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Problems of Mathematics Learning from the Perspective of Senior High School Mathematics Teachers at Limau Bandi School

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Abstract. *Mathematics plays a crucial role in various subjects, and educators/students must consider it as an essential element in solving learning problems at the high school level. The purpose of this study is to provide an overview of the problems faced by mathematics learning from the perspective of mathematics teachers. Descriptive qualitative research methods can provide a more comprehensive overview. The researchers then analysed the valid research data using mind mapping through manual data reduction, classification, and coding. The study results indicate that students' focus on memorising formulas rather than understanding concepts causes their difficulty in comprehending mathematical concepts. They also show that negative student motivation and attitudes pose challenging obstacles in teaching mathematics. Additionally, the findings reveal that the limited allocation of learning time is inadequate. The implications are the development of teaching strategies based on conceptual understanding, evaluation of time allocation, and continuous improvement of student motivation in order to change their attitudes to be more positive towards mathematics.*

Keywords: *Conceptual Understanding, Problems of Mathematics Learning, Perspective of Mathematics Teachers.*

INTRODUCTION

Mathematics teachers need to have a firm belief that mathematics plays an important role in learning as a basis for developing critical, creative, logical, and problem-solving thinking skills (Ramirez et al., 2018). Mathematics teachers need to believe that students not only need to be taught about concepts and theorems but also have various reasoning, critical, and creative thinking skills that are very much needed both in the world of work and everyday life. When students calculate mathematics, they must first understand the problem before they determine the concepts they must use to solve the problem (Maesya Firdaus et al., 2021; Nabilah et al., 2021). It requires critical thinking skills, such as distinguishing between important and unnecessary information, so that students can formulate the necessary problem-solving skills. This structured mathematics learning experience provides empirical experience for students in the future. Students

who are able to understand mathematics better will have more structured and practical problem-solving skills (Nurhayati et al., 2019). However, the facts on the ground show that there are still many problems in learning mathematics, which not only affect student learning outcomes but also have an impact on the quality of learning in schools as a whole.

Problems in learning mathematics in schools can be seen from various sides. One of the main challenges in learning mathematics is the limited facilities and infrastructure to support more effective mathematics learning (S. E. Purwanto, 2020; Rahmawati et al., 2023). Problems related to the lack of availability of learning tools, educational technology, and various other resources that can support interactive and practical mathematics learning. In fact, currently, the use of technology has become something that cannot be separated from the teaching and learning process. The use of technology in mathematics learning can overcome boredom felt by students and also support the creation of more interactive mathematics learning. Technology is able to bridge abstract mathematics into more concrete terms so that the information and knowledge conveyed to students becomes easier to understand.

Another major problem that is often faced in mathematics learning is the lack of understanding of mathematics and students' interest in mathematics (Bentley & Yates, 2017; Ferdiani et al., 2021). Students who are unable to understand basic mathematical concepts well will have difficulty with subsequent materials. The inability of students to understand mathematical material experienced for a long time will have a psychological impact on decreasing students' interest in mathematics (Febryliani et al., 2021). Low student interest in mathematics will have a significant negative impact on the quality of mathematics learning. Many students who have a low interest in mathematics will feel stressed, and these students will have anxiety every time they face mathematics material and mathematics exams. These factors are not only related to students' cognitive abilities, but also to their disinterest in the mathematics topics taught. The low understanding of fundamental mathematics in school students is a barrier for students to understand more complex material, and has an impact on decreasing mathematics learning outcomes.

With the various complexities of problems faced in mathematics learning, education practitioners need to understand the problems directly from the field related to what actually happens in mathematics learning problems. The perspective of mathematics

teachers on mathematics learning will provide comprehensive support in order to understand mathematics better. Teachers are the parties who are directly involved in the mathematics learning process in the classroom. The challenges faced by teachers are not only limited to the quality of mathematics learning, but also administrative obstacles that take up a lot of work time, making it difficult for teachers to develop the quality of mathematics learning. By understanding the problems of mathematics learning from the teacher's perspective, it will provide an idea for solving mathematics problems in the future.

Research on the problems of mathematics learning has been the focus of several literatures (Akbar et al., 2017; Maesya Firdaus et al., 2021; Novianti, 2021). Previous studies identified limited facilities and infrastructure, as well as low understanding and interest of students in mathematics, as the main obstacles. The teacher's perspective as the vanguard in the learning process is critical to understanding more deeply the root of the problems of mathematics learning (Bentley & Yates, 2017; Ferdiani et al., 2021; A. Purwanto et al., 2020). In studies that explain mathematical problems, none explain from the perspective of mathematics teachers. This study will discuss how the perspective of mathematics teachers is related to problems that are often faced in the classroom. By understanding the perspective of mathematics teachers, this study will be able to explain mathematics problems.

