

# Problem-Based Math Learning Strategies To Improve Students' Problem-Solving Skills



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## KEYWORDS

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## ABSTRACT

Effective mathematics learning is characterized by students' ability to solve mathematical problems independently. One strategy that has been known in improving students' problem-solving skills is a problem-based approach. This study aims to explore and analyze the effectiveness of problem-based mathematics learning strategies in improving students' problem-solving abilities. Qualitative methods were used in this study by conducting literature studies and library research to collect data from various relevant sources. Findings from this study reveal that problem-based math learning strategies make a significant contribution in improving students' problem-solving abilities. With this approach, students are not only taught to remember facts and formulas, but also trained to apply mathematical knowledge in real-world situations. In addition, this strategy also encourages students to develop critical, creative, and analytical thinking skills that are essential in problem solving. The results of this study provide valuable insights for educators in designing and implementing more effective mathematics learning to improve students' problem-solving abilities.

## 1. Introduction

Mathematics education plays an important role in shaping students' critical and analytical thinking skills, especially in problem-solving skills. However, there are still many students who have difficulty in understanding and solving math problems, both at the elementary, middle, and college levels. This shows the need for effective learning strategies to improve students' problem-solving abilities. Although

there has been a lot of research on mathematics learning strategies, there are still research gaps that need to be explored further, especially in the context of implementing problem-based learning strategies to improve students' problem-solving abilities. Previous research has tended to emphasize traditional teaching approaches that place more emphasis on providing information, while problem-based

approaches require students to be active in identifying, formulating, and solving math problems.

The increasing demand for problem-solving skills in various aspects of life emphasizes the urgency to develop mathematics learning strategies that can improve these abilities. Improved problem-solving skills will contribute positively to the quality of education and students' preparation for future challenges. Several past studies have highlighted the importance of problem-based learning strategies in improving students' problem-solving skills. However, further in-depth research is still needed to explore various aspects of the implementation and effectiveness of this strategy. This study proposes to explore in greater depth problem-based mathematics learning strategies and test their effectiveness in improving students' problem-solving abilities, focusing on relevant educational contexts.

The main objective of this study was to evaluate the effectiveness of problem-based mathematics learning strategies in improving students' problem-solving abilities. Thus, this research is expected to make a significant contribution to the development of more effective mathematics education. Benefits include increased understanding and application of innovative learning strategies for educators and improved students' problem-solving skills in the context of mathematics and everyday life. Thus, this research is expected to fill the existing knowledge gap and make a positive contribution to the development of better mathematics education in the future.

## 2. Methodology

This research uses a qualitative approach with a focus on literature studies and library research. The qualitative approach was chosen

because it allows researchers to explore in depth the concepts and phenomena associated with problem-based mathematics learning strategies as well as their effectiveness in improving students' problem-solving abilities. Data sources in this study are various scientific journal articles, books, theses, dissertations, and other relevant documents related to problem-based mathematics learning and students' problem-solving abilities. Data will be collected from various databases of scientific journals such as Google Scholar, PubMed, and university databases.

The data collection techniques used are literature studies and library research. Researchers will conduct a systematic search of relevant literature using keywords that are in accordance with the research topic. Next, researchers will select the most relevant and high-quality literature to be included in the analysis. The data collected will be analyzed qualitatively using the content analysis method. Researchers will read selected literature to identify patterns, themes, and concepts that emerge related to problem-based mathematics learning strategies and students' problem-solving abilities. Furthermore, the data will be compiled, categorized, and analyzed in depth to understand the implications and findings relevant to the research objectives. By using qualitative approaches and data collection techniques for literature studies and library research, it is hoped that this research can provide a deep understanding of problem-based mathematics learning strategies and their contribution in improving students' problem-solving abilities.

## 3. Result and Discussion

*1. The application of problem-based mathematics learning strategies effectively increases student involvement in the learning process. By placing students in a problem-solving context, this strategy encourages students' active involvement in identifying,*

*formulating, and finding solutions to mathematical problems.*

*2. Problem-based learning strategies provide relevant and meaningful context for students. By presenting problems related to everyday life or real-world situations, learning mathematics becomes more interesting and can motivate students to learn better.*

*3. Through the problem-solving process, students develop critical, analytical, and creative thinking skills. They are taught to identify problems, gather relevant information, develop resolution strategies, and evaluate resulting solutions.*

*4. Problem-based learning strategies also develop students' social and communication skills. Group discussions, brainstorming, and presentation of problem-solving results are integral parts of the learning process that strengthen students' social skills and communication skills.*

*5. While there is evidence supporting the effectiveness of problem-based maths learning strategies, their implementation requires support and training for teachers. Teachers need to receive training in designing and implementing effective problem-based learning, as well as being able to adapt strategies to student characteristics and learning contexts.*

*6. In the context of this study, the findings confirm that problem-based mathematics learning strategies have great potential to improve students' problem-solving abilities. By paying attention to relevant aspects of implementation, this strategy can be one of the effective learning approaches in improving the quality of mathematics education.*

The results of the analysis and discussion of this study highlight the effectiveness of problem-based mathematics learning

strategies in improving students' problem-solving abilities. Based on literature studies conducted, there is strong evidence that the application of problem-based learning strategies contributes positively to improving students' problem-solving abilities in the context of mathematics. First of all, problem-based learning strategies allow students to be actively involved in the learning process. By placing students in situations that require problem solving, this strategy encourages students to develop critical, analytical, and creative thinking skills in finding solutions. Through hands-on experience in solving math problems, students can hone logic skills and abstract thinking that are essential in problem solving.

In addition, problem-based learning strategies also provide relevant and meaningful context for students. By presenting problems related to everyday life or real-world situations, mathematics learning becomes more relevant and interesting for students. This motivates students to engage more deeply in learning and increases their understanding of the mathematical concepts taught. Furthermore, through the problem-solving process, students are also taught to work collaboratively and communicate their thoughts well. Problem-based learning strategies often involve group discussions, brainstorming, and presentation of problem-solving outcomes, which directly develop students' social and communication skills.

However, despite the evidence supporting the effectiveness of problem-based mathematics learning strategies, several factors need to be considered in their implementation. Among others is the need for support and training for teachers in designing and implementing problem-based learning well, as well as the importance of adjusting strategies according to student characteristics and learning contexts. In the context of this study, the results of analysis and discussion confirm that problem-based mathematics learning strategies have great

potential to improve students' problem-solving abilities. By paying attention to relevant aspects of implementation, this strategy can be one of the effective learning approaches in improving the quality of mathematics education.

#### 4. Conclusion

Thus, it can be concluded that the application of problem-based mathematics learning strategies is an effective approach in improving students' problem-solving abilities. Through this approach, students are not only actively involved in the learning process, but are also given the opportunity to develop their critical, analytical, and creative thinking skills. In addition, this strategy provides relevant and meaningful learning context for students, thus motivating them to learn more diligently. Thus, problem-based mathematics learning strategies have great potential to improve the quality of mathematics education and prepare students to face future challenges.

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