

The Effect of Problem Based Learning (PBL) Learning Model on Science Learning Outcomes at Grade V of State Elementary School 094126 Naga Dolok

Frendi Martuahman Damanik^{1*}, Muktar Bahrudin Panjaitan², Theresia Monika Siahaan³

^{1,2,3}Department of Elementary School Teacher Education Study, Universitas HKBP Nommensen Pematangsiantar, Indonesia

*Corresponding author's email: frendimartuahman@gmail.com

Abstract

This study aimed to determine the effect of the Problem Based Learning (PBL) model on the IPAS learning outcomes of Grade V students at SD Negeri 094126 Naga Dolok. The background of this research was the low learning outcomes and limited student participation during the IPAS learning process, which were mainly caused by the use of conventional teacher-centered learning methods. Therefore, an innovative and student-centered learning model was needed to improve students' understanding and engagement in learning. This study employed a quantitative approach using a pre-experimental design with the One Group Pretest-Posttest Design model. The population and sample consisted of all 28 Grade V students at SD Negeri 094126 Naga Dolok, selected using total sampling techniques. Data were collected through pretest and posttest instruments, while data analysis was conducted using a paired-sample t-test to determine the significance of differences before and after treatment. The results showed that the average pretest score was 68.52, indicating that students' initial learning outcomes were still relatively low. After the implementation of the Problem Based Learning model, the average posttest score increased significantly to 90.26, and all students achieved the Minimum Completeness Criteria (KKM). The paired-sample t-test analysis revealed a significance value of $0.000 < 0.05$, indicating a significant effect of the Problem Based Learning model on students' learning outcomes. In conclusion, the Problem Based Learning model effectively improved the IPAS learning outcomes of Grade V students at SD Negeri 094126 Naga Dolok. In addition, the model enhanced students' active participation, critical thinking, and collaborative learning skills during the learning process.

Keywords: Problem Based Learning, IPAS Learning Outcomes, Elementary Education, Critical Thinking, Student Engagement

INTRODUCTION

The development of the Industrial Revolution 4.0 and the transition toward Society 5.0 demand major transformations in the field of education. Twenty-first-century education no longer focuses solely on cognitive achievement but also emphasizes the development of critical thinking, problem-solving, creativity, communication, and collaboration skills. In this context, innovation in learning has become essential. Teachers are no longer expected only to deliver information, but also to act as facilitators who create active, constructive, and enjoyable learning environments, in line with the Merdeka Curriculum, which promotes character building and higher-order thinking skills.

The Merdeka Curriculum, which has been implemented at various educational levels in Indonesia, encourages the integration of 21st-century skills into the learning process, including in the Natural and Social Sciences (IPAS) subject at the elementary school level. IPAS is an integrative subject combining natural and social sciences that requires students to observe, investigate, solve real-life problems, and present their findings logically. However, the reality shows that students' learning outcomes in IPAS are still below expectations, as reflected in both national and local data. Based on the National Assessment conducted by the Ministry of Education, Culture, Research, and Technology, only about 46% of students achieved the Minimum Completeness Criteria (KKTP) in science literacy assessments related to IPAS. Similar conditions were found at SDN 094126 Naga Dolok. Based on the results of the first-semester evaluation in the 2024/2025 academic year, only 11 out of 23 Grade V students, or approximately 39.2%, achieved the KKTP in the IPAS subject. These findings indicate a serious educational challenge that requires immediate attention.

Table 1. Weekly Test Scores of Grade V Students at SD Negeri 094126 Naga Dolok

KKM	Grade	Number of Students	Percentage	Category
>70	V	8	39.2%	Passed
<70		15	60.8%	Not Passed
Total		23	100%	

Source: SD Negeri 094126 Naga Dolok



The low learning outcomes in IPAS are closely related to students' low motivation and limited active participation during the learning process. Classroom observations conducted by the teacher revealed that most students tended to be passive, rarely participated in discussions, seldom asked questions, and showed low initiative in completing tasks that required critical and analytical thinking. When students were given activities involving exploration or problem-solving, many appeared confused or reluctant to participate actively.

