**EDUMATSAINS**
JURNAL PENDIDIKAN MATEMATIKA DAN SAINS
E-ISSN:2527-7235
Volume 10 Issue. 1, July 2025, pp 224-234
http://ejournal.uki.ac.id/index.php/edumatsains

# Improving Learning Processes and Outcomes Through the Problem Based Learning Model in Natural Science Learning in Class IV SDN 127/II Sungai Arang

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**Article Info**
Article history:
Received : July 17th 2025
Revised : July 22nd 2025
Accepted : July 28th 2025
Available online : July 31st 2025

https://doi.org/10.33541/edumatsains.v10i1.7193

**Abstract**
This study was conducted in the form of action research carried out in the classroom with a Descriptive and numerical in nature approach, participants studied of this research are 15 students of grade IV SDN 127/II Sungai Arang At the implementation stage, this research consists of two cycles carried out by the researcher. Achievements of this From the results of the study it is known that use of problem-based learning strategies models is able to improve the process and results of learning science in class IV SDN 127/II Sungai Arang. This can be seen from the teacher's teaching process in cycle I reaching 84%, in cycle 2 the teacher's teaching process increased by 94%, The improvement in the teacher teaching process from cycle I to cycle 2 increased by 10%.The learner's education process in cycle achieved 61%, then in the cycle 2 the student studying process boosted by 80%. The rise in the student learning process from cycle I to cycle II increased by 19%, Improving student learning achievement in In the first and second cycle stages with 17%. In addition, An increase also occurred in learning achievement, it is known that in cycle 1 student learning outcomes reached 60% and increased in cycle 2 by 87%, Improving student learning outcomes in cycle 1 to cycle 2 reached 27%. classroom action research using the Problem Based Learning model in learning science has been proven to improve the process and achievement of deep learning class IV on state elementary school 127/II Sungai Arang.

**Keywords:** learning process, learning outcomes, science, problem based learning.

## 1. Introduction

Elementary School Education is a basic education level that plays an important role in shaping children's personality, character, and mindset from an early age. At this stage, children are introduced to various disciplines as a foundation for pursuing the next level of education.

(Komalasari & Yakubu, 2023) state that education is a human effort to foster personality in accordance with community values, and as a means to help students develop knowledge, skills, values, attitudes, and behavioral patterns that are useful for their lives. Therefore, education should not eliminate human dignity, but rather humanize young humans.

In an effort to improve the quality of education in Indonesia, as part of the education policy, the Ministry of Education, Culture, Research and Technology launched the Independent Curriculum as a form of evaluation of the 2013 Curriculum.This curriculum is oriented towards developing students' talents and interests and provides flexibility for teachers in creating education that meets students' requirements (Madhakomala et al., 2022). One of the innovations In the implementation of the Independent Curriculum at the elementary school level ie merging integration of Natural Sciences and Social Sciences subjects into IPAS (Natural and Social Sciences), which began so that be implemented in grade III. (Marwa et al., 2023) explains that this merger is based on the characteristics of elementary school children who tend to understand things in a complete and integrated manner. IPAS learning aims to enable students to understand and manage The natural and social environment as a whole, as well as increase awareness of the surrounding environment.

Conceptually, science studies the relationship between living things and the environment and the universe, for example humans who cannot live alone because they are social beings (Meylovia & Alfin Julianto, 2023). Effective science learning is anticipated to enhance educational results and students' skills in understanding natural and social phenomena. However, based on observations conducted in class IV of SDN 127/II Sungai Arang on October 7-8, 2024, a number of problems were found in the science learning process. Teachers still predominantly use conventional methods, such as blackboards and textbooks as the only media, and the application of problem solving is not optimal. As a result, students have difficulty identifying problems, formulating solutions, and linking them to real-life contexts. The impact of this can be seen in the low motivation and achievement of students.participation in learning activities, which emergence on boredom, lack of focus, and low self-confidence to ask questions or solve problems independently.

