APPLICATION PROBLEM-SOLVING LEARNING MODEL
TO IMPROVE SCIENCE LEARNING OUTCOMES IN STUDENTS
CLASS IV ELEMENTARY SCHOOL GMIM 7 TOMOHON

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INFO ARTICLE
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Abstract. The research was conducted to improve science learning outcomes for fourth-grade students at GMIM 7 Tomohon Elementary School in the academic year 2022/2023, with a total of 33 students. This study used classroom action research (CAR) with four stages: planning, action implementation, observation, and reflection, which were applied in two cycles. In this study, observations and assessments were conducted by asking all students a series of written questions using Student Worksheets and Assessment Sheets. The data were analyzed using percentage calculations and the average learning outcomes achieved by the students. The initial data obtained showed that the students' science learning outcomes were 60%. The research results showed that the students' science learning outcomes experienced a significant improvement after implementing the problem-solving learning model. In Cycle I, there was an increase in learning outcomes to 70.15%. In Cycle II, the learning outcomes reached 90%. This research provides evidence of consistent improvement in the student's science learning outcomes from Cycle I to Cycle II. Based on the research findings and discussions, implementing the Problem-Solving learning model will improve the science learning outcomes of fourth-grade students at GMIM 7 Tomohon Elementary School. This research provides evidence of consistent improvement in the student's science learning outcomes from Cycle I to Cycle II. Based on the research findings and discussions, implementing the Problem-Solving learning model improves the science learning outcomes of fourth-grade students at GMIM 7 Tomohon Elementary School. This research provides evidence of consistent improvement in the student's science learning outcomes from Cycle I to Cycle II.
INTRODUCTION

Education is a deliberate effort to create a learning environment and learning process that actively facilitates students to develop their potential. It includes religious and spiritual strength, personal self-control, intelligence, sound morality, and skills necessary for the good of oneself, society, nation and state, all of which are prioritized, Ministry of National Education (2003).

Based on Law No. 20 of 2003 concerning the National Education System, contained in Article 3 Chapter II, National Education aims to develop abilities and shape the character and civilization of a nation with dignity. It aims to improve the knowledge and life of the nation as a whole. Education aims to enable students to develop their potential and become individuals who have faith and devotion to God Almighty, behave well, and are healthy, knowledgeable, skilled, creative, independent, democratic and responsible citizens.

Teaching Natural Science (IPA) material at the elementary school (SD) level plays a significant role in increasing students' understanding of the fields of science and technology (Noorjanah, 2023). Science subjects play a significant role in education because science subjects are knowledge based on logic and facts about the universe and all its contents, as stated by Darmojo (2008). It is best if science learning at the elementary school (SD) level is carried out through a cooperative approach to develop the ability to think, work, have a scientific attitude, and communicate. It is an essential aspect of the necessary life skills. In this case,

One step to improve the quality of education is to improve the learning process in each subject carried out in class (Purnasari & Sadewo, 2021). Students can use creative thinking skills to generate new ideas and try innovative approaches or solutions to overcome problems in completing assignments.

Based on the initial observation interviews, it was found that fourth-grade students at SD GMIM 7 Tomohon considered the learning process so far uninteresting. It happens because, in science learning, teachers use the lecture method more dominantly, while student involvement in learning is given less attention. The learning process tends to be dominated by the role of the teacher, so students' thinking abilities are not encouraged, and they are rarely allowed to...
develop their potential. Apart from that, in learning science at school, students tend to learn individually, so collaboration between students and students and teachers needs to be better established.

The science learning outcomes of grade IV students at SD GMIM 7 Tomohon are still relatively low. It is reinforced by the average Score of students' daily test results, which only reaches 60% (data source is taken from the list of grade IV students). In comparison, the Minimum Completeness Criteria (KKM) learning outcomes that must be achieved is 75%. Of the 33 students, only 8 met the Minimum Completeness Criteria (KKM).

