

Analysis of Students' Mathematical Communication Ability on Two Variable Linear Equation Systems (SPLDV) Materials

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Abstract

This study aims to determine and analyze aspects of students' mathematical communication skills in the material of two-variable linear equations (SPLDV). The study was conducted with a sample of 5 students from 30 populations with different abilities and were taken randomly at one junior high school in Jakarta. used is descriptive qualitative. The research instrument is a test of mathematical communication skills in the form of 5 essay questions and interviews. The results of the tests that have been carried out show the results of communication skills in the medium category because there are 3 questions whose percentage is in the medium category and 2 other questions in the low category. It can be seen from the percentage of scores per item, that is question no. 1 has a percentage of 60%. Question no.2 has a percentage of 45%. Question no.3 has a percentage of 40%. Question no.4 has a percentage of 30%. And questions no.5 with the acquisition of a percentage of 25%. Thus, it can be concluded that the ability to communicate The mathematical students on the material of a system of linear equations of two variables are included in the medium category.

Keywords: communication ability, SPLDV, mathematics

INTRODUCTION

Since elementary school mathematics is a subject that is always studied until the level of higher education. Because mathematics is a science that plays an important role in the world of education that supports other sciences related to everyday life (Rahmawati et al., 2019). In the learning process, communication is needed so that the objectives in the learning process can be achieved, especially in mathematics. The National Council of Teacher of Mathematics (NCTM, 2000 in ((Kurniawati, 2019)) in its executive summary principles and standards for school mathematics stipulates that there are five standard processes that must be mastered by students through learning mathematics including: (1) Problem solving); (2) Reasoning and proof (reasoning and proof); (3) Communication (communication); (4) connections (connections); and (5) Representation. Therefore, communication is included in the five standard processes that must be mastered students then communication must be very concerned, because if communication in learning is not considered it can hinder a goal of learning. Communication is an important part in mathematics. Because it is through communication that students can exchange ideas and ideas and can clarify understanding and knowledge during the process of learning mathematics (Syafina & Pujiastuti, 2020). In addition, communication can be interpreted as relationships or activities that have to do with relationship problems or are also interpreted as exchanging opinions (Khadijah, Rippi, 2018). Mathematics is one of the subjects that plays a role in fostering students' rational thinking patterns to continue to innovate, so that students are able to innovate in all aspects of their lives, good communication skills are needed (Purwandari et al., 2018).

Mathematical communication skills as a social activity (talking) and as a thinking tool (writing) are

recommended by experts to continue to be developed among students (Wijayanto et al., 2018). Oral student mathematical communication is the process of delivering ideas or ideas in the form of someone's speech. A person is said to have carried out verbal mathematical communication if he speaks and involves mathematical content. Students' mathematical communication in writing is the process of delivering students' ideas in written form. A person is said to have carried out mathematical communication with written students if he presented his ideas in writing (Wardhana, Moch, 2018). This mathematical communication is useful for students to turn an idea into an object of thought. Students are directed to be able to convey their thoughts to others orally or in writing using their mathematical language. Likewise, when students listen to other people's explanations, this provides an opportunity for them to develop mathematical understanding (NCTM, 2000 in ((Suyitno, 2017)). Students can practice mathematical communication skills by studying in groups, so communication will occur. between one student and another.

In learning mathematics, a student who already has the ability to understand mathematics is also required to be able to communicate it, so that understanding can be understood by others. By communicating their mathematical ideas to others, a student can improve their mathematical understanding (Arifin et al., 2016). Usually students who do not understand the lesson will ask their friends who understand more than themselves to teach what they still don't understand, that's where communication works, students who don't understand the lesson will ask for help from friends who are able to communicate well who teach it. Mathematics is a language. Mathematics as a language is of course very necessary to be communicated both orally and in writing so that the information conveyed can be known and understood by others (in (Aminah et al., 2018). Symbols are symbols or media that contain certain aims and objectives. Communication symbols Scientific research can be in the form of tables, charts, graphs, pictures of mathematical equations and so on (in (Aminah et al., 2018). As stated by Ruseffendi (2006), in mathematics the use of symbols and terms in it makes mathematics a characteristic language that we really need to understand and have previously agreed (Rahmawati et al., 2019). Therefore students are required to be able to communicate mathematically in order to be able to solve every mathematical problem they face either in problems or everyday problems related to mathematics.

