ANALYSIS OF STUDENTS PROBLEM SOLVING SKILL IN THE MATERIAL SYSTEM OF TWO VARIABLE LINEAR EQUATIONS

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Abstract. This study aims to determine students’ mathematical problem solving abilities in material system of linear and variable equation (SPLDV). This research was conducted in the odd semester 2018/2019 school year in Padang. This study uses a qualitative research design with the subject of class eight SMPN 3 Padang. The subject of this study were 32 students. The research subjects were given SPLDV problem solving ability test accompanied by interview. Data were analyzed using data reduction, data presentation, and conclusions. Based on the results of the study, it can be concluded that at (a) Mistakes of students in understanding problem that students still can not change the SPLDV story problem into mathematical form (b) Student mistakes in this aspect is they are still not able to find a right way to answer the question. (c) Students’ mistakes in carrying out the plan according to their steps, namely students are still not through in working on each step of the strategy used (d) Students mistakes in reviewing the result obtained, most students did not dominate and only immediately solved the problem.

1. INTRODUCTION

According National Council of Teacher of Mathematics (NCTM, 2010) five standard processes of mathematical principles and standars, problem solving, understanding and proof, communication, relationships, and presentation standard process through the process students acquire and use mathematical knowledge [1]. The important of the standard process in learning mathematics is to solve problem.

According Siswono (2018:44) problem solving is the individual problem solving is the individual process of overcoming problem when answer are unclear [2]. Zevenbergen (2004:107-108) problem solving needs to have adequate understanding and knowledge that participates in having a strategy in dealing with different problem [3]. Krulik and Rudnich (1995) problem solving is to use knowledge and abilities for synthesis and apply to new and different situations [4]. The ability of problem solving
demanded to think and solve problem. Now, the problem solving must be trained for solving the problem in their life that is not in mathematic problem but the other field study. Polya (1973) the steps of problem solving:

1. understanding the problem. The questions for this steps:
   a. can you understand the questions?
   b. can you rephrase it in your language?
   c. can you write what is known and asked about the question?
   d. Is information sufficient to answer question?

2. The Planning. There are many questions in this steps:
   a. have you ever solve questions related to this problem?
   b. have you ever find problem?
   c. can you have the another way to solve the problem?
   d. can you use the theory to solve the problem?

3. Carry out the plan.

Carry out the problem have been complied whether the selected device is correct

4. Verification:
   a. check and test all arguments
   b. Are the result different?
   c. Can the result obtained and the method function to solve other problem?[5]

According to Polya (2004) the ability to solve problem is high order thinking and not all students have this ability[6]. Problem solving ability is also influenced by the level of difficult of student. Every mathematic problem has varying degree of difficult including SPLDV material. SPLDV material has many contexts in dayly life. Based on observation and interview of the teacher of SMPN 3 Padang, the student of the eighth degree has not been able to solve mathematical problem related to the application of SPLDV in every life. Some problems that arise related to the ability to solve problem in student, it is necessary for futher analysis in order to get a clear and detailed picture of the ability of students to solve SPLDV questions to problem descriptions based on the steps of Polya
2. METHOD

This research is a qualitative research. This study aims to describe students problem solving abilities in the material system of two variable linear equation (SPLDV). In this study researches did not provide any treatment. The research is conducted in odd semester 2017 / 2018. The subject were the eighth grade student, 32 students by using purposive sampling. The data collection techniques using descriptive test methods used to explore students ability to solve mathematical problem based on the steps of the method un structured interview method know students understand and flow of student thinking in solving problem and documentation methods used to obtain students work data and interview with students. The research instruments used were a description test of fourth test question in the form of description.

The techniques used in this study is analysis and qualitative:

1. Data reduction is the process of selecting the many thing, simplication and focusing on the important things. The researcher record the results of the interview and collects test data and documentation of information on understanding concepts and solving mathematical problem in solving problem.

