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Analysis of Mathematics Learning Difficulties Among 8th-Grade Students at SMP Unimuda Pulau Arar

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Abstract

This study aims to determine and describe the learning difficulties experienced by class VIII students of SMP Unimuda Pulau Arar in learning mathematics. This study uses a descriptive qualitative method. The subjects in this study were 3 class VIII students of SMP Unimuda Pulau Arar. Data collection techniques in this study were observation, tests, questionnaires, and interviews. Data analysis in this study used the Miles and Huberman data analysis technique. To obtain data validity, researchers conducted a credibility test with the triangulation technique. The results of the analysis in this study indicate that there are three categories of students who experience difficulties in learning mathematics, namely students with high, medium and low learning difficulties. Students with high learning difficulties have the characteristics of experiencing obstacles in understanding concepts, following instructions, and submitting assignments on time. They are easily distracted, even though they show good self-confidence when working on problems. Students with moderate learning difficulties have the characteristics of needing additional time to understand abstract concepts. In contrast, students with low learning difficulties generally meet the learning difficulty indicators with more consistent results

INTRODUCTION

Education is a never-ending process, but rather a continuous one, with the aim of producing continuous quality (Sudjana, 2019). This is reflected in the formation of individuals for the future, which is based on the values of the nation's culture and Pancasila. Zainuri (2018) stated that all educational activities depend on the curriculum as an interrelated system. Curriculum development must follow certain principles (Arifin, 2011). Learning is a change in behaviour in a person due to interaction with other people and their environment, which makes them more ready to adapt to the environment (Ahmad, 2013). However, human learning experiences do not only depend on responses to stimuli but also involve the ability to regulate and direct oneself, which is controlled by the brain and plays a very important role. Learning is a mental process that occurs through direct involvement between individuals and their environment, creating changes in knowledge, understanding, skills, and values that are relatively stable and have an impressive impact (Winkel, 2002). Learning outcomes are seen from students' abilities
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after they receive their learning experiences, which can appear in various types of behavioural changes.

Mathematics is an essential subject that trains critical and logical thinking skills (Boaler, 2022). However, many students have difficulty learning to understand mathematical concepts, especially in abstract materials such as algebra and geometry (Abdurrahman, 2009). These learning difficulties are not always caused by external factors (e.g., the environment or economy) but rather by cognitive process disorders that inhibit conceptual understanding, information processing, or problem-solving (Lerner & Johns, 2015). Learning difficulties are defined as disorders in basic psychological processes, such as understanding and using spoken or written language (Abdurrahman, 2019). Thus, learning difficulties occur when students cannot learn well due to interference from internal and external factors. Learning difficulties include a variety of real problems in listening, speaking, writing, thinking, or mathematics skills (Abdurrahman, 2019). Low mathematics learning outcomes are caused by various things and common mistakes often made by students who experience learning difficulties, such as problems in understanding symbols, place values, calculations, incorrect processes, and unclear writing.

The success of the learning process can be evaluated through student learning outcomes, which are influenced by various factors such as thinking ability, physical background, habits, and learning approaches applied by students (Syah, 2010). Learning outcomes are students' achievements in understanding the subject matter at school, which are reflected in the scores obtained from tests that test understanding of certain materials (Sutanto, 2013). Various tests, such as written tests, oral tests, or performance tests, measure learning outcomes. This reflects students' understanding of the material being studied, which is evaluated in the form of test result scores. At SMP Unimuda Pulau Arar, initial observations showed that grade VIII students experienced heterogeneity in learning mathematics, ranging from difficulty understanding instructions to inconsistency in completing assignments. This phenomenon has not been systematically mapped, even though identifying categories of learning difficulties can help teachers design more targeted interventions.

Based on this observation, there has been no classification of the level of learning difficulties in mathematics based on the level of intensity (high-medium-low) in remote schools such as SMP Unimuda Pulau Arar. In addition, the inconsistency between learning difficulties and non-academic factors (e.g. high student self-confidence but low learning outcomes) has not been widely discussed in previous studies. Learning difficulties are not only related to academic inability but also to the attitudes of students during learning. Learning difficulties are conditions that inhibit children's academic development, which are not caused by external factors such as inadequate teaching but by dysfunction in cognitive processes. This study aims to describe the forms of student difficulties in learning mathematics along with the specific characteristics of each and classify them based on cognitive and behavioural indicators.

METHOD

This study uses a descriptive method with a qualitative approach. This approach aims to provide an overview and explanation of the phenomenon to be studied. Qualitative methods are used to investigate phenomena naturally, with researchers as the main instrument (Creswell, 2014). As a descriptive method, this approach collects data in the form of words and images (not numbers), which are then analysed to gain an in-depth understanding of the phenomenon being studied (Sugiyono, 2017). This study aims to describe the conditions related to the analysis of mathematics learning difficulties in grade VIII students.

