that many teachers still rely heavily on conventional methods such as lectures, discussions, question-and-answer sessions, and direct instruction.

Based on observations conducted on Monday, January 26, 2026, at SD Negeri 091262 Karang Sari, the researcher found that the learning process was still predominantly conventional. Students showed low levels of active engagement. Most students simply listened to the teacher's explanations without any opportunities to express their opinions or ask questions. As a result, many students had not yet reached the Learning Objective Achievement Criteria (KKTP) of 70. Data showed that out of 25 students, only 9 (36%) passed, while 16 (64%) did not.

To address this problem, a change in the IPAS learning approach is needed. One promising solution is the implementation of the Problem-Based Learning (PBL) model, which engages students actively in solving real-world problems. PBL not only helps students understand the material but also develops critical thinking skills and collaborative abilities. This research, therefore, examines the effect of the PBL model on the learning outcomes of fourth-grade IPAS students at SD Negeri 091262 Karang Sari.

METHODOLOGY

This study uses a quantitative approach with a pre-experimental design. The specific design applied is the one-group pretest-posttest design, which involves a single class as the research subject. Measurements were taken twice: before (pretest) and after (posttest) the application of the PBL model.

The research was conducted in April 2026 at SD Negeri 091262 Karang Sari, located on Jl. Anjangsana, Karangsari Village, Gunung Maligas District, Simalungun Regency, North Sumatra Province. The population consisted of all fourth-grade students (n = 25), comprising 12 male and 13 female students. Total sampling was used because the population was fewer than 100.

The research instrument consisted of 25 multiple-choice questions covering the IPAS topic 'Now I Become More Orderly' (Kini Aku Menjadi Lebih Tertib). Before use, the instrument was validated by two expert validators (one lecturer and one teacher). Validation using the Aiken's V index yielded scores of 0.81 for content, 0.81 for language, and 0.82 for construct validity all classified as high validity. Reliability was tested using Cronbach's Alpha, resulting in a coefficient of 0.887, classified as very high.

Data analysis included normality testing using the Shapiro-Wilk test and hypothesis testing using the paired samples t-test with SPSS 24. The decision criteria for the t-test were: if t-calculated > t-table, then Ha is accepted.

RESULTS AND DISCUSSION

A. Results

The research was conducted from April 9 to 16, 2026, involving 25 fourth-grade students at SD Negeri 091262 Karang Sari. The results are presented as follows.

Table 1
Expert Validation Results (Aiken's V Index)

Assessment Aspect	Aiken's V Mean	Percentage	Criteria
Content/Material	0.81	81%	High Validity
Language	0.81	81%	High Validity
Construct	0.82	82%	High Validity
Overall Average	0.81	81%	High Validity

Source: Data processing from Excel

Based on Table 1, the instrument validation by expert validators produced a high validity category with an overall Aiken's V average of 0.81 (81%). After validation, the instrument was piloted at UPTD SD Negeri 124397 Pematangsiantar with 22 students. The SPSS validity test showed 25 items valid (r-calculated > r-table = 0.396), and 5 items invalid. Only the 25 valid items were used in the study. Reliability testing with Cronbach's Alpha yielded a coefficient of 0.887 (very high), confirming the instrument's reliability for data collection.

Table 2
Descriptive Statistics of Pretest and Posttest Scores

Statistic	Pretest	Posttest
Lowest Score	44	68
Highest Score	76	96
Mean	58.5	83.68

Source: Data processing from Excel

Table 2 shows a significant improvement in student learning outcomes. The pretest mean score was 58.5, with the lowest score at 44 and the highest at 76. After the PBL intervention, the posttest mean increased to 83.68, with the lowest score at 68 and the highest at 96. The increase in scores demonstrates the positive impact of the PBL model on student learning.

Table 3
Normality Test Results (Shapiro-Wilk)

Data	Shapiro-Wilk Sig.	Significance Level	Description
Pretest	0.124	0.05	Normal Distribution
Posttest	0.412	0.05	Normal Distribution

Source: IBM SPSS Statistics 24

Table 3 shows that both the pretest significance value (0.124) and posttest significance value (0.412) are greater than 0.05, indicating that both data sets are normally distributed. This meets the prerequisite for parametric hypothesis testing.

Table 4
Paired Samples T-Test Results

Pair	N	Correlation	Sig. (2-tailed)	t-calculated	df	Conclusion
Pretest & Posttest	25	0.926	0.000	32.047	24	Ha Accepted

Source: Data Output SPSS 24

B. Discussion

The results of data analysis show that the implementation of the Problem-Based Learning (PBL) model had a significant positive effect on the IPAS learning outcomes of fourth-grade students at SD Negeri 091262 Karang Sari. The paired samples t-test yielded a significance value of 0.000 (< 0.05) and t-calculated of 32.047, which is greater than t-table of 2.067 at df = 24 and significance level of 0.05. Therefore, Ha is accepted and Ho is rejected.

The average pretest score of 58.5 increased substantially to 83.68 on the posttest. This significant improvement demonstrates the effectiveness of PBL in enhancing student learning outcomes. Before the PBL intervention, most students (64%) had not yet achieved the KKTP score of 70. After the implementation, all 25 students (100%) achieved scores above 70.

The effectiveness of PBL in this study is aligned with the core characteristics of the model. According to Fathurrohman (2015), PBL uses authentic, unstructured real-world problems as the context for developing problem-solving skills and critical thinking. When applied to the topic 'Now I Become More Orderly,' students were actively engaged in identifying problems related to rules and regulations in their daily lives, discussing solutions in small groups, and presenting their findings to the class.

This finding is consistent with Novita (2024), who found that PBL effectively improved learning outcomes in Social Studies (IPS) for Grade IV students at SD Negeri 064967 Medan Timur. Similarly, Paratiwi and Ramadhan (2023) demonstrated that PBL increased both the activity and learning outcomes of Grade V students in IPAS learning at an elementary school in Pekanbaru. Furthermore, Uswatun Hasana et al. (2023) confirmed the positive effect of PBL on IPAS learning outcomes in elementary school settings.

The PBL model encourages students to collaborate, think critically, and apply knowledge to authentic contexts. This approach transforms the learning environment from a teacher-centered one to a student-centered one, which is particularly suitable for the integrated nature of the IPAS subject that combines natural sciences and social sciences. By experiencing learning through problem-solving, students develop a deeper and more meaningful understanding of the material.

The normality test results confirm that both pretest (sig. = 0.124) and posttest (sig. = 0.412) data are normally distributed, validating the use of parametric statistics. The high reliability coefficient of the instrument (Cronbach's Alpha = 0.887) further strengthens the quality and trustworthiness of the research data.

CONCLUSION

Based on the research results, it can be concluded that the Problem-Based Learning (PBL) model has a significant positive effect on the IPAS learning outcomes of fourth-grade students at SD Negeri 091262 Karang Sari. This is evidenced by the increase in the mean score from 58.5 (pretest) to 83.68 (posttest), and by the hypothesis testing result showing t-calculated (32.047) > t-table (2.067) with a significance value of 0.000 < 0.05. It is recommended that teachers adopt PBL as an innovative learning model for IPAS and other subjects, and that schools provide adequate facilities to support its implementation.

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