



Overcoming Numeracy Difficulties in MI Students: Educational Solutions to Improve National Assessment Outcomes

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Abstract:

This study focuses on students' difficulties in learning numeracy at Madrasah Ibtidaiyah (MI) Alam Ya Bunayya Bungo. The main problem identified was the low ability of students to solve complex numeracy problems, which involved an understanding of in-depth mathematical concepts, procedural steps, and problem-solving skills. This study uses a qualitative approach with a case study design. Data was collected through in-depth interviews with students, teachers, and parents, participatory observation during classroom learning, as well as analysis of documentation, such as lesson plans and student work outcomes. Data analysis is carried out through three main stages, namely reduction, presentation, and data verification. The results showed that students' difficulties were caused by limited understanding of basic mathematics, less interactive teaching methods, and low support from families at home. Teachers tend to use traditional teaching methods that only emphasize memorization and mechanical procedures. On the other hand, students who were actively involved with visual aids, such as pictures and concrete objects, showed a better understanding of numeracy problems. Family support was also found to have a significant influence on students' motivation and confidence in learning. The implication of this study is the importance of adopting teaching methods based on direct experience and the use of visual aids in numeracy learning. In addition, synergy between teachers, schools, and parents needs to be improved to support students' academic success holistically. This study provides strategic recommendations for teachers and education policy makers to overcome gaps in numeracy learning.

Keywords: *Numeracy Difficulty, National Assessment, Mathematics Education*

INTRODUCTION

Numeracy is an important skill that is the basis for math mastery and critical thinking skills (Arisoy & Aybek, 2021; Setiana & Purwoko, 2021; Ismail et al., 2022). However, the reality is that many students at the Madrasah Ibtidaiyah (MI) level still face great challenges in understanding and working on complex numeracy problems (Widat et al., 2023; Damayanti et al., 2023; Hermawan & Asnawi, 2023). This problem is not only happening in urban areas, but also in rural areas such as Bungo, where MI Alam Ya Bunayya is located. Based on the results of initial observations, students often find it difficult when facing problems that require understanding step-by-step steps, problem solving, or applying mathematical concepts to real situations. This difficulty is compounded by a lack of support from home because most parents of students have limited mathematical knowledge. This problem suggests that there is a gap between

students' need to master numeracy as a basic skill and the learning methods used in the classroom, which still focus on memorization and mechanical procedures (Ramírez-Montoya et al., 2021; Muñoz et al., 2022; Shirawia et al., 2023).

Previous research has shown that good numeracy mastery is strongly correlated with students' ability to understand other subjects, including science and economics (Han & Borgonovi, 2020; Davis-Kean et al., 2022; Tomaszewski et al., 2020). This is also conveyed by Shi et al., (2023) in their research which emphasizes the importance of hands-on, experiential teaching to help students understand abstract concepts such as mathematics. However, in Indonesia, several studies show that the numeracy learning approach is still not optimal (Purnomo et al., 2022; Nugraheni & Sukestiyarno, 2022; Azzajjad et al., 2023). Most teaching methods only emphasize basic numeracy skills, without involving the development of critical thinking or problem-solving skills. This condition is exacerbated by the limitations of learning aids and the lack of teacher training in implementing interactive teaching methods (Coman et al., 2020; Zalat et al., 2021; Oliveira et al., 2021). These findings underscore the urgent need to adopt a more holistic and innovative learning approach to improve students' understanding of numeracy concepts, especially at the primary education level such as MI.

This study aims to understand the difficulties faced by MI Alam Ya Bunayya students in learning numeracy and identify strategies that can help them overcome these problems. Specifically, this study seeks to answer the following questions: (1) What are the factors that cause students to have difficulty solving numeracy problems? (2) What are the teaching strategies that teachers apply in helping students understand complex numeracy concepts? (3) To what extent does support from family affect students' numeracy skills? By answering these questions, it is hoped that the research can provide practical recommendations to improve numeracy learning in MI Alam Ya Bunayya and other schools that are facing similar challenges.

