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Qualitative Study of Teachers' Barriers and Strategies in Learning Mathematics in Elementary School

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Abstract: Learning mathematics in primary schools is a crucial component in the formation of students' knowledge and skills base. However, many students face difficulties in understanding basic mathematics concepts, often due to internal and external barriers. This study aims to identify the barriers faced by students and teachers in learning mathematics in primary schools and the strategies that can be applied to overcome these barriers. A qualitative approach was used in this study through interviews with teachers and students, as well as observations in several classes in primary schools. The results show that the barriers faced by students include difficulties in understanding abstract concepts, fear of mathematics, and differences in learning abilities between students. On the other hand, barriers faced by teachers include limitations in the use of innovative learning media and lack of training in effective learning strategies. The strategies found to be effective in overcoming these barriers include the use of contextualized approaches, project-based learning, and the application of educational technology to improve students' interaction with the material. This research provides a deep insight into the dynamics of learning mathematics in primary schools and offers recommendations for the development of teaching methods that are more adaptive and suited to students' needs. It is hoped that the findings can contribute to improving the quality of mathematics learning at the primary school level and benefit the development of education in Indonesia.
Keywords: Learning Mathematics, Learning Barriers, Teacher Strategies

Introduction

Mathematics education at the primary school level is an important foundation in building children's logical, analytical and critical thinking skills (Amelia & Rusman, 2022). Math's is often considered a challenging and difficult subject to understand by most students. Therefore, a deep understanding of the barriers faced by students and effective learning strategies are very important to improve the quality of mathematics learning in primary schools (Widodo et al., 2021).

Obstacles in learning mathematics in primary schools can come from various factors, both internal and external. Among the internal factors are students' difficulties in understanding basic mathematical concepts, mathematical anxiety, and differences in ability between students (Kusmartiningrum et al., 2024). On the other hand, external factors involve limited teaching resources, an inflexible curriculum, and a lack of training for teachers in using innovative teaching methods. These barriers often affect the effectiveness of the learning process and impact on students' mathematics learning outcomes (Fadilah & Effendi, 2023).

Several previous studies have shown that traditional approaches to teaching mathematics that focus more on memorizing formulas or procedures are often not effective enough in improving students' understanding of mathematical concepts.

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Therefore, it is necessary to understand more about the barriers faced by students and teachers in the process of learning mathematics, as well as strategies that can be implemented to overcome these barriers (Prajana & Astuti, 2020).

In response to this problem, various teaching strategies have been proposed to improve mathematics understanding in primary schools (Johnson et al., 2013). These strategies include more creative and fun learning approaches, such as the use of interactive learning media, project-based learning, as well as the application of contextualized learning that connects mathematical concepts to students' daily lives (Fajriati & Murtiyasa, 2023). However, although these strategies have been proven effective in some contexts, the challenges in implementing them in the field are still enormous. Limited resources, differences in students' ability levels, and lack of support in teacher training are inhibiting factors that still need to be overcome.

This qualitative study aims to explore the barriers faced by students and teachers in learning mathematics in primary schools and the strategies that can be applied to overcome these barriers. Through interviews with teachers, classroom observations and discussions with students, this study hopes to provide a deeper insight into the factors that influence mathematics learning at the primary level and how appropriate strategies can help overcome these barriers.

Several recent studies have shown that qualitative approaches are useful for gaining a more holistic understanding of the learning context, including students' and teachers' understanding of mathematics learning (Astuti et al., 2022). With this approach, it is expected that solutions can be found that are more in line with contextual needs in the field, so as to improve the quality of mathematics learning in primary schools and provide greater benefits for students' intellectual development.

Material and Method

This study uses a qualitative approach to explore the barriers and strategies used by teachers in learning mathematics in primary schools, namely SDN 17 Rejang Lebong, SDN 18 Rejang Lebong, and SDN 77 Rejang Lebong located in Curup Selatan, Bengkulu Province. The materials used in this study include data obtained from interviews, observations, and documentation related to the learning process of mathematics in several primary schools in the designated areas.

