

ANALYSIS OF STUDENTS' LITERACY SKILLS IN SOLVING CONTEXTUAL PROBLEMS USING PROBLEM POSING

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ABSTRACT

The main problem in this study is how students' literacy skills in solving contextual problems using problem posing. the purpose of this study is to determine the literacy skills and the results of students' literacy skills in solving contextual problems using problem posing. This research is a descriptive qualitative research. This study used VIII grade students of SMPN 1 Banyuputih totaling 20 students and the samples used were 6 students who had high, medium, and low ability levels. The data collection techniques used in this study were tests, interviews, and documentation. The data analysis technique used is qualitative data analysis, namely, data reduction, data presentation, and conclusion. Based on the results of the research conducted, it can be seen that the percentage of mathematical literacy skills of students who have high abilities is 85.71%, those with moderate abilities amount to 71.42%, and students who have low abilities have a total percentage of 42.85%. Students with high ability can show $6 < x \leq 7$ mathematical literacy skills, and students in the moderate category can show $4 < x \leq 6$, and students in the low category can show $x \leq 4$.

Keywords: Literacy Skills, Contextual Problems, *Problem Posing*.

1. Introduction

Mathematics is a way of thinking that can be used to develop logical, systematic, and critical thinking. (Mena et al., 2016). The purpose of learning mathematics is that students are expected to have the ability to understand mathematical concepts, mathematical reasoning, problem-solving, mathematical communication, and understanding of the usefulness of mathematics in everyday life. The abilities that cover these learning objectives are literacy skills.

Literacy is a term commonly used to refer to a person's skills and abilities when reading. Literacy, which in English is literacy, comes from the Latin littera (letters), whose meaning involves mastering writing systems and the conventions that accompany them (Indah et al., 2016). (Indah et al.,

2016) Literacy is a person's ability to process and understand information during the reading and writing process (Maulidi, 2016). Literacy is the expertise a person has in reading and writing in books independently to gain interest, attitudes and individual abilities in using digital technology and communication tools to access, manage, integrate, analyze and evaluate information in order to participate directly in society (Setyaningasih, et al., 2019: 1203). One of the basic skills in literacy is numeracy literacy.

Numeracy literacy is the ability to think using mathematical concepts, procedures, facts and tools to solve contextual problems in everyday life that are appropriate for individuals as good citizens. This is in accordance with the AKM (Minimum Competency Assessment) which measures two basic competencies, namely reading literacy and mathematical literacy (numeracy). (Fauziah et al., 2021). Minimum Competency Assessment is an aspect that measures students' cognitive learning outcomes, including reading literacy and

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numeracy which are essential and sustainable across grades and levels. (Nurmaya et al., 2022).. Based on the description above, this is in accordance with the development of the MCA which is based on the Program for International Student Assessment (PISA). Mathematical literacy is one of the high-level abilities, this is in accordance with the main studies of PISA, namely reading literacy, scientific literacy, and mathematics literacy. (Masfufah & Afriansyah, 2021).

Mathematical literacy in the PISA (Program For International Student Assessment) framework is defined as an individual's ability to formulate, use, and interpret mathematics in various contexts. (Subroto et al., 2019).. mathematical literacy can be interpreted as a person's ability to interpret, use, and formulate mathematics in various contexts to solve everyday life problems effectively (Jose, 2016). Mathematical literacy is defined as a person's ability to formulate, apply, and interpret mathematics in various contexts, including the ability to reason mathematically and use concepts, procedures, and facts to describe, explain, or predict phenomena/events (Prabawati et al., 2018). Mathematical literacy is a knowledge to know and apply basic mathematics in everyday life (Ojose, 2011). according to (Ema et al., 2022) said that mathematical literacy can enable an individual to know the function and application of mathematics in everyday life, and can apply it in making the right decisions as a citizen who contributes to development, has a sense of empathy, and has the ability to reflect.

(Tohir, 2019) stated that the mathematical literacy skills of Indonesian students in 2018 fell when compared to the previous year's PISA results. In 2018, Indonesia ranked 73 out of 78 countries for the math category with an average score of 379, and for the science performance category, Indonesia ranked 71 with an average score of 396, and for the reading category Indonesia ranked 74 with an average score of 371. therefore mathematics learning is expected to develop students' mathematical literacy skills.

