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Analysis of Students' Learning Difficulties in Mathematics Subjects for Class V MIM Al-Akbar Pandeyan

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ABSTRACT

Grade V MIM Al-Akbar Pandeyan students generally find it difficult to learn mathematics because they consider it a difficult and scary subject, even though mathematics has an important role in everyday life. This study aims to determine students' learning difficulties and the factors causing students' learning difficulties in mathematics subjects for grade V at MIM Al-Akbar Pandeyan, Ngemplak, Boyolali, in the 2022/2023 Academic Year. This study uses a quantitative descriptive research type. Data collection techniques use tests, questionnaires, and documentation. The results of the study show that: 1) The learning difficulties faced by students in mathematics subjects for grade V consist of two, namely students' difficulties in understanding the concept of material on nets of geometric shapes (cubes and cuboids) and difficulties in problem-solving, namely in arithmetic operations, solving story problems, and changing problem sentences into mathematical sentences; 2) The factors of learning difficulties faced by students in mathematics subjects of grade V at MIM Al-Akbar Pandeyan consist of two factors, namely internal factors (attitude in learning 54.80%, learning motivation 58.97%, physical health 44.87%, and sensory ability 45.19%) and external factors (teacher factors 39.74%, use of learning media 55.13%, school facilities and infrastructure 43.27%, and family environment 46.92%). The results of this study are expected to help teachers design more adaptive learning strategies based on student needs.

INTRODUCTION

Mathematics is one of the subjects that students must study in elementary school (R. W. Utami et al., 2018). Mathematics is a discipline that can foster thinking and argumentation skills, support the development of science and technology, and contribute to solving problems in everyday life and the world of work (Ginanjar, 2019). Learning mathematics should not be

something that students fear because mathematics is a science that contains symbols, formulas, and concepts that are very useful in solving life's problems (Suci & Taufina, 2020). In mathematics, if students experience learning difficulties, it is considered normal. It has become a reality because students consider mathematics a lesson that is a scary spectre for them (Yeni, 2015). The fear that comes from students can be from anger or punishment from teachers and fear of getting low grades, which causes students to have difficulty learning (Dhian K, 2023). Meanwhile, teachers are the key holders of success in ongoing learning (Purbowati & Saifuddin, 2020).

Learning difficulties are disorders in children, both internal and external factors, which cause the brain to have difficulty following the learning process normally regarding receiving, processing and analyzing information obtained during learning (Yeni, 2015). Mathematics learning difficulties are usually caused by teaching and student factors, including language, cognitive, metacognitive, motor, social and emotional factors, learning habits, and previous experiences (Dewi, 2024). Internal and external factors influence students' learning difficulties in mathematics (Hamidah & Ain, 2022; Sudrajat et al., 2023). Hamidah & Ain (2022) state that students' interests, motivation, and attitudes are internal factors of difficulty learning mathematics. External factors of difficulty in learning mathematics are the school environment, family environment and community environment (Hamidah & Ain, 2022).

Students with difficulty learning mathematics have several characteristics, including often making mistakes or being less careful when learning to count, learning geometry, solving story problems, and so on (Andri et al., 2020). Researchers at MIM Al-Akbar Pandeyan found the characteristics and problems of learning difficulties in mathematics above. It is known that students began to experience difficulties in learning mathematics after online learning due to the COVID-19 pandemic. Students who initially had face-to-face learning were switched to online learning, which had many obstacles, and students did not pay much attention to the teacher's explanation. This problem caused students to have difficulty understanding mathematics subjects.

The difficulties experienced by students impact low mathematics learning outcomes, as evidenced by the large number of students who have not met the minimum completion criteria. This phenomenon can be seen from the results of daily test scores of students in 2 classes V, namely class V "Ibrahim" (class name) and class V "Husein" (class name). Results of daily test scores of students in class V "Ibrahim". Based on the daily test scores of students in the semester I, 19, or 73% of the 26 students, scored below the KKM, which was 68. In addition, in class V

"Husein," 18 students' scores were still below the KKM. In addition to the low learning outcomes, the amount of media used by teachers in class V "Ibrahim" is still lacking because the amount of media is still limited. In addition, the characteristics of students during mathematics learning are that students get bored quickly, many students do not dare to come forward when asked to work on problems, and only a few do.

