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The Mastery of Basic Multiplication and Division Skills and Its Impact on Students' Mathematics Achievement

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Abstract: This study examines the impact of mastering basic multiplication and division concepts on the mathematics achievement of elementary school students. Using a qualitative approach in the form of a case study, the research was conducted at SDN Teluk Dalam 12 through observations and interviews involving 5th-grade students. The findings indicate that students faced significant difficulties in understanding and applying these fundamental operations, leading them to rely on multiplication tables and resulting in low academic performance. This study highlights the importance of innovative and interactive teaching strategies to enhance students' understanding and support their cognitive development. Collaboration among teachers, parents, and the school environment is crucial in overcoming these challenges and improving mathematics learning outcomes.

Keywords: Basic Mathematics Skills; Elementary School Students' Learning Achievement; Multiplication and Division

Introduction

Mathematics plays a crucial role in everyday life and serves as the foundation for the development of various fields of knowledge. In daily activities, mathematics is used for tasks such as managing finances, measuring dimensions, or solving problems that require logical thinking. Basic skills such as arithmetic, pattern recognition, and data analysis are essential for addressing challenges in the modern world (Ginanjar, 2019). According to Maria Alexandra (2024), skills in counting and understanding place value are vital components of numeracy, forming the foundation for comprehending more complex concepts. Furthermore, mathematics also serves as a core pillar for other sciences, such as physics, chemistry, biology, and technology, as many theories in these fields are derived from mathematical principles. Students who grasp basic mathematical concepts are better prepared to solve problems at more advanced levels (Gita, 2021). Therefore, mastering mathematics not only aids in daily life but also plays a significant role in advancing various scientific disciplines.

Mastering fundamental operations such as multiplication and division is essential as it forms the basis for understanding more complex areas of mathematics, such as fractions, decimals, algebra, and geometry. If students fail to understand these concepts, they will struggle to solve more challenging problems and often make errors in basic steps. This can impede their overall progress in learning mathematics. Success in mathematics is highly dependent on the understanding of fundamental concepts (Rahmat Winata, 2020), while Friantini (2020) adds that mastering basic concepts helps students perform arithmetic operations more easily and accurately. Mahmud (2023) also mentions that if weaknesses in basic operations are not addressed during elementary school, they can continue to affect students' abilities in higher education levels, leading to difficulties in learning and in daily life. Hence, mastering basic operations is crucial to helping students achieve academic success and face future challenges.

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This study was conducted at SDN Teluk Dalam 12, a school with adequate physical facilities but lacking in the maximization of learning aids such as instructional materials and LCD projectors. On the other hand, the school has a strong culture of togetherness among students and teachers, despite the limitations in facilities that challenge the improvement of student learning outcomes. Through classroom observations and interviews with teachers, it was found that many students, particularly in the upper grades, had difficulty understanding the basic concepts of multiplication and division. This difficulty led students to rely on multiplication tables to complete tasks, thereby memorizing procedures rather than fully understanding the underlying principles. This resulted in low overall mathematics achievement, reflecting the achievement of cognitive aspects in Bloom's Taxonomy.

This research is motivated by the reality that basic mathematical skills, particularly in multiplication and division, continue to present challenges for many elementary school students, especially in the upper grades. At SDN Teluk Dalam 12, despite the adequate physical condition of the school, the limitations of supplementary learning facilities, such as instructional materials and LCDs, remain a significant barrier. These limitations affect the effectiveness of the learning process, causing students to often rely on mechanical methods, such as multiplication tables, without genuinely understanding the core concepts. Observations and interviews with teachers revealed that the majority of students struggled to master the basic concepts of multiplication and division, which negatively impacted their understanding of other mathematical material and resulted in unsatisfactory learning outcomes. This situation further emphasizes the importance of mastering basic mathematical concepts as the foundation for more complex learning and the development of students' logical skills.

Based on these findings, this study aims to evaluate the impact of poor mastery of the basic concepts of multiplication and division on the mathematics achievement of elementary school students, particularly in the upper grades. Additionally, this study seeks to identify the extent to which these difficulties affect overall student learning outcomes. It is hoped that the results of this research will provide strategic solutions to improve the quality of mathematics education, particularly in helping students master basic operations, so they can develop better arithmetic skills and support their academic success.