There are three indicators related to mathematical communication skills, namely: (1) the ability to express mathematical ideas through oral, written, and demonstrate them and describe them visually; (2) the ability to understand, interpret, and evaluate mathematical ideas either orally, in writing, or in other visual forms; and (3) the ability to use terms, mathematical notations and structures to present ideas, describe relationships with situation models (Ministry of National Education, 2006: 24 in (Septila, 2019).

The Two Variable Linear Equation System (SPLDV) is one of the mathematical materials that presents problems according to the existing situation (contextual problems), namely simple problems related to everyday life (Achir et al., 2017). Through story questions that raise everyday problems, it is hoped that students will be able to communicate everyday language into mathematical language and be able to interpret the results of calculations. Student learning activities can be improved by assessing the ideas of their friends, being encouraged to make assumptions about mathematics, then testing them and developing the skills of giving logical reasons (Khoiriyah et al., 2016).

Based on the explanation above, the problem to be discussed is the analysis of students' mathematical communication skills on the material of a two-variable linear equation system (SPLDV). So the purpose of this study is to find out how big the level of students' mathematical communication skills on the material of a two-variable linear equation system (SPLDV).

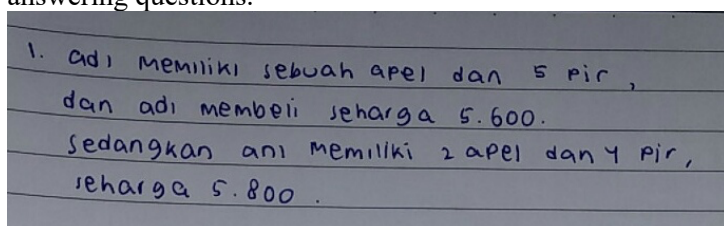
METHODS

The type of research used is descriptive qualitative research. By using this research method aims to describe the conditions that occur when it takes place on the material system of linear equations of two variables. This research was conducted with 5 samples taken at random with different abilities for each student in class VIII at one of the Jakarta State Junior High Schools. The instrument used in this study was in the form of communication skills test questions, totaling 5 questions in the form of essays and interviews. The test was used as an effort to obtain primary data with the mathematical communication skills of VIII grade junior high school students. The scope of the test material is the Two Variable Linear Equation System (SPLDV). Before being used in research, the validity of the questions has been tested for several students. The scoring of student test results is based on the indicators to be achieved. Data processing techniques on students' mathematical communication ability scores as a result of the adoption of researchers taken from the scoring guidelines according to Sumarmo (2017).

RESULTS AND DISCUSSION

After students were given a communication skill test using a two-variable system of linear equations, the researcher analyzed the results of each student's answers using the scoring guidelines according to Sumarmo (2017). Based on 5 samples of class VIII students have different abilities, namely high ability, medium ability, and low ability. The results of the data obtained are The percentage can be seen from the score on students' mathematical communication skills. In question no. 1 obtained a percentage of 60% for the indicator of the ability to express mathematical ideas through oral, written, and demonstrate and visually describe them. Question no. 2 with a percentage gain of 45% and question no. 3 with a percentage gain of 40% for indicators for questions no. 2 and no. 3, namely the ability to understand, interpret and evaluate mathematical ideas both orally, in writing, and in visual form. other. Question no.4 with a percentage gain of 30% and question no.5 with a percentage gain of 25% for the indicators for question no.4 and question no.5, namely the ability to use terms, mathematical notations and their structures to present ideas. ideas, describing relationships with situational models.

In question no. 1 students are asked to express mathematical ideas orally, in writing, and demonstrate and describe them visually. Below are the results of the work of students who still experience errors in answering questions.



1. adi memiliki sebuah apel dan 5 pir ,
dan adi membeli seharga 5.600.
sedangkan ani memiliki 2 apel dan 4 pir ,
seharga 5.800 .

From the results of students' answers above, students are quite good at pouring their ideas into the form of story questions, in the story questions that are made also in accordance with the equations in question no. 1, namely $x + 5y = 5,600$ written with Adi having an apple and 5 pears adi bought for 5600. and the second equation is also true because $2x + 4y = 5,800$ is written as ani has 2 apples and 4 pears for 5,800. So that the equation that is known in problem no. 1 he succeeded in making a story, but it was still not quite right because of the lack of a question so that it could be used as a question. In order for it to become a question it is necessary to add questions such as how much each apple and pear cost. The result of the percentage score on question no. 1 is 60% in the medium category. Below are the results of an interview with RM.