This research is based on the assumption that students' difficulties in learning numeracy are caused by a combination of internal and external factors. Internal factors include a lack of basic understanding of mathematics and low student confidence. External factors include less interactive teaching methods, lack of visual aids, and low support from families. The hypothesis proposed is that the use of visual and concrete aids and learning approaches based on direct experience can improve students' understanding of numeracy. The proposed provisional answer is that teaching strategies that integrate visual aids with interactive approaches as well as synergy between schools and families will have a significant positive impact on the numeracy skills of MI Alam Ya Bunayya students. This research is expected to provide empirical evidence to support these assumptions and hypotheses.

RESEARCH METHOD

This research was conducted at Madrasah Ibtidaiyah (MI) Alam Ya Bunayya Bungo. The unit of analysis in this study includes students who have difficulties in learning numeracy, as well as supporting and inhibiting factors that affect their learning process. The research uses a qualitative design with a case study approach, which allows for in-depth exploration of the phenomenon of numeracy difficulties in these locations (Hong et al., 2020; Tomaszewski et al., 2020; Renjith et al., 2021). The case study approach was chosen to understand

the specific context that influences learning, including teaching methods, the use of assistive devices, and social support from the family. The study also examines how students interact with complex numeracy subject matter and how teachers adapt their teaching strategies. With this design, the research aims to reveal the dynamics of numeracy learning in detail, as well as provide practical recommendations for the improvement of teaching methods in the future.

The source of information for this study involves three main groups: students, teachers, and parents. The students who were the focus of the research were those who were identified as having difficulty solving complex numeracy problems. The interviewed teacher is an educator who is responsible for teaching numeracy at MI Alam Ya Bunayya. In addition, parents of students are also the main source of information to understand the social support they provide at home. Primary data was collected through in-depth interviews with each group of respondents, while secondary data was obtained from school documents such as lesson plans, evaluation records, and student work. The selection of respondents was carried out purposively to ensure that the data obtained was relevant and provide a holistic picture of the problem being studied. The variety of respondents reflects diverse perspectives, both from students, teachers, and parents, thus providing data integrity in the research.

Data collection was carried out using three main methods: in-depth interviews, participatory observation, and documentation. In-depth interviews were conducted to explore the experiences, views, and challenges of students, teachers, and parents related to numeracy learning. Participatory observation is carried out during the learning process in the classroom to record students' interactions with teachers and the use of tools in understanding mathematical concepts. Documentation includes analysis of lesson plans, student work outcomes, and teacher teaching records. The collected data is analyzed through three stages: (1) Data reduction, namely selecting and filtering data relevant to the focus of the research; (2) Data presentation, where data is organized in the form of narratives and tables for further interpretation; (3) Data verification, which is carried out through triangulation of information sources to ensure the validity and reliability of research findings.

RESULTS AND DISCUSSION

Result

Students' Perception of Numeracy Learning

This study reveals how students perceive numeracy learning in Madrasah Ibtidaiyah (MI), focusing on the difficulties they face when working on more complex numeracy problems. Based on observations made in several classes, it was found that most students seemed to have difficulty when asked to solve numeracy problems that involved more than just basic calculations. Students tend to be confused when dealing with problems that require step-by-step calculation steps, so it takes longer to complete the task. Some students even seemed unsure of the steps to take to solve the problem, indicating a considerable gap in understanding of basic mathematical concepts. This observation shows that the delivery of numeracy material that is not optimal can be one of the main factors that hinder students' understanding.

From the observation activities carried out, it is clear that most students have difficulty understanding problems that not only test their numeracy skills, but also require a deeper understanding of mathematical concepts. Students

seem to tend to be more likely to deal with problems with simpler mathematical operations, but when faced with problems that require a more complex understanding of procedures and steps, they feel confused and stuck. In fact, some students showed impatient behavior, such as giving up or asking the teacher for help more often than when they were working on easier problems. This shows that the teaching provided so far has not been adequate in helping students understand mathematical concepts in depth. Although students have good foundational knowledge, they are less trained to think critically in solving more complex problems. From the results of the observations made, it can then be visualized as shown in figure 1. To make it easier to understand the findings found in the research conducted.

