

Analysis Of Students' Problem-Solving Skill in Learning Mathematics at State Elementary School 1 Sukorejo

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Abstract

Current education demands students to have the ability to solve problems or problem-solving during learning activities, especially in certain subjects such as mathematics. This study aims to determine the results of the initial problem-solving abilities of 6th grade students in mathematics at SD Negeri 1 Sukorejo. This research method uses quantitative descriptive. Data collection was carried out through interviews with homeroom teachers, observations of students and teachers during learning activities, and questionnaires for students. Respondents in this study were homeroom teachers and 6th grade students. The results of data analysis obtained from interviews with homeroom teachers indicate that the mathematics learning process is not always optimal due to the lack of learning tools that can support students' problem-solving abilities. This is supported by the results of observations of learning activities in the classroom, which show that teachers have not yet maximized varied learning models to improve the problem-solving abilities of 6th grade students. The results of the questionnaire on students' problem-solving abilities also show that many are still in the low category in several aspects such as solution determination, implementation, and reflection evaluation. Based on the results of the data obtained, it can be concluded that the problem-solving abilities of 6th grade students at SD Negeri 1 Sukorejo in mathematics are still low.

Keywords: Teacher Perception, Mathematics, Problem Solving

Abstrak

Pendidikan masa sekarang menuntut siswa untuk dapat memiliki kemampuan dalam memecahkan masalah atau *problem solving* ketika kegiatan pembelajaran berlangsung terutama mata pelajaran tertentu seperti matematika. Penelitian ini bertujuan untuk mengetahui hasil kemampuan awal *problem solving* siswa kelas 6 pada mata pelajaran matematika di SD Negeri 1 Sukorejo. Metode penelitian ini menggunakan deskriptif kuantitatif. Pengambilan data dilakukan melalui kegiatan wawancara kepada wali kelas, observasi siswa dan guru saat kegiatan pembelajaran, dan angket untuk siswa. Responden dalam penelitian ini adalah wali kelas dan siswa kelas 6. Hasil analisa data yang diperoleh dari wawancara kepada wali kelas yaitu proses pembelajaran matematika tidak selalu optimal dikarenakan minimnya perangkat pembelajaran yang dapat menunjang kemampuan *problem solving* siswa. Hal itu didukung dengan hasil observasi kegiatan pembelajaran di kelas menunjukkan bahwa guru masih belum memaksimalkan model pembelajaran yang variatif untuk meningkatkan kemampuan *problem solving* siswa kelas 6. Hasil angket kemampuan *problem solving* siswa juga menunjukkan bahwa masih banyak yang masuk kategori rendah dalam beberapa aspek seperti penentuan solusi, implemmentasi, dan evaluasi refleksi. Berdasarkan hasil perolehan data tersebut, maka dapat diambil kesimpulan bahwa kemampuan *problem solving* siswa kelas 6 di SD Negeri 1 Sukorejo dalam mata pelajaran matematika masih rendah.

Kata Kunci : Analisis kebutuhan, Matematika, *Problem Solving*



INTRODUCTION

Twenty-first-century learning emphasizes the development of critical thinking and problem-solving skills (Kemendikdasmen, 2025). Problem-solving is a fundamental ability that supports students in addressing challenges that require higher-order thinking and appropriate solutions (Rosdiana, 2013). Problem solving is very important for students because it serves as the foundation in the process of solving a problem that requires high-level thinking skills and the right solutions to face challenges. "In the rapidly evolving landscape of the 21st century, critical thinking and problem-solving skills have emerged as essential competencies for success in both personal and professional domains" (Rusmin et al., 2024). Mathematics, as a subject dominated by problem-based tasks and numerical operations, requires strong problem-solving skills for successful learning outcomes. The difficulty levels available in each subtopic of mathematics subject material are not always the same; sometimes they are more challenging than the previous subtopic. Students' problem-solving abilities can help in identifying, selecting solution strategies, and determining the correct solutions based on the problem criteria provided in the questions. This is an important factor in mathematics education to develop good problem-solving skills.

However, mathematics is often perceived by students as difficult, boring, and uninteresting. Teachers play a crucial role in designing engaging learning environments that foster students' active participation and develop their problem-solving abilities. At SD Negeri 1 Sukorejo, learning activities tend to be teacher-centered, resulting in students being passive during lessons. To overcome this issue, learning should be student-centered, collaborative, and enjoyable, allowing students to develop their problem-solving skills optimally. Students' motivation to learn, which may have been insufficient in the past, can be strengthened through enjoyable learning. A desire to learn and solve issues may also be sparked by this. Students' ability to solve problems will become more evident indirectly. Teachers have not yet used this, though. In the field, the lack of government-provided learning resources has prevented educators from optimizing the educational process. They merely modify classroom instructional plans, which affects pupils' fundamental abilities as well.

