# Mathematics Literacy Based On Mathematics Capability of Students ot SDN Jember Lor 05 

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#### Abstract

Mathematics literacy is a person's capability to formulate problems, apply concepts, and interpret the results of mathematics solutions in various contexts, facts, and procedures to answer mathematics questions. This type of research is a descriptive study that aims to describe the capability of mathematics literacy based on the mathematics capability of grade VI students of SDN Jember Lor 05. The data collection methods used was tests and interviews. The test was conducted in determining the student's mathematics capability and mathematics literacy capability. Mathematics capability test obtained a percentage of $13.5 \%$ of students who had low mathematics capability, $73 \%$ of students who had medium mathematics capability, and $13.5 \%$ of students who had high mathematics capability. The results showed that students with low mathematics capability were unable to fulfill the three components of the mathematics literacy process, namely formulating problems, applying concepts, and interpreting the results of completion. Students with Mathematics capability were able to fulfill two components of the process of mathematics literacy, namely formulating problems and applying concepts, whereas to interpret the results of completion, students with low mathematics capability have not been able to fulfill. Students with high mathematics capability were able to fulfill all three components of the mathematics literacy process, namely formulating problems, applying concepts, and interpreting the results of solutions.


Keywords: Mathematics Capability, Mathematics Literacy, Component of Literacy Process.

## 1. InTRODUCTION

Syahlan [6] defines mathematics literacy as mathematics knowledge, the use of method, processes that are applied in various contexts of insight, and reflective ways of mathematics resolution. Literacy is related to a person's capability to read and follow up on information obtained. The information is, then, identified, while a problem is formulated, and determining a way to solve the problem. It is in line with OECD [4] that stated:

Mathematics literacy is an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments, and to engage in mathematics in ways that meet the needs of that individual's current and future life as a constructive, concerned and reflective citizen.

Mathematics literacy is a set of complex capabilities for individuals to interpret and use symbols to answer certain questions. Fendrik [1] stated that mathematics literacy is related to the student's real problems in their daily life. As in
the PISA result [3], mathematics literacy is an important capability, because it is not limited by mathematics operations and it is more focused on the use of mathematics in everyday life. Mathematics literacy capability also includes personal tendency in using their capabilities and qualities such as curiosity and self-confidence.

Mathematics literacy capability is very significant and needed in student's life, despite it is not in line with the student's actual situation. Based on observations made on grade VI students of SDN Jember Lor 05, it shows that students are still having trouble in working on math questions such as a question with story description that require reasoning and a way to answer the question. Students also have difficulty in understanding visual representations and applying mathematical concepts. Based on information obtained from grade VI teachers of SDN Jember Lor 05, some students still need to strengthen the understanding of mathematics concepts that are a little abstract and need to do more exercises to understand mathematics concepts. This reveals that mathematics learning is still not meaningful and is related to students' daily life. Therefore, it is necessary to share and teach mathematics literacy that is useful to increase

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students' understanding toward mathematics questions and exercises that require high problem solving.

In addition, the student's low mathematics literacy capability to analyze and work on math questions. High mathematics capability is needed to solve mathematics literacy questions that illustrate students' capability in solving mathematics problems in everyday life. Sumarmo stated (in Maharani and Kurniasari [2]) the mathematics capability, contained in the purpose of learning mathematics, is that students can communicate ideas with symbols to clarify problems, formulate, and answer the question, and have an attitude that respects the benefits of mathematics in everyday life. Mathematics capability is not much different from the capability of mathematics literacy. This means there is a relation between mathematics capability and mathematics literacy capability.

Based on the explanation above, it can be seen at the time of observation that the mathematics literacy capability of Grade VI students of SDN Jember Lor 05 is still low. This also relates to students' unbalanced mathematics capabilities. Therefore, researchers are interested to know whether it is true that the mathematics literacy capability of grade VI students of SDN Jember Lor 05 is relatively low. The research conducted related to the mathematics literacy capability of students with low, moderate, and high mathematics capabilities in formulating problems, applying concepts, and interpreting the results of solutions.

## 2. METHODOLOGY

The present research used descriptive research. The subjects of the research were students of grade VI of SDN Jember Lor 05 which had 37 students. The data collection methods were tests and interviews. The test method was used to determine mathematics capability and mathematics literacy capability. Mathematics capability test was used to categorize students into 3 groups: students with low, medium, and high math capability. The math capability test uses odd midterm assessment questions, the school year 2019-2020, while the math literacy capability test used LOTS and HOTS questions. Mathematics literacy test questions consist of 3 description questions. All three questions are in accordance with the cognitive domain of Bloom C3 to C5. The test was then tested on students who had previously been categorized based on mathematics capability. Mathematics literacy test questions conducted by students were identified in accordance with the fulfillment of indicators (formulate, apply, interpret the results of completion). Interviews were conducted with 2 students with low, medium and high mathematics capabilities.