Based on the explanation above, this study is important to find out the types of learning difficulties and internal and external factors of students' learning difficulties, especially in mathematics lessons in grade V at MIM Al-Akbar Pandeyan. The results of this study can provide knowledge about the difficulties and factors causing difficulties in learning mathematics, which helps improve mathematics learning and contribute ideas for renewing the implementation of the mathematics learning process in schools that continue.

METHOD

This study uses descriptive quantitative research with a survey method that aims to provide a detailed description of students' difficulties in learning mathematics and the factors that cause students' difficulties in learning mathematics in grade V students. This study was conducted at MIM Al-Akbar Pandeyan, Ngemplak District, Boyolali Regency. The population in this study were all grade V students of MIM Al-Akbar Pandeyan in the 2022/2023 academic year with 79 students. Meanwhile, the sample for this study was taken randomly without considering the level, namely grade V "Husein" (class name) and V "Ibrahim" (class name) students at MIM Al-Akbar Pandeyan, totalling 52 students.

The research instrument used was a test to determine students' learning difficulties in mathematics by working on five essay questions about the material that students have studied. The indicators of the test instrument are conceptual understanding and problem-solving of mathematics problems. In addition, this study also used a closed questionnaire with a Likert scale to obtain data on factors of students' learning difficulties in mathematics with indicators of internal factors (attitude in learning, learning motivation, physical health, and sensory abilities) and external factors (teacher factors, use of learning media, school facilities and infrastructure, and family environment)

Based on the questionnaire distributed to students, there are 51 statement items: 27 statements are declared valid, and 25 are invalid. Statement items that are declared invalid are considered to be disqualified. Data collection techniques in this study are tests, questionnaires and documentation. The data analysis technique used is descriptive analysis.

RESULTS AND DISCUSSION

The results of this study are in the form of descriptive quantitative analysis with percentages. The research data were obtained from the scores of each instrument calculated using quantitative descriptive analysis techniques. Data from tests consisting of five questions describe students' learning difficulties. Data from questionnaires describe factors of students' mathematics learning difficulties, namely internal and external factors.

Test Result Data

Data on the results of students' work on questions regarding difficulties in learning mathematics consists of two indicators: difficulty in understanding concepts (two questions) and difficulty in solving problems (three questions). Question number 1 concerns understanding the concept of cube nets that students have learned in semester II. The following is a description of students' difficulties in understanding the concept of cube nets presented in Table 1:

Table 1. Percentage Results of Students' Answers to Question Number 1

	Information	Number of students	Percentage
No. 1	Students cannot determine the net of a cube	2	3,85%
	Students can determine one net of a cube	7	13,46%
	Students can determine two nets of a cube	26	50%
	Amount	52	100%

Table 1. explains that most students (50%) show a fairly good understanding by being able to determine two cube nets. However, around 17.31% of students still can only determine one net or cannot determine it at all, indicating the need for reinforcement on this material for this group.

Question number 2 is designed to measure students' understanding of the concept of cuboid nets taught in semester II. The analysis of question number 2 shows that most students have not fully mastered this concept. The following is a description of students' difficulties in understanding the concept of cuboid nets in Table 2:

Table 2. Percentage Results of Answers to Question Number 2

	Information	Number of students	Percentage
No. 2	Students cannot determine the net of a cuboid	2	3,85%
	Students can determine one net of a cuboid	13	25%
	Students can determine two cuboid nets	26	50%
	Students can determine three cuboid nets	11	21,5%
	Amount	52	100%

Based on Table 2, most students (50%) could determine two cuboid nets, indicating a good understanding of this concept. As many as 21.5% of students could even determine three cuboid nets, indicating a higher understanding. However, 28.85% of students (a combination of 25% who only determined one net and 3.85% who could not) still needed further reinforcement in understanding the concept of cuboid nets.