This condition is reflected in the results of the summative IPAS scores which show that out of 15 students only 4 (26.7%) achieved the Minimum Completion Criteria (KKTP), while 11 other students (73.3%) have not completed it. Therefore, it is necessary to implement a more effective learning approach that is aligned with characteristics on students. Included in the ranks recommended The learning model in question is Problem Based Learning (PBL).This This approach involves the active involvement of students in solving real-world problems are relevant until the subject matter. PBL directs students to explore, analyze, and find solutions, both independently and in groups. According to (Suryani, 2018), PBL involves students in the scientific process to solve problems, while developing the knowledge and skills needed in everyday life.

Through the implementation of PBL in science acquiring knowledge, students are not merely invited to memorize ideas, yet also understand how to utilize them in real life. This approach is expected to has the potential to provide a fun learning experience, contextual, as well as meaningful nuances in the learning process, as well as significantly improve the Education process and outcomes of students. Grounded on this background, the researcher focused the

study on the title "Improving the Learning Process and Outcomes of Through the Problem Based Learning Model in Science Learning in Class IV SDN 127/II Sungai Arang.".

Relevant research studies include the following: Nopianti's (2018) study, "The Application of the Problem-Based Learning (PBL) Model to Improve Science Learning Outcomes for Fourth-Grade Students at State Elementary School 169 Bayondo, Tomoni District, East Luwu Regency." In this study, the average student learning outcome was 43.75% in the first cycle, and an increase of 87.5% in the second cycle. This study, similar to the one being conducted, uses the Problem-Based Learning model in science learning in fourth-grade students. The difference lies in the use of the Problem-Based Learning model to measure outcomes at State Elementary School 169 Bayondo, Tomoni District, East Luwu Regency. The study will also apply the Problem-Based Learning model to measure processes and outcomes at SDN 127/II Sungai Arang.

## 2. Methods

This study uses a method called Classroom Action Research (CAR) aims to identify problems in the learning process and provide solutions through the implementation of certain actions. According to Hopkins in (Azizah, 2021) CAR is a form of research that combines scientific procedures with real practices that occur in class, carried out going to understand and Improving the course of learning activities directly. The implementation of this research took place in several Each cycle consists of four processes, namely planning, implementation, observation, and reflection.(Evendi & Verawati, 2021).

At the planning stage, researchers prepare an action plan, including objectives, materials, approaches, media, evaluations, and learning tools such as RPP or Teaching Modules, LKPD, and evaluation instruments. On implementation stage, researchers apply the model off Learning strategies that focus on problem solving (Problem Based Learning), which is model off the process of acquiring knowledge that develops is ability to solve problems through five main syntaxes: (1) problem orientation, (2) organizing students, (3) The investigation stage, (4) the process of processing and presenting the results, and (5) analysis and assessment activities regarding learning process. This model encourages students to actively find solutions to real problems (Suryani, 2018). The next stage is observation, which is the observation process by observers such as senior teachers or colleagues. Observation aims to record learning activities, both teachers and students, according to predetermined indicators. This observation can be done with tools such as observation sheets, field notes, and documentation. Then, at the reflection stage, researchers and observers together evaluate the shortcomings and successes of the action, which then establish the foundation for the following cycle’s improvement.

This research took place in the classroom IV of SDN 127/II Sungai Arang, Bungo Dani District, Bungo Regency, Jambi Province, During the even semester of the 2024/2025 academic year. The subjects of the study were educators and 15 class IV students, while the assessment targets were  a series of activities and learning outcomes In the scope of Natural and Social Sciences (IPAS) through the PBL model. Data collection techniques were carried out through tests, observations, and documentation. Tests were used to measure learning outcomes, observations to observe the learning process, and documentation as physical evidence supporting activities. Success indicators are divided into two, namely: process indicators and

outcome indicators. (1) The process is said to be successful if ≥ 80% of students are actively involved in learning; and (2) Learning outcomes are said to be successful if ≥ 70% of students achieve the minimum KKTP score, namely 70.