Based on the above description, the researcher has chosen the research title "Analysis of Students' Problem-Solving Abilities in Mathematics Learning at SD Negeri 1 Sukorejo." The purpose of this study is to present data and describe the analysis of students' problem-solving abilities at SD Negeri 1 Sukorejo in the subject of mathematics. Every research study has a theoretical foundation, and this one likewise makes use of a number of specialized theories. Understanding analysis, learning mathematics, and problem-solving techniques are some of these theories.

The first is the analysis definition. Analysis is an activity focused on breaking down something that was originally whole into more detailed components. According to Sugiyono (2019), analysis is the systematic arrangement of research data into parts that are easier to understand. Arikunto (2018) explains that analysis is an effort to process data to answer research questions and test hypotheses. Therefore, analysis is a data processing activity involving the interpretation and classification of data to produce scientifically accountable conclusions. Second is mathematics learning. Mathematics learning requires problem-solving thinking skills. It is often perceived as difficult because it involves systematic problem-solving. Mathematics learning consists of five aspects: problem solving, reasoning and proof, communication, connections, and representation (NCTM, 2000). Effective learning activities encourage students to actively construct knowledge through meaningful experiences (Hudoyono, 2005). Teachers act as facilitators rather than primary information sources. And the third is problem-solving skills. Agustin (2021) Problem-solving ability involves systematic thinking processes to find solutions to problems. Asriningtyas (2023) states that problem-solving is a higher-order thinking skill involving logical decision-making.

Problem-solving consists of five aspects: problem identification, conceptual understanding, strategy planning, strategy implementation, and evaluation. These skills are essential in mathematics learning.

The purpose of this study is to obtain initial results of the problem solving abilities of 6th grade students in mathematics subjects at one of the public elementary schools in the Wedi sub-district, namely SD Negeri 1 Sukorejo. The main material used in this study is fraction material which consists of several sub-chapters including multiplication and division of natural numbers with fractions, as well as comparing large and small values between fractions. So in this study has a problem formulation, namely how are the results of the initial needs analysis related to the problem solving abilities of 6th grade students at SD Negeri 1 Sukorejo?

METHOD

This study employed a quantitative approach. The research subjects were sixth-grade students and teachers at SD Negeri 1 Sukorejo. The research was conducted at this school because it is the main school in Wedi District, with a large student population and parallel classes. This allowed for a more proportional sample size compared to nearby public elementary schools. Furthermore, SD Negeri 1 Sukorejo has adequate facilities to support this research. There are two variables in this study. The independent variable (X) was problem-solving ability, and the dependent variable (Y) was mathematics learning. Data were collected through observation, interviews, questionnaires, and documentation. During class activities, observations were made of both the teacher and the students, with an emphasis on the students' capacity for problem-solving and the teacher's methodical approach to teaching. The sixth-grade homeroom teacher, who also teaches arithmetic, was interviewed. The purpose of the interview was to understand more about the students' mathematical problem-solving skills as well as any challenges or limitations they faced while learning. Only students who engaged in multiple facets of problem-solving were given the problem-solving ability questionnaire. Data analysis used descriptive statistics with SPSS version 20 and qualitative descriptive narration. The tests conducted were validity testing, reliability testing, and simple linear regression.

RESULTS AND DISCUSSION

Analysis of students' problem-solving abilities in mathematics conducted by the researcher obtained results from several sources, including observations of learning activities, interviews with teachers, and student questionnaires. First, based on observation results, it was found that the learning activities are still teacher-centered, so students appear passive and bored during the activities. Students' thinking patterns in solving problems are still not optimal, particularly in terms of problem-solving aspects, which are not fully met because they consider mathematics material difficult and seem less expressive or motivated in their work. Second, the interview with teachers stated that students' problem-solving abilities are relatively low in mathematics due to a lack of motivation within themselves, and teachers realize that the teaching methods used are not varied enough, causing students to easily become bored. Third, through questionnaires given to students to assess their problem-solving abilities related to mathematics material, it was found that many students still have low problem-solving skills.