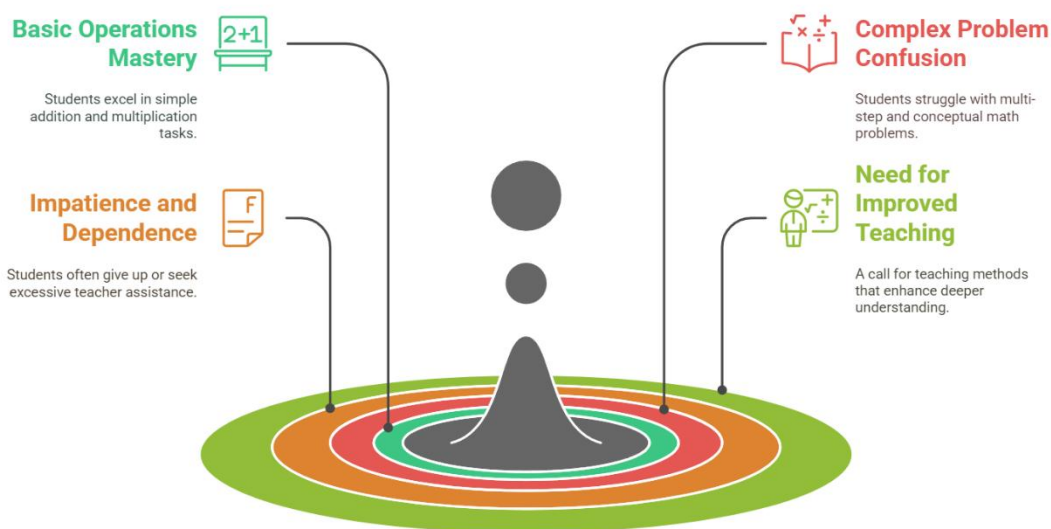


Figure 1. Students' Numeracy Challenges

From the results of the observations that have been presented previously, it can be concluded that the majority of students at the MI level face difficulties in solving more complex numeracy problems. They seem to have an easier time solving problems that involve only basic operations such as simple addition or multiplication, but experience confusion and decreased confidence when the problem requires a deeper understanding of mathematical concepts and longer procedural steps. This shows that even though students have mastered the basics of mathematics, they are not ready to apply those concepts in more complex contexts. This difficulty is more common in problems that require students to think critically and solve problems gradually, which indicates a gap between their basic and problem-solving skills. These findings show that a more in-depth teaching approach, which emphasizes not only the speed of counting, but also the understanding of the problem-solving process, is very necessary to support the development of students' numeracy skills more optimally.

Teachers' Strategies in Overcoming Students' Numeracy Difficulties

One of the important findings obtained from the lesson plan documentation is about the strategies applied by teachers to help students overcome difficulties in learning numeracy. Based on the documents collected, it was found that teachers used more visual aids, such as pictures and concrete objects, to make it easier for students to understand abstract mathematical

concepts. In the recorded lesson plan, teachers also use whiteboards and other media to describe the steps to solve problems more clearly. This is done with the aim of providing a more interactive learning experience, where students can directly see and interact with the material being taught. The use of concrete teaching aids is expected to help students to concretize the mathematical concepts they are learning, so that they can understand the calculation steps more easily.

More detailed documentation shows that the use of visual media and concrete objects does have a positive impact on students in understanding numeracy material. Where related to the use of visual media and concrete objects used by MI Alam Ya Bunayya Bungo is as shown in figure 2.



Figure 2. Use of Visual Media and Concrete Objects

In many cases, students who are actively involved in activities involving concrete objects or visual images seem to understand mathematical concepts that they previously found difficult. For example, by using building blocks or other props that can be moved around, students can more easily visualize the calculation or division process that occurs in numeracy problems. This approach allows students to not only rely on their memory of mathematical procedures, but also to understand the underlying logic of each step taken in solving a problem. Through direct observation, many students showed more interest in the learning material after using the teaching aids, which indicates that this method is indeed more effective in supporting their understanding process.