Based on these conditions, it is necessary to do learning by applying learning models that can improve student learning outcomes, one of which is the Problem-Solving learning model. The Problem-Solving learning model is one learning model that can be used. This learning model can help students develop problem-solving skills and critical-thinking skills. It can show a relationship and linkage between Problem-solving and critical thinking skills (Choi et al., 2014). In the Problem-Solving learning model, students are empowered to take responsibility for their education with minimal guidance from the teacher. The Problem-Solving learning model aims to train students to become independent in the learning process so they can apply these skills in their lives and careers in the future (Kristianti, 2023). In the Problem-Solving learning model, the teacher is a facilitator or guide who guides students through the learning process. When students become more skilled in learning, the Problem-Solving learning model is designed to overcome irregular and complex challenges that exist in the real world. These factors can motivate students to learn by combining and organizing the information obtained. In this way, this knowledge can be remembered and applied effectively in dealing with various problems in the future so that they can apply these skills in their lives and careers (Kristianti, 2023). In the Problem-Solving learning model, the teacher is a facilitator or guide who guides students through the
learning process. When students become more skilled in learning, the Problem-Solving learning model is designed to overcome irregular and complex challenges that exist in the real world. These factors can motivate students to learn by combining and compiling the information obtained. Thus, this knowledge can be remembered and applied effectively in dealing with various problems in the future. The teacher is a facilitator or guide who guides students through the learning process. As students become more skilled at learning, the Problem-Solving learning model is designed to overcome irregular and complex challenges that exist in the real world. These factors can motivate students to learn by combining and compiling the information obtained. Thus, this knowledge can be remembered and applied effectively in dealing with various problems in the future. The teacher is a facilitator or guide who guides students through the learning process. As students become more skilled at learning, the Problem-Solving learning model is designed to overcome irregular and complex challenges that exist in the real world. These factors can motivate students to learn by combining and compiling the information obtained. Thus, this knowledge can be remembered and applied effectively in dealing with various problems in the future. These factors can motivate students to learn by combining and compiling the information obtained. Thus, this knowledge can be remembered and applied effectively in dealing with various problems in the future.

In this case, the Problem-Solving learning model proved to be a practical approach to improving student achievement in science subjects because the learning model encourages students to actively think about solving problems during the learning process. In addition, it is also known that the Problem-solving learning model encourages students to be more active in thinking and participating in learning (Jaenudin, 2017).

Based on the problems mentioned, the researcher is interested in choosing the title Application of the Problem-Solving Learning Model to Improve Science Learning Outcomes in Class IV SD GMIM 7 Tomohon.

METHOD

This study applies the classroom action research (PTK) method using the PTK model developed by Kemmis and Mc. Taggart. "Researchers use this model because it is famous for its spiral cycle
process of self-reflection which starts with Plan, Action, Observation, Reflection, and Re-planning which is the basis for square off problem-solving." The PTK flow, according to the model put forward by Kemmis and McTaggart (Arikunto, 2010), can be illustrated as follows:

![Figure 1. Kemmis Classroom Action Research Model and Mc. Taggart](image)

Kemmis and Taggart detail the steps or stages involved in classroom action research. The following are these stages:

1. Planning Stage
   Planning is prepared based on the results of the problem identification that has been carried out. The plan details the steps to increase, improve, or change the desired behaviour and attitude as a solution to the Problem at hand. This planning is flexible, which means it can be adjusted to existing situations.

2. Action
   Implementation of actions involves efforts to repair, increase, or change carried out by researchers, which aligns with the action plan. Actions taken in classroom action research must be based on theoretical and empirical considerations to produce increased performance and optimal program results.

3. Observation (Observer)
   Observation activities in classroom action research can be equated with data collection activities in formal research. In this activity, researchers observe the results or impacts of actions taken by students or applied to students.

4. Reflection
   In practice, reflection activities involve the process of analyzing, combining and interpreting all the information that has been obtained during the implementation of the action.

This research was conducted in class IV of SD GMIM 7 Tomohon, Jalan Pınasungkulan, Neighborhood Dua, Talete Dua, Central Tomohon District, Tomohon City, North Sulawesi Province. This research was conducted...
in the eighth semester of the academic year of 2022/2023.