Data on students' mathematics literacy capability test results were identified and described in accordance with indicators of mathematics literacy. Furthermore, the reduced interview data was described in the form of descriptive sentences. Mathematics literacy capability is identified based on the fulfillment of mathematics literacy indicators which can be seen in Table 1. The conclusions were obtained by
comparing and combining the results of mathematics literacy test results and student interview results, so that the mathematics literacy of students with low, medium, and high mathematics capability was obtained in solving math literacy question.

Table 1. Mathematics Literacy Indicators

| Components of the Mathematics Literacy Process | Mathematics Literacy Indicator |
| :---: | :---: |
| Formulating the problem | Simplifying real situations by correctly interpreting problems based on the understanding |
|  | Thinking of an initial idea to answer a question |
|  | Formulating the problem given in the mathematics model |
| Applying the concept | Designing strategies to answer the question coherently |
|  | Using mathematics concepts, facts, procedures, and reasoning |
|  | Answering the questions correctly |
| Interpreting the results of the completion | Interpreting the results of the completion in a real context |
|  | Summing up the most appropriate way to answer the question |

## 3. RESULT AND DISCUSSION

Based on the results of the mathematics capability tests of 37 students, there were $13.5 \%$ students with low mathematics capability, $73 \%$ students with medium mathematics capability, and $13.5 \%$ of students with high mathematics capability. The results of the analysis of students' data of mathematics literacy test indicate that there were several tendencies that were seen in students with low, medium and high mathematics capabilities in solving math literacy problems. The answers of students with low mathematics capability can be seen in Figure 1 as follows.

```
1) Dicef 249kgape, scotg.antur 12SkgSalok difokohrya
    Ditarga:tentuk or dumlah kereluruhan bugh.
    Jowob:240-300w125x+\frac{1}{#}\times\frac{1}{2}+\ldots
    ...-........78.oorkg
    1. It is known that there are 240 kg of apples, 300 kg
        of oranges, and 125 kg of snakefruits in the
        market.
        Question: Determine the total number of fruits !
        Answer: 240 < 300 < 125 < 1/8 < 1/3 <1/5
```

Figure 1. The Answers of Students with Low Mathematics Capability

P03 : Try to mention what is known from the question!

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| S0203 | (silent) |
| :---: | :---: |
| P04 | Here, you have written in it (pointing to the answer sheet), What is known from this question? |
| S0204 | 240 kg of apples |
| P10 | Well, then what is the question? |
| S0210 | (silent) |
| P11 | What is the question? |
| S0211 | The total amount of fruit which is bought |

Based on students' answers and interviews, the students with low mathematics capability have not met the mathematics literacy indicators for number 1. Similarly, for questions number 2 and 3, students cannot answer the questions. Students with low mathematics capability cannot formulate the problem, apply concepts, and interpret the results of solutions, because the students did not write in detail about what they knew and what is the question, for example students do not understand the question or there is no answer.

The answers of students with medium mathematics capability can be seen in Figure 2 as follows.


1. It is known that there are 240 kg of apples $(1 / 8$ of
apples stock), 300 kg of oranges ( ${ }^{1} / 3$ of oranges
stock), and 125 kg of snakefruits $(1 / 5$ of
snakefruits stock).
Question: Determine the total number of fruits !
Answer: $(240 \times 1 / 8) \times(300 \times 1 / 3) \times\left(125 x^{1} / 5\right)$

$$
=30+69+25
$$

$$
=124 \mathrm{~kg}
$$

Figure 2. The Answers of Students with Medium Mathematics Capability
The interview of students with medium mathematics capability is as follows.

P02 : After you read the questions, can you explain the meaning in your own language?
S2702 : (silent)
P03 : Try to mention, what is known from the question!
$S 2703: 240 \mathrm{~kg}$ apples which are bought $\frac{1}{8}$ part, 300
kg of oranges which is bought $\frac{1}{3}$ part, 125 kg

## P04 : Then, what is the question? <br> S2704 : What is the total amount of fruit that the distributor bought

Based on the students' answers and interviews on question number 1, the medium mathematics student has fulfilled the first mathematics literacy indicator, namely simplify the real situation by interpreting the problem based on the understanding correctly, thinking of initial ideas to answer the questions, and formulating the problem given to the mathematics model. It is similar for the second and third indicators of mathematics literacy. In questions number 2 and 3 , there are mathematics literacy indicators that are not fulfilled by students. Mathematics literacy indicators, that are not met, are that students do not answer the question correctly and there are inappropriate uses of mathematics concepts. In addition, students do not interpret the results of the completion and do not conclude the results of problem solving.

