Improving Student Learning Outcomes in Science and Science Subjects Through a Problem-Based Learning Model for Class V.A SD Negeri 27 Palembang

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Dikirim: 02-09-2024; Direvisi: 08-09-2024; Diterima: 09-09-2024

Abstract: This study aims to improve the learning outcomes of students in the subject of Natural and Social Sciences (IPAS) by applying the Problem-Based Learning (PBL) learning model in class V.A SD Negeri 27 Palembang. This research used the Classroom Action Research (CAR) method which was carried out in three cycles. Each cycle involved planning, implementation, observation, and reflection. For data analysis, both quantitative and qualitative approaches were employed. The results showed a significant increase in students' learning outcomes in Chapter 2 "Harmony in Ecosystems". The average score of students increased from 62.6 in cycle I with 62% learning completeness, to 70.1 in cycle II with 70% learning completeness, and reached 83.3 in cycle III with 83% learning completeness. Thus, the PBL learning model proved effective in improving student learning outcomes in IPAS subjects in class V.A SD Negeri 27 Palembang.

Keywords: Student learning outcomes; IPAS subject; Problem-Based Learning Model

Abstrak: Penelitian ini memiliki tujuan guna meningkatkan hasil belajar siswa pada mata pelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) dengan menerapkan model Problem Based Learning (PBL) di kelas V.A SD Negeri 27 Palembang. Metode yang digunakan dalam penelitian ini adalah PTK, yang dilakukan dalam tiga siklus. Setiap siklus terdiri dari tahapan perencanaan, pelaksanaan, observasi, dan refleksi. Untuk menganalisis data menggunakan pendekatan kuantitatif dan kualitatif digunakan. Hasil penelitian menunjukkan adanya peningkatan signifikan dalam hasil belajar siswa pada Bab 2 "Harmoni dalam Ekosistem". Rata-rata nilai siswa meningkat dari 62,6 pada siklus I dengan tingkat ketuntasan belajar sebesar 62%, menjadi 70,1 pada siklus II dengan ketuntasan 70%, dan mencapai 83,3 pada siklus III dengan ketuntasan 83%. Dengan demikian, penerapan model pembelajaran PBL terbukti efektif dalam meningkatkan hasil belajar siswa pada mata pelajaran IPAS di kelas V.A SD Negeri 27 Palembang**.**

Kata Kunci: hasil belajar siswa; mata pelajaran IPAS; model problem based learning

INTRODUCTION

In the 21st century, education has evolved into a paradigm that prioritizes the development of skills essential for navigating contemporary challenges. This modern educational approach focuses on digital literacy, critical thinking, communication, collaboration, and creativity, emphasizing not just theoretical knowledge but also the practical application of this knowledge in real-world and complex situations (Rizky, Pratama, et al., 2023). It fosters an environment where learners are encouraged to engage in lifelong learning and adaptability, crucial for thriving in a dynamic world. Furthermore, this educational model highlights the importance of social skills, preparing students to effectively handle both opportunities and challenges. By

integrating these competencies, 21st-century education aims to equip learners with the tools necessary for success in an increasingly interconnected and rapidly evolving society. This comprehensive approach not only enhances academic achievement but also promotes personal and professional growth, ensuring that students are well-prepared for future endeavors.

21st-century education necessitates a revision of the primary school curriculum to ensure that students acquire not only foundational knowledge but also the essential skills required for thriving in today's dynamic world. The primary school curriculum should be tailored to foster the early development of critical thinking, creativity, communication, and collaboration skills, all crucial for addressing global challenges. Additionally, contemporary education places a strong emphasis on digital literacy, integrating technology seamlessly into the teaching and learning process (Smaldino et al., 2014).

The curriculum designed for primary schools aims to prepare students for advanced education. Currently, the curriculum in use is the 2013 Curriculum (K-13), as outlined in Ministry of Education and Culture Regulation No. 57 of 2014 concerning the 2013 Elementary School Curriculum. Teachers need to be both skilled and innovative in their teaching methods to ensure that students grasp the material effectively. Teachers should employ a variety of media, models, methods, and strategies to make lessons engaging and prevent student disengagement.

Effective education relies on a well-executed learning process, which is influenced by various factors including teachers, students, the learning environment, curriculum, and infrastructure. Among these, the teacher's role is particularly crucial. According to (Zega & Zebua, 2023) the effectiveness of teaching is pivotal to achieving educational goals. Competent teachers are essential for facilitating a successful learning experience, ensuring that instruction is both effective and engaging.