1. **Research Participants**

   The study participants consisted of two main groups, namely:

   a. Math's teachers: Six mathematics teachers who teach grades 4 and 5 in primary schools. These teachers were selected because they had at least 5 years of experience teaching mathematics and were therefore considered to be able to provide a deeper insight into the barriers and teaching strategies they applied.
   b. Students: A total of 30 students from grades 4 and 5 who were involved in the learning process of mathematics at the primary school. These students were randomly selected from three different primary schools to get a broader representation of their experiences and challenges in learning mathematics.

2. **Data Collection Tools**
   a. Semi-Structured Interviews: Interviews were conducted with teachers and students to gather more information about the barriers they face in learning mathematics and the teaching strategies applied in the classroom. Interviews with teachers aimed to gain an understanding of their perspectives on the challenges in the classroom, while interviews with students focused on their experiences of difficulties in learning mathematics.
   b. Classroom Observation: The researcher made direct observations of mathematics learning activities in the classroom. This observation aimed to understand the dynamics of interaction between teachers and students, the methods used by teachers in teaching, and students' responses to the material taught.
   c. Documentation: The collection of documents such as teacher lesson plans, mathematics exam questions, and student evaluation records was conducted to provide a more complete picture of the context and practice of learning mathematics in the classroom.
3. **Research Location**

   The study was conducted in three primary schools located in urban and rural areas, each representing different conditions in terms of access to educational resources and the level of socio-economic diversity of students. The primary schools, SDN 17 Rejang Lebong, SDN 18 Rejang Lebong and SDN 77 Rejang Lebong, are located in Curup Selatan, Bengkulu Province.

Results and Discussion

In this study, some of the main barriers faced by students and teachers in learning mathematics in primary schools were found. These barriers fall into two broad categories: barriers experienced by students and barriers faced by teachers.

Barriers Faced by Students

1. Difficulty in Understanding Mathematical Concepts: Based on interviews, most students had difficulty in understanding basic mathematical concepts, especially in abstract material such as fractions, measurement, and geometry. This difficulty is especially prevalent among students who have different levels of understanding. For example, at SDN 17 and SDN 18 Rejang Lebong some students revealed that they had difficulty understanding more complex arithmetic operations such as division and multiplication of large numbers. This is also influenced by a lack of understanding of basic concepts that should have been mastered in previous grades.
2. Mathematical Anxiety**:** Some students report that they feel anxious and fearful when facing math's lessons. This fear leads to a lack of motivation to learn, which in turn affects their performance in class. Almost all of these students at SDN 18 and SDN 77 Rejang Lebong perceived math's as a "complicated" and

"confusing" subject, so they felt pressured when they had to solve math's problems. This phenomenon was more common among students who had had bad experiences with math's in previous years.

3. Differences in Student Ability: There is a marked difference in ability among students in understanding mathematical material. Some high ability students can easily solve more complex problems, while low ability students experience greater difficulty. This creates challenges for teachers in devising teaching strategies that can reach all students equally.

Barriers Faced by Teachers

1. Limited Teaching Resources: Four out of six teachers revealed that they experienced difficulties in providing sufficient resources to support mathematics learning. These limitations include the lack of varied learning media (such as teaching aids or educational technology) that can help students understand the material in a more fun and interactive way. In addition, many schools have not fully utilized technology in the learning process.
2. Lack of Training in Innovative Teaching Strategies: All the Math's Teachers involved in this study admitted that they often feel they lack skills in using innovative and creative teaching strategies. They tend to rely on conventional teaching methods, such as lectures and practice problems, which are sometimes not effective enough in overcoming students' learning barriers. Limited training on the use of technology in mathematics learning is also an obstacle.
3. Challenges in Managing a Diverse Ability Class: Five out of Six Teachers revealed that managing a class with students who have different abilities in mathematics is a big challenge. Teachers often find it difficult to tailor materials to the needs of all students, as some students need more attention in understanding basic concepts and others need additional challenges. This results in learning not being fully optimized for all students.

Strategies Used to Overcome Barriers

Despite the various barriers to learning mathematics, some effective strategies have been implemented by teachers to overcome these challenges.