Method

This study employs a qualitative method with a case study approach to explore the issues in depth. Data collection techniques include direct observation in the 5th-grade classroom of SDN Teluk Dalam 12 and interviews with the teacher, who also serves as the class advisor. The observations were conducted to monitor the mathematics learning process, as well as to understand how students solve problems, comprehend numbers, and tackle challenges in basic mathematical operations. The interviews with the teacher aim to strengthen the data and provide insight into the factors influencing the students' difficulties. This approach enables the researcher to obtain a comprehensive picture of the obstacles faced by students in mastering the basic concepts of multiplication and division.

Result and Discussion

Result

The interview results with the 5th-grade teacher at SDN Teluk Dalam 12 reveal that students' mastery of basic multiplication and division operations remains a significant issue. Nearly all students in the class have not yet fully understood these concepts despite regular lessons being conducted. The teacher emphasized that these skills form a crucial foundation for understanding more advanced mathematics topics. However, the students' difficulties in grasping the basic concepts indicate that the existing teaching approach has not been sufficiently effective in addressing their needs.

The interview also revealed that, despite students having high interest and enthusiasm for learning mathematics, many of them still rely on multiplication tables to solve problems. This suggests that they have not yet deeply understood the patterns or principles of mathematical operations. Additionally, students often lack confidence when facing problems that require the application of concepts or critical thinking, which ultimately slows down the development of their skills. Observations during class activities support these findings. In the classroom, students were seen taking a long time to solve simple problems involving multiplication or division. Their reliance on aids, such as multiplication tables, affects their efficiency in solving problems, especially more complex ones. For example, in word problems involving basic operations, most students required the teacher's assistance to break down the problems into smaller steps to facilitate understanding.

In response to this situation, the teacher has attempted various strategies to enhance students' understanding. One approach is to have students routinely write the multiplication table before beginning the lesson. Additionally, the teacher frequently asks quick questions during lessons to encourage spontaneous thinking. This strategy is not only aimed at helping students memorize but also at understanding mathematical patterns. The teacher continues to motivate students to build their confidence and

recognize the importance of mastering the fundamentals of mathematics. Although these methods have shown progress in some students, the research findings indicate that the existing approach has not been entirely effective in resolving the issue. Most students still struggle to solve problems, especially those requiring the application of concepts in different situations. This is reflected in daily evaluations, where students' success rates in answering multiplication and division problems remain low compared to problems involving only addition or subtraction.

The lack of mastery in these basic operations has a significant impact, particularly on students' ability to understand more complex mathematical topics, such as fractions, percentages, or algebra. These difficulties not only affect individual students' achievements but also impact the overall success of mathematics learning in the classroom. Therefore, the teacher feels the need to implement more interactive and diverse teaching methods, including the use of relevant learning media.

Discussion

The findings of this study provide a clearer understanding of the impact of low mastery of basic multiplication and division concepts on the mathematics achievement of elementary school students, particularly in the upper grades. Based on interviews and observations, it was found that many students still struggle to understand and perform basic mathematical operations, despite various teaching methods being applied. Mathematics plays a significant role in shaping students' character and thinking patterns. According to Yanala (2021) and Gusteti (2022), mathematics learning can enhance reasoning skills, logical thinking, and creativity. In this sense, mathematics not only serves as an academic competency tool but also instills important values such as precision, perseverance, and analytical thinking. If these skills are well-developed, they will benefit students not only in the educational environment but also in society and the workplace.

Lerner (2022) identifies eight types of learning difficulties in mathematics, some of which are directly related to multiplication and division operations. Students' struggles in understanding basic multiplication and division concepts greatly impact their ability to learn independently and their overall learning outcomes. The inability to master these basic operations often results in difficulty solving problems, particularly word problems or those requiring the application of concepts. As a result, students tend to rely on teacher assistance or tools such as multiplication tables, which ultimately reduces their confidence and ability to understand more complex mathematical content.

