



ANALYSIS OF STUDENTS' LEARNING DIFFICULTIES IN MATHEMATICS SUBJECTS: A CASE STUDY IN HIGH SCHOOL STUDENTS

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Abstract

This study analyses students' mathematics difficulties at SMA Negeri 1 Mesuji Raya, Lampung. This study uses a qualitative approach with a case study design involving 30 students. The collection was carried out through classroom observation and in-depth interviews. Data analysis includes data reduction, data presentation, and conclusions. The results show that learning mathematics is difficult due to internal and external factors. Internal factors include anxiety and student learning motivation. External influence factors include the quality of teaching methods and the support of the learning environment. The recommendations included teacher training and increased student support to address learning difficulties effectively. This study sheds a deeper understanding of the importance of holistic support in improving mathematics learning at the secondary level. The results of the study support efforts to improve the quality of education through a more structured and comprehensive strategy.

Keywords: Learning Difficulties, Mathematics, Teaching Methods, Learning Strategies.

INTRODUCTION

Mathematics is a field of science that can develop children's thinking skills. Therefore, mathematics is used as a tool to develop children's thinking skills from elementary to secondary education and continues at the lecture level. However, math is often considered the most difficult subject by most students. In school, many students seem to be less interested in math lessons. However, research shows that mathematics has an important role in daily life.

Difficulties in learning mathematics are often a significant obstacle in the educational process at various school levels. According to research conducted by Al Amin and Murtiyasa (2021), the difficulty of learning mathematics increases in online learning situations, especially when the learning methods are less relevant to students' needs. Problem-based learning methods can help reduce these learning difficulties because students are more involved in solving problems directly and concretely. However, implementing this learning method still faces various challenges, both from the side of teachers and students themselves.

Cahirati et al. (2020) examined students' learning difficulties in mathematics learning using the PMRI (Indonesian Realistic Mathematics Education) approach. Their study shows that understanding mathematical concepts through the PMRI approach is more likely to enable students to overcome learning difficulties (Sitepu et al., 2022). Emphasising the importance of support from teachers in directing and facilitating learning to be more effective and directed. It highlights the need for professional development for teachers to enhance their ability to implement innovative, student-centered learning methods. Fatimah et al. (2020) identified learning difficulties in multiplication operations at the junior high school level. Students often have difficulty understanding the concept of

multiplication due to a lack of basic knowledge and inadequate teaching methods. This research shows that interventions at the elementary level are essential to ensure students have a strong foundation in mathematics. Thus, the difficulty of learning mathematics must be overcome with the right teaching methods and improving students' basic knowledge from an early age.

Based on observations made at SMA Negeri 1 Mesuji Raya, Lampung, it was found that many students had difficulties participating in mathematics learning. Many factors influenced this. Many students have difficulty understanding mathematical concepts due to a lack of effective teaching strategies and motivation to learn (Unaenah et al., 2023). This study aims to analyse students' difficulties in learning mathematics in SMA Negeri 1 Mesuji Raya, Lampung students. The focus of this research is to identify the causative factors and provide recommendations to improve the quality of learning in the school so that it can overcome learning difficulties experienced by students.

METHOD

Research Design

This study uses a qualitative approach with a case study design. The subjects were grade XI students at SMA Negeri 1 Mesuji Raya, Lampung, who were selected by purposive sampling. Data was collected through classroom observations, in-depth interviews with students and teachers, and analysis of documents such as test scores and teacher notes. The main focus of the research is to identify the types of learning difficulties that students face, explore the causative factors, and formulate strategies to overcome these difficulties.

Data Collection Techniques

The study's data collection techniques consisted of observation, learning difficulty questionnaires, semi-structured interviews, and documentation. As an initial data source, observations were made on mathematics subjects in grade XI. The researcher also observed the students' learning conditions, including the preparation and skills that the students demonstrated during the mathematics learning activities. Table 1 below describes the observation sheets used during the study. The observation sheet contains the observed indicators and explains each indicator.

Table 1. Observation Rubric

No	Indicators	Aspects observed
1	Learning Implementation	1. How enthusiastic are students when learning mathematics?
		2. Do students find math lessons difficult and uninteresting?
		3. Is the task given by the teacher more challenging than the example given?
		4. Are the teacher's explanations during the learning process less appealing?
		5. Students do not do the assigned assignments themselves.
2	Learning difficulties	1. Students face challenges in understanding concepts
		2. Students have difficulty with numeracy skills.