RESEARCH METHOD

This study uses a descriptive qualitative research method to provide a comprehensive picture of the problems of mathematics in schools. Quantitative data cannot provide a comprehensive picture of the problems of mathematics in schools. By using qualitative data, this study will be given a more comprehensive opportunity to explore the information needed more deeply. The qualitative data explored can also provide a fairly interesting picture, so that it can provide a reasonably detailed understanding of the problems.

The subject selection technique was carried out on mathematics teachers at the high school level in the Muhammadiyah Kebayoran Baru high school environment, South Jakarta. Two mathematics teachers will represent each class level. The involvement of

two mathematics teachers is part of the data comparison that the researcher will carry out. Information from the two mathematics teachers at each level also provides additional information if there are any shortcomings. Teachers who will be selected to be the subjects of this study must have more than ten years of teaching experience because teaching experience provides more complex teacher knowledge. Additional requirements to become a subject of this study are the willingness to spend time and good communication skills. Teachers involved in this research must provide an agreed-upon time allocation so that this research can run well. The teacher's ability to communicate is also an important requirement to be considered, where teachers who are able to communicate well will provide all the information they know.

The data collection technique for this research is divided into two stages: the initial collection stage and the data collection stage for reliability. The collection of research data will use a structured interview guideline that the research team has prepared. This interview guideline will be a reference when researchers explore the information needed, such as "The biggest challenge in learning mathematics that is usually faced in class?" To support the research data, researchers also collected a second set of data within one week after the first interview. The selection of this one week was used to meet the validity criteria for time triangulation data. Researchers will use the comparison of data between mathematics teachers at various levels as a source of triangulation to compare one dataset with another.

Qualitative data analysis techniques are carried out using mind-mapping. The transcription data that has been reduced is then classified into codes that have the same meaning. Coding is done manually to ensure that the data has the same characteristics and meaning. In order to meet the validity and reliability criteria, this study used time triangulation, where teachers were interviewed twice in different periods, and source triangulation by comparing field notes, interview transcriptions, and relevant documents such as lesson materials, student test results, and teacher notes.

RESULT AND DISCUSSION

The results of the study show that there are four main factors in the problems of high school mathematics at Muhammadiyah Kebayoran Baru High School, South Jakarta.

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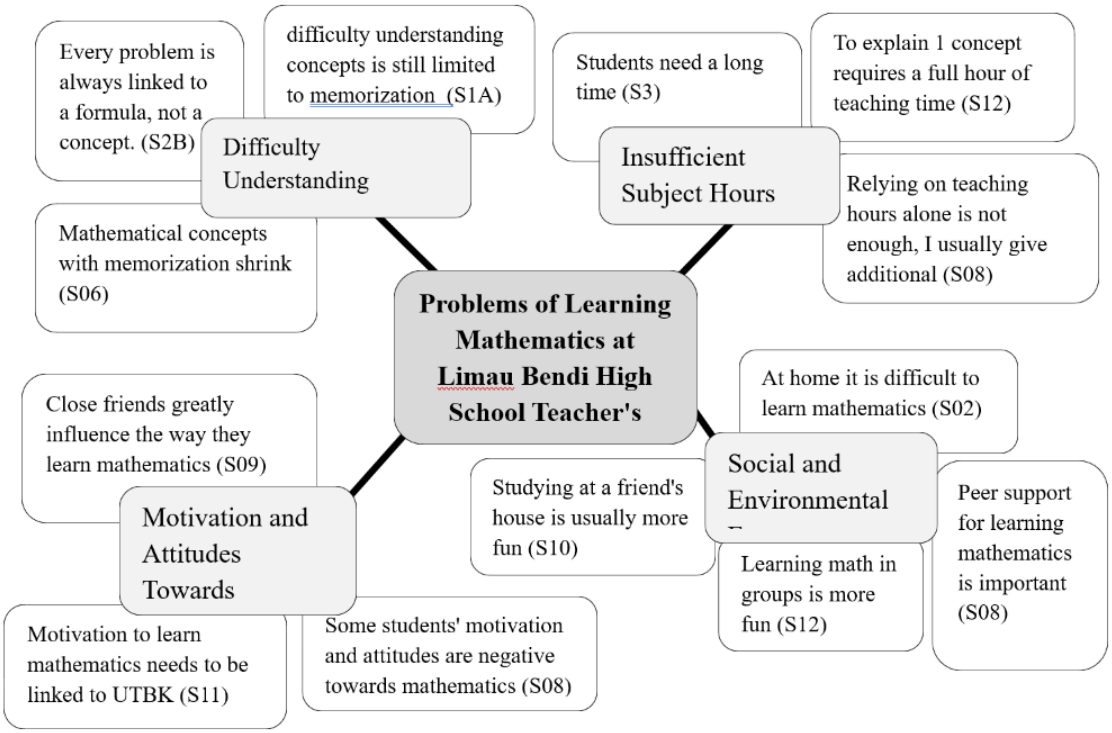