This condition is further aggravated by the use of conventional teacher-centered learning methods, in which teachers dominate the learning process through one-way lectures and repetitive exercises. Such approaches tend to position students as passive recipients of information without opportunities to explore ideas, ask questions, or engage in contextual learning activities. As a result, students become less intellectually and emotionally challenged and show lower motivation to learn independently or collaboratively. In fact, IPAS as an integrative subject requires active student involvement in observing phenomena, exploring relationships between concepts, and solving real-world problems in their environment. To overcome these problems, a more innovative, contextual, and student-centered learning approach is needed. One learning model considered highly suitable is Problem Based Learning (PBL). PBL is designed to encourage students to become active learners by engaging directly in the learning process through solving problems related to real-life situations. In this model, students are encouraged to observe, ask questions, discuss in groups, search for relevant information, and propose solutions to problems. This process not only develops students' curiosity and critical thinking skills but also improves communication and collaboration abilities.

Conceptually, Problem Based Learning is aligned with the goals of 21st-century education and the direction of the Merdeka Curriculum because it develops essential competencies such as creativity, communication, collaboration, and digital literacy. Previous studies have demonstrated the effectiveness of this learning model. Wardani and Wati (2024) found that the implementation of PBL assisted by animated video media effectively improved students' IPAS learning outcomes. Widuri (2024) also reported that PBL significantly improved Grade V students' IPAS achievement, with an average score increase of 18.4 points after the intervention. Similarly, Wibowo and Cahaya (2024) concluded that PBL effectively enhanced students' critical thinking skills and learning outcomes through active discussion and environmental exploration, while Fauziah (2024) stated that integrating PowerPoint media into PBL helped students better understand learning contexts and improve concentration during lessons.

Although many studies have shown the effectiveness of Problem Based Learning, most previous research has been conducted in urban schools with adequate facilities. Research in



rural areas such as Naga Dolok, which face limitations in educational resources and infrastructure, remains limited. In addition, many previous studies mainly employed descriptive or simple quasi-experimental methods without strong statistical analysis. Therefore, this study aims to address these gaps by applying a more rigorous quantitative approach to examine how Problem Based Learning not only improves IPAS learning outcomes but also influences students' motivation and active participation in the learning process.

RESEARCH METHODS

1. Research Design

This study employed a quantitative approach using a quasi-experimental method. A quantitative approach was selected because it enables the collection of numerical data that can be statistically analyzed to test previously formulated hypotheses. In this study, the relationship between the Problem Based Learning (PBL) model as the independent variable and students' IPAS learning outcomes as the dependent variable was measured systematically and objectively.

This research is not only technically and practically relevant but also contributes significantly to educational research. The study serves as an empirical validation of the effectiveness of the Problem Based Learning model in improving students' IPAS learning outcomes and provides a reference for the development of innovative learning strategies within the curriculum. Theoretically, this study strengthens the constructivist learning approach, which emphasizes students' active involvement in solving real-world problems. The findings are expected to contribute to the development of more meaningful, contextual, and competency-oriented IPAS learning strategies.

This study used a pre-experimental design with the One Group Pretest-Posttest Design model, in which only one group of students was involved as the research subject. The group was given an initial test (pretest), followed by treatment through the implementation of the Problem Based Learning model, and finally a posttest to measure changes in students' learning outcomes. This design is appropriate for classroom-based research where randomization of subjects is difficult to implement. According to Sugiyono (2019), this design belongs to pre-experimental research because it does not involve a control group; however, it remains effective in measuring the impact of a treatment through comparisons of pretest and posttest scores.

Table 2. One Group Pretest-Posttest Design

Group	Pretest	Treatment (X)	Posttest
Experimental	O1	X	O2

Source: Sugiyono (2019)



Description:

O1 : Pretest (test before treatment)

X : Treatment using the Problem Based Learning (PBL) model

O2 : Posttest (test after treatment)

In this study, the independent variable was the Problem Based Learning model, which emphasizes learning through real-world problems as a stimulus for investigation and collaborative learning. Meanwhile, the dependent variable was students' learning outcomes in the IPAS subject, measured using objective multiple-choice tests. The research process was conducted systematically, beginning with problem identification, literature review, instrument development (pretest-posttest and observation sheets), implementation of PBL-based learning, and data analysis using a paired-sample t-test. The analysis aimed to determine the differences between pretest and posttest scores to evaluate the effectiveness of the learning model.