In class V.A. at SD Negeri 27 Palembang, one of the thematic units in Chapter 2, "Harmony in the Ecosystem." Observations indicate that student learning outcomes for this chapter are suboptimal. Many students appear bored and disinterested during lessons, which can be attributed to the ineffective learning models currently in use. Interest plays a crucial role in motivating students, as it encompasses elements such as pleasure, willingness, awareness, and attention (Rizky, Maryamah, et al., 2023).

Traditional learning methods in class V.A. often fall short in optimizing student potential, particularly in fostering active participation and deep understanding of the material. This underscores the need for innovative teaching methods that engage students more effectively and spark their interest in learning (Rina Dwi Muliani & Arusman, 2022; Rizky, Ihwanah, et al., 2023; Safitri & Nurmayanti, 2018). The Problem-Based Learning (PBL) model has been selected as a solution, as it has demonstrated success in enhancing critical thinking, problem-solving, and collaboration skills among students (Anjani et al., 2021; Maulida et al., 2020; Paloloang et al., 2020). By implementing PBL, the goal is to make learning more engaging and to improve student outcomes through a more interactive and applied approach.

The problem-Based Learning (PBL) model is designed to engage students in solving real-world problems, which helps them acquire relevant knowledge and develop problem-solving skills simultaneously (Anjani et al., 2021; Maulida et al., 2020; Noviati, 2023). By employing PBL, it is anticipated that students will experience

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increased curiosity and critical thinking abilities, which in turn will boost their motivation to learn. Motivated students are more likely to actively engage in their studies and strive for better outcomes. This model aims to enhance student learning results and foster a positive shift in students' attitudes towards learning.

The effectiveness of the PBL model in improving student learning outcomes is well-documented, as it promotes active involvement through real problem-solving scenarios (Harahap, 2021). PBL positions students at the heart of the learning process, requiring them to engage in critical thinking, analyze information, and collaborate to find solutions. By addressing relevant and meaningful problems, PBL not only deepens students' conceptual understanding but also enhances higher-order thinking skills and adaptability (Agustin, 2013; Noviati, 2023). This student-centered approach ensures that learners connect theoretical concepts with practical applications, thus increasing motivation and engagement. Research supports the notion that PBL can significantly boost students' motivation and learning outcomes.

With the implementation of the Problem-Based Learning model, it is expected that the learning outcomes for students in class V.A at SD Negeri 27 Palembang, particularly in Chapter 2, "Harmony in the Ecosystem," will improve. This approach aims to alleviate student boredom, enhance attention, and increase interest in the subject matter.

The purpose of this research is to examine the effectiveness of the Problem-Based Learning (PBL) model in improving student learning outcomes in science subjects for Class V.A. at SD Negeri 27 Palembang. Specifically, the study aims to explore how the PBL model enhances students' understanding of scientific concepts, promotes critical thinking, and fosters problem-solving skills. The research also seeks to assess the impact of PBL on student engagement and motivation during science lessons. Through this study, it is expected that the PBL approach can be shown as a viable instructional method to enhance learning experiences and outcomes in elementary science education.

The research is guided by several key questions. First, how does the use of the Problem-Based Learning model influence student learning outcomes in science subjects? Second, in what ways does PBL improve students' critical thinking and problem-solving skills? Lastly, how does the PBL model affect student participation and engagement in the classroom? These research questions aim to uncover the broader educational benefits of PBL in promoting a deeper understanding of science while making learning more interactive and student-centered. Given this background, the researcher is inspired to conduct a classroom action research project titled "Improving Student Learning Outcomes in Science and Technology Subjects through a Problem-Based Learning Model for Class V.A SD Negeri 27 Palembang."

RESEARCH METHODS

Classroom action research involves the systematic observation of teaching activities that are intentionally implemented and occur simultaneously within the classroom (Hatijah, 2023; Intan et al., 2024). This type of research requires educators to make deliberate efforts to enhance the learning process. It is crucial to recognize that classroom action research extends beyond routine teaching; it aims to introduce specific interventions to achieve significant improvements in teaching and learning outcomes. The research is conducted in multiple cycles, each designed to address and

improve the targeted factors. Each cycle follows a structured process consisting of (1) Planning, (2) Implementation of Action, (3) Observation, and (4) Reflection (Anjani et al., 2021). Through this iterative approach, researchers and educators can continually assess and refine their strategies, ensuring that each intervention leads to measurable improvements in student learning and classroom dynamics. This methodical process not only helps in achieving the desired educational goals but also contributes to the overall enhancement of teaching practices.

The subject of this class action research is class V.A. students of SD Negeri 27 Palembang which consists of 16 students, 7 female students, and 9 male students. This class action research was carried out in class V of SD Negeri 27 Palembang which is located at Lr. Mufakat Jl. Pembangunan No.29, RT.03/RW09, Siring Agung, Ilir Bar.1 District, Palembang City, South Sumatra. This research was carried out in the 2023/2024 school year in the odd semester. The determination of research time refers to the school's academic calendar because PTK requires several cycles that require an effective teaching and learning process in the classroom.

