

Analysis of Mathematics Literacy Ability Based on Problem Solving Ability For Class VII Students of SMP Bunda Rangkiang

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(Received: 24-03-2021; Reviewed: 2-04-2021; Revised: 27-05-2021; Accepted: 9-05-2021; Published: 5-07-2021)



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Abstract

In modern times, students are required to have logical, creative, and critical thinking in order to be able to manage and deal with problems that exist in real life. This study aims to analyze mathematical literacy based on the problem-solving abilities of students. The type of research used is qualitative research with a case study research method. The subjects in this study were 9 students of grade VII SMP Bunda Rangkiang. The results of this study are descriptive related to mathematical literacy, among others, to formulate, apply, and interpret using PISA (Program for International Students Assessment) questions. It can be seen from the mathematical literacy of students in the low category 42.85%, the medium category 75%, and the high category 89.28%.

Keywords: Mathematical Literacy, Mathematical Problem Solving Ability

INTRODUCTION

Mathematics has a goal to manage and deal with problems that exist in life. This data is supported by (Jeheman, 2019) that mathematics can provide a solution to a problem in life, besides that with mathematics a person can be equipped with the ability to think and be able to solve a problem. Therefore, mathematics is a pattern in life that is manifested from the pattern of human thinking. In addition, mathematics that can relate to all aspects of real life can be called mathematical literacy.

Mathematical literacy is the capacity of students to be able to integrate information and draw conclusions so that they can generalize the knowledge possessed by each individual into everyday life. (Ozkale, 2020) that mathematical literacy ability is an individual's ability to interpret mathematics, which includes mathematical reasoning in the use of concepts, procedures, facts and mathematical tools to describe phenomena. Mathematical literacy ability is a person's ability to be able to formulate and use mathematics in various contexts. In addition, most students have difficulty solving story problems due to lack of practice in reading and solving math problems. The difficulty of mathematics for students to solve problems, this causes a lack of interest in students to accept challenges. Mathematical literacy emphasizes students to be able to learn independently and must understand the basic concepts of mathematics so that they are able to connect to real life. This ability can be expressed as mathematical literacy ability. Mathematical literacy ability is the main factor that must be considered in students. Therefore, in learning mathematics, students need abilities that can more easily solve or solve mathematical problems by using mathematical problem solving abilities.

Problem solving ability is a basic mathematical skill that requires knowledge, readiness, creativity, and application in students in order to solve a problem. (Herlawan, 2017) Mathematical problem solving is currently the focus of learning mathematics in order to improve mathematical problem solving skills. This can be developed through problem understanding skills, designing mathematical models, solving problems, and reviewing and drawing conclusions. (Susanti & Nurfitriyanti, 2018) that problem solving

ability is an ability that must be possessed by students, so that students can get used to solving a problem such as solving math story problems. One of the abilities used in the use of mathematical literacy is the ability to solve mathematical problems. Because mathematical problem solving skills make students build self-motivation to seek new knowledge and actively participate in the learning process.

OECD through PISA carries out assessments related to the ability of students in reading and mathematical literacy which has been carried out since 2000 regularly every three years (Muzaki, 2019). PISA is an international studies related to mathematical literacy achievement seen from various factors including reading factors, math factors, and science factors. PISA has a goal, one of which is to assess the ability of the state in basic education in order to make students who have broad knowledge, socialize globally, and are ready to face the real world (Eprilita, 2020). PISA is something that not only makes students learn mathematics related contextually, but PISA can connect with real life and can form mathematical literacy skills according to the stages of their age (Mutia & Effendi, 2019).

METHODS

The research method used in this research is qualitative with the type of case study research. This research was carried out at Bunda Rangkiang Junior High School in Bogor district in the even semester. The subjects of this study were 9 students of class VII. The instrument used in collecting this data is in the form of a test of 7 questions (Program for International Students Assessment) PISA and in the form of interviews with 4 students. One of the objectives of the research instrument is to obtain student literacy results. The following table guides the scoring of each item and the criteria for the results of the PISA test. Data analysis was carried out by giving scores to students, then linked with mathematical literacy indicators in order to get the percentage results. The results that have been adjusted can be adjusted according to whether or not the category is good for their mathematical literacy skills. After getting the test results, the next thing to do is to use the interview method. Only a few students did the interview. The purpose of the interview was to get more information about the literacy abilities of students.

RESULTS AND DISCUSSION

Based on the results of tests and interviews obtained in this study, the achievement of students' mathematical literacy skills can be seen that students who have good mathematical literacy skills can be seen in the high percentage results, namely 89.28%. Students who have a high category can achieve three indicators, namely formulating, implementing, and interpreting so that students have good literacy skills. Students who have moderate abilities are seen at a percentage of 75%. Students who have moderate abilities are able to achieve only 2 indicators. In addition, students who have low abilities are seen in the percentage of 42.85%, in low students only include 1 indicator, namely applying.

The students can identify a mathematical factor contained in the problem in a real context. In addition, students can understand the information contained in the core of the question. Of the 9 students who took the test questions related to mathematical literacy, only a few students were able to fulfill the stages of mathematical literacy where students did it by identifying a mathematical problem and writing down what was known and asked about the problem, the following students who had high, medium, and low categories.