To obtain teacher performance data, the data is assessed from observation sheets that will be filled out by senior teachers during the research by seeing whether the researcher's performance is in accordance with what is expected on the observation sheet. To determine the results of the teacher observation sheet, namely the determination of the results of the grades is done using a formula. Meanwhile, to obtain student data in cycles I and II, the data uses observation sheets and test questions. The observation sheets are filled out by colleagues during the research by observing each student who is assessed according to the contents of the observation sheets that have been provided according to whether or not they are in accordance with what is expected on the observation sheet and the test questions are filled out by each student at the end of learning in each cycle. Furthermore, the results of the observation sheets and test questions are determined using a formula.

**Table 1.**
*Observation results.*

| No | Student initials | Cycle 1 | | | | Cycle 2 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Meeting 1 | | Meeting 2 | | Meeting 1 | | Meeting 2 | |
| | | Amount | ket | Amount | Ket | Amount | Ket | Amount | Ket |
| 1 | A.A.M | 54% | E | 57% | E | 65% | E | 63% | E |
| 2 | A.A | 65% | E | 67% | G | 77% | G | 80% | G |
| 3 | G.S | 77% | G | 87% | VG | 88% | VG | 100% | VG |
| 4 | J | 81% | VG | 83% | VG | 85% | VG | 97% | VG |
| 5 | M.A.Z.J | 81% | VG | 87% | VG | 88% | VG | 100% | VG |
| 6 | M.F.A.H | 46% | E | 53% | E | 62% | E | 63% | E |
| 7 | M.I | 73% | G | 83% | VG | 88% | VG | 97% | VG |
| 8 | M.L | 81% | VG | 87% | VG | 85% | VG | 100% | VG |
| 9 | M.R | 62% | E | 60% | E | 65% | E | 80% | G |
| 10 | M.A.l.J | 65% | E | 63% | E | 65% | E | 77% | G |
| 11 | M.I | 77% | G | 70% | G | 77% | G | 97% | VG |
| 12 | R.K | 81% | VG | 87% | VG | 88% | VG | 100% | VG |
| 13 | S.K.G | 65% | E | 67% | G | 77% | G | 90% | VG |
| 14 | S.A.R | 69% | G | 70% | G | 88% | VG | 100% | VG |
| 15 | S.K | 62% | E | 63% | E | 77% | G | 97% | VG |
| Number of Students Category VG dan G | | 54% | | 67% | | 73% | | 87% | |

Ket: E = Enough, G: Good, VG: Very Good

**Table 2.**
*Learning test results.*

| No | Student initials | KKTP | Cycle l | | Cycle ll | |
|---|---|---|---|---|---|---|
| | | | Score | Adverb | Score | Adverb |
| 1 | A.A.M | 70 | 40 | lncomplete | 65 | lncomplete |
| 2 | A.A | 70 | 45 | lncomplete | 75 | Complete |
| 3 | G.S | 70 | 75 | Complete | 80 | Complete |
| 4 | J | 70 | 75 | Complete | 85 | Complete |
| 5 | M.A.Z.J | 70 | 80 | Complete | 100 | Complete |
| 6 | M.F.A.H | 70 | 45 | lncomplete | 45 | lncomplete |
| 7 | M.I | 70 | 70 | Complete | 100 | Complete |
| 8 | M.L | 70 | 95 | Complete | 100 | Complete |
| 9 | M.R | 70 | 60 | lncomplete | 75 | Complete |
| 10 | M.A.l.J | 70 | 55 | lncomplete | 70 | Complete |
| 11 | M.I | 70 | 75 | Complete | 80 | Complete |
| 12 | R.K | 70 | 85 | Complete | 95 | Complete |
| 13 | S.K.G | 70 | 70 | Complete | 90 | Complete |
| 14 | S.A.R | 70 | 75 | Complete | 90 | Complete |
| 15 | S.K | 70 | 65 | lncomplete | 75 | Complete |
| Student Completed | | 9 | | 60% | 13 | 87% |
| Student Incomplated | | 6 | | 40% | 2 | 13% |

For data analysis, quantitative and descriptive approaches were used. Assessment of observation results was carried out using the following formula:

$$\text{Mark} = \frac{Number\ of\ scores\ obtained}{Maximum\ score} \times 100$$

(Source: Purwanto and Sari & Megawati, 2022)

**Table 3.**
*Categories of learning outcome process acquisition*

| Value Range | Category |
|---|---|
| 81-100 | Very good |
| 68-80 | Good |
| 51-65 | Enough |
| 0-50 | Not enough |