No	Indicators	Aspects observed
		3. Students have difficulty solving problems
3	External factors	1. Teacher's teaching methods
		2. Utilisation of learning media
		3. School Facilities and Infrastructure
4	Evaluation	Teachers evaluate the learning activities that have been carried out

Interviews are conducted to dig deep into information that may not be revealed in observation. In this study, the type of interview applied was a semi-structured interview. Semi-structured interviews are included in the in-depth interviews, which provide more flexibility in their implementation (Sugiyono, 2013). Thus, the researcher can add questions outside the established guidelines to get the respondents' views. Furthermore, the questionnaire makes it difficult to learn mathematics. Table 2 shows the mathematics learning difficulty questionnaire used. The statement has nine indicators: learning motivation, concept understanding, independence, learning methods, numeracy, family factors, environment, and the media used.

Table 2. Mathematics Learning Difficulties Questionnaire

No	Indicators	Statement
1	Motivation and interest in learning	I am interested in math lessons
2	Difficulty understanding concepts	I often have trouble understanding the mathematical concepts that are taught.
3	Inability in learning	I feel like I cannot solve math problems
4	Learning independence	I find it difficult to learn math on my own without the help of others
5	Teacher's teaching methods	The teacher's teaching method confused me
6	Numeracy skills	I am having difficulty doing mathematical calculations
7	Family support	My family supported me in learning mathematics
8	Learning environment	School facilities and infrastructure support mathematics learning activities
9	Use of learning media	The learning media used helped me understand the material well

The author's research will involve the use of videos and photos related to the analysis of students' learning difficulties in mathematics lessons in grade XI of SMA Negeri 1 Mesuji Raya, Lampung. Documentation was obtained from observation and during the research's implementation.

Data Analysis

Data reduction, data presentation, and conclusion are data analysis techniques used in research. The results of observations and interviews with students were selected according to the main focus of the research. The selected data is then presented in pictures, tables, and narratives about students' difficulties in mathematics learning. In the final section, the researcher gave a conclusion about learning difficulties. In this case, the factors that cause students to have difficulty in learning

mathematics consist of internal and external factors. In addition, based on these results, the researcher provides recommendations to overcome students' learning difficulties during mathematics learning.

RESULTS AND DISCUSSION

Research Results

Based on observation data and interviews during the implementation of learning activities, teachers have prepared teaching modules as a reference for the teaching and learning process of activities. The learning process is carried out in three stages: introduction, implementation, and closing. Before starting the learning process, teachers always attend and review the material taught in the previous meeting. Table 3 is the result of observations obtained during the mathematics learning process. The aspects observed were related to the implementation of learning, learning difficulties, external factors, and evaluation.

Table 3. Observation Results

No	Indicators	Aspects observed	Results Obtained
1	Learning Implementation	1. How enthusiastic are students when learning mathematics?	Students show low enthusiasm when learning mathematics.
		2. Do students find math lessons difficult and uninteresting?	Their facial expressions show that many students find math difficult and uninteresting.
		3. Is the task given by the teacher more challenging than the example given?	The assignments the teacher gives are often considered more difficult than the examples given and often confusing.
		4. Is the teacher's explanation during the learning process less appealing?	Teachers' explanations tend to be monotonous, and less involve students, so students are distracted.
		5. Students do not do the assigned assignments themselves.	Many students do not work on assignments independently, preferring to copy from friends.
2	Learning difficulties	1. Students face challenges in understanding concepts	Students have difficulty understanding basic concepts such as addition and subtraction.
		2. Students have difficulty with numeracy skills.	Many students have difficulties in numeracy skills, as seen from the mistakes that often appear in practice.
		3. Students have difficulty solving problems.	Students also struggle to solve problems, especially story problems that require analysis.
3	External factors	1. Teacher's teaching methods	Teachers' teaching methods are less varied, so they are not interesting to students.
		2. Utilisation of learning media	The use of learning media, such as teaching aids or technology, is still minimal and underutilised to the fullest.

		3. School Facilities and Infrastructure	School facilities and infrastructure, such as classrooms that do not support learning activities, impact student concentration.
4	Evaluation	Teachers evaluate the learning activities that have been carried out	<ul style="list-style-type: none"> ✓ Teachers conduct periodic evaluations. ✓ Students do not receive enough support to understand their mistakes, so they are less motivated to improve.

The results obtained from the distribution of student learning difficulties questionnaires can be described in Table 4.