The answers of students with high mathematics capability can be seen in Figure 3 as follows.


Figure 3. The answers of students with high mathematics capability
The interview of students with high mathematics cability is as follows.


Based on students' answers and interviews on question number 2, the high mathematics student capability has fulfilled the first mathematics literacy indicator which is to simplify the real situation by interpreting the problem based on the understanding correctly, thinking of initial ideas to answer the question, and formulating problems given into the

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mathematics model, likewise for the second and third indicators of mathematics literacy. In question number 1 , students have fulfilled all indicators of mathematics literacy, as well as for question number 3 . Students are able to write correctly and precisely about what is known and what the question is. Students formulate problems into mathematics models. Students are able to design coherent problem solving strategies, use mathematics concepts, and answer the question appropriately. Students are able to interpret the results of the completion and conclude the most appropriate problem solving results. The results of the data analysis show that there are several tendencies that are seen in students with low, medium and high mathematics capabilities in solving mathematics literacy question. There are 5 students with low mathematics capability. The whole amount still could not fulfill the 3 components of the mathematics literacy process in question number 1. Likewise after being interviewed, 2 students with low mathematics capability were unable to meet the indicators of mathematics literacy. Likewise for questions number 2 and 3, students with low mathematics capability cannot answer the question. Students are only able to fulfill one component of the first mathematics literacy process by mentioning what is known and what the question is, despite the things, that are known and questioned, are incorrect and incomplete answers which are written by students with low mathematics capability. For students with medium mathematics capabilities, most students fulfill the mathematics literacy process component for question number 1. Students are able to write what is known and what the question is, formulate problems into mathematics models, implement coherent solving strategies, answer the question, and interpret the results of the completion and conclude the results of the most appropriate solving problem. In question number 2 , only some students can fulfill the first component of the mathematics literacy process, which is to formulate a problem, by stating what is known and what the question is. There are students who are able to fulfill the second component of the mathematics literacy process, namely designing coherent problem solving strategies, using mathematics concepts, and answer the question correctly, likewise the third component of the mathematics literacy process, which is interpreting the results of completion, only a few students are able to do it. In question number 3, most students are still unable to answer the question. Most students are only able to write down what is known and what the question is. They have not reached the level of answering the question.

For students with high mathematics capabilities, most students have fulfilled the first component of the mathematics literacy process for question number 1 and they are also able to finish the question. Likewise in questions number 2 and 3, students are also able to fulfill the first process component, but they are still unable to finish the question. However, different data were obtained when interviewing students with high mathematics abilities. The students interviewed were able to fulfill the indicators of mathematics literacy.

Based on the results of analysis of tests and interviews, students with low mathematics ability are unable to fulfill the
three components of the mathematics literacy process, namely formulating problems applying concepts, and interpreting the results of completion. Students with mathematics capability are able to fulfill two components of the process of mathematics literacy, namely formulating problems and applying concepts, whereas to interpret the results of completion of low mathematics capabilities, students have not been able to fulfill. Students with high mathematics capability are able to fulfill all three components of the mathematics literacy process, namely formulating problems applying concepts, and interpreting the results of solutions.

The component of the mathematics literacy process that most students fulfill is the first component, which is formulating the problem. Students are able to write whatever is known and what the question is. This indicates that students actually understand about the question. However, only to solve it, there are students who are still confused. When applying the concept, which is the second process component, some students still do not meet the mathematics literacy indicators. There are still students who do not know the formula around the circle and the volume of the cone and half the ball contained in the question. Therefore, students cannot finish the question, because students still do not know the mathematics formulas. Likewise in the third process component, namely interpreting the results of the completion, only students with high mathematics capability and some students with medium mathematics capability reached at the process of interpreting and concluding the most appropriate way to answer the question.

## 4. CONCLUSION

Students with low mathematics capability are unable to fulfill the three components of the mathematics literacy process, namely formulating problems, applying concepts, and interpreting the results of solutions. Students with mathematics capability are able to fulfill two components of the process of mathematics literacy, namely formulating problems and applying concepts, whereas to interpret the results of completion, low mathematics abilities students have not been able to fulfill. Students with high mathematics capability are able to fulfill all three components of the mathematics literacy process, namely formulating problems, applying concepts, and interpreting the results of solutions.

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