Adding mixed fractions is one of the materials taught in learning. Question number 3, related to this concept, shows that students have not fully mastered solving mixed fraction addition problems. The following is a description of students' difficulties in solving mixed fraction addition problems in Table 3:

Table 3. Percentage Results of Answers to Question Number 3

	Information	Number of students	Percentage
No. 3	Students who cannot do the questions or get them wrong	42	80,77%
	Students only write down the correct answers	4	7,69%
	Students can complete arithmetic operations accurately and correctly	6	11,54%
	Amount	52	100%

Based on Table 3. Most students (80.77%) could not do or answered question number 3 incorrectly, which shows that this question is a big challenge for them. Only 11.54% of students could solve the question correctly and precisely. These results indicate the need to strengthen learning of the concepts and arithmetic operations related to this question.

Question number 4 measures students' ability to solve story problems related to fraction division, a material they have learned. Through this question, it can be seen to what extent students can apply the concept of fraction division in concrete situations. The following is a description of students' difficulties in solving fraction division problems in Table 4:

Table 4. Percentage Results of Answers to Question Number 4

	Information	Number of students	Percentage
No. 4	Students who cannot do the questions or get them wrong	24	46,15%
	Students only write down the answers, but they are correct	16	30,77%
	Students can complete arithmetic operations accurately and correctly	12	23,08%
	Amount	52	100%

Table 4 shows that most students (46.15%) still have difficulty working on question number 4, while only 23.08% of students can complete it correctly and completely. Although 30.77% of students gave the correct answer, the absence of a work process can indicate an understanding that is not yet fully mature.

Question number 5 is designed to measure student's ability to solve story problems related to determining the volume of cuboids, a material they studied in semester II. This question shows to what extent students can apply the cuboid volume formula and present the answers in the right units. The following is a description of students' difficulties in solving cuboid volume problems in Table 5:

Table 5. Percentage Results of Answers to Question Number 5

	Information	Number of students	Percentage
No. 5	Students who cannot do the questions or get them wrong	37	71,15%
	Students only write down the answers	5	9,62%
	Students can complete arithmetic operations accurately and correctly	10	19,23%
	Amount	52	100%

Based on Table 5, most students (71.15%) had difficulty working on question number 5. Only 19.23% of students were able to complete the question correctly and showed a good understanding of the concept, while the other 9.62% only provided answers without complete steps.

Questionnaire Result Data

The questionnaire data were obtained from 52 students with 27 statements. The questionnaire data describes two indicators: internal factors (attitude in learning, learning motivation, physical health, and sensory abilities) and external factors (teachers, media,

facilities and infrastructure, and family environment). The results of this study are the results of descriptive analysis calculations. To find out data on factors of students' learning difficulties in mathematics subjects using a questionnaire that has been filled out by class V students at MIM Al-Akbar Pandeyan on April 10-13, 2023, using a questionnaire measurement scale, namely the Guttman scale shown in Table 6.

Table 6. Questionnaire Measurement Scale (Guttman Scale)

Respondent's Answers	Score	
	Positive Statement	Negative Statement
Ya	0	1
Tidak	1	0

Based on the results of the questionnaire and unit analysis of the factors of students' learning difficulties in mathematics, the following are the results of research using a questionnaire regarding the factors of students' learning difficulties in mathematics based on the high, medium, and low categories presented in Table 7:

Table 7. Percentage of Research Results on Student Learning Difficulty Factors in Mathematics Subjects

No.	Score Range	Frequency	Percentage	Category
1.	≥ 14,60	16	30,77%	Low
2.	14,60 s/d 6,20	33	63,46%	Currently
3.	≤ 6,20	3	5,77%	high
	Jumlah	52	100%	

Based on Table 7 above, it can be seen that students' learning difficulties in mathematics subjects at MIM Al-Akbar Pandeyan are in the category of moderate learning difficulties with a percentage of 63.46%. In addition, the following is a percentage based on indicators of factors of students' learning difficulties in mathematics subjects:

a. Internal factors

The results obtained from the questionnaire filled out by 52 students with 27 statements based on internal factor indicators in Table 8 are as follows:

Table 8. Results and Percentage of Internal Factors of Students' Learning Difficulties in Mathematics Subjects for each Indicator

No.	Internal Factors	Results	Overall Value	Percentage(%)
1	Attitude in learning	57	104	54,80%

No.	Internal Factors	Results	Overall Value	Percentage(%)
2	Motivation to learn	92	156	58,97%
3	Body Health	70	156	44,87%
4	Sensing ability	47	104	45,19%