The researcher used Classroom Action Research (CAR), and the procedure used in this study was in the form of a cycle. This cycle does not only last one cycle but several times until it achieves the expected goals in learning, namely: (Pratiwi et al., 2018). Planning, Implementation, Observation, and Reflection

These cycles can be explained as follows. The CAR implementation plan includes the following activities, among others. Analyze core competencies and basic competencies to find out the learning material, guided by Permendikbud No. 64 of 2013 concerning Content Standards. Based on the analysis results, the teacher identifies and examines real-world problems, selects an appropriate model using a contextual approach with the Problem-Based Learning (PBL) model, and prepares various learning media for the research. These media include pictures, PowerPoint presentations, LCD projectors, laptops, and children's songs. Create learning tools (competency mapping, Learning Modules, and assessment instruments) needed in the learning implementation process, guided by Permendikbud No. 65 of 2013 concerning Process Standards. Making assessment instrument sheets, in the form of observation sheets of student activities and knowledge learning outcomes.CAR actions include procedures and actions that will be carried out in the learning process, as well as the improvement process that will be carried out. Observation includes a procedure for recording data about the process and results of the implementation of the actions taken. The use of guidelines or instruments that have been prepared in advance needs to be disclosed. Reflection describes the procedure for analyzing the results of monitoring and reflection on the process and impact of corrective actions taken, as well as criteria and action plans for the next cycle. Based on the stages in the first cycle, the activities in the next cycle are improvements in actions from the results of reflection in the first cycle. The stages in the next cycle are also the same as the first cycle starting from planning, action, observation (observation), and reflection.

To obtain the necessary data, the researcher used several techniques, which are as follows. The test technique is a procedure or way to obtain tentative data (numbers). The form of test used is a written test to determine the learning outcomes of the cognitive domain. Through this test, it will be known that the improvement of students' learning outcomes in learning science using Educandy learning media. Assessment with this technique is carried out at the end of each cycle meeting. The non-test technique used is observation, the technique is used to collect qualitative data. The

variables measured using observation techniques are students' activities and learning outcomes in thematic learning through *the problem-based learning* model. Documentation is a record of events that have passed. Documents can be in the form of writings, drawings, or monumental works of a person (Sugiyono, 2019). This study uses photo images from one cycle to the next cycle which are used to complete the observation results.

RESULTS AND DISCUSSION

This research is organized into three cycles, each focusing on different learning topics. The first cycle focused on IPAS Topic A, 'Eating and Feeding'. The second cycle addresses IPAS Topic B, "Energy Transfer Between Living Things," while the third cycle focuses on IPAS Topic C, "Harmonic Ecosystems." Throughout the learning process, student activities were observed, and a cycle evaluation test was administered at the end of each cycle. Data analysis yielded the following results:

Table 1. List of evaluation scores of Cycle I

Category	Frequency	Percentage
Not Finished	9	56,25 %
Completed	7	43,75 %
Sum	1.003	
Average	62.6	
Percentage of learning completion in the classroom	62%	

From the results of the implementation of the first cycle, 7 students were found to be complete and 9 students were not completed. The average score of the first cycle was 62.6 with a percentage of learning completion in the classroom which was 62%. From the results of this percentage, it is necessary to carry out a second cycle, because the percentage of learning completeness in the classroom has not reached 80%.

Table 2. List of evaluation scores for cycle II

Category	Frequency	Percentage
Not Finished	6	37,5 %
Complete	10	62,5 %
Sum	1.122	
Average	70.1	
Percentage of learning completion in the classroom	70%	

From the results of the implementation of the second cycle, 10 students were found to have completed and 6 students had not completed. The average score of the first cycle was 70.1 with the percentage of learning completion in the classroom which was 70%. From the results of this percentage, it is necessary to carry out the third cycle, because the percentage of learning completeness in the classroom has not reached 80%.

Table 3. List of evaluation scores for cycle III

Category	Frequency	Percentage
Not Finished	3	23,07 %
Complete	13	81,25 %
Sum	1.333	
Average	83.3	
Percentage of learning completion in the classroom	83%	

Based on the table above, it can be seen that out of 16 students, there are 13 students, or 83% who have completed their studies, and those who have not completed their studies there are 3 students or 9%. Thus, the percentage of completeness of students in cycle III has reached the set KKM.

Based on the data of the cognitive learning outcome test using *the problem-based learning* model, the average score of students with classical completeness was obtained as listed below.