Handwritten mathematical calculation on lined paper:

$$\begin{aligned} \text{Diskon} &= 20\% \\ \text{Dik:} & \text{Harga jual 3} \\ \text{Jawab:} & \text{HJ} = 200.000 \\ & \text{HJ} \cdot \text{HJ} = 200.000 \\ & \text{HJ} \cdot \text{HJ} = \text{harga diskon} \\ \text{Total bayar} &= 200.000 - (200.000 \times \frac{20}{100}) \\ &= 200.000 - 40.000 \\ &= \text{Rp } 160.000 \end{aligned}$$

Based on the analysis in Figure 1, the subject of PD8 in working on problem number 1 can use their knowledge in order to solve mathematical problems in a general context. The subject of PD8 reads and understands the information contained in the arithmetic problem and solves mathematical problems

using a way of describing what is known, being asked from the problems contained in question number 1 clearly and correctly. Then the subject of PD8 forms a mathematical model related to the purchase price, discount, and selling price and solves problems related to social arithmetic related to the selling price. The steps taken by PD8 are coherent and clear and in accordance with the indicators of mathematical problem solving ability.

Jawaban MTK

No. 1

20% x 200.000
= $\frac{20}{100} \times 200.000$
= 40.000

Stel baju dan celana setelah didiskon
= Rp 200.000 - Rp 40.000
= Rp 160.000

Based on the analysis in Figure 2 that, PD2 Subjects in working on question number 1 read and understand the information contained in the arithmetic problem, PD2 can understand every core of the problem. However, the subject of PD2 did not write down what was known and was asked at the core of the question. Then PD2 can make a mathematical model related to the selling price, discount and purchase price and PD2 can describe the steps of each of the core questions, but the explanation made by PD2 is correct. After getting the results of solving problem number 1, PD2 did not give any conclusions regarding the results he got. So it can be seen that the subject of PD2 does not meet the indicators of solving mathematical problems masalah.

harga baju setelah di diskon
= Rp 200.000 - Rp 40.000
= Rp 160.000

Based on the analysis in Figure 3, the subject of PD6 in working on question number 1 revealed that PD6 was unable to understand the information contained in the question so that PD6 could not write down what was known and what was asked of the questions related to this selling price. PD6 is also not able to make mathematical models at the core of mathematical problems. However, PD6 only gives answers to the mathematical problems without giving conclusions from the answers and is not checked first. It can be judged that PD6 is not able to solve mathematical problems so that it does not meet the indicators of mathematical problem solving ability. Based on the results obtained above, students in the high category, namely in the qualification of 89.28% are able to solve mathematical problems on PISA questions by using good solutions starting from being able to identify problems, being able to develop a plan in solving mathematical problems, being able to solve a problem mathematics and able to re-examine and draw conclusions on the results of mathematical problems that can be done. So that students who have a high category can use their reasoning well and can work in solving mathematical problems effectively and are able to relate to everyday life (Level 1). Students who have a high category can have the ability to interpret and can draw conclusions on a relevant information, therefore students can provide conclusions and reasons face-to-face through video calls from the results obtained.

Students who are classified as moderate achievers in qualifications (75%) are able to reveal information. Students are not able to provide information on the information contained in the problem, but PD2 can plan mathematical models well, and can arrange steps related to selling prices. the process of the steps carried out by PD2 was correct and correct, but when the interview was in progress PD2 was wrong about the results he did himself. Students classified as having low achievement in qualification (42.85%) have confusion about understanding the problems contained in the question so that students do not meet the level 3 and level 4 indicators because these students are not able to identify problems, develop a plan in solving mathematical problems, solving a mathematical problem and not being able to re-examine

and draw conclusions on the results of mathematical problems that can be done. The following data can be seen from the results carried out and the results of interviews via video calls.

In addition, the results that have been analyzed by the researcher are supported by interviews with the seventh grade mathematics teacher at Bunda Rangkiang Middle School that the method used during the learning process is case studies or the teacher gives project assignments to students, for example, when the social arithmetic material teacher gives students assignments, namely by plunging into the field, one of which is like buying clothes at a store and then calculating the discount and buying and selling price, so that students are more familiar with math problems related to real life. Then the teacher revealed that the mathematics learning at this time was given independently without discussing or in groups so that with the current COVID pandemic situation, students were less than optimal in this learning.

CONCLUSIONS AND SUGGESTIONS

Based on the analysis that has been done by researchers, most of the seventh grade students of Bunda Rangkiang Junior High School are not used to solving problems related to mathematical literacy skills, it can be seen from the results of interviews that have been carried out by researchers so that students are not accustomed to dealing with questions that require logical thinking, critical, as well as applicable solutions. Many students cannot fulfill their mathematical literacy, only 2 students who have good student abilities, 3 students who have low problem solving abilities because students can only do one stage of mathematical literacy or not at all, and 4 students who have sufficient literacy skills in class VII SMP Bunda Rangkiang

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