Proceedings of the 2nd Early Childhood and Primary Childhood Education (ECPE 2020)

by Rissa Prima

Submission date: 03-Nov-2021 04:09AM (UTC+1100)
Submission ID: 1691158779
File name: Artikel_Atlantis_Rissa_Conference_UM.pdf (532.42K)
Word count: 3510
Character count: 17990

Advances in Social Science, Education and Humanities Research, volume 487
Proceedings of the 2nd Early Childhood and Primary Childhood Education (ECPE 2020)

Mathematic Literation Abilities Based on Problem Solving Abilities in First Class 4 of Elementary School

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ABSTRACT
Mathematics learning in elementary schools has several problems such as the lack of variation in teacher learning models in class teaching and the teacher only explains the material and then gives assignments in textbooks or student worksheets. This results in low mathematics literacy in primary schools. The purpose of this study was to describe mathematical literacy skills based on problem solving abilities in grade IV elementary school students. This type of research is qualitative research. The results of this study indicate that at literacy level 2, students have no difficulty and can solve questions quickly, students can choose the information that will be used to find the right solution. In literacy level 3 questions, students took a little longer to write down information in the form of what was known and asked, then determined the procedure for solving the solution to the problem. To increase the level of mathematical literacy, teachers in elementary schools must provide a variety of appropriate learning models or strategies and can make students more active in class. And teachers should more often provide motivation and assignments containing math problems such as solve questions about HOTS.

Keywords: *Mathematical Literacy, Problem Solving, HOTS*

1. INTRODUCTION

Currently, the development of technology in Indonesia is becoming more advanced. The development of technology and information has the potential to improve learning methods [1]. This technological development has an effect on learning in Indonesia, especially in learning mathematics. Mathematics is one of the important subjects in Elementary School and one of the subjects that have the most hours of instruction in Elementary School. Mathematics is an abstract science so that learning mathematics will be easier if it is related to material in everyday life.

Learning mathematics can be done outside or inside the classroom. Students can improve problem-solving and mathematical communication skills through mathematics learning which is applied in elementary schools [2]. Mastery of mathematics material can help students improve their ability to solve math problems [3], [4]. However, many students in elementary schools have difficulty solving math problems.

The problem of learning mathematics in elementary schools is that when teaching in class, teachers do not use a variety of learning models. Sometimes some teachers in teaching mathematics are only teacher-centered and do not use learning media [5]–[8]. The teacher only explains the material then gives the assignment in the textbook or student worksheet, and the teacher also provides less motivation so that students are more active in learning and understanding mathematics material. This causes students to less like learning mathematics and the low mathematics learning outcomes of grade IV students in elementary schools. PISA results in 2018 show that students in Indonesia score lower in reading, mathematics and science [9].

For the mathematics category, Indonesia is ranked 7th from the bottom (73) with an average score of 379 [10]. The focus of PISA is literacy which emphasizes the competencies and skills of students in everyday life and in various situations [3]. Mathematical literacy leads to mastery of problem solving that requires reasoning and must be able to use logic in every decision making [11].

Table 1. Six Levels of Student Literacy Ability

Level	What Students Can Do
6	• Students can make use of information and use their knowledge in solving problems • Students use mathematical reasoning in solving problems • Students are able to apply and develop new strategies to deal with new problems • Students can reflect and describe their findings according to the situation
5	• Students can develop models to identify problems • Students can select and apply strategies in solving complex problems • Students can communicate their opinions and reasons
4	• Students can work effectively with models in both concrete and complex situations • Students can present different information and relate it to real situations. • Students can provide explanations and communicate about their arguments
3	• Students can carry out procedures clearly and sequentially • Students can solve problems and apply simple strategies. • Students can present the information obtained and convey directly.
2	• Students can interpret and recognize problem situations • Students can sort out relevant information • Students can work on, carry out procedures, or determine strategies to solve problems
1	• Students can solve problems in the context of common problems. • Students can determine information and take steps based on clear instructions.

In mathematical literacy, there are several components, namely formulating, employing and interpreting mathematics to solve problems [12]. The purpose of this study was to describe mathematical literacy skills based on problem solving abilities in grade IV elementary school students.

2. METHOD

This research uses qualitative research. This research was conducted at Elementary School 1 Taman, Madiun, Indonesia. Data collection techniques in this study were tests, interviews, and documentation. There are two sources of data in this study, namely primary data sources and secondary data sources. The primary data sources in this study were tests and interviews. Meanwhile, the secondary data source in this study is documentation. The data analysis technique in this research is the first is data collection, this data collection is obtained through tests and interviews with students.

