ANALYSIS OF STUDENTS' MATHEMATICAL LITERACY ABILITY IN SOLVING STORY PROBLEMS

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Abstract

The purpose of this study was to describe students' mathematical literacy abilities in the material of flat sided geometric shapes. This type of research is qualitative research. Data collection was carried out by conducting written tests and interviews with students. The research subjects in this study were 23 class VII students. The interview subjects were taken by purposive sampling of 6 students, each consisting of 2 students in the upper group, 2 students in the middle group, and 2 students in the lower group. Based on the types of aspects that have been determined to analyze students' mathematical literacy abilities in solving word problems on flat-sided geometric shapes, data is obtained that: (1) 99 aspects of understanding were fulfilled with a percentage of 86.08%, (2) aspects of reasoning were fulfilled as many as 93 with a percentage of 80.86%, (3) aspects of reasoning that were fulfilled as many as 35 with a percentage of 30.43%, and (4) aspects of communication that were fulfilled as many as 39 with a percentage of 33.91%. As well as the results of calculating the percentage of the total aspects that students fulfilled was 57.82%.

Keywords: math literacy ability, *essay questions*

1   INTRODUCTION

Education is a guide which means guiding all the initial abilities that exist in humans so that humans can achieve happiness and safety (Hasbullah 2013). Education is a teaching and learning activity carried out with the aim of acquiring knowledge which involves two components, namely educators and students.

Mathematics is one of the subjects taught at all levels of education. Mathematics is a science that is synonymous with calculations. So it is not surprising that many students think that mathematics is a science that is difficult to learn, scary and uninteresting.

According to the OECD (Organization for Economic Co-operation and Development), mathematical literacy is the ability of students to formulate, apply and interpret mathematics in various contexts. Includes mathematical reasoning and uses mathematical concepts, procedures, facts and tools to describe, explain and predict events.

According to the 2012 PISA assessment framework draft, mathematical literacy is the ability of an individual to practice, formulate and explain mathematics in various phenomena, including the ability to reason mathematically and use concepts, procedures and facts to describe, explain or predict phenomena. that happened. According to Stacey and Turner (2015), literacy in the context of mathematics is problem-solving thinking in everyday life which includes solving problems, reasoning logically, communicating, and explaining mathematics in various contexts. The application of mathematics is based on the knowledge and abilities that have been explored and implemented. Good mastery of mathematics can help students solve problems in everyday life (Larasati, Susongko, and Isnani 2017).

According to Kusumah in Fatani (2016), mathematical literacy is a series of questions (posing problems), describing, solving, and analyzing problems based on the existing context. This is not different from Isnaini's opinion in Fatani (2016) which defines mathematical literacy as the ability of students to be able to understand facts, concepts, principles, operations, and solve mathematical problems.

Based on interviews conducted with the class VII mathematics teacher at Brebes 3 Public Middle School, Mrs. Nur Irmawanti, S.Pd in 2023, information was obtained that some students at Brebes 3 Public Middle School had low mathematical literacy skills. From the four aspects that will be discussed

in this study, the low mathematical literacy ability of Brebes 3 Public Middle School students is seen from the reasoning aspect. Students find it difficult when determining the steps in solving math literacy questions.

Based on interviews with Class VII-I students of SMP Negeri 3 Brebes (Ayunda Naellatul Izza, Abiyyi Al-Ariibu Asysyakhiyyi, and Wulan Pujiastuti) information was obtained that learning mathematics in class was fun and challenging because the learning model used by the teacher and learning media used by teachers varies. Students can also understand any given material. However, students found it difficult to work on math literacy questions in the form of word problems. The difficulty is when they understand the problem so they are confused about where to start working on the problem and when determining the formula to be used in solving the problem.

From the description above, it can be concluded that some class VII-I students of SMP Negeri 3 Brebes have low mathematical literacy skills. So the purpose of this research is to describe the mathematical literacy abilities of class VII students of SMP Negeri 3 Brebes in the 2022/2023 academic year on the subject matter of Flat Sided Buildings.

