

APPLICATION OF THE PROBLEM SOLVING LEARNING MODEL IN IMPROVING NUMERACY SKILLS IN CLASS IV STUDENTS OF SDN

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ABSTRACT

This research aims to improve the numeracy skills of mathematics problem-solving of grade IV students of SDN Tanetea by using problem-solving learning model on square, rectangular and triangular flat building materials. The subjects of this study are grade IV students of SD N Tanetea, Gowa Regency for the 2023/2024 school year, totaling 23 students. This type of research is Classroom Action Research that is carried out in 2 cycles, each cycle is carried out 2 times. The data collection was carried out by tests, observation sheets of teachers and students as the level of implementation and achievement in using the problem-solving learning model. The results of problem-solving skills can be seen from the results of the pre-test, cycle I and cycle II. In the pre-test, the average score of the success indicator was 42.86 with the percentage of learning completeness with total score 4%, it was lack. In the first cycle, there was an increase with an average score of 71.15 with a percentage of learning completion with total score 65% and in the second cycle there was an increase with an average score 79.57 with a percentage of learning completion with a total success score of 87%. Based on the results of the study, it can be concluded that the problem-solving learning model can improve problem-solving numeracy skills in grade IV students of SD Negeri Tanetea, Gowa Regency.

1. INTRODUCTION

Education is a very important thing in human life, because education is a human need to be able to survive the times. As the next generation of the nation, we must have education in order to compete nationally or internationally. Education based on Law Number 20 of 2003 concerns the national education system, especially conscious and planned efforts to create a learning atmosphere and learning process so that students actively develop their potential to have religious and spiritual strength, self-control, personality, intelligence, noble morals and skills necessary for society, state, and state (Yuliarsih & Agustyarini, 2023).

Education must produce good human resources, think critically, creatively, and innovatively so that they are able to compete. The government conveyed that the focus on improving the quality of elementary and secondary education evenly throughout Indonesia is also continuing to be carried out, the government continues to strive to improve the quality of education by developing a learning curriculum with the hope that education in Indonesia will be even more advanced by carrying out the concept of an independent curriculum (Negara & Indonesia, 2018). The presence of the independent curriculum is a development of the previous curriculum which focused on improving students' literacy and numeracy skills.

Education plays a very important role in human life and progress. Education will produce quality human resources. Through education, a nation can stand alone, be resilient and highly competitive so that a young generation will be formed who are devoted to God Almighty, noble, intelligent and skilled. In addition, education also equips humans both physically and spiritually so that they are able to face all forms of challenges in their life journey (Hastati et al., 2024)

Numeracy is a knowledge, skill and behavior that students need to use mathematics in a variety of situations. This includes the introduction and understanding of mathematics in the world, as well as the ability to use the knowledge and skills in accordance with their goals. Numeracy skills refer to the ability to use, interpret, and communicate mathematical information to solve problems that exist in the real world (Ujjione, n.d.).

The ideal condition of numeracy skills according to the Ministry of Education and Culture in 2021, namely knowledge and skills that are closely related to the understanding of numbers, symbols, and analysis of quantitative information (graphs, tables, charts, and so on), is very important for the current generation to have. (Tari et al., 2023). 21st century learning is student-centered, meaning that learning provides greater opportunities for students to construct knowledge independently and mediated with peers (Afni et al., 2021). By having good numeracy skills, students are able to competently apply their mathematical knowledge in real life (Mubarakah et al., 2023). While the actual condition of students is that they cannot solve mathematical problems that have been associated with daily life, it means that students lack knowledge or skills in developing mathematical knowledge and skills with confidence in all aspects of life (Tari et al., 2023).

Another source says that Numeracy is the ability to apply the concept of numbers and numeracy skills in daily life and interpret the quantitative information that is around us. This ability is evidenced by a sense of comfort with numbers and intelligence in applying mathematical skills. (Jabar, 2022).

The reality on the ground shows that Indonesia's numeracy ability level is still very low. Based on the results of the 2022 PISA survey, Indonesian numeracy received a score of 366 points, compared to the results of the PISA assessment in 2015-2018. This score is still far below the average of the participating countries which range from 465-475. The results of another survey conducted by TIMSS or *Trends in International Mathematics Science Study* 2015, stated that Indonesia's mathematics score was at 397 with an average TIMSS score of 500. The low level of numeracy is homework for the Government to improve students' numeracy skills. Improving numeracy skills in schools requires a learning approach that is able to provide children's understanding in problem solving. The strong flow of information and technological advances cause educators to innovate to develop the media used in learning (Maghfiroh et al., 2021).