Students' mathematical literacy skills can be achieved by solving problems based on contextual problems. (Silver, 2012) (Silver, 2012) said that the contextual problems in question are problems whose contents are in the form of material to be learned and are related to everyday life and the environment around students. Someone who has mathematical literacy skills does not just understand mathematics but is able to use it in solving everyday problems. (Muzaki, 2019).

One of the approaches that can be used to determine students' mathematical literacy skills in solving contextual problems is problem posing. Problem posing is an English term derived from the word "problem" which means problem, problem, or issue, and the word "pose" which means to propose. suggests that Learning with Problem Posing is a learning model in which students are asked to formulate, form and ask questions or questions from the situation provided, the situation can be in the form of pictures, stories, or other information related to the subject matter, and then the students themselves must design how to solve it. problem posing is a learning model that requires students to learn by submitting questions and working on problems independently without the help of a teacher. (Subroto et al., 2019)

(Education & Mathematics, 2021) Students' learning activities in problem-posing learning can improve critical thinking skills, connection skills, and mathematical reasoning in solving mathematical problems as well as communication skills in conveying the results of solving mathematical problems that students have made. Ayllon, et al (2016) also stated that problem-posing and problem-solving activities in Problem Posing learning are very strong evaluation tools to measure students' thinking skills in reasoning and problem-solving. Surya, E. & Sari, N. (2017), Xia, et al (2008) stated that in Problem Posing learning students will learn to propose and solve problems in a context that is more useful in everyday life. This is in line with research conducted by (Subroto et al., 2019) that the problem-posing learning model is effective in

improving students' mathematical literacy skills.

2. Research Methods

This research uses qualitative descriptive research methods. qualitative research is a research method based on the philosophy of postpositivism, which is used to research the condition of scientific objects. the subject of this research is class VIII students of SMPN 1 Banyuputih totaling 20 students. then a sample of 6 students who have high, medium, and low levels of literacy skills is taken. each ability level is sampled 2 students.

The data collection techniques used in this study were tests, interviews, and documentation. the test was conducted to determine and measure students' mathematical literacy skills using the Problem Posing method. the interview aims to verify the test results that have been given. while the documentation aims to capture every activity carried out by the teacher and students using a camera.

The data analysis technique used in this study is qualitative data analysis in the form of data reduction, data presentation, and conclusion. Data reduction aims to ensure that there is no more random and irrelevant data. data presentation (data display) organizes data, namely intertwining (groups) of data with (groups) of other data, so that all data analyzed is truly involved in a unified whole. conclusion (conclusion) aims. to report complete research results with new findings.

3. Results and Discussion

The results obtained in this study are students' mathematical literacy skills in solving contextual problems using problem posing on statistics material. The research was conducted on 20 students who have different levels of literacy skills. Based on the test given to 20 students, the following is the condition of mathematical literacy of 20 students, namely:

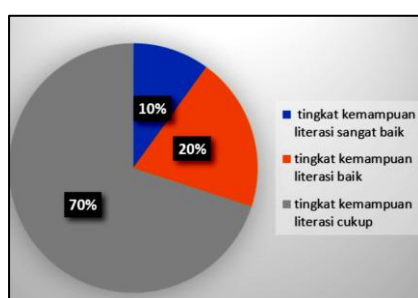


Figure 1. Students' literacy skills

Based on the results of the mathematical literacy skills of the 20 students above, the percentage of the level of literacy skills of the 20 students above, it can be seen that students who have a high level of ability are 2 students with a total percentage of 10%, medium ability students are 4 students with a total percentage of 20%, and low ability students are 14 students with a total percentage of 70%.

So, 6 students were chosen to be the research subjects. The selection of 6 students is from the category of students who have high, medium, and low abilities. The following is a table of students who became research subjects:

Table 1. Research Subject Data

No	Initials	Category	Ability
1.	VAN	High	7 abilities
2.	APF	High	6 abilities
3.	INA	Medium	5 abilities
4.	NDF	Medium	5 abilities
5.	DA	Low	3 abilities
6.	AF	Low	3 abilities

Based on Table 1, the researcher can describe the 6 answers of students who became research subjects. The following shows the results of the work and the results of the researcher's interview with the research subject:

A. High Ability Students

1. Student-1 (S01)

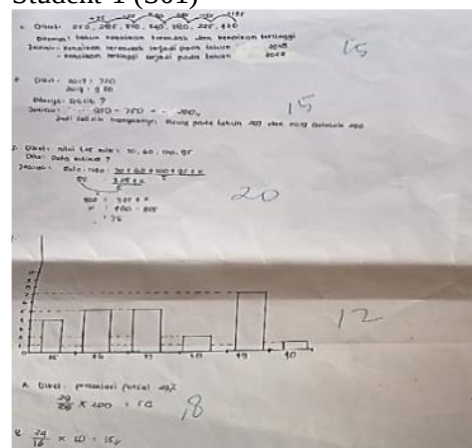


Figure 2. Result of S01's Work

Figure 2 above, shows that in problem numbers 1 and 2 the students' answers are correct, students can write down the known things, rewrite the things that are asked, and write the solution in accordance with the answer to the statistics problem, and can write

the conclusion of the existing problem-solving. In problem number 3, the student's answer is correct, the student can write down the things that are known and asked and can write the answer to solve the statistics problem. In question number 4, the student's answer is correct, but the student does not write the known things, and asks according to the scoring guidelines, the student only draws a diagram which is the solution to the statistics problem. In problem number 5, the student's answer is correct, but here the student does not describe the solution steps that must be done in solving problems based on contextual problems, such as known things, questions, and solution steps.

2. Student-2 (S02)

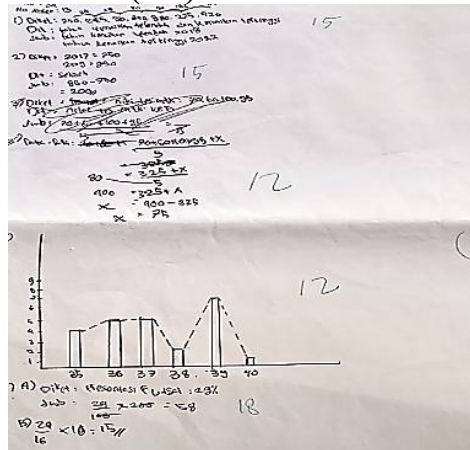


Figure 3. Result of S02's Work

Figure 3 above, shows that in numbers 1 and 2 the students' answers are correct, students have been able to solve the problem by writing down the things that are asked, known, and can write the solution of the existing problem in accordance with the existing scoring guidelines. In question number 3, the student's answer is correct, but the student does not write down the things that are known, and asked, the student only writes the answer to the solution to the statistics problem. In question number 4, the student's answer is correct, but the student only writes the answer without writing the things known and asked. In question number 5 students have written the correct answer, but here students do not describe the solution steps that must be completed in

accordance with the existing scoring guidelines.

B. Medium Ability Students

1. Student-3 (S03)

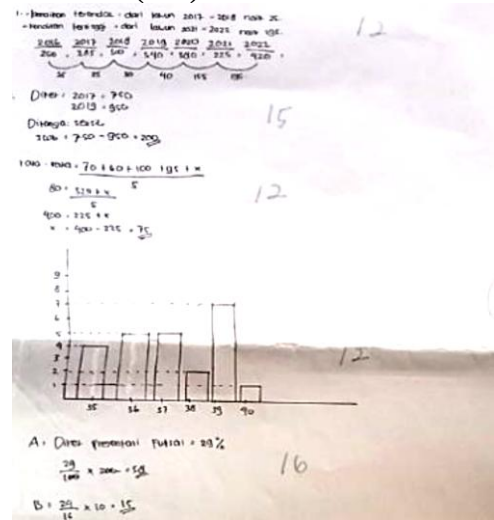


Figure 4. Result of S03's Work

Figure 4 above, shows that in problem numbers 1, and 2 the students' answers are correct and students can already convert problems related to contextual problems into mathematical form, and can design a solution strategy for the existing problems. In problem numbers 3, and 4 the students' answers are correct, but the students only write the answers to the existing problems without writing the steps of solving them, such as writing the known and questioned things. In question number 5, the student's answer was correct, but the student did not write down the solution steps of the existing problem.