In qualitative research, research subjects are called informants. The subjects in this study were selected based on certain criteria or characteristics so that they could represent the phenomena observed in the study. In this study, there were 12 respondents, and they were grouped based on the results of the tests given. In addition, the research subjects with high, medium, and low levels of difficulty in learning mathematics were grouped based on the level of achievement or specific characteristics, namely learning difficulties. Based on this understanding, the subjects in this study were grade VIII students of SMP Unimuda Pulau Arar, Sorong Regency.

Data collection techniques in the research on the analysis of mathematics learning difficulties in class VIII students are questionnaires, observations, written tests or assessments, interviews, and documentation.

Table 1. Data collection technique

Data Taken	Data Source	Source Person	Attachment
Difficulty Learning Mathematics	Questionnaire	Learners	Learning Difficulties Questionnaire
	Observation	Learners	Observation Sheet
	Test	Learners	Student Worksheet

RESULTS

The results of this study are presented in the form of tables, descriptive, and interpretation of the results needed before being discussed. The table is written in the middle or at the end of each text, with a description of the research findings. The following are descriptive statistics from the questionnaire on the assessment of mathematics learning difficulties in students in class VIII of SMP Unimuda Pulau Arar on September 4, 2024:

Table 2. Learning Difficulties Questionnaire Statistics

Description	Statistical Values
Respondents	12
Highest Score	85
Lowest Score	63

Mean (M)	**75,16**
Standard Deviation (SD)	7,6

The scores generated from the 12 respondents were then grouped into three categories, as shown in Table 2 below:

Table 3. Learning Difficulties Questionnaire Categories

Score Range	Category	Frequency
$x \leq 67,5$	High	3
$67,5 < x < 82,7$	Middle	6
$x \geq 82,$	Low	3

Using these categories, the research subjects selected to be involved in the research can be identified as follows:

Table 4. Research Subjects

Subject	Description	Criteria Learning Difficulties Subject
AR	Subject 1	High
RK	Subject 2	Middle
MK	Subject 3	Low

Based on the results of interviews and observations on research subjects, the following is a table of data collection results by the researcher:

Table 5. Differentiated Mathematics Learning Difficulty Results

Learning Difficulties Indicators	Subject Learning Outcomes in Mathematics Learning Using the Discovery Learning Model	Subject 1	Subject 2	Subject 3
Motivation and Interest in Learning Mathematics	- Active participation in class	No	Yes	Yes
	- Listening to instructions	Yes	Yes	Yes
	- Always ask questions if you don't understand	No	Yes	No
	- Not giving up when encountering difficulties	Yes	No	No
Conceptual Understanding	- Able to identify and apply concepts	No	Yes	Yes
	- Tends to rely on friends for explanations	Yes	Yes	No
	- Understand the material	No	Yes	Yes
Operational Ability	- Follow the steps for completing the student's worksheet	Yes	Yes	Yes
		Yes	No	Yes
	- Complete assignments thoroughly	Yes	No	Yes
	- Submit assignments on time	Yes	Yes	No
	- Keep trying to do the work according to your ability			
Concentration and Attention	- Complete the assigned tasks	Yes	Yes	Yes
	- Focus on learning	Yes	Yes	Yes
	- Pay attention to the material presented	Yes	Yes	Yes
	- Raise your hand to answer or ask questions	No	Yes	No
Psychological Aspects	- Showing confidence when working on questions	Yes	Yes	Yes
	- Not daring to ask questions	Yes	No	No
	- Feeling frustrated	Yes	No	No
	- Working on questions independently	No	No	Yes

In the table above, the researcher maps five indicators with several characteristics attached to each indicator to determine the character of each category of difficulty levels experienced by each subject in this study. The contents of this table are obtained from observations and interviews conducted by the researcher.

DISCUSSION

Based on the results of observations and interviews with research subjects related to learning difficulties in mathematics learning in this study, variations in results were obtained for each indicator from each student. The first indicator regarding motivation and interest in learning mathematics with three items, namely less enthusiastic with little involvement in exploration activities in class, often passive, not asking many questions, students who have high learning difficulty criteria show difficulty in being actively and independently involved in the learning process, often rely on external assistance. Meanwhile, students with moderate and low learning difficulty criteria show varying motivation; students with moderate learning difficulties are able to engage in learning but are not consistently active. Students show lower interest in exploratory learning activities, but their engagement increases significantly when teachers provide structured guidance (OECD, 2020).

In the second indicator, namely conceptual understanding, there are also differences in results between students. Students with high learning difficulty criteria are confused when given assignments or questions, have difficulty understanding the concepts taught, especially during learning, and lack attention when learning. This finding is in accordance with research by Sari and Fatimah (2021), which found that a lack of conceptual understanding is caused by unstructured learning and a lack of emphasis on the basics of mathematical concepts. In addition, according to research by Pratiwi and Hasan (2022), students who experience learning difficulties are often distracted by their surroundings or feel bored with monotonous teaching methods. Meanwhile, students with moderate learning difficulty criteria only meet two items, and the other 2 need additional time to understand instructions and are confused when faced with abstract concepts.