The abilities that a student must have in mastering mathematics include the ability to use numbers, mathematical symbols and calculation operation skills. These mathematical skills are related to literacy and numeracy. Literacy and numeracy skills are a person's ability to acquire, interpret, use, communicate and analyze a number, data, or mathematical symbols related to real problems in daily life so that a person can reach a decision (Amaliah et al., 2021).

Mathematics learning applied in schools today is a very important basis in its participation in educating the life of the nation. The achievement of the target of educating the nation's life will remain a priority in the development goals in Indonesia to welcome competition in the era of industrialization and globalization in all lives relevant to the rapidly developing advancement of information and

communication. Without science and technology, a nation will only be left behind. One of the main ways to have strong science and technology skills is mastery in the field of mathematics. (Alannasir, 2019).

Mathematics learning has become common when many students have problems learning mathematics. This may be due to several factors, among others: lack of basic numeracy skills, feeling that mathematics is difficult, unpleasant and boring which of course results in the math score being below the average score. The low mathematics learning outcomes at each school level are caused by students who do not understand each material in mathematics lessons. The lack of student interest in learning in mathematics lessons is something that we need to pay attention to as a material or reference to improve students' mathematics learning outcomes for each subject so that it can be followed up by every educator in the future, especially in the aspects of the learning process and in the evaluation aspects that are applied. This is intended so that students have more meaningful mastery of mathematics and students' reasoning develops better. (Rahmawati & Nurdiansyah, 2022)

The criteria for the required learning model are being able to solve a problem contained in the problem, student-centered learning, group learning and solving a problem through discussion, a learning model that can increase confidence, independent students because students are required to compile their own knowledge through the information they get (Tari et al., 2023). The study, titled "Student Teacher Consultation as an Oral Means to Improve Speaking Skills," suggests that learning to solve problems will permanently expand an individual's abilities because problem-solving activities, once learned, can be applied to other similar situations. Therefore, simply teaching facts, concepts, and principles, problem-solving techniques should be taught in schools. In problem-solving, students are naturally in contact with language, but this contact occurs because students are actively involved in achieving solutions to the task. (Hastati & Kaddas, 2023)

From the results of the initial observations made by the author during the pre-research at SD Negeri Tanetea, Gowa Regency, the author observed learning activities in the classroom. When the teacher gives math problems to students, there are still students who have difficulty understanding what kind of problems are known in the questions, what is asked in the questions and so on, so students still need guidance from the class teacher when working on the questions. There are also students who are not careful in reading the questions so that in the process of solving the questions there are errors such as errors in writing and errors in calculations. During the learning of teachers using book teaching materials, especially mathematics learning in which there are story problems that require problem solving, teachers also make mathematics problems that are distributed to students to be worked on. When students work on story problems that require problem solving given by the class teacher, they are still not thorough in reading the story problems so that students still have difficulty in analyzing and understanding the concept of a math problem. During learning, teachers relate mathematics problems in daily life so that they can help students find solutions to solving the mathematics problems.

The purpose of this study is to find out the application of the problem-solving learning model in improving numeracy skills in grade IV students of SD Negeri Tanetea, Gowa Regency.

This type of research is a classroom action research using a descriptive statistical analysis research method. The subjects of this study are all grade IV students of SD Negeri Tanetea, Gowa Regency which totals 23 students. Test instruments are in the form of pre tests, test posts and worksheets used for data collection.

2. METHODS

The type of research used is classroom action research (PTK), which the researcher conducts aims to improve the numeracy skills of grade IV students of SD Negeri Tanetea, Gowa Regency. By using a problem-solving learning model. The research location is at SD Negeri Tanetea, Gowa Regency. The subjects in the study on grade IV students, totaling 23 people, were held on May 21 – May 31, 2024 at SD Negeri 1 Tanetea, Gowa Regency. With a class action research design, namely 2 cycles.

The data collection technique through test instruments is carried out by providing observation sheets, pre-tests, and post tests. The research instruments used are:

1. Observation sheet

The observation sheets used are of two types, namely

1) There are several stages of teacher activity observation sheets, namely:

- a. Preliminary stage. As for the Indicators: Opening the lesson and preparing for learning, Such as: the class begins with a greeting followed by prayer, student attendance, giving appreciation and motivation and conveying learning objectives.
- b. Core activity stage. The indicators: carrying out learning according to the competencies (objectives) to be achieved using the learning model method of problem solving, materials, applying learning strategies by involving students, explaining the initial problem, the learning process, by solving problems and using clear language and examples.
- c. Final stage. There are indications: closing and ending the lesson by reflecting and making a summary by repeating the conclusion of the lesson and ending the lesson with greetings and closing prayers.