2. Student-4 (S04)

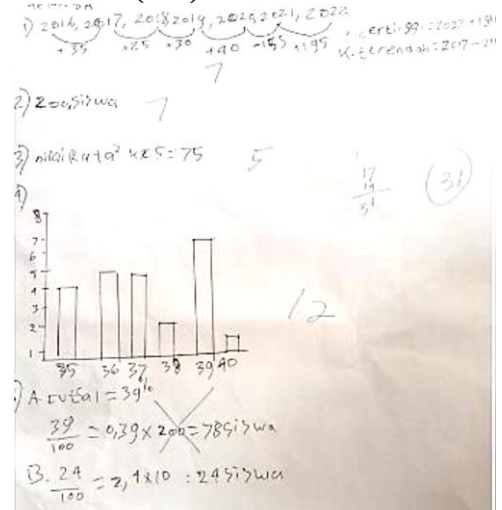


Figure 5. Result of S04 Work

Figure 5 above, shows that in questions number 1 and 2 the students' answers are correct, students can write the steps of completion in accordance with the scoring guidelines. In questions number 3, and 4 the students' answers are correct, but the students only write the answers without using the steps to solve the existing statistical problems such as known things, and asked. In question number 5, the student's answer is correct, but in the next question the student's answer is wrong, because it does not match the answer to the problem in the scoring guidelines and the student does not write the steps for solving the existing problem.

C. Low Ability Students

1. Student-5 (S05)

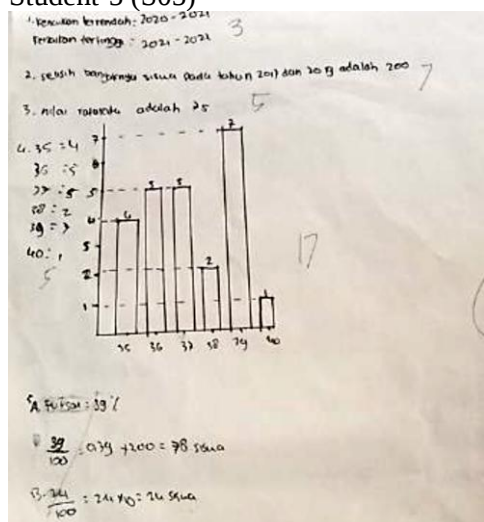


Figure 6. Result of S05's Work

Figure 6 above, shows that in problem number 1, the student's answer is wrong and less thorough, the student does not write the known and asked things, and the student writes the answer without using a solution that is in accordance with the statistical formula. In questions number 2 and 3 the student's answers are correct, but the answers are not clearly described the known things and the things asked so students only write the answers without being able to convert the literacy questions into mathematical form. In problem number 4, the student's answer is correct, but the student only writes the answer without sequential and clear solution steps. In question number 5, the

student's answer was wrong and did not comply with the steps for solving statistical problems.

2. Student-6 (S06)

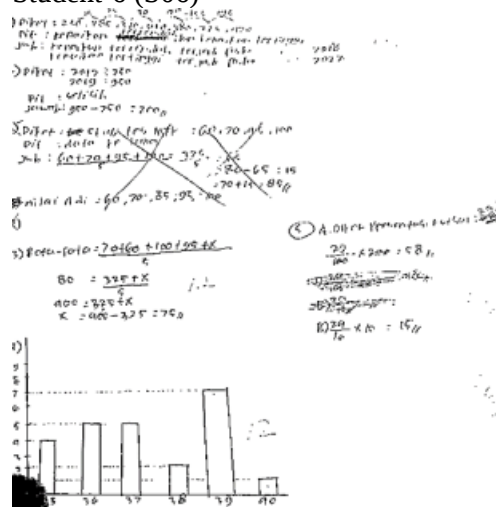


Figure 7. Result of S06's Work

Figure 7 above, shows that In problem numbers 1, 2, and 3, students' answers are correct, but students are still mistaken in applying problem solving in accordance with the steps for solving literacy problems. In problem number 4, the student's answer is correct, but the student only writes the final result without writing the steps of solving the statistical problem such as things that are known, asked, and answered, and the student does not make the final conclusion of the solution step. In problem number 5, the student's answer is wrong, the student does not write the solution steps of the existing problem so that the student only writes the wrong and inconsequential answer without knowing the steps that must be written in solving the existing statistics problem.

Based on the results of student work above, it can be seen the mathematical literacy skills possessed by the research subjects based on the answers that have been written by students. the following is a table listing the literacy skills of research subjects:

Table 2. List of research subjects' literacy skills.