Table 4. Results of Mathematics Learning Difficulties Questionnaire Based on Internal and External Factors

No	Indicators	Statement	Number of Students Answering				
			SS	S	R	TS	STS
Internal Factors							
1	Motivation and interest in learning	I am interested in math lessons	4	21	0	7	5
2	Difficulty understanding concepts	I often have trouble understanding the mathematical concepts that are taught.	10	16	3	7	1
3	Inability in learning	I feel like I cannot solve math problems	6	16	6	5	4
4	Learning independence	I find it difficult to learn math on my own without the help of others	7	14	5	7	1
5	Numeracy skills	I am having difficulty doing mathematical calculations	13	9	0	12	3
External Factors							
6	Teacher's teaching methods	The teacher's teaching method confused me	2	6	6	20	3
7	Family support	My family supported me in learning mathematics	4	14	0	10	9
8	Learning environment	School facilities and infrastructure support mathematics learning activities	7	13	0	15	2
9	Use of learning media	The learning media used helped me understand the material well	14	18	0	4	1

Description:

SS: strongly agree

S: Agree

R: Nervous

TS: Disagree

STS: Strongly Disagree

Based on Table 4, it can be seen that students who felt interested in learning mathematics chose four students (10.81%) strongly agreed, 21 students (56.75%) agreed with the answers, seven students (18.91%) disagreed, and five students strongly disagree (13.51%). The indicator of difficulty understanding the concept showed that 10 students answered strongly in agreement (27.07%), 16 students answered yes (43.24%), 3 students answered hesitantly (8.10%), 7 students answered no, and 1 student answered strongly disagree (2.70%). Students felt unable to solve math problems; there were a total of 6 students who answered strongly in agreement (16.21%), 16 students answered yes (43.24%), 6 students felt hesitant (16.21%), 5 students disagreed (13.51%), and 4 students strongly disagreed (10.81%). The indicators of learning independence were obtained with 7 students answering strongly in agreement (18.91%), 14 students answering yes (37.87%), 5 students answering hesitantly (13.51%), 7 students answering no (18.91%), and 1 student strongly disagreeing (2.70%). Indicators of teachers' teaching methods were obtained: 2 students answered strongly in agreement (5.40%), 6 students answered yes (16.21%), 6 students answered hesitantly (16.21%), 20 students answered no (54.05%), and 3 students strongly disagreed (8.10%). The numeracy skill indicator was obtained with 13 students answering strongly in agreement (35.13%), 9 students answering yes (24.32%), 12 students answering no (32.43%), and 3 students strongly disagreeing (8.10%). The family support indicator showed that 4 students answered strongly agreed (10.81%), 14 students answered yes (20.42%), 10 students answered no (27.02%), and 9 students strongly disagreed (24.32%). Students obtained the learning environment indicators: 7 students answered strongly in agreement (18.91%), 13 students answered yes (35.13%), 15 students answered no (40.54%), and 2 students answered strongly disagree (5.40%). Indicators on the use of learning media were obtained by 14 students who answered strongly in agreement (18.91%), 18 students answered yes (37.83%), 4 students answered no (10.81%), and 1 student answered strongly disagree (2.70%). The recapitulation of the results can be presented in the visualisation in Figure 1 below.

