DESCRIPTION OF STUDENTS' MATHEMATICAL LITERACY AS ASSESSED FROM THEIR INITIAL ABILITIES IN GRADE VIII OF SMP NEGERI 1 MAJAULENG

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Abstract;This study aims to describe the mathematical literacy of students with high, medium, and low initial abilities. This type of research is descriptive research with a qualitative approach.The subjects used in this study were three students of class VIII C of SMP Negeri 1 Majauleng, who were randomly selected based on their initial abilities. The instruments in this study were test sheets and interview guidelines. Data collection techniques used were initial ability tests, mathematical literacy tests, and interviews. The data analysis technique used was qualitative analysis. Meanwhile,The validity of the data used is technical triangulation with the method of collecting the results of initial ability tests, mathematical literacy test results and interviews from the same source.Based on the research results, it can be concluded that: (1) description of mathematical literacy of students who have high initial abilities. Subjects are able to achieve the criteria of level 1, level 2, level 3, level 4 and level 5 of mathematical literacy. (2) description of mathematical literacy of students who have moderate initial abilities. Subjects are able to achieve the criteria of level 1, level 2 and level 3 of mathematical literacy. (3) description of mathematical literacy of students who have low initial abilities. Subjects have not been able to achieve all the criteria of mathematical literacy levels.

Keywords: Early Abilities, Mathematical Literacy, Qualitative Analysis

Introduction

Through education, students are equipped with the information and skills needed in school and their practical application. Students have a certain perspective that can be assessed, and the results can provide useful data for efforts to improve the nature of education through testing. For example, the PISA study, a global literacy study that assesses the capacity and information of 15-year-old students, is conducted periodically under the auspices of the OECD (Khaerunisak, 2015).

The PISA study screens the learning outcomes achieved by students in each participating country, which include 3 things, namely literacy, mathematical literacy and scientific literacy. PISA intends to evaluate 15-year-old students in OECD countries and other countries in the fulfillment of reading, mathematics and science skills to commit to their state. The results of the 2003 PISA study Indonesia ranked 39th out of 40 countries and the following year was also not empowering. The 2009 PISA score showed that the results of Indonesian students' mathematical literacy ranked 61st out of 65 countries and the results of the 2012 PISA test Indonesia ranked 64th out of 65 countries interested in participating in PISA. The results of the 2015 PISA test Indonesia ranked 63rd out of 69 countries. Based on this, Indonesian students at the junior high school/Islamic junior high school level actually have a capacity below OECD countries in formulating, applying, and interpreting mathematical wonders in different settings, or it can be said that the mathematical literacy of Indonesian junior high school/Islamic junior high school students is low (Khaerunisak, 2015). The results of the PISA in 2018 placed Indonesia in 74th place out of 79 countries (OECD, 2019).

Mathematics is taught to students with the aim of equipping them with intelligent, scientific, sequential, fundamental, and imaginative thinking skills, as well as the ability to work collaboratively. However, until now, mathematics instruction has consistently been applied conventionally. This requires adapting mathematics teaching from simply receiving enlightening information from teachers to a valuable education/approach. Mathematical literacy is the right decision to learn mathematics correctly and carefully to create appropriate responses to questions. Students' prior knowledge and abilities become applied material as the main reason for addressing problems (Supatro, 2018).

Solving problems requires persistence in reflection. Therefore, learning mathematics is not suitable if it is completed solely by memorization; rather, mathematics can be learned well by working on numerical problems. During the time spent answering practice problems, students begin to become literate about the stages of handling these problems. Literate children will construct appropriate statements, answer questions accurately, and collect necessary data skillfully and inventively. As a rule, literacy is the ability to investigate, reason, and adequately present their numerical information. Mathematical literacy is defined as the ability to use mathematical knowledge and understanding effectively to solve everyday life problems (Supatro, 2018).

Several factors influence student achievement in mathematics, including internal factors, including prior ability, level of insight, learning inspiration, learning tendencies, learning anxiety, and learning interests. External variables include family climate, school climate, local climate, financial situation, and so on (Astuti, 2015). In this study, the author focused solely on the internal factor, namely prior ability. This was because the author wanted to first determine students' prior abilities before being given the PISA-based mathematical literacy questions.

A student's prior abilities are the abilities they already possess before participating in the learning process. These initial abilities reflect the student's readiness to receive the learning provided by the teacher. It is crucial for teachers to understand their students' prior abilities before the lesson begins. This way, teachers can determine whether students already have a grasp of the material presented (Astuti, 2015).

Based on observations conducted by the author at the school on August 5, 2019, it was found that students were less active in asking questions, working on problems, and expressing opinions. Some students also relied solely on their peers for assignments. After examining the students' daily assignment scores, the authors found that their scores varied. Therefore, the authors decided to assess the students' initial abilities before administering the PISA mathematical literacy test.

