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An Analysis of Student's Difficulties in Learning Mathematics at Madrasah Ibtidaiyah

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Abstract

This study aims to describe the level of difficulty of students in solving story problems in mathematics learning at Madrasah Ibtidaiyah. This research is a descriptive-analytical study. The participants of the study were third-grade students at one Madrasah Ibtidaiyah in Palangka Raya City, which numbered 34 people and fifth-grade students at one Ibtidaiyah Madrasah in East Lampung City, which amounted to 40 people. Data collection techniques use tests in the form of 10 questions. The tests given to the research sample have met the criteria of validity and reliability. Data analysis techniques use descriptive statistics in the form of tables and graphs through the calculation of averages and percentages. The results of this study explain that, in general, students have difficulty solving story problems. The most difficulty experienced by third graders is associating mathematics with daily life problems, which is 83.82%. In comparison, the most difficulty experienced by fifth-grade students is changing the language of everyday problems into the language of mathematics (making mathematical models or making a solution plan), which is 82%. This research produced a novelty in describing the difficulty of students solving story problems in mathematics learning by linking mathematics to daily life problems in Madrasah Ibtidaiyah.

Keywords: *analysis of difficulty levels, story problems, mathematics learning.*

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan tingkat kesulitan siswa dalam memecahkan masalah cerita dalam pembelajaran matematika di Madrasah Ibtidaiyah. Penelitian ini merupakan penelitian deskriptif analitis. Subjek penelitian adalah siswa kelas III Madrasah Ibtidaiyah Kota Palangka Raya yang berjumlah 34 orang dan siswa kelas lima Madrasah satu Madrasah Kota Lampung Timur yang berjumlah 40 orang. Teknik pengumpulan data menggunakan tes berupa 10 pertanyaan. Tes yang diberikan kepada sampel penelitian telah memenuhi kriteria validitas dan reliabilitas. Teknik analisis data menggunakan statistik deskriptif berupa tabel dan grafik, melalui perhitungan rata-rata dan persentase. Hasil penelitian ini menjelaskan bahwa pada umumnya siswa mengalami kesulitan dalam memecahkan masalah cerita. Kesulitan yang paling banyak dialami oleh siswa kelas tiga adalah mengaitkan matematika dengan masalah kehidupan sehari-hari, yaitu 83,82%. Sedangkan kesulitan yang paling banyak dialami oleh siswa kelas V adalah mengubah bahasa soal sehari-hari menjadi bahasa matematika (membuat model matematika atau membuat rencana solusi) yaitu 82%. Penelitian ini menghasilkan kebaruan berupa deskripsi kesulitan siswa memecahkan masalah cerita dalam pembelajaran matematika dengan mengaitkan matematika dalam masalah kehidupan sehari-hari di Madrasah Ibtidaiyah.

Kata kunci: *analisis tingkat kesulitan, permasalahan cerita, pembelajaran matematika.*

INTRODUCTION

One of the common goals of mathematics in schools is to prepare students to use mathematics and mathematical thinking in everyday life and in studying various sciences (Sumarmo, 2003). To achieve these goals, the government has done much. The government always tries to improve education quality, especially mathematics education, through curriculum change, teacher training, provision of infrastructure advice, etc. Other efforts are also through teachers' various learning approaches, one of which is student-centered learning. Student-centered learning will support the achievement of mathematics learning (Lischka et al., 2022).

Along with the government's efforts, the reality in the field shows that education, especially in the field of mathematics in Indonesia, still needs to be improved. This can be seen from the achievement of mathematics achievement of Indonesian students who are low. According to the results of the Trends In Mathematics and Science Study (TIMSS) in 2015, the achievement of Indonesian students is ranked 45th out of 50 countries (Mullis, 2015). This fact illustrates that education, especially in mathematics, needs more serious handling. The low achievement of this student is proof of the problems that obstruct the students' understanding of mathematics.

