Scientific Journal of Elementary School Teacher Education
April 2025, XI (1), 1-13
P-ISSN: 2085 – 4048
https://journal.unj.ac.id/unj/index.php/pgsd/

# Implementation of Problem Based Learning Model to Improve Science Learning Outcomes of Grade V Elementary School Students

**Nurhidayah Nasution[1], Tunjungsari Serangingtyas[2], Yofita Sari[3]**
*[1,2,3] Faculty of education, Universitas Negeri Jakarta*
nasutionnurhidayah117@gmail.com

## Abstract

*Natural Sciences (IPA) is one of the most important subjects in elementary school, allowing students to exploit students and think logically, analytically, systematically, critically and creatively. Studying natural sciences in elementary school should provide students with hands-on experience to develop their ability to learn scientifically and understand the natural environment. The reality is that science learning in elementary schools is still traditional and usually focused on teachers, so students are less active in the learning process. This study aims to obtain data on improving cognitive learning outcomes of IPAS by applying the Problem Based Learning model assisted by mind mapping in grade V of SDN Tanjung Barat 07 South Jakarta. The research is carried out with Class Action Research (PTK) which consists of 2 cycles each cycle consists of 4 stages, namely planning, action, observation and reflection. The results of the study showed that the percentage of data obtained on students' learning outcomes in the first cycle was 74.19%. In cycle II, there was a significant increase of 87.09%. Meanwhile, the data for monitoring learning actions using the Problem Based Learning model in the first cycle was 89.41% and in the second cycle increased to 100%. From the results of the study, it can be concluded that using the Problem Based Learning model can improve students' learning outcomes in science learning. The conclusion is that IPAS learning using the Problem Based Learning model can be used to improve the learning outcomes of students in grade V of e elementary school Tanjung Barat 07 South Jakarta.*

**Keyword**: *Problem Based Learning Model, Science Learning, Elementary School Students*

(*) Corresponding Author: nasutionnurhidayah117@gmail.com

Received: 2025-04-19 Revised: 2025-04-29 Accepted: 2025-04-30

How to Cite: *Nurhidayah Nasution, Tunjungsari Serangingtyas, Yofita Sari. (2025). Implementation of Problem Based Learning Model to Improve Science Learning Outcomes of Grade V Elementary School Students, Scientific Journal of Elementary School Teacher Education, XI (1): 1-14*

## INTRODUCTION

Education is a very important process to improve the quality of human self. Education can continuously change the behavior of an individual or group through various trainings in learning. Education is closely related to

Curriculum. The curriculum is a guide and guideline in the form of an educational program to build a quality of life for children according to their needs at that time. The curriculum is basically dynamic and systematic. Meaning: The curriculum in the 1960s is not the same as the current curriculum. Curriculum change is the development of a previous curriculum that is more reactionary and conditional depending on the era, so the curriculum can often change and improve. Therefore, the curriculum aims at what people already have today. A good curriculum is expected to prepare a program where students' interests and talents can do justice. This is consistent with the objectives of the independent curriculum currently used in education. The curriculum is a guide and guideline in the form of an educational program to build a quality of life for children according to their needs at that time. Therefore, the curriculum aims at what people already have today. A good curriculum is expected to prepare a program where students' interests and talents can do justice. This is consistent with the objectives of the independent curriculum currently used in education. The independent curriculum aims to achieve context-related holistic learning so that students can gain meaningful and useful learning and learn not only material but also understanding (Ministry of Education and Culture 2022)

Quality learning certainly cannot be separated from the various efforts required. Especially when studying natural and social sciences. Science learning is important content that can be found at the elementary school level. Science learning aims to develop a wide range of skills among students, including: Science learning should be associated with problems contained in the student's nature, as it cannot separate people from various problems in daily life. Based on the collection of pre-study data collection on interviews, document studies, and observations. Researchers have found problems learning science in Class V of elementary school Tanjung Barat 07 South Jakarta. This means that they use learning models and media to learn students, learning outcomes with low learning outcomes, low learning and learning, and often absorb material from textbooks and assignments. This is a trigger for science learning, dominated by monotonous learning, so that learning is not student-focused and student participation in science learning is still limited.

In front of the classroom, classroom teachers strive to improve the learning outcomes of natural and social sciences Class V students, namely by conducting natural and social sciences learning activities with a circular Leshan sitting position in this area. The goal is to have a more fun and less monotonous learning atmosphere. Learning activities are carried out in this way in the hope that students will be motivated and interested in learning natural science.