The test used is an essay. The second is data reduction, data reduction in this research is to select the data needed in the research and discard unnecessary data. The data reduction analyzed was the result of written test and interview. The third is the presentation of the data, presenting data on the mathematics literacy abilities of the fourth-grade students of Elementary School 1 Taman. The fourth is drawing conclusions.

3. RESULT AND DISCUSSION

Mathematical literacy is the ability to understand problems related to mathematics and can be applied in everyday life [11]. Mathematical literacy can also be defined as the mathematical reasoning capacity of a student in determining the concepts, procedures, facts and tools used in learning mathematics to describe, explain and predict phenomena [13]. The level of student's mathematical literacy skills consists of 6 levels, as described in the Table 1.

3.1. Mathematical Literacy Skills of Subject 1 (S1)

The result of answer number 1 (Level 2), can be seen that S1 can write down the known and asked information correctly. Writing what is known and asked shows that S1 understands the problem in question number 1 [16]. S1 can also select the information that will be used to find the correct solution, using what is known in the problem to calculate the perimeter of the rectangle and count the number of trees correctly (Figure 1).

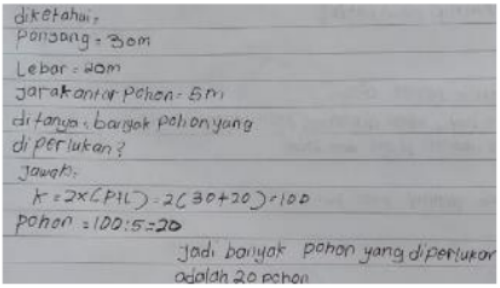

Figure 1 S1 Answers to Number 1.

The result of answer number 2 (level 3), S1 can write down information from the problem in mathematical form as it is known and what is asked. S1 can solve problem number 2 by applying the formula for the area of a triangle and the area of a square correctly. S1 is able to explain again the question clearly and in detail starting from what is known, asked, until the final answer

correctly, even though S1 still sees the answer to the question (Figure 2).

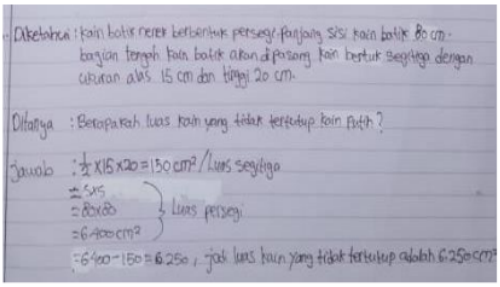

Figure 2 S1 Answers to Number 2.

The result of the answer to number 3 (level 3), S1 can write down the information from the question correctly as it is known from the question and is asked. S1 can solve the problem in number 3 correctly, although there are some that are less like writing the ones of perimeter. When asked to explain the answer to question number 3, S1 can explain the answer of question number 3 correctly (Figure 3).

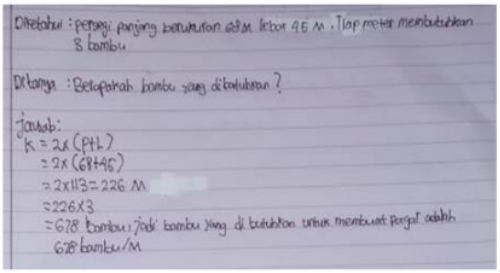

Figure 3 S1 Answers to Number 3.

The result of answer number 4 (level 3), S1 can write what is known and what is asked of the questions correctly. However, the result of S1's answer is not correct, S1 immediately writes down the perimeter of the triangle without finding one of the unknown side lengths of the triangle. Although S1 can write down what is known and asked, S1 cannot use the information obtained to find a solution and S1 also does not understand question number 4 (Figure 4).

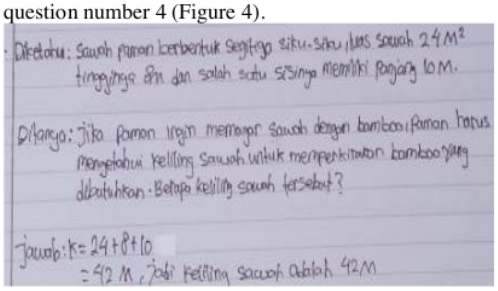

Figure 4 S1 Answers to Number 4.