In the process of learning mathematics in schools, for example, teachers often complain about students' difficulty in solving math problems, especially applied questions. Students will face problems in learning mathematics if difficulties in solving mathematical problems are not fixed. The difficulties need to be improved through the analysis of the difficulties, the location of the difficulties, and the difficulties faced by students in solving math problems, especially the application questions. These difficulties in mathematics need special attention, especially by teachers. Teachers need to intervene to improve problem-solving skills in students (Qingli et al.,

2020; Jonte et al., 2022). In addition, this math difficulty should be a priority for teachers to learn mathematics more flexibly (Nick et al., 2023).

Based on pre-observation and interview with a third-grade teacher of elementary school level in Palangka Raya, it was found that some problems, especially in learning mathematics. From the results of evaluations conducted by teachers, student mastery of mathematics occupies the lowest position compared with the mastery of other lessons. According to the teacher, mathematics is still considered difficult for students. One that is considered difficult by students is to work on problems that form application problems or stories related to real life as well as with other disciplines. The same thing was also conveyed by fifth-grade teachers in Lampung Timur, who stated that the fifth-grade students still have difficulty in solving the problem, especially in the form of stories. This proves that students have not been able to apply mathematical concepts in solving math items.

The concept of mathematics is highly important to students to master due to the nature of mathematics as the queen of science and as an attendant for other sciences. Mathematics is a discipline that studies thinking, procedure, and processing logic (Wahyudin, 2003). In mathematics, the foundation was placed on how to develop ways of thinking and acting through the rules called theorem (can be proved) and axioms (without proof). Furthermore, that basis is embraced and used by other study fields or disciplines (Suherman, 2003).

A previous study conducted by Sulistyani et al. (2021) states that students' difficulties in learning mathematics involve problem-solving skills. This research emphasizes mathematical difficulties in the aspect of skills in relating mathematical concepts to daily life problems. In fact, the ability to solve mathematical problems is very important for students to master (Trilling, 2009). In addition, the ability to read or understand problems will affect students' mathematical problem-solving skills (Boonen et al., 2016; Yuanze, 2022). Sabri (1995:88) explained in his book that the difficulty of learning is the difficulty of students in accepting or absorbing the lessons in school; the learning difficulties encountered by students occur during a lesson submitted or commissioned by a Master. Ahmadi (1991) also expressed the same thing, saying that learning difficulties are a situation where students can't learn properly. The presence of certain constraints can also characterize learning difficulties in achieving the learning objectives to be achieved (Syah, 1999). One indicator of student learning difficulties is the mistakes made when working on the questions.

In relation to learning mathematics in school, the students who experience learning difficulties are caused by the following: (1) the students do not understand the meaning of symbols; they only write/say them without being able to use them. Consequently, all the mathematical sentences become meaningless to them; (2) the students cannot comprehend the concept correctly. The students have not reached the process of abstraction yet and are still in a concrete world. They do have no comprehension of concept and only know how to mention the examples, but they cannot describe them; (3) the students cannot understand the origin of a principle. They know and use the formula, but they do not know where or in what context the principle is used; (4) the students are not fluent in operation and procedure. Inequality in using prior operation and procedure influences the understanding of other procedures; and (5) the incompleteness of knowledge will hinder the ability of students to solve mathematical problems;

meanwhile, the lessons keep going in stages. Based on the above description, the goal to be achieved in this research is to know and then describe the location of student difficulties in learning mathematics in Madrasah Ibtidaiyah.

METHODS

This research uses a quantitative approach in the form of numbers obtained from the answers generated by students in solving math problems at each step of the process. Data sources were obtained from students of third-grade MIN Model Pahandut Palangka Raya, which amounted to 34 people, and students of fifth-grade MIN 4 Lampung Timur, which amounted to 40 people.

The data processing procedure in this research is: (1) give coding to each result of the research sample answer, (2) classify the coding result into tabulation form, and (3) analyze data obtained through average and percentage.