2. Research Location and Time

This study was conducted at SD Negeri 094126 Naga Dolok, located in Tapian Dolok District, Simalungun Regency, North Sumatra Province. The research was carried out in Grade V of SD Negeri 094126 Naga Dolok during the first semester of the 2025/2026 academic year.

3. Population and Sample

According to Sugiyono (2019), population refers to a generalized area consisting of objects or subjects with specific characteristics determined by the researcher for study and conclusion drawing. The population in this study consisted of all Grade V students at SD Negeri 094126 Naga Dolok, totaling 28 students, including 13 male students and 15 female students. A sample is a part of the population possessing certain characteristics of that population (Sugiyono, 2019). This study employed total sampling, meaning all members of the population were included as research samples. The sample consisted of all 28 Grade V students at SD Negeri 094126 Naga Dolok during the 2024/2025 academic year, comprising 13 male and 15 female students.

The sampling technique used was non-probability sampling, specifically saturated sampling, where all members of a relatively small population are selected as the sample. According to Sugiyono (2019), saturated sampling is appropriate when the population size is fewer than 30 individuals or when the researcher intends to minimize sampling error.



Table 3. Sample of Grade V Students at SD Negeri 094126 Naga Dolok

No.	Grade	Total Students	Gender	Research Subjects
1	V	28	Male: 13 Female: 15	28

Source: SD Negeri 094126 Naga Dolok

4. Research Variables

This study involved two variables: the independent variable (X) and the dependent variable (Y).

a. Independent Variable (X)

The independent variable in this study was the Problem Based Learning (PBL) model.

b. Dependent Variable (Y)

The dependent variable in this study was students' learning outcomes in the IPAS subject.

5. Data Collection Techniques

Data collection is a crucial stage in research because the accuracy of the collected data determines the credibility of the research findings. Therefore, data collection procedures must be conducted carefully and in accordance with established research methodology principles. Sugiyono (2019) states that strategic procedures are required in research to reveal phenomena accurately and reliably.

To obtain valid and accurate data, this study employed the following data collection techniques:

a. Pretest

The pretest was administered to measure Grade V students' initial abilities in the IPAS subject before the implementation of the Problem Based Learning model.

b. Posttest

The posttest was conducted after the implementation of Problem Based Learning to determine the extent of improvement in students' learning outcomes.

c. Documentation

Documentation was used to complement the research data by providing visual evidence of the learning process. Documentation included photographs of classroom activities using the PBL model and corrected answer sheets from the pretest and posttest.

6. Data Analysis Technique

Data analysis is the process of systematically organizing and interpreting data obtained from observations, field notes, and documentation by categorizing data, synthesizing information, identifying patterns, and selecting meaningful findings for further interpretation (Sugiyono, 2019).

The hypothesis in this study was tested using the t-test. The paired-sample t-test was applied to determine whether the Problem Based Learning model significantly affected students' learning outcomes. The criteria for determining significance were as follows:

- If the significance probability value > 0.05, H_a is accepted.
- If the significance probability value < 0.05, H_o is rejected.

$$\text{t-test Formula: } t_{\text{hitung}} = \frac{Md}{\sqrt{\frac{\sum x^2 d}{N(N-1)}}}$$

Description:

Md = Mean difference between pretest and posttest scores

X1 = Learning outcomes before treatment (pretest)

X2 = Learning outcomes after treatment (posttest)

D = Deviation of each subject

$\sum x^2 d$ = Sum of squared deviations

N = Number of research subjects

RESULTS

This research was conducted in fifth-grade students at SD Negeri 094126 Naga Dolok during the 2025/2026 academic year, from April 27 to April 29, 2026. The population used in this study was all fifth-grade students at SD Negeri 094126 Naga Dolok. This section will describe the results of the study. These results are the conclusions drawn based on the collected data and the data analysis conducted. This study aims to determine the "Effect of the Problem-Based Learning (PBL) Model on the Science Learning Outcomes of Fifth-Grade Students at Naga Dolok Public Elementary School 094126." In the initial phase, the average pretest score was 68.52, indicating that students' initial abilities were still relatively low, and most had not yet achieved the Minimum Completion Criteria (KKM). This was due to the previous learning process being conventional, resulting in students being less active and lacking a deep understanding of the material.

After being treated using the Problem-Based Learning (PBL) model, the average posttest score increased to 90.26, indicating that all students successfully achieved learning completion.