2   METHODOLOGY

This study uses a qualitative approach. The design of this research is qualitative research with a descriptive qualitative approach, namely research that focuses on experience, interpretation and the meaning of life of someone who experiences it (Sugiyono 2018). The research location is Brebes 3 Public Middle School. The research subjects were 23 Class VII-I students of SMP Negeri 3 Brebes. The data analysis technique used is qualitative analysis. The research instrument was in the form of math word problems on flat sided space material, totaling 5 questions that had been through a trial process, and validity.

3   RESULTS

The subjects in this study were class VII-I students of SMP Negeri 3 Brebes. The research was conducted by conducting tests of mathematical literacy skills totaling 5 essay questions that had gone through a trial and validation process to 23 students. Furthermore, the results of the answers to the mathematical literacy ability tests that have been done by students are examined to identify students' mathematical literacy abilities by looking at predetermined aspects. Then 6 students were selected to be interviewed in order to obtain real data.

3.1   Math Literacy Ability

Based on the results of the tests carried out by 23 students in completing the mathematical literacy ability test questions, information was obtained that there were still many aspects that had not been fulfilled perfectly in each question by students. Unfulfilled aspects can be caused by several factors such as students who do not write down what is known from the questions, what is asked from the questions, students who are not precise in writing formulas that are appropriate to the questions, students' calculations that are not precise, students who are not precise in write the conclusion of the question, and students do not write any conclusions at the end of the answer. These factors have been grouped respectively in the appropriate aspects.

The following details the types of aspects that can be fulfilled by students based on the results of solving math literacy test questions that have been given to 23 students.

Table 1 Percentage of Aspects fulfilled by Students

Question number	Number of Students who Meet Aspect			
	Aspecct understanding	Aspek Application	Aspect Reasoning	Aspek Commnication
1	23	23	13	17
2	23	21	2	20
3	23	23	5	2
4	22	22	13	0
5	8	4	2	0
Amount	99	93	35	39
Persentage	86,08 %	80,86 %	30,43 %	33,91 %

Based on the results of calculating the percentages in the table above, information is obtained that the percentage of the total aspects that can be fulfilled by students in solving the mathematical literacy ability test questions, namely:

$$P_{total} = \frac{x_1}{\sum x_{total}} \times 100\%$$

Information :

P_{total} : Persentase total of aspect

xi : The number of aspects that can be fulfilled by students

$\sum x_{total}$: The number of all aspects that should be fulfilled by students

Percentage of total aspects fulfilled by students:

$$P_{total} = \frac{x_1}{\sum x_{total}} \times 100\%$$
$$= \frac{266}{460} \times 100\%$$
$$= 57,82 \%$$

The results of calculating the percentage of aspects fulfilled by students obtained 57.82%.

3.1.1 Aspect Understanding

The aspect of understanding is defined by the ability of students to understand mathematical concepts which cover all the theories and materials that have been presented and can describe problems in various contexts. In this aspect of understanding, students are required to be able to understand and be able to explain the purpose of the questions given.

The application of the understanding aspect in analyzing mathematical literacy skills in solid-sided geometric material can be in the form of students' understanding of what is known, asked, and answers to questions. In this aspect of understanding, students are required to be able to explain what is known, what is being asked, and the answers to the questions given. Unfulfilled aspects of understanding can be caused because students do not know what is known from the questions, what is asked from the questions and answers to the questions given.

Based on the results of the calculation of the types of aspects, the percentage of understanding aspects that can be fulfilled by students in all questions is 99 aspects with a percentage of 86.08%.

3.1.2   Aspect Application

The aspect of application is defined by the ability of students to apply or practice mathematics based on concepts that have been understood as guidelines for solving mathematical problems. In this aspect of application, students are required to be able to change the concept of a problem in a problem into a mathematical form, and apply the formula that will be used in solving the problem.

The application of the application aspect in analyzing mathematical literacy skills in geometric material can be in the form of using a flat geometric formula in a problem. In this aspect of application, students are required to be able to apply the appropriate formula to solve problems in mathematical literacy questions. The non-fulfillment of these aspects is caused by students who cannot explain or write down the formula of the geometric shapes that will be used in solving problems. question. Because the application of the appropriate geometric formula is the main key for students in solving the problems given.