The instrument used is a description test. Before the instrument is given to the research sample, the instrument has met the criteria of validity and reliability (Azwar, 2010). The instrument used is ten questions. The method used in this research is the descriptive method. After the data is collected, in the form of scores of test results in solving mathematical problems, the difficulties experienced by students from each step of the problem can be identified. The next step is to classify the data obtained into tabulations and analyze it through a predetermined technique.

RESULT AND DISCUSSION

Data Collection

This research aims to determine and describe student's difficulties in learning mathematics at elementary school. Based on the results of interviews with teachers in State Madrasah Ibtidaiyah (MIN) Model Pahandut Palangka Raya and State Madrasah Ibtidaiyah (MIN) 4 Lampung Timur, many students have difficulty solving math story problems. It can be known from the results of formative and summative tests. It shows many students who make mistakes, especially in solving the story items.

On the other hand, students must make some steps to find the final answer in math when solving the story items. In the completion test process, students usually make some mistakes in understanding the problem, connecting problems with mathematics, creating mathematical models, making plans, performing arithmetic calculations, and making conclusions. Therefore, to know the details of the student's difficulties in solving the story items in math, in this research, students are given tests from mathematics stories, which is the final result of studying to know most of the last difficulties experienced by elementary school.

Based on the results about story test related to daily life obtained data as follows:

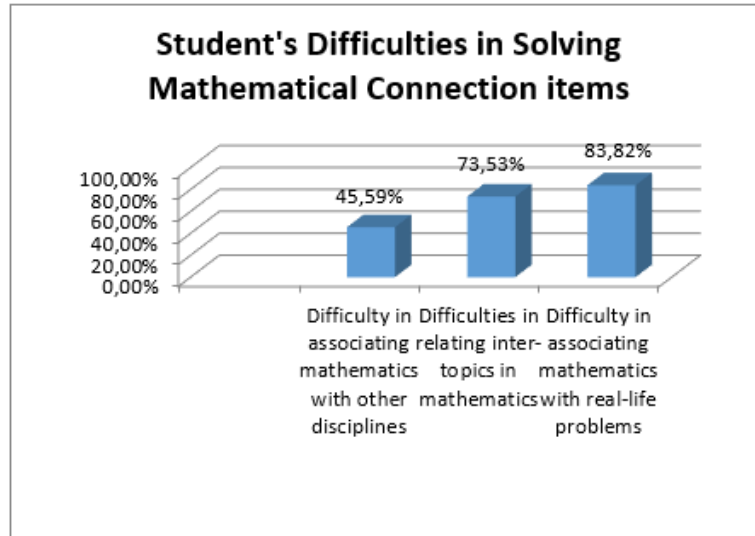


Figure 1. Student's Difficulties in Solving Mathematical Connection items

1. Data of difficulties third grade students at MIN Model Pahandut Palangka Raya in solving the story items.

Data of difficulties students in class III MIN Model Pahandut Palangka Raya in solving the story items test show the number of students who make mistakes in solving connection math items. The mathematical connections referred to in this study are the students' ability to relate the mathematical topics being discussed with other mathematical topics, to associate mathematics with other disciplines, and to relate mathematics to real life.

Based on the assessment results, student answer sheets then obtained data about students' difficulties in solving problems of mathematical connections. The data can be more clearly seen in Figure 1 below:

Figure 1 shows that students' difficulties in associating mathematics with other disciplines 45.59% (this difficulty includes the medium criteria). The difficulties of students in associating between topics in mathematics amounted to 73.53% (this difficulty includes the high criteria). Students' difficulty relating mathematics with daily life problems amounted to 83.82% (this difficulty includes the very high criteria). Based on these data, the most difficulty experienced by students to associate math with the problems of everyday life.

Students' difficulties relating mathematics with other disciplines are known through the results of student answers when answering the questions on items 1 and 2. Both of these questions link between Indonesian and mathematics subjects. In question number 1, students are expected to be able to identify different types of flat wake and be able to write simple poems from the available images. As for question number 2, students are expected to be able to identify various types and major angles and able to tell the events that have been experienced, heard, or seen by students.