In order to collect the data in the research, several data collection techniques are available. In the research carried out, the techniques that will be used are observation and tests. Observations are carried out by directly observing student activities, while tests are carried out by giving all students a series of written questions using Student Worksheets and Assessment Sheets.

In this classroom action research, test result data will be analyzed using percentage calculations and the average learning value achieved by students. Evaluation of improvements in abilities and skills in learning, as well as learning outcomes, will be carried out by comparing these achievements in each learning cycle. Determined by the Department of Education and Culture, as quoted by Trianto (2012), student learning outcomes are analyzed using the formula:

\[ Kb = \frac{T}{Tt} \times 100\% \]

Information

Kb = Mastery learning
T = Total Score achieved
Tt = Total Score

After calculating the percentage level of achievement of student learning outcomes, if the learning completeness level reaches 75%, it can be concluded that the class succeeded in achieving the learning objectives. The level of learning completeness indicates student competency achievement after participating in learning activities. The hope is that educational institutions can continue to improve learning mastery standards on an ongoing basis to achieve ideal mastery standards.

RESULTS AND DISCUSSION

Research result

1. CYCLE I

a. Planning

Based on the difficulties experienced by students, the researcher designed a lesson that can be used to solve these problems, including:

1) Developing a learning action plan in the form of teaching preparation is:
   a) Developing Learning Implementation Plans (RPP)
   b) Prepare learning media and learning materials
   c) Prepare teacher and student observation sheets
   d) Prepare student worksheets
   e) Prepare an assessment sheet

2) Designing a class organization that includes:
   a) Designing a problem that will attract students' interest in finding
solutions and being actively involved in the learning process

b) Establishment plan for the working group
c) Group seating plan
d) The design of student work procedures during the action

3) Discussions with class teachers to equalize perceptions and explain the procedures for implementing the Problem-Solving learning model.

4) Prepare instruments used in the research process, such as student worksheets and observation sheets.

b. Implementation Stage

This stage is the implementation (execution) of all the plans that have been made. At this stage, learning is carried out by applying the Problem-Solving learning model in science learning about Magnetic Forces. The learning steps are:

1) Initial activity
   a) Greetings
   b) Prayer
   c) Absence
   d) Class management
e) apperception

2) Core activities
   a) Formulating the Problem
   b) The teacher forms six groups and gives each group a fact text about magnetic objects. Then, students look for problems given by the teacher.
   c) Examining Problems. Students find problems; students analyze the Problem.
   d) Formulate a Hypothesis. After analyzing the problems that students find, students formulate problems that cause these problems and the consequences of these problems.
   e) Researchers need to collect and group data as material to prove the hypothesis. The group leader directs all his group mates to classify the data as evidence for the hypothesis.
   f) Hypothetical Bookkeeping. The whole group makes decisions and conclusions based on the available data.
   g) Define Problem Solving. The entire group looks for alternative solutions to existing problems.

3) Closing Activities
   a) The teacher gives LKPD (Student Worksheets)
   b) Motivate to be more active in learning at home and school
   c) Close Lesson

c. Observation Stage

The results of observations on student activities in the implementation of the cycle
I action for the initial activities showed that the willingness and enthusiasm of students to learn was seen when asked by the teacher, and they immediately answered. While in this activity, the students studied actively, it was seen that some children did not hesitate to ask questions. Based on the results of the class teacher's observations (observations) above, student activity in learning science using the Problem-Solving learning model can result in motivation and enthusiasm for students to learn more actively in the sense that children are happy and excited to follow the lessons given by the teacher. It can be seen in every step of learning followed by students.