Table 4. Student Learning Outcomes

Cycle	Average	Completion Percentage
I	62.6	62%
II	70.1	70%
III	83.3	83%

Based on data on student learning outcomes from cycle I, cycle II, and cycle III, shows an increase in the average learning outcomes and student learning completeness. The activeness of students in the learning process was observed using observation sheets. The recapitulation of the activeness of students per cycle can be seen in the following.

Table 5. Student Observation Results

Cycle	Activeness score	Percentage
I	316	88%
II	327	90%
III	332	92%

Based on the table above, it can be seen that there is an increase in the percentage of students who carry out activities from cycle I, cycle II to cycle III.

DISCUSSION

This classroom action research was conducted in class V.A. during the social studies lessons in Chapter 2, across three cycles. There was a noticeable increase in student engagement, with the activity rate rising from 88% in the first cycle to 90% in the second and reaching 92% in the third cycle. This enhancement in student participation is attributed to the implementation of the problem-based learning (PBL) model. As a facilitator, the researcher employed PBL to encourage active student involvement, particularly during the problem orientation phase. The active participation of students in the learning process not only fosters a deeper understanding of the material but also leads to improved academic outcomes.

This study aligns with previous research findings, which demonstrate that the Problem-Based Learning model effectively enhances student engagement in the learning process (Noviati, 2023). In Classroom Action Research (CAR), the analysis of cooperative abilities using a t-test revealed that the t-count value of 3.279 exceeded the t-table value of 2.011. Similarly, the analysis of student learning outcomes showed a t-count value of 2.854, which also surpassed the t-table value of 2.011. These results indicate a significant difference in both cooperative skills and post-test scores between the experimental and control groups. Consequently, the implementation of the project-based learning (PjBL) model, supported by the edutainment method, successfully improved the cooperative abilities and academic performance of grade IV students at SD Muhammadiyah Kudus (Pratiwi et al., 2018).

The enhancement in student performance can be linked to the implementation of the Problem-Based Learning (PBL) model, which fosters active student participation through targeted questioning during the problem orientation phase. By effectively utilizing PBL, the researchers, acting as facilitators, were able to boost student interaction and engagement. This increased involvement not only deepened students' comprehension of the material but also enhanced their academic outcomes. These findings reinforce the idea that interactive, problem-based approaches to learning can lead to substantial improvements in both student engagement and understanding, as evidenced by numerous prior studies.

The data on student scores for Chapter 2, "Harmony in the Ecosystem," from cycles I, II, and III, indicates a continuous improvement in student learning outcomes across each cycle. During the first cycle, the learning objectives were not fully met, as nine students did not achieve the minimum competency criteria (KKM). Based on the results of the cycle I, the following measures were proposed for the subsequent cycle: (1) Encouraging students to be more active in the learning process, and (2) Revising group formation rules. Cycle II was conducted with planned improvements based on reflections from Cycle I.

After implementing these changes, many students reached learning completeness, with the average student score increasing to 70.1 and the percentage of learning completeness rising to 70%. Despite these improvements, the target for learning completion was still not achieved, necessitating a third cycle. The recommendations for cycle III included: (1) Inspiring greater student enthusiasm through activities like singing during lessons, and (2) Offering special assistance to students with low scores.

In Cycle III, the average student learning outcomes improved to 83.3, with the percentage of mastery reaching 83%. This surpasses the mastery learning indicator of at least 80%. Out of the students, 13 achieved masteries while 3 did not. The enhancement in learning outcomes is attributed to the implementation of the Problem-Based Learning model. Additionally, student activity increased to 92%. These improvements reflect the effectiveness of actions and reflections based on the previous Cycles I and II. By Cycle II, students had already adapted well to the learning steps, creating a more engaging and enjoyable learning environment. This aligns with findings from prior research, which highlight the benefits of interactive learning approaches (Agustin, 2013) which found that the PBL model can enhance student learning outcomes.

CONCLUSION

The use of the Problem-Based Learning model in Class V.A. at SD Negeri 27 Palembang led to noticeable improvements in student learning outcomes for Chapter 2, "Harmony in Ecosystems." The average student scores increased from 62.6 in Cycle I, with a mastery level of 62%, to 70.1 in Cycle II, with a mastery level of 70%, and finally to 83.3 in Cycle III, with a mastery level of 83%. These results indicate that the Problem-Based Learning model effectively motivates students and enhances their engagement in the learning process. As students became more active participants, their understanding of the material improved. It is recommended that teachers consider adopting the Problem-Based Learning model as an instructional approach. To maximize its effectiveness, teachers should provide students with an introduction to

the model before lessons begin, manage classroom time efficiently to cover all learning stages, and maintain effective classroom control to ensure students' engagement and comprehension.

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