2) The student activity observation sheet has several stages, namely:

- a. Convey learning objectives. Students listen to the explanation of the learning objectives presented by the teacher.
- b. Explain how to solve existing problems, such as pseas as educating students to pay attention to the procedures for solving mathematical problems, applying strategies and formulating in solving problems in the material.
- c. Conducting learning activities. Students use problem-solving methods.
- d. Conclusion of the learning material. Students conclude and mention the points that arise from learning.

2. Pre test and Post test questions

In this study, the test used is a test in the form of mathematical questions based on the material that has been described. The test technique was carried out to determine the improvement of numeracy skills after using the problem-solving learning model. The test is carried out by students working on the questions that have been given in each cycle. For more details, you can see the appendix of pre test and post test questions.

The data analysis technique used is a qualitative data analysis technique. Qualitative analysis is used to explain the results of actions that lead to student activities during the teaching and learning process and teachers' activities during learning. For the value of the work results of pre-test and post-test questions through the problem-solving learning model based on the learning outcomes of students in cycles I and II (quantitative data) was analyzed statistically descriptively. In this case, the researcher used descriptive statistical analysis to find the average value and percentage of success of numeracy ceramics.

Research and documentation instruments are methods used to collect data. Instruments are research tools used in this study. Descriptive statistics and graphs are used in the data analysis method of this study.

Indicators of observation results are obtained by observing the results written on the observation form of learning activities. The following are the success indicators used to see teacher learning and the implementation of Shiva learning. The success rate of observation, the author found data from observation results that were categorized as lacking (value 43). The author chose and set the minimum success standard for this study, which is 80%, which is a high category.

Interval	Category
0 - 34	Very Less
35 - 54	Less
55 - 64	Keep
65 - 84	Tall

3. RESULT AND DISCUSSION

This study identifies how the application of the problem-solving learning model in improving numeracy skills in grade IV students of SD Negeri Tanatea, Gowa Regency. The research method applied by other students included observation sheets, questions and documentation to assess the extent of the influence of the application of the problem-solving learning model in improving numeracy skills in grade IV students of SD Negeri Tanatea, Gowa Regency. The respondents in this study were grade IV students totaling 23 students and a teaching teacher. The instrument used was an observation sheet with a total of 20 questions. Each question has four answer options with a range of questions of 1-4, where 4 (very good), 3 (good), 2 (not good), and 1 (not good).

Application of Problem-Solving Learning Model in Improving Numeracy Skills



(Picture 1)



(Picture 2)

a. Overview of the Implementation of the Masaslah Learning Model in Improving Numeracy Skills

The implementation of problem-solving learning in solving mathematics problems in flat building materials in grade IV students with a total of 23 students. The first meeting students were given pretest questions in the form of questions with a total of 15 questions consisting of multiple-choice questions. The second to fourth meetings were the implementation of a problem-solving model guided by the independent curriculum.

Measuring tools in the implementation of the problem-solving process are used as instruments of teacher observation sheets and student observation sheets in the use of the observation sheet instruments are used as the basis for describing and assessing the implementation of learning whose application uses problem solving by improving numeracy skills in solving problems measured based on gru teaching activities and student learning activities.

The implementation of improving numeracy skills using a problem-solving model is carried out based on learning steps in 3 stages, which are as follows:

1) Introductory Activities

In the preliminary stage, the researcher starts the class with a greeting followed by a prayer, the author prepares the material and checks the readiness of the students to follow the learning process then continues by checking the attendance of students, conducting perceptions to motivate students.

2) Core Activities

In learning activities that use a problem-solving model, the researcher begins by conveying the learning objectives to be achieved, the researcher describes the procedures for implementing the problem-solving model (students pay attention and understand the explanations given). The researcher began to explain the material of building a square flat (Circumference and Square Area) by asking students to observe the pictures and formulas on the board, the steps to work on the problem and the examples that have been provided. Then the researcher gives practice questions to students to find out how far students understand what has been explained.

3) Closing Activities

In the closing stage after all students have completed the evaluation questions, the researcher and students together make learning conclusions and convey the benefits of building a square flat.

1. Application of Problem Solving Model in Improving Numeracy Skills in Flat Building Problems

After this study was carried out, it was identified that the application of the problem-solving learning model in improving numeracy skills in grade IV students of SD Negeri Tanetea, Gowa Regency was still in the poor category, but after the implementation of this learning, the level of problem solving changed to a good category. The respondents in the study were 23 grade IV students of SD Negeri Tanetea, Gowa Regency. The instrument used was a pre-test sheet consisting of 15 questions.