Based on Table 8 above, it can be seen that the highest percentage of internal factors of students' learning difficulties in mathematics is 58.97% in the learning motivation indicator.

b. External factors

The results obtained from the questionnaire filled out by 52 students with 27 statements based on external factor indicators in Table 9 are as follows:

Table 9. Results and Percentage of External Factors of Students' Learning Difficulties in Mathematics Subjects for each Indicator

No.	External Factors	Results	Overall Value	Percentage(%)
1	Teacher	62	156	39,74%,
2	Use of learning media	86	156	55,13%,
3	School facilities and infrastructure	135	312	43,27%,
4	Family environment	122	260	46,92%.

Based on Table 9 above, it can be seen that the highest percentage of external factors of students' learning difficulties in mathematics is 55.13% in the indicator of the use of learning media.

Analysis of students' learning difficulties in mathematics subjects for grade V

Analysis of the results of students' answers to the questions includes two indicators: difficulty in understanding the concept (nets of geometric shapes) and difficulty in solving problems (fractions and volumes of geometric shapes).

1. Difficulty understanding concepts

The concept refers to students' basic understanding. The study results showed that students had difficulty determining the nets of geometric shapes (cubes and cuboids). This difficulty was shown when students could not answer or work on questions about nets of cubes and cuboids. This condition happened because of the lack of students understanding the concept.

According to Munasiah (2015), in understanding concepts, students can develop a concept when they can classify or group objects or associate a name with a certain group of objects (Munasiah, 2015). If students are less able to classify it, then it is a difficult

experience for students to understand the concept. Understanding the concept in question number 1 is the concept of cube nets by mentioning three correct nets. However, many students still answer only one or two nets. The results of the students' answers, on average, were answered by mentioning only two cube nets, even though there were three correct cube nets in the question.

In question number 2, conceptual understanding is the concept of cuboid nets by mentioning three correct nets. However, many students still answer only one or two nets. The results of the students' answers, on average, were answered by mentioning only two cuboid nets, even though there were three correct cuboid nets in the question.

Based on two questions regarding nets for cubes and cuboids, some students still do not understand the concept of nets for cubes and cuboids and still have difficulty determining nets for cubes and cuboids.

2. Difficulty solving problems

Problem-solving is an application of conceptual understanding and arithmetic skills. The results of this study showed the difficulties students experienced in solving problems of adding fractions, story problems of dividing fractions, and story problems of determining the volume of cuboids. These difficulties were shown when students could not answer or work on problems regarding adding fractions, story problems of dividing fractions, and story problems of determining the volume of cuboids. This result occurred due to the lack of students' understanding in understanding the concepts and arithmetic skills of students. According to Munasiah (2015), if students are less able to understand concepts and skills, then this is a difficulty experienced by students in problem-solving (Munasiah, 2015).

Problem-solving in question number 3 is adding mixed fractions. However, there are still many students who miscalculate it. The results of the students' answers show that students directly add mixed fractions without changing the denominator first. In addition, students know how to calculate it by first changing mixed fractions into ordinary fractions and equating the denominators. However, the students' error occurs when calculating the second fraction. This condition causes students to miscalculate the final result.

Problem-solving on question number 4 is a story problem of dividing fractions. However, there are still many students who miscalculate it. The results of the students' answers show that students can still not operate fraction division because in dividing fractions, they must first be changed into fraction multiplication by reversing the second fraction or a/b ： c/d=a/b x d/c. The students' answers are only given by subtracting the

numerator. In addition, there are still many students who answer without calculating first.

Problem-solving on question number 5 is a story problem about the volume of a solid shape (cube). However, there are still many students who miscalculate it. The results of the students' answers show that many students still cannot work on the volume of a cuboid. Students only add up the numbers in the question, even though the concept of cuboid volume is multiplication, namely volume = length x width x height. In addition, students only write the answer without changing the question sentence into a mathematical sentence and do not write the unit at the end of the answer.

Based on the results of working on questions 4 and 5, all students did not change the story problem into a mathematical sentence first and immediately calculated it. In addition, students also did not write the counting unit at the end of their answers. Based on the three questions regarding adding fractions, story problems dividing fractions, and story problems determining the volume of cuboids, it can be concluded that there are still many students who do not understand the concept and skills of counting, which means that students still have difficulty in solving problems regarding adding fractions, story problems dividing fractions, and story problems determining the volume of cuboids.