3.2. Mathematical Literacy Skills of Subject 2 (S2)

The result of answer number 1 (Level 2) above shows that S2 can write down the information that is known and what is asked correctly. S2 can select the information that will be used to solve the problem in number 2 correctly by using what is known to calculate the formula for the perimeter of the park and count the number of trees. S2 can answer question number 1 correctly and write conclusions with the final result correctly (Figure 5).

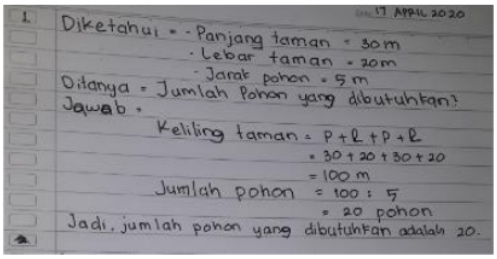

Figure 5 S2 Answers to Number 1.

The results of the answer to number 2 (level 3), S2 can write down information from the questions as they are known and those that are asked. S2 can solve the problem of question number 2 by applying the formulas for the area of a triangle and the area of a square correctly. S2 can also write down the final answer correctly. When asked to explain the results of the answers, S2 was also able to explain the questions clearly and in detail starting from what was known, asked, to finding the final answer correctly and smoothly (Figure 6).

The result of the answer to number 3 (level 3), S2 can write down the information from the question correctly as it is known from the question and is asked. S2 can solve problem number 3 correctly with calculating the perimeter of the rectangle and counting the number of bamboos used correctly. When asked to explain the results of the answer to question number 3, S2 can explain in the right and smooth order.

The result of the answer to number 4 (level 3), S2 can write down the information as it is known from the questions and be asked correctly. S2 can solve the problem in number 4 correctly by calculating the perimeter of the triangular rice field by determining one of the unknown side lengths. When asked to explain the results of the answers to question number 4, S2 can explain in the right and smooth order (Figure 7).

3.3. Mathematical Literacy Skills of Subject 3 (S3)

The result of answer number 1 (Level 2) shows that S3 can write down the information that is known and what is being asked correctly.

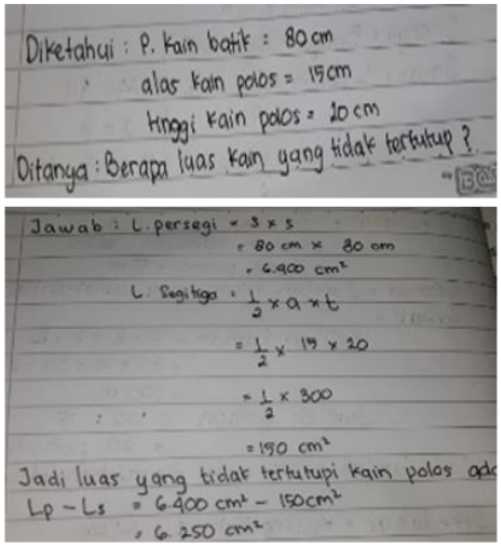

Figure 6 S2 Answers to Number 2.

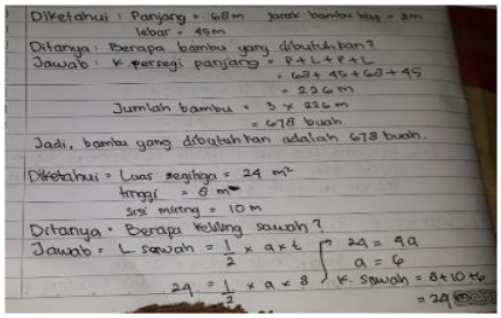

Figure 7 Answers to Numbers 3 and 4.

S3 can select the information that will be used to solve the problem in number 2 by determining the perimeter of the rectangle then calculating the number of trees needed. S3 can answer question number 1 correctly and write conclusions with the final result correctly (Figure 8).

The result of answer number 2 (level 3), S3 can write down the information that is known and what is asked. S3 can solve the problem of problem number 2 with applying the formula for area of triangle and area of square. S3 can also correctly determine the final result. When asked to explain the result of the answer, S3 was also able to explain the question again starting from what was known, asked, until he found the final answer correctly (Figure 9).

The result of answer number 3 (level 3), S3 can write down the information that is known and what is asked correctly. S3 can solve problem number 3 correctly, S3 can calculate the perimeter of the rectangle then calculate the number of bamboos needed to make a fence.