Then, students with low learning difficulty criteria showed a good understanding of the material being taught, were able to identify and apply mathematical concepts, and showed resilience in trying various approaches until finding the right solution. This finding is in accordance with research by Astuti (2022), saying that students with low difficulty showed a good ability to apply mathematical concepts in real situations. Their resilience in trying various strategies to solve problems was also raised as the key to their success. In addition, research by Sari et al. (2023) showed that motivated students were better able to identify and apply mathematical concepts well and showed resilience in the learning process.

The third indicator shows operational skills in learning mathematics with 5 items, namely, following the steps for working on questions, showing the ability to solve questions, submitting assignments on time, completely identifying mathematical concepts, and following the instructions given. The results vary among the students

studied. Students with high learning difficulties often have difficulty following instructions given by the teacher, both verbally and in writing, and do not submit assignments on time. According to researchers Razak and Santosa (2022), the discovery learning model can help students understand concepts more deeply. However, students with high learning difficulties require additional adaptation to follow each step of learning effectively.

In Wulandari's (2022) research, it was found that although the discovery learning model encourages student creativity, students with high learning difficulties still have difficulty understanding more complex instructions and often do not submit assignments on time. On the other hand, students with moderate and low learning difficulties both show good understanding skills in working on the steps to solve problems, can solve problems but take longer, follow the instructions given by the teacher, and are consistent in following the steps to solve problems. This is in line with the research of Fathurrahman and Dewi (2020), which states that students with moderate and low learning difficulties show good abilities in following instructions and solving problems. However, they tend to take longer to process information and carry out the steps to solve correctly. Research by Putri & Anggraeni (2023). This study found that students with low and moderate learning difficulties showed persistence in solving problems, followed the steps consistently, and showed good understanding even though it took more time compared to students without learning difficulties.

In the fourth indicator, concentration and attention, with five items, the results varied among the students analysed. Research related to students with high learning difficulties who show a passive attitude and rarely ask questions or answer teacher questions is supported by various studies. One of them is a study by Wulandari and Mustadi (2019), which shows that the application of certain learning models, including discovery learning, can help improve student interaction gradually. However, students with high difficulties still show limitations in active participation. Meanwhile, Purba et al. (2018) found that the discovery learning model can improve students' ability to communicate mathematically, but the effect is more significant in students without learning difficulties. They feel less confident in their understanding and are often distracted by environmental factors, such as sounds or movements around them.

Meanwhile, students with moderate learning difficulties criteria were able to fulfil the item by showing a fairly good level of concentration during the learning process, paying attention to the material presented and being actively involved in learning activities. Show consistent attention, especially when working on questions or participating in class discussions. Meanwhile, students with low learning difficulties managed to fulfil the item, namely showing a fairly stable concentration ability during learning, focusing on the tasks given, but sometimes distracted by peer chatter around them, concentrating on the material being studied after being reminded by the teacher. Research by Sari and Andriani (2023) shows that students with low learning difficulties have quite good resilience in maintaining concentration during the discovery learning

process. They only need a little guidance from the teacher to refocus when experiencing interference from the surrounding environment.

In the fifth indicator, namely the psychological aspect of the learning process of students, the results vary between students with high, medium, and low learning difficulties, all showing good self-confidence when working on questions and not feeling frustrated. However, students with low criteria do not dare to ask questions if they have difficulty working on questions. In a study by Wulandari Arifin (2020), it was found that students with high and medium learning difficulties showed a good level of self-confidence when they were guided through the stages of solving questions, while students with low learning difficulties were often more independent but reluctant to ask questions when faced with problems, especially because they were worried about looking incapable in front of their friends. This is in line with the research of Rahman and Nugraha (2023). This study shows that students with high, medium, and low learning difficulties all show calmness when dealing with mathematics problems. Still, students with low difficulties tend to be more passive in asking for help or asking teachers when they encounter difficulties. A high sense of personal responsibility is one of the reasons they do not ask for help.

CONCLUSION

Based on the results of the study and discussion, it can be concluded that the level of learning difficulties of students can affect motivation, conceptual understanding, operational skills, concentration, and psychological aspects of the learning process. Students with high learning difficulties tend to be passive and need external assistance to be involved in the learning process. In contrast, students with low and moderate learning difficulties show more varied motivation, with low students being more independent in exploring the material. Students with high learning difficulties have difficulty understanding the concepts taught and are easily distracted by the environment. Students with moderate learning difficulties need more time to understand abstract concepts, while students with low learning difficulties show good abilities in understanding and applying mathematical concepts.

Students with high learning difficulties have difficulty following instructions and are not punctual in submitting assignments. Students with moderate and low learning difficulties are better able to follow the steps to solve problems even though it takes longer. Students with high learning difficulties are easily distracted by the environment and are rarely actively involved in class. In contrast, students with moderate and low learning difficulties show better concentration, although students with low difficulties are sometimes distracted by peers.

All students, whether with high, medium, or low learning difficulties, showed a good level of self-confidence when working on problems. However, students with low learning difficulties tend to be more independent but passive in asking for help when facing difficulties.

Realising that this study is still limited and imperfect, the researcher thinks that further and in-depth research is needed, such as exploring cognitive or psychological factors that cause mathematics learning difficulties in each category or other studies related to the three categories

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