This improvement indicates that the Problem-Based Learning (PBL) model is able to provide a more meaningful learning experience for fifth-grade students at Naga Dolok Public Elementary School 094126.

The results of the hypothesis test using a paired sample t-test showed a significance value of $0.000 < 0.05$, indicating a significant difference between pre- and post-treatment scores. Furthermore, the average increase of 21.30 points indicates This study found that improved learning outcomes did not simply occur by chance, but were a direct result of the implementation of the learning model.

This improvement in learning outcomes can be explained by the characteristics of the Problem-Based Learning (PBL) model, which emphasizes problem-based learning. In this model, students are encouraged to actively think, analyze problems, and seek solutions both independently and in groups. This aligns with constructivist theory, which states that knowledge is actively constructed by students through learning experiences. Furthermore, the Problem-Based Learning (PBL) model also increases student engagement in the learning process. Students not only receive information from the teacher but also directly participate in the process of discovering concepts. Thus, students' understanding of the material becomes deeper and more lasting.

The results of this study also support previous findings that the Problem-Based Learning (PBL) model is effective in improving students' learning outcomes, critical thinking skills, and problem-solving skills. Therefore, the implementation of the Problem-Based Learning (PBL) model not only improves cognitive learning outcomes but also develops higher-order thinking skills.

DISCUSSION

The results of this study indicate that the implementation of the Problem Based Learning (PBL) model had a significant positive effect on the IPAS learning outcomes of Grade V students at SD Negeri 094126 Naga Dolok. This finding is supported by the substantial increase in students' posttest scores compared to their pretest scores after the application of the PBL model. The improvement demonstrates that student-centered and problem-oriented learning approaches can effectively enhance students' understanding of IPAS concepts. The pretest results showed that students' initial abilities were still relatively low, with an average score of 68.52. Most students had not yet achieved the Minimum Completeness Criteria (KKM). This condition indicates that the learning process previously implemented was less effective in facilitating students' conceptual understanding. Conventional learning methods, which tend to





rely heavily on teacher explanations and passive student participation, limited students' opportunities to actively construct knowledge and engage in meaningful learning experiences.

After the implementation of the Problem Based Learning model, students' average posttest score increased significantly to 90.26, and all students successfully achieved learning mastery. This improvement reflects the effectiveness of the PBL model in helping students understand learning materials more comprehensively. Through problem-solving activities, students became more actively involved in the learning process, enabling them to connect theoretical concepts with real-life situations. As a result, students were better able to retain and apply the knowledge they acquired during instruction.

The findings of the paired-sample t-test further strengthen the conclusion of this study. The significance value of 0.000, which is lower than 0.05, indicates a statistically significant difference between students' pretest and posttest scores. In addition, the average increase of 21.30 points confirms that the improvement in learning outcomes was not incidental but was directly influenced by the implementation of the Problem Based Learning model. Therefore, it can be concluded that PBL was effective in improving students' IPAS learning achievement. The improvement in students' learning outcomes can be explained through the characteristics of the Problem Based Learning model itself. PBL emphasizes learning through authentic and contextual problems that encourage students to think critically, analyze situations, and develop appropriate solutions independently and collaboratively. This learning process aligns with constructivist learning theory, which states that knowledge is actively constructed by learners through direct experience and interaction with their environment. By actively participating in problem-solving activities, students become more engaged and motivated to learn.

Furthermore, the Problem Based Learning model contributed positively to students' classroom participation and engagement. During the learning process, students were encouraged to discuss ideas, ask questions, collaborate with peers, and present solutions to problems. Such activities created a more interactive and meaningful learning atmosphere compared to traditional teaching methods. Students were no longer passive recipients of information but became active participants in constructing their own understanding. This active involvement helped students develop greater confidence, communication skills, and collaborative abilities. The findings of this study are consistent with previous studies that reported the effectiveness of Problem Based Learning in improving learning outcomes and higher-order thinking skills. Research conducted by Wardani and Wati (2024), Widuri (2024), and Wibowo and Cahaya (2024) also demonstrated that the PBL model significantly improves students' conceptual understanding, critical thinking skills, and problem-solving abilities in IPAS



learning. The consistency between this study and previous research further strengthens the argument that PBL is an effective instructional model for elementary school learning contexts.