In question no. 2 students are asked to answer problems in understanding, interpreting and evaluating mathematical ideas either orally, in writing, or in other visual forms. Below is the result of student work that is still wrong.

2. Benar, $5a + 2b = 26.000$
 $3a + 4b = 38.000$

$\times 2$ $10a + 4b = 52.000$
 $\times 1$ $3a + 4b = 38.000$ -
 $7a = 14.000$
 $a = 14.000 : 7$
 $a = 2.000$

$5a + 2b = 26.000$
 $10.000 + 2b = 26.000$
 $2b = 26.000 - 10.000$
 $b = 16.000 : 2 = 8.000$

In question no. 2 students are still not careful when reading the questions given so that the application in understanding and evaluating mathematical ideas both orally and in writing is still not good. On the results of the student's work it is written that the known equation in question no. 2 is correct, and the student strengthens his opinion by working on the equation. Students should only need to answer the question incorrectly or correctly and give reasons instead of solving it, because the question is asked whether the form of the equation is correct or not and asked to give the reason. The result of the percentage score for problem no. 2 is 45% and is in the medium category. Below are the results of the interview with SA.

In question no. 3 students are asked to interpret both orally and in writing. Below are the answers of students who experienced errors when answering questions.

3) x : banyak ayam jadi, banyak komputer di sekolah
 y : banyak komputer ABL, S.

$x = 2y + 3$
 $x = 2(y + 4) = 2y + 8$

$2y + 3 = 2y + 8$
 $2y - 2y = 8 - 3$
 $y = 5$

In question no. 3, actually the way students do it is correct. However, students are less careful when entering numbers in the equation, which causes some processing steps and results to be wrong. On the work of MRD students, students can symbolize many students and many computers, then students can make the first equation, namely $x = 2y + 3$, but in the second equation the student answers $x = 2(y + 4) = 2y + 8$ which should be $3(y - 4) = 3y - 12$. Then from the equation both steps and also the result is wrong. The result of the percentage score for problem no. 3 is 40% and is in the medium category. The following are the results of interviews with MRD students.

In question no. 4 students are asked to use terms, mathematical notations and structures. Below is an answer that is still not quite right.

4. dik :
daging ayam : x
daging sapi : y

$2x + 3y = 404.000$
 $3x + 5y = 710.000$

In question no. 4, students complete the first step by writing what they know and then symbolizing chicken meat with x and mutton with y . However, the students did not read the questions carefully. Shiva is able to make an equation but enter numbers incorrectly. The second equation should not be $3x + 5y = 710,000$ but $5x + 5y = 710,000$. One number error can be bad for the assessment. The result of the percentage score for problem no. 4 is 30% and is in the low category. The following are the results of interviews with MAA students.

In question no. 5 students are asked to use terms, mathematical notations and structures to present ideas, describe relationships with situational models. Below is an incomplete answer.

Eliminasi x dari persamaan 1 dan 2
 $10a + 4b = 36.000 \quad | : 2 \quad 5a + 2b = 18.000$
 $5a + 8b = 27.000 \quad | \times 1 \quad 5a + 8b = 27.000$
 $6b = 9.000$
 $b = 1.500$

In question no. 5, the method of processing is correct but not finished. On the results of the work, IDA students were able to make equations correctly, namely $10a + 4b = 36,000$ and $5a + 8b = 27,000$. Then students are also able to eliminate equations with the first equation divided by 2 and the second equation multiplied by 1 which results in the first equation being $5a + 2b = 18,000$ and the result in the second equation being $5a + 8b = 27,000$. Then the first equation and the second equation are reduced to $6b = 9,000$ and divided by 6 to get $b = 1,500$. IDA students only finish up to the elimination method and only find the value of b . The result of the percentage score for problem no. 5 is 25% and is in the low category. Below are the results of interviews with IDA students.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the research that has been described, it can be concluded that the mathematical communication ability in the material of the two-variable linear equation system (SPLDV) is still in the medium category. This can be seen from the percentage score on each item. Of the 5 questions, there are 3 questions whose percentage is in the medium category, namely 33%, and 2 other questions are in the low category 33%. And students still have difficulty working on questions no. 4 and no. 5 for indicators using terms, mathematical notations and structures to present ideas, describe relationships with situation models.

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