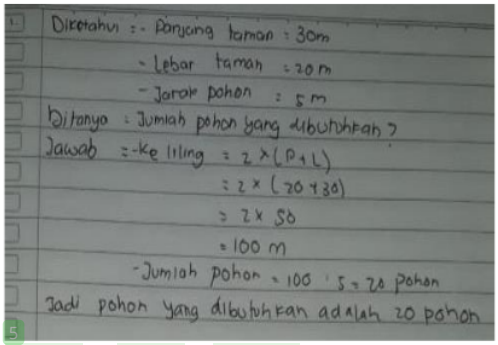

Figure 8 S3 Answer to Number 1.

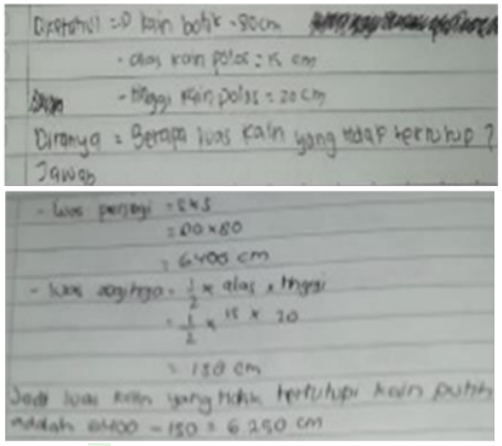

Figure 9 S3 Answer Number 2.

S3 can also determine the final answer correctly. When asked to explain the results of the answers, S3 is also able to explain the questions clearly and in detail starting from what is known, asked, until they find the final answer correctly, although sometimes S3 still sees the results of the answers.

The result of answer number 4 (level 3), S3 can write down the information that is known and what is asked correctly. S3 can solve problem number 4 correctly, S3 can calculate the base using the formula for the area of a triangle, after that S3 calculates the perimeter of the rice fields correctly. Then S3 was asked to explain the result of the answer and S3 was able to explain again the answer to the question clearly and in detail starting from being known, asked, until finding the final answer correctly and exactly (Figure 10).

3.4. Mathematical Literacy Skills of Subject 4 (S4)

The result of answer number 1 (Level 2) shows that S4 can write down the information that is known and what is being asked correctly. However, S4 can't solve problem number 1 correctly, S4 can't write the perimeter formula correctly.

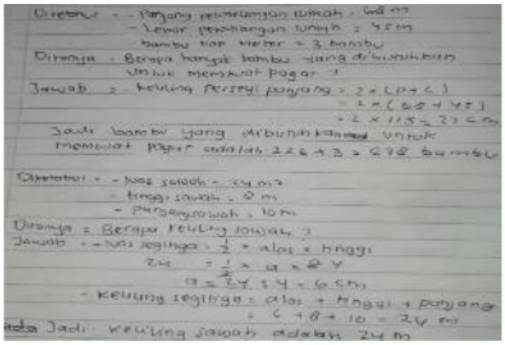

Figure 10 S3 Answer to Numbers 3 and 4.

This is because S4 doesn't understand the problem and doesn't know the formula for the perimeter of the rectangle. So that S4's answer is wrong (Figure 11).

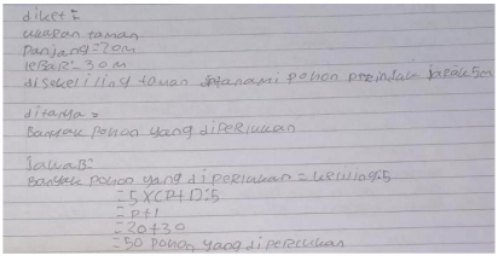

Figure 11 S4 Answer to Number 1.

The results of the answer to number 2 (level 3), S4 can write down the information that is known and what is asked. S4 can solve problem number 2 by calculating the formula for area of triangle and area of square correctly. S4 can also determine the final result correctly. When asked to explain the result of the answer, S4 was also able to explain the question again starting from what was known, asked, until he found the final answer correctly, even though he still saw the result of the answer. S4 in solving question number 2 takes a longer time (Figure 12). The results of the answer to number 3 (level 3), S4 can write down the information that is known and what is asked correctly. S4 can solve problem number 3 correctly, that is, S4 can determine the perimeter of the rectangle and then calculate the number of bamboos needed to make a fence.