Factors causing students' learning difficulties in mathematics subjects in class V MIM Al-Akbar Pandeyan

Learning difficulties are a condition in the learning process characterized by certain obstacles in achieving learning outcomes. Learning difficulties can hinder the learning process due to students' internal and external factors.

1. **Internal factors**

   Attitude in learning

   Based on the results of the questionnaire completed by students, the attitude of students in learning a percentage of 54.80% that the attitude in learning mathematics lessons in class V MIM Al-Akbar Pandeyan, students consider mathematics is not a fun or boring lesson for those who are the same as they do not like mathematics lessons. In addition, students also often talk to themselves when the teacher explains mathematics lessons, meaning they do not concentrate during learning.

   This condition can cause learning difficulties because a person's attitude can affect their learning process. These results follow Andri's (2020) explanation that a person's attitude

can affect students' success in their learning process (Andri et al., 2020). In addition, it also follows Anturichana's (2021) explanation that a positive attitude towards lessons is a good start to the learning process, and a negative attitude has the potential to cause learning difficulties or result in less than optimal learning outcomes (Anturichana et al., 2021).

Motivation to learn

Based on the results of the questionnaire completed by students, student motivation in learning with a percentage of 58.97%, means that the motivation to learn students in mathematics subjects in class V MIM Al-Akbar Pandeyan still has many students who feel lazy to follow mathematics lessons and during learning there are still students who are embarrassed to ask their teachers if they do not understand the material explained. In addition, many students still do not study at home if there is no math test. This condition can cause learning difficulties because motivation is important in doing something, including learning activities.

The results above follow Emda's (2017) explanation that motivation is one of the factors that influences the effectiveness of student learning, which can encourage students to carry out learning activities (Emda, 2017). If students do not have the motivation to learn, then students will have difficulty in learning. In addition, Anggraeni et al. (2020) said that motivation in learning is important for students because motivation has the aim of arousing students' enthusiasm for learning, which can be done verbally or by giving rewards that students like (Anggraeni et al. 2020).

Body Health

Based on the results of the questionnaire completed by students, students' physical health was 44.87%. Some students still do not concentrate when taking math lessons and do not eat breakfast if there is a math lesson. In addition, there are still students who are often sleepy when taking math lessons. This condition causes learning difficulties because physical health can affect students' motivation or enthusiasm to take part in learning. In fact, according to Pratama (2022), physical health is an important factor in carrying out activities, including studying (Pratama & Winarno, 2022). Students who are sleepy and unable to concentrate during lessons can be a sign that the student's physical condition is not optimal (K. D. Utami et al., 2019).

Sensing ability

Based on Table 4.10, the students' sensory abilities with a percentage of 45.19%, not many students have visual impairments. Students with visual impairments, namely nearsightedness, are usually placed in the front row so they can still see the board clearly. In addition, hearing impairments can also affect students' ability to absorb information conveyed by the teacher. Some students still do not listen to the teacher's explanation well. This phenomenon can cause learning difficulties because students' sensory abilities greatly influence learning; for example, the sense of hearing is used to listen to learning activities, and sight is used to see what the teacher explains in learning activities in class.

In fact, according to Utami et al. (2019), visual and hearing impairments will interfere with students' receiving information, especially in mathematics learning, which causes students' learning difficulties (K. D. Utami et al., 2019). In addition, according to Anggraeni et al. (2020), the condition of organs, especially the sense of hearing and sight, greatly affects students' ability to absorb the teacher's information and knowledge (Anggraeni et al. 2020).

2. External factors

Teacher

Based on the results of the questionnaire completed by students, the teacher factor with a percentage of 39.74%, there are still many students who answered that teachers in teaching mathematics never form discussion groups as a variation of teachers in teaching. However, some students also said teachers have taught mathematics through group discussions. So, in addition to the lecture method, teachers have also used discussion methods in learning mathematics.