Overall, this study demonstrates that the Problem Based Learning model not only improves students' cognitive achievement in IPAS but also fosters active learning, critical thinking, collaboration, and problem-solving skills. Therefore, the implementation of PBL is highly recommended as an innovative and student-centered learning strategy to improve the quality of IPAS learning at the elementary school level, particularly in schools facing challenges related to student engagement and learning achievement.

CONCLUSION

Based on the research discussion in the previous section, the following conclusions can be drawn:

1. The application of the Problem-Based Learning (PBL) model improves fifth-grade students' science learning outcomes. This is evident in the increase in students' average score from 68.52 in the pretest to 90.26 in the posttest.
2. The results of the hypothesis test, which showed a calculated t-value of 18.504, which is greater than the t-table of 1.717, with a significance level of 0.000, less than 0.05, indicate that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. This indicates a significant effect of the implementation of the Problem-Based Learning (PBL) model in improving students' science learning outcomes.

REFERENCES

- Arends, R. I. (2021). *Learning to Teach* (11th ed.). McGraw-Hill Education.
- Arends, R. I., & Tan, O. S. (2020). *Learning to Teach* (11th ed.). Cengage Learning Asia.
- Arikunto, S. (2020). *Prosedur Penelitian: Suatu Pendekatan Praktik* (Revisi). Rineka Cipta.
- Bestiyana, A. (2024). PBL Menggunakan Media Wordwall terhadap Motivasi dan Hasil Belajar IPAS. *Jurnal Inovasi Pendidikan Dasar*, 9(1), 45–56.
- Cahyati, S. S., Tukiyo, T., Saputra, N., Julyanthry, J., and Herman, H. (2022). How to Improve the Quality of Learning for Early Childhood? An Implementation of Education Management in the Industrial Revolution Era 4.0. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 5437-5446. DOI: 10.31004/obsesi.v6i5.2979
- Creswell, J. W., & Creswell, J. D. (2020). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications.
- Dewi, F., & Hardiansyah, R. (2025). Pengaruh Pendekatan Kontekstual terhadap Hasil Belajar

- IPAS. *Jurnal Pendidikan Ilmu Sosial Dan Alam*, 7(2), 101–115.
- Fatmawati, E., Saputra, N., Ngongo, M., Purba, R., and Herman, H. (2022). *An Application of Multimodal Text-Based Literacy Activities in Enhancing Early Children's Literacy*. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 5127-5134. DOI: 10.31004/obsesi.v6i5.278
- Fauziah, L. (2024). *Efektivitas Media PowerPoint dalam Model PBL terhadap Hasil Belajar IPAS*. *Jurnal Edukasi Sains SD*, 5(1), 23–30.
- Gaol, R. L., Manullang, E. B., Silalahi, A. E. L., Bondar, R. S., Lubis, J., and Herman, H. (2023). Analisis Penerapan Metode Bermain Peran Untuk Meningkatkan Toleransi Siswa dalam Pembelajaran IPS di SDN 116253 Lorong Sidodadi. *Jurnal Pendidikan Tambusai*, 7(1), 914-919
- Hadiyanti, S. (2025). *Model Inovatif dalam Kurikulum Merdeka*. *Jurnal Ilmiah Pendidikan Dasar*, 12(1), 12–22.
- Joyce, B., Weil, M., & Calhoun, E. (2021). *Models of Teaching* (10th ed.). Pearson Education.
- Lestari, D., Jamil, M., & Karmajaya, R. (2025). *Penerapan PBL dalam Meningkatkan Hasil Belajar IPAS*. *Jurnal Pendidikan Dasar Nusantara*, 9(1), 77–89.
- Listianingrum, R. (2024). *Model Pembelajaran Terpadu dalam Kurikulum Merdeka*. *Jurnal Inovasi Kurikulum*, 15(1), 33–44.
- Manalu, R. J., Tumanggor, E. J., Sidauruk, M. A. B., Sitorus, H. A., Damanik, G. T. I., and Herman, H. (2023). Pengaruh Penggunaan Model Pembelajaran Cooperative Script dalam Pelajaran Bahasa Indonesia Kelas V di SD Negeri 056915 Perumnas Batu 6 dalam Keterampilan Menyimak. *Journal on Teacher Education*, 4(3), 204-211. <https://doi.org/10.31004/jote.v4i3.12245>
- Mintarsih, W. (2025). *Tantangan Pembelajaran IPAS di Sekolah Dasar*. *Jurnal Pendidikan Dasar Indonesia*, 8(2), 55–64.
- Nadyah, I. (2025). *Media Interaktif Canva pada Pembelajaran IPAS Menggunakan Model PBL*. *Jurnal Media Pembelajaran Inovatif*, 10(1), 15–26.
- Nasution, T., Afrianti, D., Tukiyo, Sulistyani, and Herman. (2022). *Critical Discourse Analysis in the Classroom: A Critical Language Awareness on Early Children's Critical Thinking*. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(5), 4992-5002. DOI: 10.31004/obsesi.v6i5.2951
- Permatasari, Y., Ramadhani, R., & Yusuf, A. (2025). *Integrasi IPAS dalam Kurikulum Merdeka*. *Jurnal Kurikulum Dan Pembelajaran Dasar*, 11(2), 120–132.
- Pohan, M. A., Tanjung, R. A., & Restu, Y. (2024). *Development of PBL-Based Multimedia to Improve Learning Outcomes*. *Indonesian Journal of Primary Education*, 6(2), 88–97.
- Pramesti, N. A. (2024). *Pengembangan Media Wordwall Berbasis PBL pada IPAS*. *Jurnal Teknologi Pendidikan Dasar*, 8(1), 50–60.