Based on the results of the calculation of the types of aspects, the percentage of application aspects that can be fulfilled by students in all questions is 93 aspects with a percentage of 80.86%.

3.1.3   Aspect Reasoning

The reasoning aspect has the definition that students have the ability to think logically in solving mathematical problems and think in calculations to answer mathematical questions in a given problem. In this aspect of reasoning students are able to connect each problem solving from the beginning to the end of the completion.

The application of the reasoning aspect in analyzing mathematical literacy skills in this flat-sided geometric material is in the form of calculating answers when working on questions. In this aspect of reasoning, the calculation of answers is very important because to obtain the correct final result, correct calculations are also needed. The reason for not fulfilling this aspect is due to students who are not careful in calculating.

Based on the results of the calculation of the types of aspects, the percentage of aspects of reasoning that can be fulfilled by students in all questions is 35 aspects with a percentage of 30.43%.

3.1.4   Aspect Communication

The aspect of communication means that students are able to relate one problem to another and explain various problems in words. In this aspect of communication students are required to be able to explain in words the answers to the questions that have been worked on.

The application of the communication aspect in analyzing students' mathematical literacy abilities can be in the form of giving conclusions at the end of problem solving. Giving conclusions is an important point in fulfilling the communication aspect. Because at the end of solving word problems, conclusions must be given from all the answers that have been done. So that when students do not write conclusions at the end of the answers, then these students can be said not to fulfill the communication aspect.

Based on the results of the calculation of the types of aspects, the percentage of communication aspects that can be fulfilled by students in all questions is 39 aspects with a percentage of 33.91%.

Based on the calculation of the percentage of types of aspects that have been fulfilled by students in solving mathematical literacy ability test questions, it can be seen that the percentage of these aspects is in the following diagram.
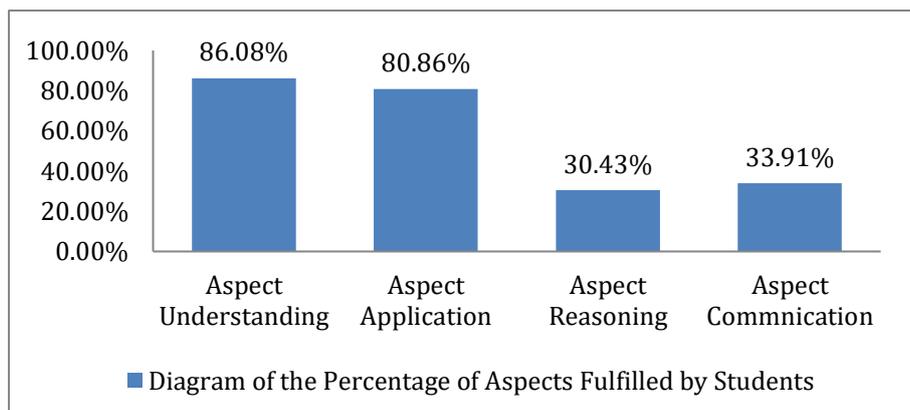
Figure 1 percentage of aspects completed by students

4   CONCLUSIONS

Based on the results of the research and discussion that has been put forward, it can be concluded that the aspects fulfilled by class VII students of SMP Negeri 3 Brebes in solving literacy ability test questions are based on four predetermined aspects, namely (1) the understanding aspect which is fulfilled as much as 99 with a percentage of 86.08%, (2) aspects of understanding that were fulfilled as many as 93 with a percentage of 80.86%, (3) aspects of reasoning that were fulfilled as many as 35 with a percentage of 30.43%, and (4) aspects of communication that fulfilled as many as 39 with a percentage of 33.91%. As well as the results of calculating the percentage of the total aspects that students fulfilled was 57.82%. Of the four aspects that have been fulfilled by students, it can be seen that the aspect of understanding is the type of aspect that is most fulfilled by students because it has the highest percentage among other aspects, while the aspect of reasoning is the aspect that is least fulfilled by students because it has the highest percentage. the smallest among other aspects.

ACKNOWLEDGEMENTS

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