In addition, some students also answered in the questionnaire that teachers had scolded students if they could not do the problems given during math lessons. Teachers' varied teaching methods are needed to attract students' attention and reduce boredom (Sudrajat et al., 2024). In agreement with the statement above, according to Febriyanti and Seruni (2014), teachers and their teaching methods are important factors in determining students' success in learning mathematics (Febriyanti & Seruni, 2014).

Use of learning media

Based on the results of the questionnaire completed by students, the use of learning media with a percentage of 55.13%, many students still answered that teachers sometimes

use teaching aids during mathematics learning but sometimes do not use mathematical teaching aids. In fact, according to Arnandi (2022), the use of learning media aims to help explain the material to students (Arnandi et al., 2022). This statement means that using learning media is an important factor that needs to be considered in learning mathematics so that students can understand mathematical concepts well. In addition, according to Anggraeni et al. (2020), media or teaching aids are needed to support the learning process in the classroom and make it easier for students to understand the material (Anggraeni et al., 2020). Abstract mathematics subjects require learning tools to clarify abstract material.

School facilities and infrastructure

Based on the results of the questionnaire completed by students, school facilities and infrastructure with a percentage of 43.27%, school facilities and infrastructure in the form of textbooks or mathematics guides in the library and mathematics teaching aids are not fully available at school. In addition, some students consider the desks and chairs in the classroom to be uncomfortable for learning mathematics. However, according to students, their classrooms are comfortable for learning. According to Aulia et al. (2022), a lack of supportive school facilities and infrastructure can hinder the learning process (Ahmad et al., 2022). Incomplete teaching tools make the presentation of lessons less than good (Anggrella et al., 2023), especially for practical lessons. The lack of laboratory equipment will cause many difficulties in learning (Anggrella et al., 2021). In addition, according to Asriyanti & Purwati (2020), the lack of supporting reading books in learning causes students to experience learning difficulties, and the presence of other reading books outside of learning materials can also interfere with students' learning focus (Asriyanti & Purwati, 2020).

Family environment

Based on the questionnaire completed by students, the family environment, with a percentage of 46.92%, is the majority of parents of students who have provided facilities or needs in learning mathematics. However, in their studies, parents do not accompany students while studying at home, and some parents never remind students to study because they are busy. In addition, family members such as older siblings or other family members mostly never help students if they have difficulty doing homework given by the teacher. In fact, according to Saputra (2021), the family is the first centre of education for students. Guidance and attention from parents are important factors in students' learning success

(Saputra, 2021). In addition, according to Asriyanti & Purwati (2020), parental attention to children is very important because if children are studying or working on questions that are considered difficult at home without help from their parents, this can cause students to have difficulty learning (Asriyanti & Purwati, 2020).

This study makes a significant contribution to the educational literature, namely by providing specific data on mathematics learning difficulties at MIM Al-Akbar Pandeyan, identifying factors causing learning difficulties that can strengthen or modify existing theories, and providing concrete solutions to overcome mathematics learning difficulties in the school and other similar schools. In addition, this study fills the knowledge gap about mathematics learning difficulties in specific contexts and contributes to developing more effective learning practices. This study has limitations in test indicators, namely indicators of difficulty in skills using performance. This case is a limitation for researchers because it requires time and careful preparation to design skill indicators using performance.

CONCLUSION

The learning difficulties faced by students in the fifth-grade mathematics subject consist of two, namely students' difficulties in understanding the concept of the material on nets of geometric shapes (cubes and cuboids) and difficulties in problem-solving, namely in arithmetic operations, solving story problems, and changing problem sentences into mathematical sentences.

The learning difficulties faced by students in mathematics subjects of grade V at MIM Al-Akbar Pandeyan consist of two factors, namely internal factors and external factors. Internal factors of students' learning difficulties in mathematics subjects of grade V at MIM Al-Akbar Pandeyan include attitudes in learning at 54.80%, motivation to learn at 58.97%, physical health at 44.87%, and sensory abilities at 45.19%. External factors of students' learning difficulties in mathematics subjects of grade V at MIM Al-Akbar Pandeyan include teacher factors at 39.74%, use of learning media at 55.13%, school facilities and infrastructure at 43.27%, and family environment at 46.92%. This study is expected to be used as additional insight in working on final assignments for those who want to conduct research using quantitative methods on the same variables in order to add new variables. Further research is suggested to add indicators of skill difficulty by using performance.

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