Students' difficulties relating mathematics to real-life problems are known through the results of student answers in answering questions number 3 and 5. Through Instrument number 3, students are expected to be able to determine the type of angle by involving the

direction of the wind. In instrument number 5, students are expected to be able to determine the angle as the rotation distance.

Students' difficulties relating to mathematics topics are known through the results of student answers to test number 4. On the question, students are expected to be able to determine the type of taper angle, dull angle, and right angle by using the concept of the clock.

Students' difficulties relating mathematics to real-life problems are known through the results of student answers in questions number 3 and 5. Through Instrument number 3, students are expected to be able to determine the type of angle by involving the direction of the wind. In instrument number 5, students are expected to be able to determine the angle as the rotation distance.

2. Data on students difficulties fifth grade at MIN 4 Lampung Timur in solving the story items

According to the difficulties, students' data grade V B MIN 4 East Lampung can be seen from the data mistakes students made in accomplishing the math test story. The story test provided is a matter of non-routine or problem-solving test. The assessment results of student answer sheets show that students make mistakes at the stage of understanding the problem, making a mathematical model, performing calculations or solving problems, and making conclusions. The number of errors is different. Figure 2 explains the number of student errors in solving the story problem.

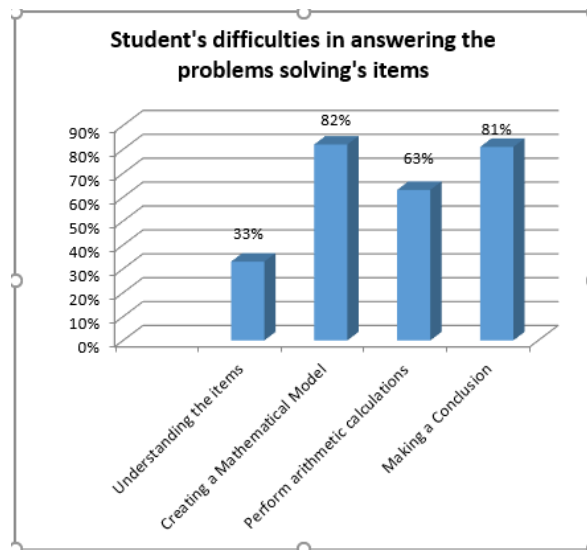


Figure 2. Student's difficulties in answering the problems solving's items

The figure above 2 explains that in terms of troubleshooting steps, 33% of students make mistakes in understanding problems, 82% of students make mistakes in making mathematical models, 63% of students make mistakes in performing arithmetic calculations, and 81% of students make mistakes in making a conclusion. These data indicate that the most errors made by students lie in the second step; 82% of students make mistakes in mathematical models.

When understanding the test, students must be able to read and understand the purpose of every sentence that exists on the matter of the story. According to Santrock (2008), in understanding the story, the students should be able to find important information while reading and able to understand the relationship between the text of the sentence questions. If students can't understand the problem correctly, students can make mistakes in the next step.

On the other hand, when making mathematical models or making completion plans, students must be able to change the information from the language of stories relating to daily life into the language of mathematics. This step is an essential aspect of the process of solving mathematical problems. Because the process of completion or calculation of mathematical operations begins from the activities of students in making mathematical models, when students make a mistake in creating a mathematical model or determining a strategy of completion, it will result in errors in calculations.

Furthermore, to perform the calculation or solve the mathematical model, students are required to be in accordance with procedures and arithmetic operations correctly. This step requires the skills of counting various operations in mathematics count. The accuracy, dexterity, and counting speed of students in accordance with the procedures and rules of arithmetic greatly affect the correctness of the answers sought.

In the final step, to make a conclusion, the student checks the answers, checks the completion steps, and writes the answers into the context of the story. This is in accordance with Polya's opinion in Kaufmann (1983), who advises paying attention to some questions that arise after getting the result of completion, such as checking the answers, checking the completion steps, and others.