2. Presenting data in the form of information in the form of narrative texts that are compiled, summarized, and arranged so that they are easy to understand and plan research work.

3. Conclusion is the stage of data analysis that has been presented in table form. To find out the percentage of errors in each indicator of problem solving in the context of the SPLDV subject matter with the formula

3. RESULT AND DISCUSSION

The study was conducted in the eighth grade SMPN 3 Padang with 32 students by giving four problem solving ability test question. After conducting interview with students, researches conducted interview with mathematic teacher. From the results of the workmanship the data obtained mathematical problem solving ability in complity the SPLDV problem in terms of indicators of mathematical problem solving.

Result of students error analysis based on Polya:

a. Understanding the problem

Based on interview the students can not change story matter SPLDV to mathematic question. Student error is rewriting what is known.
T: Can you change the shape of the story into mathematical form? S: No, we can not. It is true, is not it?

T: Yes, but this is not yet in the form of mathematics.

b. Find a plan that fits the problem

Lack of students ability to find the right strategy.

T: What strategy do you use?
S: I don't know, based on known questions. T: and then, you made like this.

S: yes, mom. From what is known.
T: so, from you making a question, it immediately crossed your mind using only this method. S: yes, mom.
Based the results of interviews between students and teachers, it was seen that students still lacked knowledge to be able to find the right way to answer questions. Students only see from things that are known and immediately do it without thinking first whether the method is in accordance with what is asked by the problem. So that what is done by students is wrong. Almost all students at the stage of finding a plan or strategy cannot or have not succeeded can be seen from one example of student answers and the results of student interviews with the teacher.

c. Implement the strategy

Students are not careful in working

\[
\begin{align*}
  & \frac{1}{a} + \frac{3}{b} = \frac{1}{2} \\
  & \frac{2}{a} - \frac{1}{b} = \frac{3}{4} \\
  & \frac{5}{a} + \frac{1}{b} = \frac{5}{4} \\
  & \frac{b}{a} = \frac{1}{a} + \frac{1}{b} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4} \\
  & \frac{2}{b} = \frac{1}{b} + \frac{1}{b} = \frac{1}{a} + \frac{1}{b} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4} \\
  & \frac{2b}{a} = \frac{a}{b} = \frac{1}{a} + \frac{1}{b} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4} \\
  & b = 4b \\
  & a = b
\end{align*}
\]

T : Please, see the question about this number
S : (student read again the question)
T : Can you understand them?
S : Yes
T : Write what is known and do it
S : Ok
After a few minutes:
T : Let's we check
S : (after check). sorry, mom. I made a mistake
T : You have to be careful
Based the results of teacher interviews with students, almost all of the students in this program have succeeded through it, but there are some students who are still not thorough. Viewed from one of the results of the answers from the students, in fact the student already understood the problem and what was asked about the problem but because the student was still not careful about what he was doing so that it produced an incorrect answer. When the teacher asks the student to work on the problem and asks him to do it carefully the student produces the right answer and then the teacher asks the student to look for where the student has done the mistake in the previous work. After students find the point of error in the previous work and students have admitted where the mistake is then the teacher advised to be more thorough in working on mathematical questions in order to produce the right and correct answers.

d. Re-examine the result obtained

Based on interview, student do not repeat what is done

T : Can you repeat your work

? S : No, I am not

T : Can you read the question

? S : (read the work)

T : What you have been done for the question? S : Sorry, mom, I donot work until it is finished

At this stage of checking, most students leave this stage because if the student has finished working, the student has continued to work on the next question without checking whether the results of the work are in accordance with what was asked or not and also without checking whether the results are correct or not. Most students like this result in the results of student work being wrong and harming the students themselves.
4. CONCLUSION

Analysis of mathematical problem solving abilities experience by eighth grade SMP 3 Padang in solving SPLDV problem is that students have problem solving but there are still a small number of students who are less able to solve problem error occur in the first stage indicator can not understand the known problem. This data is in accordance with the problem that is done by all students,

5. REFERENCES