Table 1. Student Learning Outcomes Cycle I

<table>
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Information:
- Completed Score = 75-100
- Incomplete Score = Score less than 75

Based on the results from table 1 above, the presentation of student learning completeness can be calculated using the formula:

$$Kb = \frac{T}{Tt} \times 100\%$$

Information:
- Kb = Mastery learning
- Q = Number of successes
- Tt = Sum of total scores

Then, learning completeness can be calculated as follows:

$$KB = \frac{2250}{3300} \times 100\% = 68.18\%$$

So, the achievement of learning outcomes in cycle 1 was 68.18%. In the first cycle, this was not successful.

d. Reflection stage

At this reflection stage, the data obtained by the researcher during the action was discussed with the class teacher to assess the level of success obtained in this first round. After making observations, it turned out that the results could have been more satisfying because they only reached 68.18%. It is caused because some students need help understanding the material regarding style and are less active in
2023 | Manggribeth, S.N., Rindengan, M., Palendeng, F.G., Rorimpandey, W.H.F., Application of the Problem Solving Learning Model to Improve Science Learning Outcomes in Class IV Students at Elementary School GMIM 7 Tomohon

participating in the learning process by researchers. Therefore, the researcher plans to conduct a second cycle again to see the development of student learning in the first cycle.

2. CYCLE II

a. Planning

Based on the reflection in Cycle I, the researcher re-planned learning to be applied in Cycle II, namely:

1) Developing a learning action plan in the form of teaching preparation is:
   a) Developing Learning Implementation Plans (RPP)
   b) Prepare learning media and learning materials
   c) Prepare teacher and student observation sheets
   d) Prepare student worksheets
   e) Prepare an assessment sheet

2) Designing a class organization that includes:
   a) Designing a problem that will attract students' interest in finding solutions and being actively involved in the learning process
   b) Establishment plan for the working group
   c) Group seating plan
   d) The design of student work procedures during the action
   3) Discussions with class teachers to equalize perceptions and provide explanations about the procedures for implementing the Problem-Solving learning model

4) Prepare the instruments that will be used in the research process. Such as student worksheets and observation sheets.

b. Stage Implementation / action

This stage is the implementation (implementation) of all the plans that have been made. At this stage, learning is carried out by applying the Problem-Solving learning model in science learning about Magnetic Force.

The learning steps are:

1. Initial Activities
   a) Greetings
   b) Prayer
   c) Absence
   d) Class management
   e) apperception

2. Core Activities
   a) Formulating the Problem
      The teacher forms six groups and gives each group a text about magnetic forces in everyday life. Then, students look for problems given by the teacher.
   b) Examine the Problem
      Students find problems, and students analyze the Problem.
   c) Formulating Hypotheses
      After analyzing the problems that students find, students formulate problems that cause these problems and
what are the consequences of these problems.

d) Collect and classify data as evidence for the hypothesis
   The group leader directs all his group mates to classify the data as evidence for the hypothesis.

e) Hypothesis Bookkeeping
   The whole group makes decisions and conclusions based on the available data.

f) Determining Settlement Options
   The whole group looks for alternative solutions to existing problems.

3. Closing Activities
   a) Teacher gives LP (Assessment sheet)
   b) Motivate to be more active in learning at home and school
   c) Close Lesson

c. Observation Stage

From the results of observations of student activities during the implementation of cycle II actions, the initial activities showed that the student's willingness and enthusiasm for learning were visible when asked by the teacher; they answered immediately. While in this activity, the students studied actively, it was seen that some children did not hesitate to ask questions. Based on the results of the classroom teacher's observations (observations) above, student activities in science learning using the Problem-Solving learning model can result in students' motivation and enthusiasm for learning more actively in the sense that children are happy and happy to follow the lessons given by the teacher. It can be seen in every step of learning followed by students,

<table>
<thead>
<tr>
<th>Table 2. Cycle II Student Learning Results</th>
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Information:
Completed Score = 75-100
Incomplete Score = Score less than 75

Based on the results of the table above, the presentation of student learning
completeness can be calculated using the formula:

\[ \text{Kb} = \frac{T}{T_t} \times 100\% \]

Information:
- \( \text{Kb} \) = Mastery learning
- \( Q \) = Number of successes
- \( T_t \) = Sum of total scores

Then, learning completeness can be calculated as follows:

\[ \text{KB} = \frac{2970}{3300} \times 100\% = 90\% \]

It has reached 90% in cycle II, so this research was conducted only up to cycle II. So, by using the Problem-Solving learning model, student learning outcomes have increased.