Table 1. Normality test

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
X	.118	26	.200*	.955	26	.295
Y	.189	26	.018	.927	26	.065

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Because there were fewer than thirty respondents in the research samples, the researcher employed the Shapiro-Wilk test. The purpose of this test is to ascertain the typical state of the study's data. Whether the value experiences significance (Sig.) greater than the typical limit of 0.05 serves as the foundation for decision-making in the Shapiro-Wilk test. The data is deemed suitable for distribution if the final result exceeds the standard value. The significant values for variables X (problem-solving ability) and Y (mathematics learning) are 0.295 and 0.065, respectively, based on the normality test results. As a result, the research data satisfy the normalcy assumption, allowing parametric analysis to proceed.

Table 2. Linearity test

ANOVA Table						
		Sum of Squares	df	Mean Square	F	Sig.
Y * X Between Groups	(Combined)	40.834	5	8.167	5.485	.002
	Linearity	30.325	1	30.325	20.365	.000
	Deviation from Linearity	10.509	4	2.627	1.764	.176
Within Groups		29.781	20	1.489		
Total		70.615	25			

It is known that the deviation from linearity value is 0.176. The linearity test is used to determine whether the connection between the independent variable X (problem-solving abilities) and the dependent variable Y (mathematics learning) is linear if the significance value is larger than 0.05. It can be inferred that there is a linear relationship between the independent variable X (problem-solving ability) and the dependent variable Y (mathematics learning) based on the findings of calculating the significance value of Deviation from Linearity in this study, which is $0.176 > 0.05$.

Table 3. Hypothesis test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.325	1	30.325	18.064	.000 ^b
	Residual	40.290	24	1.679		
	Total	70.615	25			

a. Dependent Variable: Y

b. Predictors: (Constant), X

H0 was rejected, and H1 was approved based on the significance test findings, which showed a significance value of $0.000 < 0.05$. As a result, there is a strong correlation between variable Y (mathematics learning) and variable X (problem-solving skill).

Table 4. Determination Test

Model Summary ^b				
Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.789 ^a	.623	.605	2.333

a. Predictors: (Constant), X

b. Dependent Variable: Y

In comparison to variable Y (mathematics learning), variable X (problem-solving skill) can account for 62.3% of students' poor problem-solving ability, according to the R Square (R^2) value of 0.623. Other factors outside of variable X that were not looked at in this study have an impact on the remaining 37.7%.

It may be inferred from the study's test results that there is a correlation between the dependent variable Y (mathematics) and the independent variable X (problem-solving skills). Additionally, the data collection results show that some children continue to have poor problem-solving skills. In addition, the data collection results show that some students still have low problem-solving skills. This can be explained through observation activities during learning facilitated by the teacher. During mathematics learning activities, many students remain passive. There is no visible enthusiasm or excitement within them. The teaching activities conducted by the teacher are too monotonous and lack student activity, which results in boredom. Additionally, this has the side effect of limiting or not maximizing exercises to improve students' problem-solving abilities. The teacher only uses basic learning tools without developing or updating them to support the classroom learning process. Therefore, the teacher hopes that someday there will be the provision of learning tools.

Students' low problem-solving abilities can occur because teachers implement the teacher-centered method and do not utilize students' creative learning abilities, resulting in problem-solving abilities not emerging when solving a problem (Cahyani & Sulastri, 2021). The problem of students' low problem-solving abilities requires learning

that is in harmony with students' characteristics and needs (Tripani et al., 2023). Students' problem-solving abilities must be improved and become the focus of this research to provide immediate solutions, especially regarding supporting learning devices. This aligns with the statement that success in education can be influenced by learning tools and a supportive environment (Utami et al., 2022).

The success of an educational activity is also influenced by the use of learning tools (Efrina et al., 2021). Teaching modules are an important part of learning tools and are a determining factor in the quality of learning carried out by teachers. In previous research, many researchers developed separate learning tools, such as student worksheets (LKPD) or lesson plans (RPP), that successfully improved students' thinking skills. This study focuses on improving students' problem-solving skills through the use of a comprehensive learning tool, namely a teaching deep learning module.

CONCLUSION

Mathematics is considered a difficult subject because students are required to identify and solve problems. This requires students to develop good problem-solving skills. This study aims to determine the percentage of students at SD Negeri 1 Sukorejo who have low problem-solving skills. Based on the results of the tests conducted and the collected data, it was found that 62.3% of students still have low problem-solving skills. Interviews with the 6th-grade homeroom teacher revealed that this could occur due to a suboptimal learning system, which only uses basic learning tools and minimal learning motivation from within the students.

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