Figure 1. Problems from the perspective of mathematics teachers

The chart above visualises the problems of learning mathematics at the senior high school level, especially at Limau Bendi School, based on the teacher's perspective and the factors that can influence it. This chart uses a mind map format that will be explained for each factor as follows;

Difficulty Understanding Mathematical Concepts

Several teachers stated that students tend to always associate mathematics with formulas rather than concepts (S2B). This statement indicates that the learning approach is not deep enough, where students may memorise mathematical formulas without really understanding the underlying purpose of the formation of mathematical formulas. The results of this study are in line with research that emphasises the dangers of rote learning in mathematics and the importance of good conceptual understanding for more effective knowledge transfer (Arico et al., 2018; Baran et al., 2019). Other studies also emphasise that excessive focus on the behaviour of memorising formulas can hinder the development of deeper mathematical thinking (Zhang et al., 2021). High school students

need to understand that mathematical formulas are not to be memorised, because the formation of mathematical formulas can be explained logically.

Furthermore, there is an assumption that mathematical concepts with memorisation reduce accurate understanding (S06), implying that reliance on memorisation hinders students' ability to apply concepts flexibly and in different contexts. This is supported by a study that found a negative correlation between the ability to memorise formulas and students' mathematical problem-solving abilities (Peter, 2012). One teacher even stated that explaining one concept takes a full teaching hour (S12), which shows that students have difficulty understanding mathematical material, so a significant allocation of time is required for each explanation of a mathematical concept.

In addition, the data explains that it takes a long time to understand the concept, strengthening the indication of challenges in fundamental understanding. This study has implications for changes in mathematics teaching strategies that emphasise conceptual understanding and logical reasoning rather than just memorising formulas. The development of a mathematics curriculum and ongoing mathematics teacher training that is oriented towards active, exploratory, and contextual teaching methods, which allow students to build a deep understanding of mathematical concepts and see their relevance in various situations. Thus, it is hoped that students will not only be able to remember formulas, but also be able to elaborate on mathematical concepts more creatively and effectively in solving various problems..

Lack of lesson hours is a problem in learning mathematics.

A teacher realised that relying on teaching hours alone was not enough, and teachers usually provide additional support (S08). This shows that there is awareness on the part of teachers that the time allocation format for mathematics subjects may not be adequate to accommodate students' needs, especially in overcoming difficulties in understanding concepts. This finding is in line with research on school learning models, which emphasise that the time needed for students to learn to achieve mastery of the material can vary (Ibrahim & Alhosani, 2020; Kolar & Hodnik, 2021). Therefore, the standard time allocation may not be enough for all students, and there needs to be flexibility in providing additional time for students who really need it. The teacher's

initiative to provide additional teaching hours is very important in improving the quality of mathematics learning in the classroom. This is supported by research that emphasises the important role of responsive and adaptive teachers in meeting the diverse learning needs of students (Blum & Borromeo, 2009; Ramirez et al., 2018). Conversely, if teachers do not have this initiative, then schools need to encourage the creation of additional mathematics hours outside the teaching and learning process in the classroom. This implies the need for systemic support from schools in providing additional resources and time to help struggling students.

Research shows that supportive and collaborative school environments, where teachers feel supported to innovate and provide additional assistance to students, are positively correlated with improved student mathematics learning outcomes (Ike & Suhendri, 2021; Tint & Nyunt, 2015). The implication of this finding is the need to evaluate the allocation of time for mathematics subjects in the curriculum to ensure sufficient time to facilitate a deeper understanding of mathematical concepts. In addition, schools need to encourage and facilitate teacher initiatives in providing additional learning assistance and consider policies that support the provision of remedial programs. This requires collaboration between teachers, schools, and other stakeholders to create a comprehensive learning support system for students.

Motivation and attitudes towards mathematics have a negative impact.