(Source: Purwanto and Sari & Megawati, 2022)

To calculate the individual learning outcome value, the following formula is used:

$$DSI = \frac{Jnumber\ of\ scores\ obtained}{number\ of\ scores\ obtained} \times 100$$

(Source: Purwanto and Sari & Megawati, 2022)

To calculate classical learning completion, the following formula is used:

$$KBK = \frac{Number\ of\ students}{Number\ of\ students\ who\ completed} \times 100\%$$

(Source: Aqib et al., in Megawati et al., 2022)

Findings based on analysis of each cycle used as a basis for determining ei success of actions and improvement steps in next cycle, until optimal internal improvements process and from the results learning science are obtained through the application of the Problem Based Learning model.

## 3. Result and Discussion

### 3.1. Result

This study has implemented the PBL model to improve the process and outcomes of science learning implemented in class IV of State Elementary School 127/II Sungai Arang.The problems faced are low interest and learning outcomes of students due to ineffective learning methods. The using two cycles in this study, starting together planning in ie form originate compiling teaching modules, LKPD, and evaluation instruments.

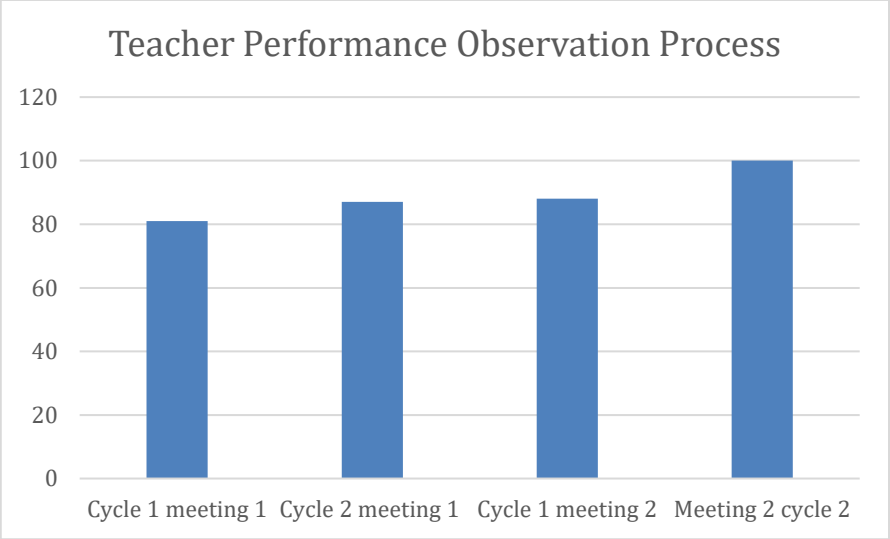
In the implementation of cycle I, learning was carried out in two meetings using five stages of PBL, namely problem orientation, group organization, investigation, presentation, and evaluation. The results of observations showed an increase in teacher and student activity. On first meeting, 27% of students were categorized as very good and increased to 40% in the second meeting. The results of the learning test showed that 60% of students achieved KKTP. Although there was progress, there were still students who had not completed it. Reflection showed the need for improvement in student activeness during discussions, courage to ask questions, and group cooperation. Therefore, the research was continued towards cycle II.

In cycle II stage, the researcher prepared a learning plan through the use of the Problem Based Learning (PBL) model with assistance from observers. Material discussed was "How Do I Meet My Needs?". The implementation was carried out in two meetings. The activity began with greetings, singing the national song, conveying the objectives, to group discussions with LKPD. Students watched videos, read texts, discussed the contents of LKPD, and presented the results. The teacher facilitated the discussion and provided reinforcement of concepts. In the first meeting, the teacher's activity was considered very good with a percentage of 88%, then increased to 100% in the second meeting. Student activity also increased. In the first meeting, 46% of students were classified as very active, and in the second meeting it increased to 67%. The results of the learning test showed that 87% of students achieved KKTP. Reflection Shows significant improvement increase When compared with cycle l, in terms of both the process and the final achievement. Then,research stopped for one cycle II because the success indicators had been achieved.