The use of visual aids and concrete objects in numeracy learning has proven to be effective in helping students overcome the difficulties they face. Teachers who use concrete props, such as building blocks and visual images, are able to make it easier for students to understand mathematical concepts that previously felt abstract. This can be seen from the increase in students' understanding of more complex numeracy problems, which can be explained with the help of visual tools. Students who were directly involved in activities using these props seemed to be more interested and had a better understanding compared to those who only received verbal or written instructions. By associating mathematical concepts with concrete experiences that can be seen and felt, students gain a deeper understanding of how each step in solving a problem should be performed. This shows that learning approaches that involve more interactive and visual-based teaching not only increase students'

motivation but also deepen their understanding of the material being taught.

Social Factors Affecting Numeracy Learning

One of the factors that also affects students' difficulties in solving numeracy problems is social support, especially from family. Based on interviews with several parents, it was found that many of them found it difficult to help their children learn math at home. One parent said: "I try to help my child, but sometimes I am also confused by the questions being taught. I feel incapable of giving a proper explanation" (I_P1, 2023). This shows that although parents have a strong desire to help, their limited knowledge is often a barrier in accompanying their children to learn. In addition, some parents reveal that they are often busy with work and do not have much time to interact deeply with their child's learning.

In other interviews, it was found that some parents expressed similar challenges related to their time limitations and ability to help their children with numeracy problems. One mother revealed, "I can't accompany my children often because of my job, and when I try to help, I feel like I don't understand enough how to solve those problems" (I_P2, 2023). These findings show that although parents want to provide support, they often feel less confident in providing help, especially regarding more technical and difficult materials. In addition, their busyness is also the main obstacle in paying more attention to the learning process of children at home, which in turn has an impact on the difficulties faced by students in solving numeracy problems. From a series of interviews conducted to several informants, a thematic analysis was then carried out as shown in table 1.

Table 1. Thematic Analysis

Theme	Sub-Theme	Analysis
Parent Support	Limitations of Parents' Knowledge	Parents have a desire to help their children, but are limited by their inadequate knowledge in understanding numeracy material. This hampers the effectiveness of the assistance provided.
	Parents' Time Limitations	Busy work is an obstacle for parents to provide enough time for their children, so they cannot accompany their children in learning optimally.
Busy Parents	Limited Time to Help Children	Limited time results in parents not being able to actively engage in their children's learning. This affects the overall learning process of children's numeracy.
Parent Involvement in Learning	Desire to Help, but Limited Ability	Parents' strong desire to help is faced with limitations in both knowledge and time. This indicates the need for additional support from other parties, such as teachers.
Limitations of Social Factors at Home	Social Influence on Numeracy Difficulties	Social factors at home such as lack of time and knowledge of parents exacerbate the difficulties faced by children in solving numeracy problems at school.

From the results of table 1. It can be concluded that social factors, especially support from the family, play an important role in students' numeracy learning at home. Although many parents are eager to help their children with numeracy problems, they often feel that they are not skilled enough or do not have enough time to provide the needed support. This can be seen from the

admission of some parents who feel confused by difficult math problems and feel incapable of providing the right explanation. Time limitations due to busy work are also one of the main barriers for parents to be able to pay enough attention to their children's learning. Therefore, students' difficulties in solving numeracy problems are not only influenced by academic factors at school, but also by social factors at home. These findings highlight the importance of creating synergy between teachers, parents, and schools in providing more integrated support for students, so that they can more easily overcome the difficulties they face in learning mathematics.

Discussion

The difficulty of students in solving numeracy problems in the National Assessment is related to the number of students experiencing difficulties in problems that require more complex problem-solving skills. The implication of these findings is that even though students have mastered the basic concepts of mathematics, they are not yet ready to face higher challenges in problems that require conceptual application. In other words, numeracy learning at the MI level should not only focus on numeracy skills, but should also include the development of critical thinking and problem-solving skills. This is especially important, given the challenges students face in connecting basic mathematical concepts to more complex real-world problem situations. If these issues are not addressed, then students will continue to have difficulty achieving higher learning goals, which can ultimately affect their ability to face tougher exams or tests in the future.