Data Based on Descriptive Statistical Analysis Pre Test Descriptive Data and Frequency Distribution

The descriptive data of the pretest learning outcomes for this research can be seen in the table as follows:

Table 4.1 Results of Pre Test Numeracy Skills for Grade Students

Statistik	Skor
N	20
Mean	71,1
Median	73
Modus	73
Maximum Score	87
Minimum Score	60
Range	27
Deviasai Standars	6,67

Data Source: Research Results 2024

Table 4.1 shows the results of the pre-test with a total of 20 students with an average score of 71.1; the median numeracy skill score is 73; The most frequently appearing value in this data is 73; the standard deviation is 6.67; lowest score of 60; the highest score of 87; and the range of values is 27.

The results of the descriptive calculation in table 4.1 can be made a table of categorization of pre-test learning outcomes on the data of the research results of the classroom management instrument as a result of the classroom management instrument :

Table 4.2 Pre Test Categorization

Interval	Frequency	Percentage	Category
0 - 34	-	-	Very Low
35 - 54	-	-	Low

55 - 64	4	17%	Keep
65 - 84	15	4%	Tall
85 - 100	1	13%	Very High
Total	20	100	

Based on table 4.2, the research subjects are classified as follows: 17% (4 students) are in the medium category, 4% (15 students) are in the high category and 13% (1 student) are in the very high category. This means that 15 students who can apply the problem-solving model in improving numeracy skills.

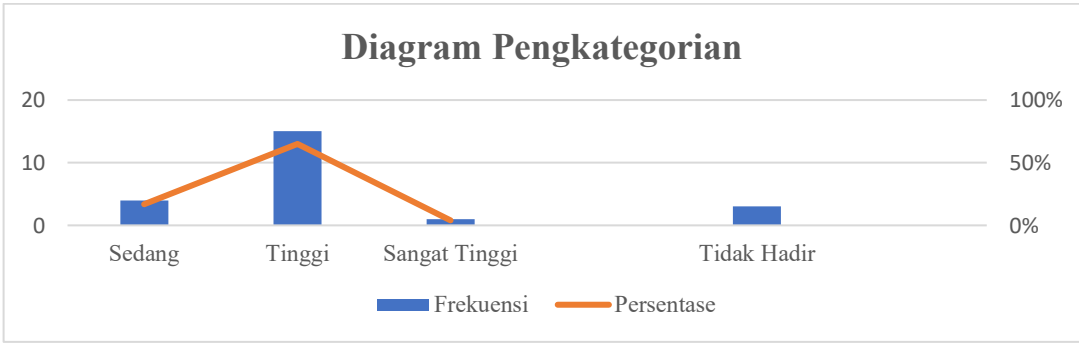


Figure 4.1 Pre Test Categorization Diagram

Based on Figure 4.1, the diagram showing the results of the problem solving shows that 4 students got results in the medium category, 15 students got results in the high category, only 1 student got the very high category and there were 3 students who did not take this test.

Descriptive Data Test Post and Frequency Distribution

The descriptive data of the post-test learning outcomes for this research can be seen in the table as follows:

Table 4.3 Results of the Grade Student Numeracy Skills Post Test

Statistik	Skor
N	23
Mean	79,57
Median	80
Modus	87
Skor Maksimum	93
Skor Minimum	60
Rentang	33
Standar Deviasai	9,04

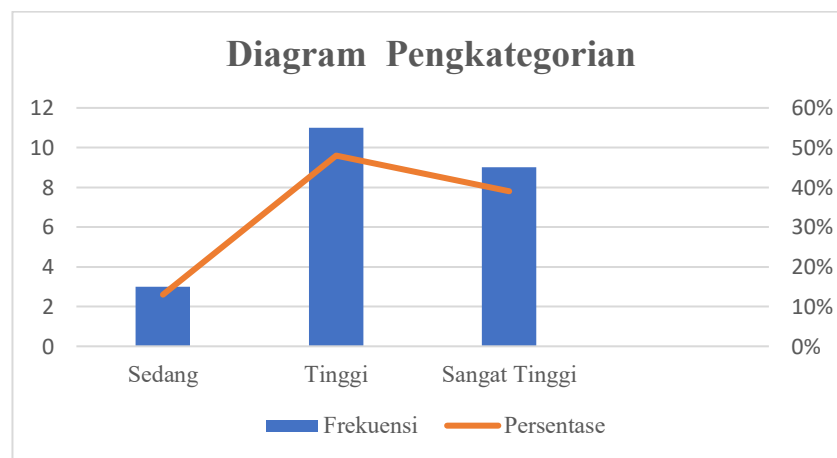
Sumber Data: Hasil Penelitian 2024

Table 4.3 shows the results of the post test with a total of 23 students with an average score of 79.57; the median numeracy skill score is 80; The most frequent value that appears in this data is 87; the standard deviation is 9.04; lowest score of 60; highest score of 93; and the range of values is 33.