The above data of research that has been described shows that the location of the most difficulty experienced by third-grade students in MIN Model Pahandut Palangka Raya is to relate mathematics with problems of everyday life. Meanwhile, the most difficulty experienced by students of class V MIN 4 Lampung Timur is to make a mathematical model. Creating a mathematical model can be interpreted as changing information from the language of stories related to daily life into the language of mathematics.

According to both aspects of the difficulty above, it can be drawn thread that both groups of students above have experienced similar difficulties, that is, the ability to associate mathematics with problems of everyday life and a similar ability to change the language of everyday problems into the language of mathematics (making the model mathematics). Students with learning difficulties in mathematics tend to give up all confidence in comprehending mathematics and memorize worthless information, procedures, symbols, and procedures repeatedly (Jabeen et al., 2021).

Students' difficulty relating mathematics with everyday problems shows that students have not been maximally in conceptual understanding of the direction of the wind and the concept of angles applied in solving real-life problems. According to Schunk (2012), students with difficulty in conceptual understanding show a low memory of received information and tend to have lower performance. To minimize this difficulty, it is necessary for the role of teachers who are able to use a variety of ways to help students improve mathematical connection skills applied in solving real-life problems. The results of this study are in line with

research by Kenedi (2019) that student's ability to recognize and exploit the relationship between ideas in mathematics, understand how ideas in mathematics interconnect and underlie each other to produce a coherent unity and recognize and apply mathematics in everyday life is categorized as low.

This research also shows that students have difficulty understanding mathematical concepts related to everyday life, which are stated in narrative form. These results are in line with research conducted by Retnawati & Bukhori (2017) that imply student difficulties were caused by the fact that the students had not been able to understand the narrative text items in mathematics tests.

The results of research by Acharya (2017) concluded that there was a lack of teacher connection between new mathematical concepts and previously learned mathematical structures, anxiety towards mathematics, negative views towards mathematics, economic conditions and educational background, school management systems, lack of school infrastructure and lack of assessment systems school is regularly the main cause of failure difficulty in learning mathematics. Furthermore, another study showed that most students were still in the low category in the ability of critical thinking, as for the difficulties experienced by students, namely in providing simple explanations and working on problems that are not systematic (Salahudin et al., 2020).

Teachers can make or act as models that can assist students in improving conceptual understanding skills so that students are able to solve the problems they face. This is in line with the social cognitive theory proposed by Bandura (1994) that modeling is an essential component of the social cognitive theory that refers to behavioral, cognitive, and affective changes derived from observing one or more models or examples. Besides that, research conducted by Nurlaily et al. (2019) indicates that teacher finds it difficult to direct students to problems that require solutions, and teachers need enough time to organize students in group activities. Also, they have difficulty dividing time when guiding groups because students are still waiting for the teacher to explain to the group without doing it themselves first.

Furthermore, in solving mathematical problems, the ability to create a mathematical model or make a completion plan is a step that requires a critical and creative thinking process since it is the most difficult and core process of problem-solving (Supriatin *et al.*, 2020). According to Polya's opinion, problem-solving abilities are on the idea of developing a solution plan (Polya, 1981). Therefore, through the results of this study, the teacher can make it an evaluation material for implementing mathematics learning in elementary school students. Making improvements in learning mathematics focused on improving the ability of students to solve story problems, especially activities to create a mathematical model that changes the language of the story or everyday problems into the language of mathematics (symbol language).

CONCLUSION

In general, students' difficulty in learning mathematics at elementary school lies in solving the story test well in the problem of mathematical connections and problem-solving tests. In solving the story test problem, include grade III students of MIN Model Pahandut Palangka Raya

and VB students of MIN 4 Lampung Timur; both experienced the most similar difficulties that linked daily problems with mathematics or changed the language of everyday problems to the mathematics language (making model mathematics). The most challenging experience by third-grade students of MIN Model Pahandut Palangka Raya is to relate mathematics with daily life problems, which is equal to 83,82%. The most difficult for V B students in MIN 4 East Lampung is changing the language of everyday problems into the language of mathematics (making a mathematical model or making a completion plan), which is equal to 82%.

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