However, this activity takes a long time for all students to be conditioned. Other students focus when other students in their class are in the bathroom. Separately, Harmeroom teachers have tried to apply a problem-based learning model to science learning, but problem-based learning is still not optimal and ineffective in improving student learning outcomes.

This issue provides a background for researchers to use in different, more effective and interesting PBL models based on literature research, by modifying or integrating mind mapping as a learning medium. The advantage of the PBL model of mind-mapping mapping is to actively participate in solutions to problems and train students to find appropriate solutions so that they make more sense (Buzan 2006). Students feel more comfortable because problems related to daily life are solved so that learning motivation can increase student motivation. (Rumini 2020). This is combined with mind mapping as a learning medium for copyrighted images and shapes arranged like branching trees. Therefore, PBL is supported by mind mapping as a model applied to science learning related to science learning for science learning purposes. In other words, it is hoped that students will be able to understand science learning materials and understand the learning outcomes of class V of elememntary school Tanjung Bharat, South Jakarta.

Based on the explanation above, we can draw the conclusion that the results of science learning are changes in the knowledge, attitudes and behaviors that students have after creating science learning experiences in the form of knowledge about the surrounding nature. References to student learning outcomes in this study refer to cognitive aspects, namely remembering (C1), understanding (C2), application (C3), analysis (C4) and evaluation (C5).

## METHODS

### *Types and Approaches to Research*

This study uses the class action research method using the Kemmis and McTaggart models (2014), which consists of four stages carried out in two cycles: planning, effects, observation, and reflection. Cclass action research was chosen because it is suitable for identifying classroom learning problems and increasing the use of problem-based learning models (PBL) to improve students' science learning outcomes (Arikunto et al., 2021). This study aims to improve cognitive learning outcomes in science using the mind mapping problem learning model (PBL) from Class V Tanjung Bharat 07 in South Jakarta.

Subject in this study is SDN Tanjung Barat 07, a student in South Jakarta, Class V-C. The class action research process used is the Kemmis and MC-Taggart models, which consist of two cycles. Each cycle consists of four levels: planning, implementation, observation and reflection. (Sipangkar 2022)

***Research Subject***

The study focused on 31 students from Class V primary schools, consisting of 16 male students and 15 female students in the age range of 10-11 years. The selection of subjects was based on preliminary observations that showed that the science learning outcomes of Class V students were still below 70 minimum competency standards. Learning is said to be successful if the Cognitive aspect of students can reach a minimum of ≥80% of the number of students in the class who have reached a minimum competency standard which is 70. The implementation of monitoring the actions of the *Problem Based Learning model* has reached a score of ≥90.

***Research Procedure***

***Planning***

a. Preparing a Learning Implementation Plan with a Problem Based Learning model
b. Prepare student worksheets containing contextual problems according to the material
c. Prepare research instruments: observation sheets for teacher and student activities, learning outcome test questions, and interview guidelines
d. Prepare learning media that supports scientific inquiry
e. Set up the Documentation tool

***Implementation (Action)***

a. The implementation of the Problem Based Learning model has five stages:
b. Student orientation to the problem: students are exposed to the phenomenon of contextual science
c. Organizing students to learn: formation of heterogeneous groups (4-5 students)
d. Guiding individual/group investigations: students conduct simple experiments
e. Develop and present the work: students compile research reports
f. Analyzing and evaluating the problem-solving process: class discussion and Reflection.

***Observation***

a. Observing teachers' activities in applying the PBL model using observation sheets
b. Observe student activities during the learning process
c. Record important findings during learning
d. Documenting the learning process

***Reflection***

a. Analyzing data from observation results and learning outcome tests
b. Discuss the advantages and disadvantages of learning implementation
c. Formulating corrective actions for the next cycle

***Data Collection Techniques and Instruments***

***Observation***

Observations were made to observe the activities of teachers and students while learning with the PBL model using a structured observation table. Observations were made by two observers, namely employees and teachers.

***Test***

Learning outcomes in the form of multiple questions and descriptions include cognitive aspects C1 (souvenirs), C2 (comprehension), C3 (application) and C (analysis). Tests are administered at the end of each cycle to measure the improvement of students' academic science outcomes.

***Interview***

Semi-structural interviews were conducted on students to discover their perceptions and reactions to learning with the PBL model.

***Documentation***

Documentation in the form of learning photos and videos, student work results, and field notes are used as supporting data.