Table 4.4 Categorization of Post Test Cycles

Interval	Frequency	Persentase	Kategori
0 - 34	-	-	Very Low
35 - 54	-	-	Low
55 - 64	3	13%	Keep
65 - 84	11	48%	Tall
85 - 100	9	39%	Very High
Total	23	100	

Berdasarkan tabel 4.4, subjek penelitian pada diklasifikasikan sebagai berikut: 13% (3 siswa) berada pada kategori sedang, 48% (11 siswa) berada pada kategori tinggi dan 39% (9 siswa) berada pada kategori sangat tinggi. Artinya, 15 orang siswa yang dapat menerapkan model pemecahan masalah dalam meningkatkan keterampilan numerasi.



Based on Figure 4.2, the diagram showing the results of the problem solving shows that 3 students got results in the medium category, 11 students got results in the high category, only 9 students got very high category. So it can be concluded that after problem solving is applied, students can solve problems and most of them are in the high category. This research can be said to have increased after the application of the problem-solving model.

This shows that there is a difference in learning using the problem-solving model and before using problem-solving, which can provide an interesting experience, can improve learning outcomes and help students to solve problems that have been faced both in the school environment, at home and in the surrounding environment.

The same (relevant) research conducted by the previous researcher is a research conducted by Yoce Febri Yoce Febrianus Abidano entitled "Application of Mathematical Problem Solving Approach in Curved Side Runag to Improve the Learning Outcomes of Grade IX.2 Students of SMPAN Mataram". The conclusion is that students' mathematical problem-solving ability in the subject matter of building curved side spaces is obtained on average 93.65%, the aspect of planning the solution is 67.25%, the aspect of implementing the solution is 87.69% and the aspect of checking the results is 63.94%. Learning with a mathematical problem-solving approach can improve students' ability to solve students' mathematical problems. This can be seen from the increase in average mastery of each cycle and daily repetition. From cycle I to cycle II increased by 14.63% and from cycle II to cycle III increased by 12.67%. (Siswa et al., 2021)

The similarity of this research with the research that will be carried out is that both research the approach to problem solving. Meanwhile, the difference in this research lies in the location of the research, the object of the research and the usefulness of the research.

The second research, research conducted by (Nurdiansyah & Riaddin, 2020) entitled "Comparison of Mathematics Learning Outcomes Through Problem Solving and Problem Posing Approaches in Grade IV Students of Rama Sejahtera Private Elementary School, Makassar City". The results of the study showed that mathematics learning for grade IV students of Rama Sejahtera Private Elementary School in Makassar City who were taught through the problem solving approach had an average score of 73.36 with a standard deviation of 10.20 out of an ideal score of 100. The mathematics learning outcomes of grade IV B students of Rama Sejahtera Private Elementary School in Makassar City who were taught through the problem posing approach had an average score of 67.96 with a standard deviation of 8.29 out of an ideal score of 100; and there is a significant difference in learning outcomes between students who are taught with the problem solving approach and the problem posing approach. The problem solving approach is better used in teaching and learning activities, especially for mathematics subjects in grade IV of Rama Sejahtera Private Elementary School, Makassar City.

4. CONCLUSIONS AND SUGGESTIONS

The application of the problem-solving learning model in mathematics subjects to improve students' numeracy skills is well carried out. It is evidenced by the increase in the implementation of the problem-solving learning model on the students' observation sheets in the good category. The results of the study showed that in cycle I, students with complete learning results in mathematics learning were 15 students or 65%, while the number of students who did not complete was 5 students or 22% with an average score of 71.15 and 3 people who did not attend the test out of a total of 23 students. Furthermore, in the second cycle, 20 students completed with a percentage of 87% and the number of students who did not complete was 3 people or 13% with an average score of 79.87. The conclusion is that the research at SD Inpres Tanetea is said to have succeeded in improving numerical learning outcomes for students in grade IV of SD Inpres Tanetea, Gowa Regency.

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