Learning Strategies to Overcome Student Barriers

1. Contextualized Learning Approach: Some teachers use a contextualized approach that connects mathematical concepts to students' everyday life situations. For example, teachers illustrate the concept of fractions by using examples of food or goods division that students are familiar with. This approach is proven to help students understand abstract concepts more easily and enjoyably. This is also supported by research (Damayanti, 2023) that in overcoming the difficulties of elementary school children to work on mathematics story problems, it is highly recommended to use a contextual approach.

2. Use of Interactive Media and Technology: In some classes, teachers have begun to utilize technology such as game-based math's learning apps or interactive learning videos that can capture students' interest. Such media allows students to learn while playing, thus reducing their anxiety towards math's. (Astuti et al., 2022) The use of applications such as Kahoot! and Google Classroom also provide opportunities for students to practice problems independently outside of class hours.
3. Collaborative Learning: To address the differences in ability between students, some teachers apply collaborative learning methods, where students work in small groups to solve math's problems together. Supported by research (Ekowati et al., n.d.) this method not only improves the understanding of faster students, but also provides opportunities for struggling students to learn from their peers.

Learning Strategies to Overcome Teacher Barriers

1. Ongoing Teacher Training: The teachers involved in this study stated that they benefited from training conducted by their schools or other educational institutions on more innovative mathematics teaching strategies. For example, training on the use of technology in learning or project-based learning methods helped teachers to create a more dynamic and engaging learning environment.
2. Use of Differentiated Learning Methods: To overcome the differences in students' abilities, teachers apply differentiated learning methods. They give different types of tasks according to the ability level of each student, for example, simpler problems for students who are struggling and more challenging problems for students who have more ability. In the research (Ananda & Wandini, 2022) mentioned that this method helps each student to learn according to their ability, without feeling left behind or burdened.
3. Flexible Lesson Plan Development: Teachers also adopted a more flexible approach in designing lesson plans. They give space for students to ask questions and discuss, and provide sufficient time for more practice problems. This helps students to better understand the concepts gradually and reduces the pressure they feel.

Impact and Implications

The strategies implemented by teachers in this study showed a positive impact on students' understanding and motivation to learn. Students who previously felt anxious and struggled in learning mathematics showed an improvement in their ability after the implementation of more creative and contextualized learning methods. In addition, the use of technology in learning also increased students' engagement, making them more enthusiastic in participating in lessons. For teachers, more intensive training and the use of more varied teaching strategies increased their confidence in teaching mathematics. Teachers felt more prepared to face challenges in the classroom and were better able to manage the class, especially in dealing with students who have different learning abilities.

Conclusion

This research shows that learning mathematics in primary schools faces significant barriers, both from the students and teachers. Obstacles faced by students include difficulties in understanding abstract concepts, anxiety about mathematics, and differences in ability between students. On the other hand, teachers also face challenges in terms of limited learning resources, lack of training in the use of innovative teaching strategies, and difficulties in managing a class with diverse abilities. Barriers to Math's Learning: 1). Student Difficulties: Many students have difficulty in understanding mathematical concepts, especially those involving abstract logic and calculations. 2). Limited Facilities: Some schools lack resources such as teaching aids or technology that can assist in learning mathematics. 3). Time Limitations: Limited time in class hours often prevents teachers from teaching concepts in depth. 4). Lack of Student Motivation: Many students feel disinterested or inhibited in learning mathematics because it is considered a difficult or boring subject. Teachers' Strategies in Overcoming Obstacles: 1). Varied Approaches: Teachers apply various learning methods such as group discussions, educational games, and the use of props to make math's more interesting and easy to understand. 2). Use of Technology: Some teachers utilize technology, such as learning apps or videos, to clarify concepts and increase students' interest. 3). Adjustment of Learning Materials: Materials are tailored to students' needs and abilities, paying more attention to students who are having difficulties. 4). Increased Student Engagement: Teachers try to increase student motivation and engagement through a more interactive and fun approach. Overall, to improve the quality of mathematics learning at the primary school level, more flexible and creative approaches are needed, as well as greater support for teachers, both in terms of training and the provision of supporting facilities and infrastructure. This research is expected to contribute to the formulation of better education policies and strategies, so that the barriers can be overcome and learning mathematics can be more effective and enjoyable for students.

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