The data shows that some students are negative towards mathematics (S08), which can be a significant barrier in the learning process. This negative attitude can stem from various things, such as previous unpleasant learning experiences, perceptions of the difficulty of the subject, or lack of perceived relevance to everyday life. Previous studies also reinforce this, where a lack of motivation to learn mathematics has a negative impact on students' psychology and students' preparation in facing mathematics subjects (Hastuti, Umam, et al., 2021; Susanto, 2016; Yana & Sari, 2021). The results of this study are consistent with studies conducted that discuss the role of affect in mathematics learning, including how students' emotions and beliefs can affect mathematics learning outcomes (El-Adl & Alkharusi, 2020; Mann & Walshaw, 2019). The mindset also reinforces this, showing that students with a fixed mindset tend to avoid mathematics challenges because

they are afraid of failure, which contributes to students' negative attitudes towards learning mathematics (Hastuti, Eclarin, et al., 2021; Kramarski et al., 2010; Nabilah et al., 2021). Furthermore, motivation to learn mathematics is also needed with a larger goal, such as UTBK preparation (S11), which shows that external motivation, such as exam demands, plays an important role in encouraging students to learn mathematics. This is in line with the self-determination theory, which distinguishes between intrinsic and extrinsic motivation (El-Adl & Alkharusi, 2020; Weldegebriel et al., 2016).

Extrinsic motivation, such as UTBK demands, can encourage students to learn. Research shows that intrinsic motivation is more sustainable and correlates with a deeper conceptual understanding of mathematics. The implication is that it is important for teachers to not only focus on mastering the material but also on developing students' positive attitudes towards mathematics. Teaching strategies that can increase intrinsic motivation, such as connecting mathematics to everyday life, providing challenges that are appropriate to students' ability levels, and creating a supportive and fear-free learning environment, should be implemented. In addition, interventions that aim to change students' negative beliefs about their mathematics abilities are also important to improve mathematics learning outcomes in the long term.

Social and environmental factors are very important factors in mathematical problems.

Research data shows that close friends greatly influence the way they learn mathematics (S09), highlighting the influence of social environment and peer interaction in the learning process. Furthermore, learning at home with friends is usually more enjoyable (S10), indicating that a collaborative and supportive learning environment can increase motivation and learning effectiveness. This finding is in line with Vygotsky's social constructivism theory, which emphasises the importance of social interaction in the construction of knowledge (Goos, 2004). Based on this theory, learning can begin through interaction with others, where students can share ideas, ask questions, and build shared understanding (Goos, 2004; Leiss et al., 2010). Extensive research supports the use of cooperative learning in improving students' learning outcomes and attitudes towards mathematics (White et al., 2015; Yoto et al., 2024). Peer support for learning mathematics

is also considered important. Learning mathematics in groups is important and more fun (S08, S12), emphasising the value of cooperative learning and social interaction in understanding mathematics. However, on the other hand, it was mentioned that at home, students were less likely to study mathematics (S02), which may be due to various factors such as the lack of a conducive learning environment. This condition may contradict the assumption that studying with friends is always positive, indicating that the quality of interactions and the learning environment at home need to be considered. Research that focuses on peer social support can have a positive impact on student motivation and achievement (Blaine, 2019; Goos, 2004), but this is highly dependent on the norms and values of the peer group.

The implication of the results of this study is the importance of facilitating positive and productive social interactions in mathematics learning. Teachers can utilise cooperative learning strategies in the classroom and encourage students to study together in effective study groups outside the classroom (Husain et al., 2023; Safrina et al., 2014). However, it is also necessary to realise that the learning environment at home can be a massive obstacle, so efforts are needed to create more conducive learning conditions at home. This can be done through parental support or the use of structured online learning. In addition, mathematics teachers need to guide students in choosing study partners who are supportive and have positive learning motivation.

CONCLUSION

The problems of school mathematics learning from the perspective of mathematics teachers have provided insight and knowledge for all of us that quality mathematics learning requires support from all parties. Difficulty in understanding mathematical concepts is the main problem in mathematics learning because students are more accustomed to memorising formulas rather than understanding mathematical concepts. Students who memorise will have limitations when faced with contextual mathematical problems. From the teacher's perspective, it is also explained that negative motivation and attitudes of students are quite significant obstacles in teaching mathematics because teachers need to change students' perspectives from negative to positive first. Students who have a positive attitude towards mathematics will consider

mathematical problems as challenges that need to be solved. However, students who have a negative attitude will stay away from problems rather than solve them. With a variety of students who have different perspectives on mathematics, in the process of learning mathematics, teachers need more time because they need to understand mathematical concepts rather than memorize mathematical formulas.

Future research needs to explore the extent of the role of parents in supporting mathematics learning. This is because the role of parents is to provide outstanding support for students' psychology so that students have a positive attitude towards mathematics. Future research also needs to explore the extent to which schools facilitate problems in mathematics learning because schools, as the authority for organising education, need to identify problems in the learning process as well as provide various alternative solutions to problems so that schools are able to maintain the quality of mathematics learning..

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