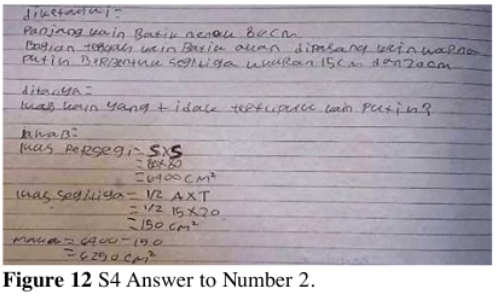

Figure 12 S4 Answer to Number 2.

S4 can also determine the final answer correctly. When asked to explain the result of the answer, S4 was also able to explain again the questions clearly and in detail starting from what was known, asked, until he found the final answer correctly, although S4 occasionally failed to explain well and still saw the results of the answers (Figure 13).

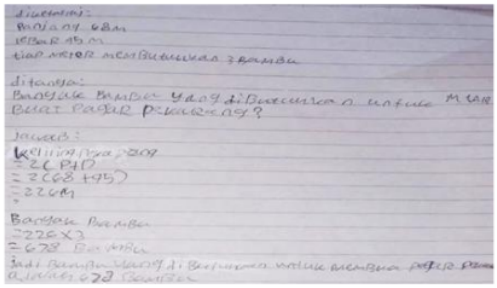

Figure 13 S4 Answer to Number 3.

The result of answer number 4 (level 3), S4 can write down the information that is known and what is asked correctly. S4 cannot solve problem number 4 which is calculating the perimeter of the triangle because it has not determined one of the unknown sides. So that S4's final answer to number 4 is wrong (Figure 14).

In level 2 questions, students have no difficulty and can solve questions quickly, students can choose the information that will be used to find the right solution. In level 3 questions, students took a little longer to write down information that is known and what is asked, then determined the procedure for solving these questions. This is because students in elementary schools are more often given easy questions, like level 1 questions. There are several teachers in elementary schools who teach and give the same questions every year, does not provide variations on the questions or provide other questions that help students think high level like HOTS.

The literacy skills of students in primary schools is different. Mathematical literacy abilities, creative character, and mathematical literacy skills of students vary by group [12]. This is because students are not familiar with literacy questions, so it is necessary to apply the right strategy in the learning process to get students used to solving problems that require high-level thinking [17], [18]. To increase the level of mathematical literacy, first, teachers in elementary schools must provide a variety of appropriate, creative learning models or strategies that can make students more active in class. Second, teachers often give assignments containing math problems such as hots questions. Third, teachers often provide motivation so that students are more active in learning mathematics.

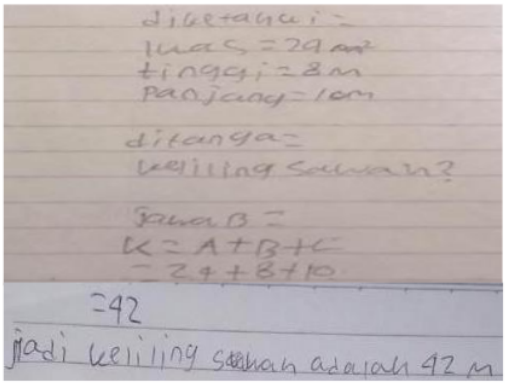

Figure 14 S4 Answer to Number 4.

4. CONCLUSION

Based on the results of the study, it can be concluded that subject 1 can solve math problems level 2 on number 1 and math problems level 3 on numbers 2 to 3 correctly. Whereas for level 3 math problem number 4, subject 1 is not correct in applying the procedure to solve the problem, so that the final answer number 4 is wrong. Subject 2 can solve math problem level 2 on number 1 and math problem level 3 on number 2 to 4 correctly. Subject 2 has high self-confidence and is diligent in studying mathematics, so that subject 2 can solve problems correctly and present the results of the answers smoothly.

Subject 3 can solve math problem level 2 on number 1 and math problem level 3 on number 2 to 4 correctly. However, subject 3 takes a little longer to answer the questions and present the results of the answers. Subject 4 cannot solve math problem level 2 in number 1. This is because S4 does not understand the contents of the problem and does not know the formula for park circumference. On level 3 math problems in numbers 2 and 3, S4 can solve the problem with the correct answer, even though it takes a long time. In math problem level 3 in number 4, S4 cannot solve problem number 4 because the steps used to solve the problem are wrong, it should determine one of the unknown sides, then calculate the perimeter of the rice fields.

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