- Pratiwi, S., & Hasanah, U. (2025). Hasil Belajar IPAS dan Keterampilan Reflektif Siswa. *Jurnal Sains Terpadu SD*, 7(2), 105–116.
- Purba, N., Sipayung, R. W., Rahmawati, R., Siagian, B. A., Herman, H., Saragi, C. N., and Fatmawati, E. (2024). An Implementation of Project-Based Learning (PBL) Teaching Model in Improving Early Child's Critical Thinking Skill. *Library Progress International*, 44(3), 90-96. <https://bpasjournals.com/library-science/index.php/journal/article/view/313>
- Purba, N., Wondal, R., Yuliantina, I., Sagala, A. C. D., Budiarti, E., Susanti, D., and Herman, H. (2026) Bringing Numbers to Life through Numeracy Literacy: Practical Use of E-Comic Media in Early Education. *Studies in Media and Communication*, 14(1), 15-25. <https://doi.org/10.11114/smc.v14i1.7933>
- Raihan, H. (2025). Tujuan IPAS dalam Kurikulum Merdeka. *Jurnal Pendidikan Sains Dan Sosial*, 4(1), 91–103.
- Ravitch, S. M., & Riggan, M. (2016). *Reason & rigor: How conceptual frameworks guide research*. Sage publications.
- Safitri, N., Maulida, H., & Rasyid, A. (2025). Faktor-Faktor yang Mempengaruhi Hasil Belajar IPAS. *Jurnal Ilmiah Pendidikan*, 9(1), 40–52.
- Santika, T. (2025). Karakteristik dan Penerapan PBL di Sekolah Dasar. *Jurnal Model Pembelajaran Inovatif*, 6(1), 30–42.
- Slavin, R. E. (2021). *Educational Psychology: Theory and Practice (13th ed.)*. Pearson.
- Sudjana, N. (2021). *Penilaian Hasil Proses Belajar Mengajar*. Remaja Rosdakarya.
- Sugiyono. (2019). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Tan, O. S. (2020). *Problem-Based Learning Innovation: Using Problems to Power Learning in the 21st Century*. Cengage Learning Asia.
- Ulia, R., Hamzah, H., & Karim, N. (2025). Pengaruh Faktor Internal dan Eksternal terhadap Hasil Belajar. *Jurnal Evaluasi Pendidikan Dasar*, 10(1), 70–83.
- Wardani, Y., & Wati, L. (2024). Pengaruh PBL Berbasis Video terhadap Hasil Belajar IPAS. *Jurnal Pembelajaran IPA SD*, 5(2), 98–110.
- Wibowo, T., & Cahaya, P. (2024). Penerapan PBL untuk Meningkatkan Hasil Belajar dan Keterampilan Berpikir Kritis. *Jurnal Pendidikan Dasar Berbasis Riset*, 8(1), 77–89.
- Widuri, M. (2024). Implementasi Model Problem Based Learning dalam Pembelajaran IPAS. *Jurnal Inovasi Pendidikan Dasar*, 9(2), 45–60