### 3.2. Discussion

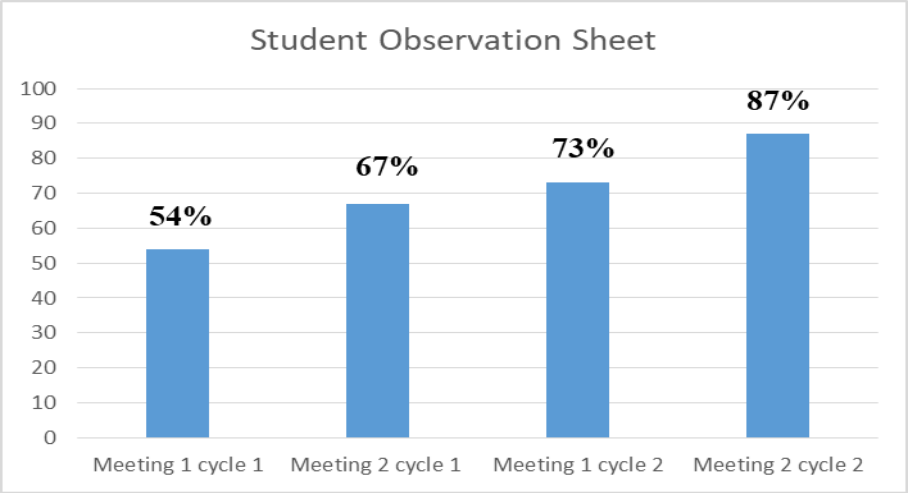
a. Aspects of the Educator Performance Observation Sheet for Cycle I and Cycle II.
Based on observation results, there was an increase in teacher performance Starting from cycle I to cycle II. In cycle I, teacher performance was recorded at 81% in the first meeting and increased to 87% in the second meeting. In cycle II, performance increased to 88% and reached 100% in the second meeting. The average increase the period between cycle I and cycle II shows 4%, indicating increase in the quality of learning process.

**Figure 1**
*Progress of Educator Performance in Cycle I and Cycle II*




b. Aspects of Cycle I and II Student Observation Sheets
So observation results show that student learning activities grew dramatically between cycles I and II. During cycle I, students activity increased from 54% to 67%. In cycle II, it increased again from 73% to 87%. This shows that the Problem Based Learning (PBL) model's application is effective on increasing student participation as well as involvement in science Education.

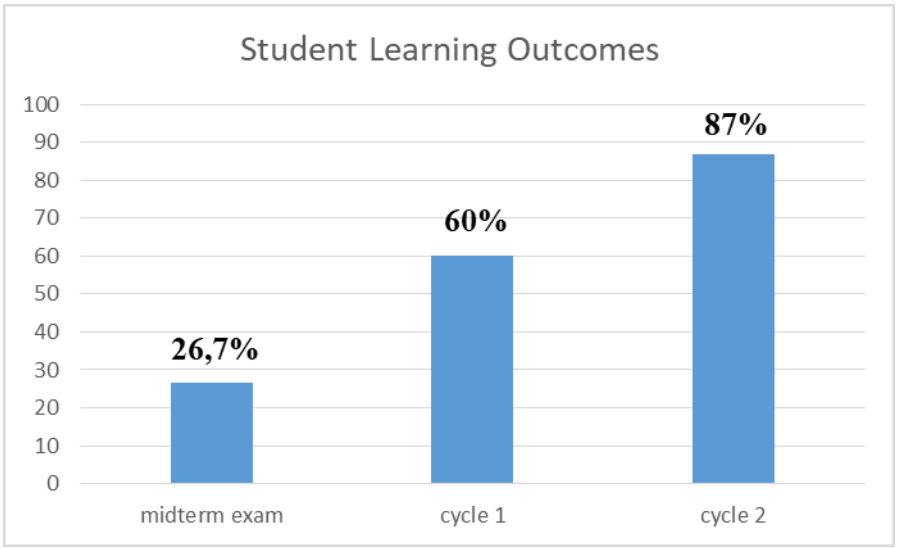
**Figure 2**
*Results of Student Observation Sheets for Cycle I and Cycle II*




c. Aspects of Student Question Sheets for Cycle I and Cycle II

Based on test results obtained a significant improvement after the implementation of the Problem Based Learning (PBL) model. The students' learning completion increased from 60% in cycle I to 87% in cycle II. This shows an increase of 27% and that the science learning has met the success indicators.