Research methodology

This research is a descriptive study using qualitative methodology. The subjects were students of class VIII C of SMP Negeri 1 Majauleng. The primary instrument was the researcher herself, while supporting instruments included an initial ability test, a mathematical literacy test, and an interview guide. The initial ability test, consisting of 12 numbers, was administered to all students to determine their initial ability category.

Table 1. Initial Ability Category Standards

Category	Interval
Low	$0 < 65$
Currently	$66 < 80$
Tall	$81 < 100$

Source: (Widiarti, 2012)

A four-point mathematical literacy test was administered to all students to determine their mathematical literacy. Indicators of mathematical literacy were based on mathematical literacy level criteria. Interview data collection was conducted in a semi-structured manner.

Research result

The results of this study examine students' mathematical literacy, based on their initial abilities. This research was conducted at SMP Negeri 1 Majauleng, with class VIII C students serving as the subjects. Three methods of data collection were used: an initial ability test, a mathematical literacy test, and interviews.

High Subject Data

a) Level 1: Muse their insights to solve routine problems, and can handle problems with common settings.

Q: Why do you say that the order from highest to lowest is according to what you answered?

T: because if you add them up, the result will be like that. Adding up the whole thing

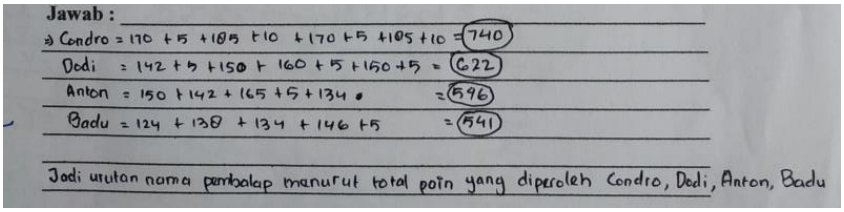
Q: did you add it up?

Q: Yes

Q: Do you add them up so you get the highest and the lowest?

Q: Yes

Figure 1. High Subject Answers

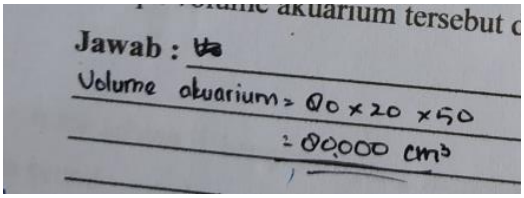


Based on written and interview results, the High subject was able to understand the problem well, applying his knowledge to solve routine problems and solving problems in general contexts. Based on this, the High subject was able to achieve level 1 of mathematical literacy.

b) Level 2:Describe the problem and solve it with a formula.

Q: How much did you get in number 3?
T : 80,000 cm3
Q: Why can you say that?
Q: from$80 \times 20 \times 50$
Q: What is the formula for volume?
T : Length times width times height
Q: So you wrote your answer straight away? Why didn't you write the steps?
T: because it's easy, to make it easier (while laughing)

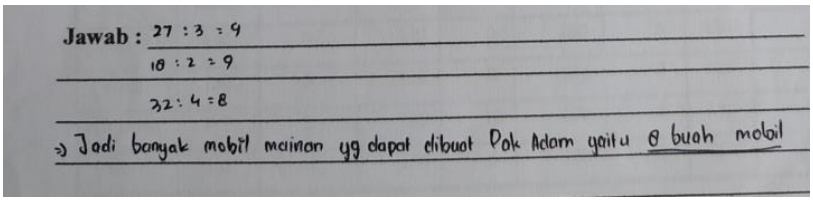
Figure 2. High Subject Answers



Based on written and interview results, the High subject was able to interpret problems and solve them using formulas. The High subject's problem-solving skills were consistent with the formulas. Based on this, the High subject was able to achieve level 2 mathematical literacy.

c) Level 3:Carry out procedures properly in solving problems and be able to choose problem-solving strategies.
Q: What do you think about number 2? Is it difficult or easy?
T: difficult
Q: How much do you get for making toy cars?
Q : 8
Q: Why do you say 8?
Q: because$27 \div 3 = 9, 18 \div 2 = 9, 32 \div 4 = 8$. So I chose number 8 because the ingredients are complete, if 9 the ingredients are incomplete.