The importance of the difficulties faced by students in solving numeracy problems can be explained through a broader learning concept. Research conducted by Mitani, (2021) states that mathematics learning that focuses too much on basic skills can cause a gap between basic understanding and higher-order thinking skills, as found in complex problems. Hilliard et al. (2020) stated that students often feel anxious or depressed when they have to deal with problems that require them to think more critically and structured. This is in line with the findings in this study, which shows that students' difficulties lie in understanding and applying mathematical concepts in a more abstract context. Therefore, a more balanced approach to teaching, which includes the development of problem-solving skills, is urgently needed to prepare students for greater challenges.

The findings regarding the use of visual and concrete aids by teachers in overcoming students' numeracy difficulties show the importance of a hands-on experience-based approach in mathematics learning. These findings imply that teaching strategies that rely on concrete teaching aids can improve students' understanding of abstract mathematical concepts, as well as make them more involved in the learning process. This shows that a more interactive and hands-on experience-based approach is very effective at overcoming the difficulties that students encounter, as seen in their improved understanding of numeracy problems after using visual aids. Further implications are the importance for educators to consider the diversity of teaching methods and introduce learning aids that suit the needs of students in order to improve the effectiveness of the learning process.

The importance of the use of concrete props in mathematics learning is in line with the findings in a study by Ziatdinov & Valles, (2022), which emphasizes that the use of visual props can strengthen the relationship between theory and

practical applications in mathematics. Where in his research it was revealed that experiential learning, such as those involving teaching aids, improves student understanding by connecting abstract concepts with concrete objects that can be understood directly. This is in line with the results of this study, where students who were given visual aids showed a better understanding of numeracy problems. Therefore, the use of visual aids is a very effective strategy in facilitating mathematics learning, especially for students who have difficulty understanding abstract concepts.

The findings related to social factors, especially parental support for students' numeracy learning, highlight the importance of the role of the family in supporting their children's learning. These findings imply that although schools can provide quality teaching materials, active family support greatly determines students' success in learning mathematical concepts. If parents can be involved in the learning process by providing guidance or even just listening to the problems the child is facing, students will feel more motivated and confident. Therefore, these findings demonstrate the importance of a more holistic approach to education that involves the family as an important partner in students' academic development.

These results can be explained by the literature stating that social factors and emotional support have a major impact on students' academic success. A study by Ghazali et al. (2021) revealed that parents who are involved in their child's education can help improve motivation and mastery of the material, especially in subjects that are considered difficult such as mathematics. Research conducted by Otani, (2020) explains that parental involvement not only provides academic support, but also forms a positive attitude of students towards learning. The findings also suggest that family support can help overcome the anxiety or confusion that students feel when dealing with more complex numeracy problems. Therefore, an approach that reinforces the role of parents in mathematics education is essential for improving students' overall academic success.

CONCLUSION

The conclusion of this study highlights several important findings that provide valuable insights into the challenges faced by students in solving numeracy problems in the National Assessment. Specifically, the study reveals that although students have mastered basic skills, many of them have difficulty applying those concepts in more complex contexts. The main lesson that can be drawn from these findings is that the teaching of mathematics at the elementary level should not only focus on understanding the theory, but also on the ability to solve problems and apply concepts in a variety of situations. The study also underscores the importance of more holistic and interactive learning approaches, such as the use of visual aids and parental engagement, to support students' overall numeracy development. As such, these findings enrich our understanding of how best to prepare students for the greater academic challenges of the future.

A significant contribution of this study is its ability to identify the factors that influence numeracy difficulties in MI students, while also providing evidence on the effectiveness of experiential approaches, such as the use of visual aids and parental involvement. This study also proposes a new approach in overcoming numeracy difficulties by integrating various learning methods that are more practical and applicable. However, this study has limitations, especially related to the limited scope of MI students in one region and does not take into account

other demographic variables, such as gender or age differences. Therefore, further research is needed to develop a more comprehensive understanding of the factors that affect numeracy difficulties and to explore the influence of other variables that may not yet be reached. Further research can also expand the scope by involving students from various social and cultural backgrounds to obtain a more representative and in-depth picture.

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