**Figure 3**
*Student Learning Outcomes in Cycle I and Cycle II*




This is in accordance with several previous studies conducted by (Tamariska Febri Kristiana, 2021), (Kusuma, 2020) which explain this Problem Based Learning model is an Educational framework approach this presents real problems so that students can actively seek the best

solutions. The purpose of this learning is to develop critical thinking skills, social sensitivity, and the ability to connect existing knowledge with situations in everyday life. In addition, this model also encourages students to become independent individuals. Problem Based Learning is in line with constructivism theory, which emphasizes that learning occurs when students actively construct their own knowledge (Sifa Nurul Aisyah, Mangara Sihaloho, Julhim S. Tangio, Astin Lukum, 2025).

The application of the Problem Based Learning (PBL) model in science learning has been proven effective in improving student learning processes and outcomes. This is theoretically supported by a constructivist approach that emphasizes the active role of students in building knowledge, as well as PBL theory that solves real-world problems as a means of meaningful learning. Research findings indicate that PBL is able to encourage critical thinking skills, collaboration, and student learning motivation. In addition, improved learning outcomes also indicate achievement in higher cognitive domains according to the Revised Bloom's Taxonomy. The relationship of these findings with relevant learning theories strengthens the validity of the PBL model as an appropriate strategy to improve the quality of science learning at the elementary school level.

Research shows that the application of the PBL model in science learning is able to increase students' active involvement, collaboration and communication skills, initiative in finding solutions to real problems and curiosity and active questioning. This finding is in line with the theory of constructivism which states that students build knowledge through direct experience and social interaction. Students demonstrated a better understanding of the environment, their reflective thinking skills improved, as evidenced by the way students analyzed the causes and solutions to environmental problems based on real-life case studies around them, particularly through self-reflection and small-group discussions. This is in line with (Fitriyah et al., 2024) who showed that it significantly increased the learning completion of fifth-grade students on environmental change material (increasing from 75% to 91.67%) and strengthened their reflective thinking skills on environmental issues in science learning.

## 4. Conclusion

According to the findings of the study, the use of the Problem Based Learning (PBL) paradigm has been proven in order to enhance the caliber of teacher teaching as well as student education outcomes at the subject of Science in grade IV of SDN 127/II Sungai Arang. Teacher performance increased from 81% to 100% during two cycles, while student learning activities increased from 58% to 87%. Furthermore, the percentage of learner education outcomes completion also experienced a significant increase from 60% During the implementation of the initial cycle stage until 87% on cycles II. These results indicate that PBL works well to help students engagement, conceptual understanding, and the quality learning implementation and achievement stages.

According to these findings, it is suggested that teachers apply the PBL model consistently in science learning to guide students to become increasingly engaged and independent on learning. Students are besides that expected to perfect their attention also participation outside of learning

to attain the highest level of learning outcomes. For further study, it is suggested that the PBL model be applied to other subjects or different grade levels to determine its effectiveness in a broader learning context, as well as to explore supporting and inhibiting factors in its application.

## 5. Aknowledgments

The researcher expressed his deepest appreciation deepest appreciation to everyone who has helped with the implementation and the end of this research process. Special gratitude is expressed to the Principal of SDN 127/II Sungai Arang who has given permission and opportunity to the investigator to carry out studies in the school environment. Gratitude is also expressed to the fourth grade teacher who has helped and cooperated during the action process, as well as to all fourth grade students of SDN 127/II Sungai Arang who have actively participated in every stage of learning. The researcher also expresses deep appreciation to the supervising lecturer for the guidance, direction, and motivation that are very meaningful in the process of compiling this report. Additionally, the researcher is grateful to the relatives and coworkers who have contributed moral also material support during the research. Hopefully all the help and support will be rewarded accordingly by God Almighty.

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