Figure 3. High Subject Answers



Based on the written results and interviews, the subject is Highsuccessfully completing problem-solving methodologies and selecting critical thinking methodologies. Based on this, High subjects are able to achieve level 3 mathematical literacy.

d) Level 4:Works successfully with models and can select and coordinate various depictions, then relate them to current reality.
Q: For example, in your school environment there is a flagpole with a height of 18 and a tree with a height of 15. So how high is a car?
Q : 3
Q: How do you get 3?
Q:$18 - 15$

Based on the interview results, the high-ability subjects were able to connect mathematics to the real world. Based on this, the high-ability subjects were able to achieve level 4 mathematical literacy.

e) Level 5:Work with models for complex situations and can handle complex problems.
Q: Suppose I add two more triangles. I place the first triangle above, the second triangle below, and the total height of this building is 19. What is the height of each triangle?
T : means 5
Q: How do you get 5?
Q: $19 - 9 = 10.$ lalu $10 \div 2$
P: So 5?
Q: Yes

Based on the interview results, the high-achieving subjects were able to solve complex problems. The questions the researchers asked were a continuation of the previous questions. Based on this, the high-achieving subjects were able to achieve level 5 mathematical literacy.

f) Level 6:Using their thinking in dealing with numerical problems, can speculate, describe and communicate their findings.

High-achieving subjects for this level 6 indicator are unable to generalize, formulate, and communicate their findings. Therefore, high-achieving subjects have not yet achieved level 6 mathematical literacy.

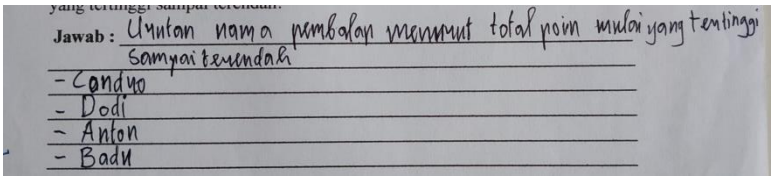
Based on the results of the High subjects, it can be concluded that the High subjects were able to reach level 1, level 2, level 3, level 4 and level 5.

Medium Subject Data

a) Level 1: Muse their insights to solve routine problems, and can handle problems with common settings.
Q: Why do you say this?
S: My total competencies are 1, 2, 3 and also 4.
Q: Did you add them all up?

S: Yes

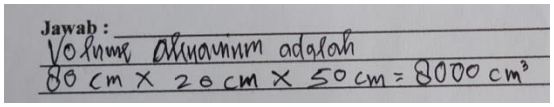
Figure 4. Medium Subject Answer



Based on written and interview results, the subject understands the questions well and is therefore able to solve them effectively. Based on this, the subject is capable of achieving level 1 mathematical literacy.

b) Level 2:Describe the problem and solve it with a formula.
Q: How many answers did you get for number 3?
S : 8,000 cm3
Q: Why do you say that?
S : I multiplied all the numbers
Q: What is the formula for volume?
S: forgot (laughing)

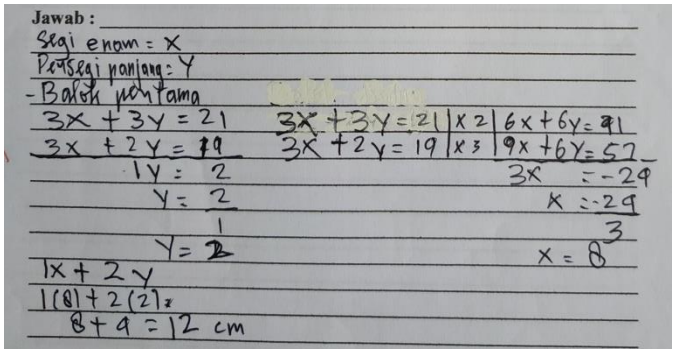
Figure 5. Medium Subject Answer



Based on written and interview results, the subject was able to solve the problem correctly. However, during the interview, the subject forgot the volume formula. Based on this information, the subject was able to achieve level 2 mathematical literacy.

c) Level 3:Carry out procedures properly in solving problems and be able to choose problem-solving strategies
Q: How do you get the number 12?
S: I first look for y in this way (while pointing to answer number 1)
Q: Are there any other formulas you know of?
S: nothing, just this

Figure 6. Medium Subject Answer



Based on written and interview results, the subject was able to select strategies for solving problems. However, he still made errors in writing down the results. Based on this, the subject was able to achieve level 3 of mathematical literacy.

d) Level 4:Works successfully with models and can select and coordinate various depictions, then relate them to current reality.

Subjects with moderate levels of level 4 are unable to successfully work with models and select and coordinate various representations and then relate them to current reality. Based on this, subjects with moderate levels have not yet achieved level 4 mathematical literacy.

e) Level 5:Work with models for complex situations and can handle complex problems.

Subjects with moderate levels of level 5 have not yet worked with models for complex situations and cannot handle complex problems. Based on this, moderate subjects have not yet achieved level 5 mathematical literacy.

f) Level 6:Using their thinking in dealing with numerical problems, can speculate, describe and communicate their findings.