d. Reflection Stage

Based on the results of observations on aspects of teacher teaching skills, student activities, and student learning outcomes, satisfactory results were obtained. It is because the indicators of success in this PTK have been achieved. The increase in aspects of teacher skills in each cycle affected increasing student activity in class and student learning outcomes. It shows that the teacher has succeeded in implementing the Problem-solving learning model to improve student learning outcomes. Student learning outcomes always increase from the beginning to the end of the cycle. Even so, teachers' improvements in teaching skills and student classroom activities continued in cycle II of this study. Teachers must always reflect and introspect to look for weaknesses that teachers experience. Next, the teacher must be able to determine appropriate solutions and alternative Problem solving to improve subsequent learning. In this way, the quality of learning can continue to be well maintained, and student learning outcomes can improve.

Discussion

The research results on applying the Problem-Solving Learning Model to Improve Science Learning Outcomes in Class IV SD GMIM 7 Tomohon students in each cycle form the basis for giving meaning to the researchers' findings. Based on the research results on the initial data, the learning outcomes have not reached the overall level of completeness, with an average percentage of student learning completeness of 60% of the total 33 students; only eight students have reached the KKM. At the same time, 25 students must reach the Completeness Criteria Minimum (KKM).

The results of the study in cycle I, the performance of researchers in working on the Problem-solving
learning model was still incomplete, as indicated by the learning outcomes obtained by students after participating in the learning process, which only reached 70.15% of a total of 33 students, only 15 students succeeded in achieving the Completeness Criteria Minimum (KKM). In contrast, 18 other students still have not achieved it. The cause is the students' need for habits in dealing with the Problem-solving learning approach that was initially applied. Students need time to understand new concepts and problem-solving processes. Students must still answer every question and assignment the teacher gives properly and correctly. Students still tend to be involved in group interactions and rely on specific students to answer or solve problems given in each group. Therefore, a continuation of cycle II is needed to overcome this.

From the research results in cycle II, the performance of researchers has increased in implementing the Problem-Solving Learning model. The student learning outcomes reached 90%, meaning all 33 students have achieved the minimum level of completion (KKM). Implementation of actions over two cycles showed significant progress. There is an increase in student activity during the learning process and an increase in student learning outcomes. The researcher explains part of the material again and pays attention to students' activeness in the teaching and learning process until students show their abilities and improve good results. Researchers have paid attention to the steps of the Problem-solving learning model.

Furthermore, learning can run well to achieve learning objectives. Every student can answer well and correctly every question and assignment given by the teacher. In this second cycle, students have shown active involvement in group work, so there is no need to continue research into the third cycle.

<table>
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<th>No</th>
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<th>Average value</th>
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<tr>
<td>1</td>
<td>Pre Test</td>
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<tr>
<td>2</td>
<td>Cycle I</td>
<td>70.15 %</td>
</tr>
<tr>
<td>3</td>
<td>Cycle I</td>
<td>90 %</td>
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Based on the evaluation results of applying the Problem-solving learning model in improving science learning outcomes on Magnetic Force material, students in class IV of SD GMIM 7 Tomohon experienced increased science learning outcomes. After knowing the comparison of each cycle, there was an increase in student learning outcomes, so it was known that in cycle I, there were 15 people who achieved complete learning and 18 people who did not complete it, so students got an average score of 70.15%. While the learning outcomes in cycle II were excellent because the 33 students all achieved the KKM with an average score of 90%. With the learning outcomes in the science subjects above, an indicator of success has been achieved, namely if the completeness achieved by students has reached 90% of the KKM of 75%.

**CONCLUSION**

Based on the analysis and discussion of the results of this study, the conclusion that can be drawn is that the application of the Problem-Solving learning model is effective in improving student learning outcomes in class IV SD GMIM 7 Tomohon in science subjects. As the next step based on the research results and conclusions that have been obtained, the researcher provides the following suggestions: 1) Class teachers are advised to adopt the Problem-Solving learning model because, through the application of this model, students can increase their creativity and courage in the teaching-learning process in class. 2) Students in the learning process must be active, creative, think critically, and work in groups. 3) To the principal, Providing advice and opportunities for teachers to take part in workshops on skills in using learning models is recommended. In this way, learning can experience better development.

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