### *Data Analysis Techniques*

### *Quantitative Data Analysis*

The data on student learning outcomes was analyzed descriptively by calculating:

a. Class average. Average = Total score of all students / Number of students
b. Percentage of classical learning completeness. Completion Percentage = (Number of students completed / Total number of students) × 100%
c. Percentage increase in learning outcomes.
   Percentage Increase = (Average cycle II - Average cycle I) / Average cycle I) × 100%

### *Qualitative Data Analysis*

Qualitative data in the form of observation results of teacher and student activities were analyzed using the Miles and Huberman model (Sugiyono, 2022) which includes: (a) data reduction, (b) data presentation, and (c) conclusion drawn.

## RESULTS & DISCUSSION

### *Results*

### *Observation results Quantitative*

Model application *Problem Based Learning* in class V-B SDN Tanjung Barat 07 with steps that include: (1) orienting students to problems, where students are given issues or problems related to the surface of the earth in daily life so that students have the motivation to dance more deeply about these problems; (2) organizing students to learn, where students are prepared to study in groups and get LKPD; (3) guiding individual and group investigations, where students are encouraged and guided in investigating the given problems so that they can solve problems; (4) developing and presenting the results of the work, students are asked to develop the results of investigation and problem solving into mind mapping which is then presented in front of the class; (5) analyze and evaluate the problem-solving process, students convey the difficulties faced when conducting investigations and problem-solving that are poured into *Mind Mapping*.

Based on the application of the Problem Based Learning model with the 5 steps above, it was found that there was an increase in student learning outcomes in science learning in class V-B elementary school Tanjung Barat 07. This can be seen from the percentage of success obtained from the data on student learning outcomes in the first cycle of 74.19% and the second cycle of 87.09%. In addition, data on monitoring teacher actions and student activities through the application of *the Problem Based Learning* model has also increased. Teacher action in the first cycle was 88.45% and in the second cycle was 100%, then the student activity in the first cycle was 86.53% and in the second cycle was 100%.

***Qualitative observation results***

***Cycle I***

Based on the reflection of the data in the first cycle, there are still many students who get a score of <70. The learning outcomes in the first cycle reached a percentage of 74.19% or only 23 students who reached the minimum completeness criteria, the remaining 25.80% or 8 students have not reached the minimum competency standards. The results of the implementation of learning activities using the Problem Based Learning model in the first cycle of the 1st meeting reached a percentage of 86.53% and the 2nd meeting reached a percentage of 92.30%, then if the average value of the instrument for monitoring the actions of teachers and students in the first cycle is 89.41%. Based on the results of the actions that have been carried out in the first cycle, they have not met the specified achievement targets. So the research will continue in the next cycle, namely cycle II.

***Cycle II***

This stage is an action to assess the improvements that have been made to cycle II. The researcher conducted a study on learning outcomes in the cognitive aspect in cycle II which refers to the improvement plan that has been prepared in cycle I. Based on the learning outcomes of students in cycle II, it shows that there is an increase in the number of students who get a score of ≥70. The learning outcomes of the cognitive aspect in cycle II reached a percentage of 87.09% with 27 students who achieved the minimum completeness criteria. The results of observation of the actions of teachers and students also increased in this second cycle, reaching a percentage of 100%. The upgrade from cycle 1 to cycle II can be seen in the image below:

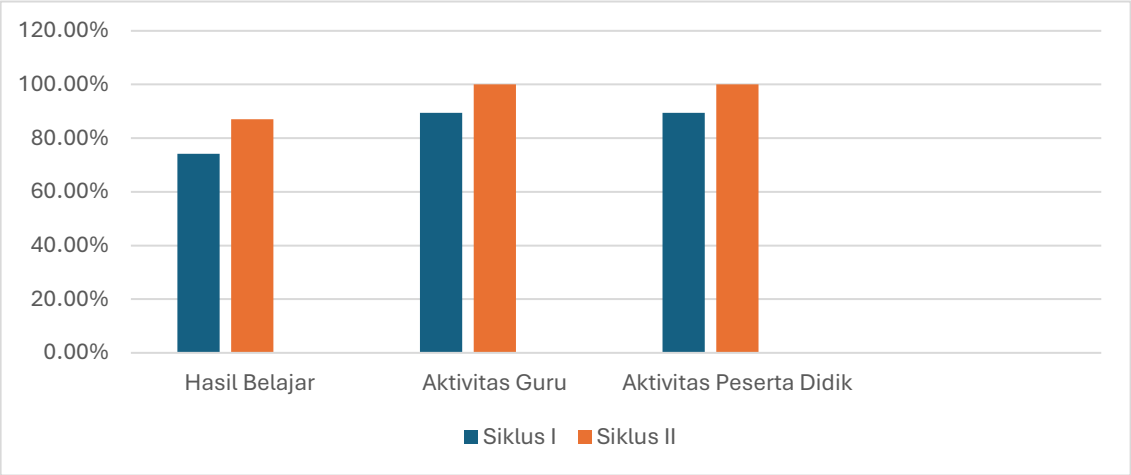


**Figure 1.** Improvement of Learning Outcomes and Monitoring of Cycle I and Cycle II Actions

Based on the picture above, it can be concluded that there is an increase in cycle II, there are indicators of learning outcomes, teacher activities and student activities. The percentage increase from cycle 1 to cycle 2 can be seen in the table below:

**Table 1. Increase in the percentage of student learning outcomes, monitoring teacher activities and student activities**

| Cycle | Student Learning Outcomes | Teacher Activities | Student Activities |
|---|---|---|---|
| I | 74,19% | 89,41% | 89,41% |
| II | 87,09% | 100% | 100% |

In table 1 above, it can be concluded that there is an increase in student learning outcomes with a score of 12.9%, teacher activity increases from cycle 1 to cycle 2 with a score of 10.59% in student activities, there is an increase in scores in the second cycle of 10.59%. Based on the score results in cycle II, the application of the Problem Based Learning Model to Improve Science Learning Outcomes for Grade V elementary school students got a very good category.

## DISCUSSION

The results showed that the application of the PBL model in grade V of primary school for five main stages: problem-oriented students, students organized for learning, counselors in surveys, work development and presentation, and analyzing and assessing problem-solving processes. The student-orientation phase on the problem is the key to the success of learning with the PBL model. At this stage, the presentation of real-life problems that are close to the student's life tries to spark curiosity and motivation for student learning. This is consistent with the opinion of Cahyani et al. (2022) that the presentation of contextual problems can increase the relevance of learning in the eyes of students.

The application of learning problems (PBL) in education has shown significant effectiveness in improving student learning outcomes, especially in scientific problems in primary schools. This model not only emphasizes the use of media, but also supports the development of critical thinking skills and the ability to solve students' problems through actual situations (Musfirah et al., 2023). Thanks to the implementation of the United Nations, students are encouraged to think positively and work together in groups to solve the problems at hand, thereby increasing their participation in the learning process (Rania et al., 2023).

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In the specific context of Class V, this study was conducted by Musfirah et al. This shows that the application of PBL to materials related to the water cycle can improve student learning outcomes by 8% in the second cycle (Musfirah et al., 2023). This complies with the results of Fatah et al. This recorded an increase in learning outcomes from 1% to 89% after multiple PBLs (Fatah et al., 2023).

In addition, this suggests that the combination of PBL and the use of media such as WordWall also yields positive results, with significant improvements in students learning outcomes (Olimpiani et al., 2024). Another advantage of the PBL model is the ability to strengthen students' social skills. By discussing and working in groups, students learn how to communicate, organize, and work together in groups (Nafiah and Susanto, 2014). This process is essential for developing the social skills necessary in daily life. In addition, researchers such as Sari and Indriati noted that PBL has increased student activities in learning, thereby creating a more dynamic and interactive learning atmosphere (Sari, 2018; Indriati, 2022).

However, there are challenges in implementing this model, such as the need to carefully prepare teachers to manage classrooms and create conditions for effective discussion (Eismawati et al., 2019). Guttormsen Research also said that training teachers to implement the UN correctly is essential to get the desired results (Abarang and Delviany, 2022). To address the decline in student activity, use different environments, such as

video or visual assistance, can be an effective solution (Syaputra et al., 2023; Utami et al., 2018). In general, the application of a learning model based on scientific learning problems in V-GRAD elementary schools showed promising results in improving student learning outcomes. This model is not only beneficial for the development of learning, but also for students' social and individual skills. Therefore, it is important that educators continue to explore and implement PBL with the right approach to achieve more optimal educational goals.

## CONCLUSION

Model application *Problem Based Learning* running optimally and effectively gradually, type *Problem Based Learning* can improve the learning outcomes of IPAS students in class V-B SDN Tanjung Barat 07 South Jakarta.

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