Subjects with moderate levels of level 6 are unable to generalize, formulate, or communicate their findings. Based on this, subjects with moderate levels of mathematical literacy have not yet reached level 6.

Based on the results of the moderate subjects, it can be concluded that the moderate subjects were able to reach level 1, level 2 and level 3.

Low Subject Data

a) Level 1:Use their insights to solve routine problems, and can handle problems with common settings.

Subjects with low levels of level 1 are unable to use their knowledge to solve routine problems and cannot solve problems in a general context. Based on this, low-level subjects have not yet achieved level 1 mathematical literacy.

b) Level 2:Describe the problem and solve it with a formula.

Subjects with low literacy for the level 2 indicator are unable to interpret problems and solve them using formulas. Based on this, low literacy subjects have not yet achieved level 2 mathematical literacy.

c) Level 3:Carry out procedures properly in solving problems and be able to choose problem-solving strategies.

Subjects with low scores for the level 3 indicator are unable to properly implement procedures for solving problems and select problem-solving strategies. Based on this, low scores have not yet achieved level 3 mathematical literacy.

d) Level 4:Works successfully with models and can select and coordinate various depictions, then relate them to current reality.

Subjects with low scores for level 4 indicators are unable to successfully work with models and select and coordinate various representations and then relate them to current reality. Based on this, low scores have not yet achieved level 4 mathematical literacy.

e) Level 5:Work with models for complex situations and can handle complex problems.

Subjects with low scores on the level 5 indicator are unable to work with models for complex situations and handle complex problems. Based on this, low scores are unable to achieve level 5 mathematical literacy.

f) Level 6:Using their thinking in dealing with numerical problems, can speculate, describe and communicate their findings.

Subjects with low literacy for level 6 indicators are unable to use their reasoning to solve mathematical problems, generalize, formulate, and communicate their findings. Based on this, low literacy subjects have not yet achieved level 6 of mathematical literacy.

Discussion

Description of Mathematical Literacy of Students with High Initial Ability

Based on the results of the mathematical literacy test and interviews conducted with the subjects, the author will discuss the research results obtained based on the criteria for mathematical literacy levels according to PISA. High subjects are at levels 1, 2, 3, 4, and 5 of mathematical literacy. Subjects with high mathematical literacy abilities are able to solve problems well. High subjects said that problem number 1 was difficult. However, they were able to solve the problem using an example. High subjects in working on problems still have incomplete work methods. Ovan (2017) shows that in general, subjects with high abilities are capable in all components of mathematical literacy. Subjects can complete what has been planned. Subjects write down what is

known and what is asked. Subjects' analysis in solving problems is good and coherent so that it is easy to understand. Subjects provide reasoned conclusions and the language used is logical.

Description of Mathematical Literacy of Students with Moderate Initial Ability

Based on the results of the mathematical literacy test and interviews conducted with the subjects, the author will discuss the research results obtained based on the criteria for mathematical literacy levels according to PISA. Subjects are at level 1, level 2, and level 3 of mathematical literacy. Moderate subjects are able to use strategies in solving problems. Moderate subjects are still wrong in writing the final results, the method of work is correct. Moderate subjects are not yet able to solve complex problems. This is in accordance with the results of research by Maharani & Kurniasari (2016) showing that students with moderate mathematical abilities are also able to understand the problems in the questions and are able to solve the problems, although not completely.

Description of Mathematical Literacy of Students with Low Initial Ability

Based on the results of the mathematical literacy test and interviews conducted on the subjects, the author will discuss the research results obtained based on the criteria for mathematical literacy levels according to PISA. Low subjects have not reached all levels of mathematical literacy. Low subjects in solving problems, all their answers are still wrong. In terms of interviews, low subjects still lack understanding of mathematics. Rifai & Wutsqa (2017) In the very low category group, most students answered the questions, but their answers were still not quite right. Many factors influence students' low mathematical literacy skills. Lukman & Zanthy (2019) said that students still make mistakes in the solution process, in the use of formulas, are unable to interpret questions, make mistakes in concluding the results of the solution and are not complete in solving. Maulana & Hasnawati (2016) said that from student work it can be seen that students' mathematical literacy abilities are caused by a lack of basic mathematical abilities.

Conclusion

Based on the research results and discussion, it can be concluded thatSubjects with high initial ability were able to achieve several levels of mathematical literacy criteria, including levels 1, 2, 3, 4, and 5. Subjects with moderate initial ability were able to achieve several levels of mathematical literacy criteria, including levels 1, 2, and 3. Subjects with low initial ability were not able to achieve all levels of mathematical literacy criteria.

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