Previous research emphasizes the importance of mastering basic operations as the foundation for learning more advanced mathematics. Hattie (2023) stresses that a deep understanding of mathematical concepts supports the development of critical and relational thinking skills, which are crucial for solving mathematical problems in real-life contexts. If these fundamental concepts are not mastered, students will struggle to build connections between concepts, which is central to developing mathematical reasoning abilities. Boaler's (2022) research supports this view by stating that students who can link mathematical concepts to real-life contexts tend to achieve greater success in mathematics learning. Therefore, mastering basic operations not only serves as the foundation for learning mathematics but also plays a key role in building students' confidence, independence, and critical thinking skills.

Students' dependence on multiplication tables to solve problems indicates that they have not yet fully grasped the underlying patterns in mathematics. Although multiplication tables can help students arrive at answers quickly, excessive reliance on them leads students to memorize numbers without understanding the workings of multiplication itself. As Mailani (2024) notes, learning strategies that focus solely on memorization do not support the development of relational thinking necessary to solve mathematical problems effectively. As a result, students struggle to apply multiplication and division to problems requiring deep understanding, such as word problems or those involving pattern analysis.

The constructivist approach emphasizes that effective learning occurs when students actively construct understanding through experiences and connections between concepts (Suparlan, 2019). In mathematics, students need to comprehend the relationships between numbers, rather than merely memorizing answers. Dependence on multiplication tables can hinder students from transitioning from mechanical thinking to conceptual understanding. Ideal mathematics learning should focus on mastery of competencies through a deep understanding of the material (Zulmaulida, 2021). To address this, teachers need to implement teaching strategies that encourage students to understand the patterns and principles in mathematics. This approach aligns with Vygotsky's theory of the "zone of proximal development," which emphasizes the importance of teacher support in helping students move from memorization to comprehension (Voon, 2021). For instance, the use of manipulative tools or concept visualization can assist students in recognizing relationships between numbers.

Furthermore, success in building mathematical understanding heavily depends on the active role of teachers in creating a learning environment that supports exploration and discussion. Teachers must be able to identify the level of understanding of each

student and provide constructive feedback to help students overcome their difficulties. As Meilida (2022) and Rivai (2022) suggest, support from various parties, including teachers and parents, is crucial in boosting students' confidence in mathematics. With proper guidance and a more comprehensive approach, students can learn to overcome their fear or anxiety towards mathematics and build stronger self-confidence.

An effective solution to overcome these challenges is the implementation of problem-based learning. Suriansyah (2021) affirms that problem-solving skills can be developed through directed activities that involve understanding the problem, organizing data, selecting relevant information, and applying appropriate problem-solving strategies. This approach helps students understand the connections between mathematical concepts and real-life situations. By solving relevant problems, students not only improve their computational skills but also strengthen their conceptual understanding. Teachers can also use game-based or simulation-based learning methods that are not only engaging but also support meaningful learning. As Afnisa (2024) points out, learning approaches for elementary school students must consider their tendency to enjoy playful activities. This also supports students in creating more relevant and meaningful mathematics learning experiences across various contexts (Unaenah, 2022).

Conclusion

Students' difficulties in understanding the fundamentals of multiplication and division have a significant impact on their academic achievement, particularly in mathematics. Dependence on memorization methods without comprehending the core concepts makes it challenging for students to tackle more complex mathematical problems. To address this challenge, the implementation of innovative, interactive, and contextually relevant teaching strategies is essential, such as the use of educational media and problem-based learning approaches. Collaboration between teachers, parents, and the school environment is crucial in helping students master basic mathematical concepts, enabling their academic performance to improve holistically and sustainably.

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Author Contributions
In this study, Author 1 played a central role in conceptualizing the research framework and designing the methodology, ensuring a robust approach to data collection and analysis. Author 2 and Author 3 contributed significantly to data curation and formal analysis, processing and interpreting the findings to derive meaningful conclusions. The writing and initial draft preparation were primarily undertaken by Author 1, while Author 4 and Author 5 were actively involved in reviewing and editing the manuscript to refine its clarity and coherence. Through this collaborative effort, each author played a crucial role in ensuring the quality and integrity of the research.

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Conflicts of Interest
The authors declare no conflict of interest.

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