Code	Literacy Skills
S01	7 capabilities
S02	6 capabilities
S03	5 capabilities
S04	5 capabilities
S05	3 capabilities

S06	3 capabilities
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Based on the test results and interviews, the high category on the test results shows that students have been able to demonstrate seven basic abilities that are central to mathematical literacy, namely: a) *Communicating*, b) *Mathematizing*, c) *Representation*, d) *Reasoning and Argument*, e) *Devising Strategies for Solving Problems*, f) *Using Symbolic, Formal and Technical Language and Operations*, g) *Using Mathematical Tools*. However, there is a difference in one of the literacy skills in *Using Symbolic, Formal and Technical Language and Operations*.

The medium category shows most of the abilities that are central to mathematical literacy skills, namely: a) *Communicating*, b) *Mathematizing*, c) *Representation*, d) *Devising Strategies for Solving Problems*, e) *Using Mathematical Tools*. In this case, the medium category has the similarity of being able to show the 5 basic abilities in mathematical literacy, and does not show *Reasoning and Argument*, and *Using Symbolic, Formal and Technical Language and Operations*.

The low category indicates partial literacy skills. Students who have low or moderate ability can only demonstrate 3 basic abilities that are central to mathematical literacy, namely: a) *Representation*, b) *Using Symbolic, Formal and Technical Language and Operations*, c) *Using Mathematical Tools*.

Based on the description of the results of student work and interviews above, it can be seen that the percentage of the level of literacy skills of students who are research subjects is as follows:

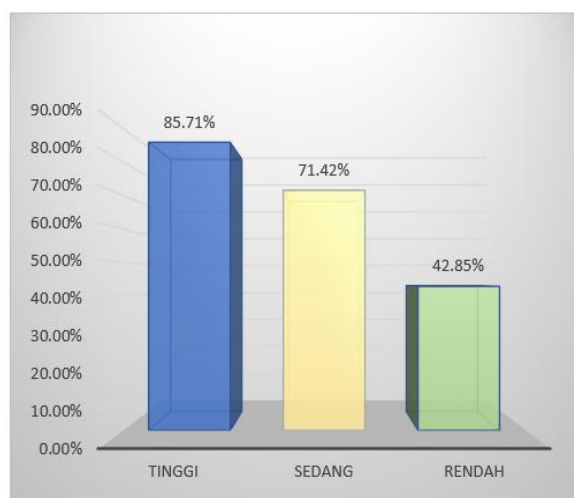


Figure 8. Percentage level of students' literacy skills

Based on the data above, it shows that 85.71% of high ability students can show 7 to 6 indicators of literacy skills which are the main in mathematical literacy skills, 71.42% of medium ability students can show 5 indicators of mathematical literacy skills, and 42.85% of low ability students can show 3 indicators of mathematical literacy skills. This is in line with research conducted by (Fitriana) which shows that the results of students' literacy skills are 10% classified as high, 50% classified as medium, and 40% classified as low.

Students with high ability can show $6 < x \leq 7$ mathematical literacy skills, and students in the medium category can show $4 < x \leq 6$, and students in the low category can show $x \leq 4$. The literacy skills that many students still do not have include:

1. Communicating
2. Mathematization (Mathematizing)
3. Reasoning and Argument
4. Devising Strategies for Solving Problems

Another factor that causes students' literacy skills to be low is that most students do not like contextual problem-based problems in the form of story problems. This makes students unable to communicate problems into mathematical language, and students also cannot reason about the conclusions that will result from the steps of solving statistics problems, and students cannot design a solution strategy to solve problems from contextual problem-based problems faced.

The lack of students' abilities in terms of communication (Communicating), mathematization (Mathematizing), reasoning and argument, and devising strategies for solving problems, causes students' literacy skills to remain in the low category. Most students only like problems that are not related to contextual problem-based problems in the form of story problems, because most students cannot understand problems that are too long and require more understanding.

4. Conclusions

Students' literacy skills in solving contextual problems using problem posing, showed that the total percentage of students' mathematical literacy skills who had high abilities was 85.71%, those with moderate abilities amounted to 71.42%, and students who had low abilities had a total percentage of 42.85%. This is based on the literacy skills possessed by students.

The results of students' literacy skills in solving contextual problems using problem posing, it can be seen that the results of students' literacy skills are still relatively low. This is because most students do not really like reading problems related to contextual problems in the form of story problems because they are unable to interpret them into mathematical language (Mathematising).

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