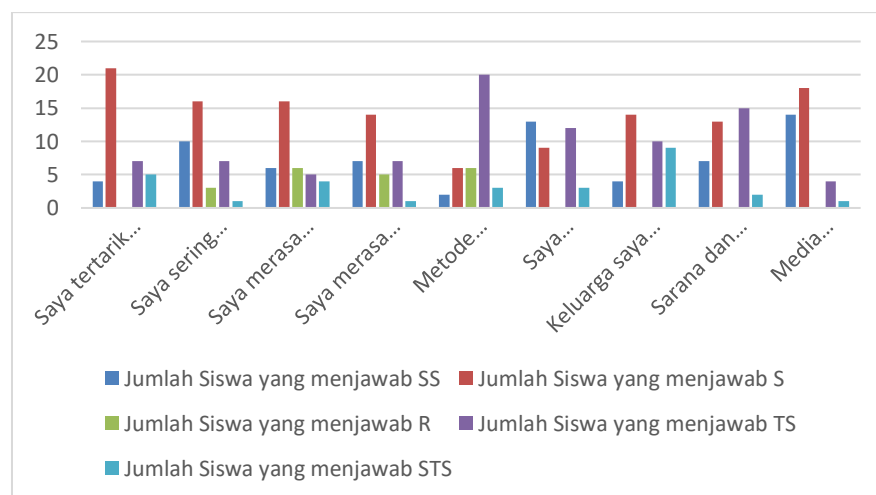


Figure 1. Recapitulation of Mathematics Learning Difficulties Questionnaire

Discussion

Identifying students' difficulties in learning mathematics in students of SMA Negeri 1 Mesuji Raya indicates that many students find it difficult to understand basic mathematics concepts. Students face difficulties solving problems that require a deep understanding of basic concepts such as algebra and geometry (Retnawati, 2017; Tatlah et al., 2017). In addition, students feel confused about applying mathematical concepts to story-shaped problems. This difficulty may be caused by teachers' lack of reinforcement of good concepts (Fatimah, Wirnawa, & Dewi, 2020). Some students also exhibit negative attitudes towards maths, which can affect their Performance in the subject. This negative attitude usually arises from previous bad experiences in learning math, such as getting bad grades or feeling frustrated when you do not understand the material quickly. Therefore, it is important to explore the causes of these difficulties more deeply and look for appropriate strategies to help students overcome difficulties (Habibah et al., 2021).

Internal factors such as cognitive abilities and the drive to learn majorly impact students' ability to learn mathematics. Students with good intellectual potential tend to understand the subject more easily than those with low cognitive ability (Akhter & Akhter, 2018). What students do and what is charged to students in the curriculum make a difference. It makes it difficult for students to learn mathematics. Lack of motivation to learn is also often a major obstacle. Low-motivation students are usually reluctant to practice questions or try to understand difficult material (Muqtafia et al., 2022). Based on figure 1 shows that many students show diverse motivations and interests in learning. Although most students with a percentage (67.56%) admitted that they were interested in mathematics lessons, some felt less motivated. In addition, difficulty understanding concepts is a problem that is often faced, where many students admit that they often have difficulty understanding the material being taught.

There is also an inability to learn, where several students struggle to solve math problems well. It is related to learning independence, with many students finding it difficult to learn independently without the help of others. Another aspect is the numeracy skills. This aspect is important because many students admit they have difficulty doing mathematical calculations, which are the basis of mathematics learning. In addition, anxiety and insecurity can also hinder the teaching and learning process. Students who feel anxious when facing math problems will have difficulty solving them. Lack of confidence also makes students avoid mathematics subjects, ultimately contributing to low student learning achievement (Putridayani & Chotimah, 2020).

External factors such as teaching methods and learning atmosphere also play an important role in learning difficulties in mathematics. Less interesting and monotonous teaching methods and methods can make students quickly bored and lose interest in learning. Teachers use interesting and interactive learning methods to make learning fun for students (Netson & Ain, 2022). It will have a positive impact on solving students' learning difficulties. Teachers who cannot explain the material

well also contribute to students' difficulty understanding mathematical concepts (Nabila & Sulistiyaningsih, 2020). An atmosphere and learning environment that is not conducive, such as a classroom atmosphere that is too noisy or lacking infrastructure, can also interfere with student concentration. In addition, the enthusiasm and motivation of parents and friends are also very important. Students who do not get motivation from parents or friends usually feel that learning mathematics is a burden, which worsens their learning difficulties (Acharya, 2017; Sudarsana et al., 2023).

A teacher must try various innovative and interesting teaching strategies to overcome the obstacles and difficulties in the mathematics learning process. For example, interactive learning media, such as videos or math apps, can help students understand the material more easily. Project-based or game-based learning can also make learning more enjoyable and increase students' interest in mathematics (Syakur, Purnamasari, & Kurnia, 2021). In addition, teachers need to pay special attention to students with learning difficulties. Providing additional guidance and support, such as remedial or individualised learning, can be very beneficial. Collaborative efforts between teachers, parents, and students are also needed to ensure that each student gets the help they need to succeed in math (Utami & Cahyono, 2020).

CONCLUSION

Based on the analysis, it can be concluded that the difficulties experienced by students in SMA Negeri 1 Mesuji Raya, Lampung are influenced by various internal and external factors, including anxiety, motivation, basic knowledge, and teaching methods teachers use. To overcome these difficulties, schools and teachers can improve their competence using more varied and effective teaching methods and provide additional support for needy students, such as tutoring and counselling services.

Further research can be more deeply related to students' cognitive and psychomotor aspects. These two aspects play an important role in solving mathematical problems, especially in the more complex and contextual era of digitalisation. The cognitive aspect can begin by examining students' mathematical problem-solving skills in solving HOTS problems. Then, for the psychomotor aspect, they can study the skills of demonstrating the results of students' work.

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