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Analysis Of Vocational High School Students About Difficulty In Completing The Spldv Problem Viewed From Mathematic Communication Ability

W Evijayanti¹, S Sutiarto¹

¹ Graduate Program of Mathematics Education, Lampung University,
Lampung, Indonesia

* Corresponding author : widyaevi22@gmail.com

Abstract. This research intended to describe the difficulties of students in solving SPLDV questions in terms of students' mathematical communication skills. This research qualitative descriptive. Samples taken were 5 students from of 37 students with different abilities and were taken randomly at one of the Vocational Schools in South Lampung District, class X RPL SMK Negeri 1 Kalianda. The technique of collecting data through observation, tests, interviews, and documentation, while the data analysis technique used is data collection by observation then processing data, presenting data and drawing conclusions. The research instrument was a mathematical communication skills test using 3 items of essays and interviews. The test results show there are 2 difficulties in solving SPLDV questions namely; (1) concept difficulties, and (2) verbal difficulties. the causes of these difficulties are due to the low mathematical communication skills of students.

1. Introduction

Mathematics is a field of study that is studied by all students from elementary to high school / vocational school and even universities. The reason mathematics needs to be taught to students is because mathematics is widely used in life, it can be used to present information in various ways towards solving problems. Mathematics is also a universal science, because mathematics is a science that is the basis for all sciences. Some subjects learned in school must be related to mathematics. Which states that mathematics will arise from human thoughts related to analyzing then proving theorems, then relating to logic and so forth [1]. Some of the reasons why a person needs to study mathematics are: (1) a means for thinking clearly and logically; (2) a means to solve a problem in daily life; (3) a means to recognize patterns of relationships and generalizations from an experience; (4) means to develop creativity; and (5) a means to increase student awareness of cultural development in the surrounding environment [2].

But on the other hand, mathematics is still considered as a difficult subject for students, this is because mathematics has an abstract nature, or because learning is less associated with the facts commonly encountered by students in daily life, or because the teacher considers students as an empty bottle that needs to be filled and less attention that students can actually construct their own understanding of a knowledge.

There are things that are the reason most students are not interested in mathematics

because mathematics is an abstract subject, uses a lot of formulas, is confusing and boring. The reason is one of the characteristics of learning difficulties [3]. In general, when students experience learning difficulties can be caused by the ability of students themselves. This can be found when students solve a mathematical problem, sometimes students will solve the problem completely. However, some of them sometimes solve problems with incomplete or even not in accordance with what was ordered.

The occurrence of difficulties for students to learn mathematics is also due to the lack of understanding of concepts and theories that have been learned. These mathematical concepts and theories are related to students mathematical communication skills. In addition, low communication skills also affect student learning difficulties which ultimately make student achievement is not good.

Based on the information above, the government does not stop to always improve the curriculum. Some curriculums that have been implemented include, CBSA (How to Study Active Students), KTSP 2006 (Education Unit Level Curriculum) and what is currently being undertaken is the 2013 Curriculum, where the 2013 curriculum is the development curriculum of the 2006 KTSP. According to Fahrädina, Ansari, & Saiman, [4] in his journal stated that the strengths of the 2013 curriculum were because in this curriculum emphasized the importance of problem solving, reasoning, communication and valuing the use of mathematics as a goal in learning mathematics in elementary, middle, high school / vocational high school apart from the learning objectives about the concepts given by the teacher. Thus, to learn mathematics, communication skills are needed in students. Communicating students can improve vocabulary, develop speaking skills, write ideas systematically, and have better learning abilities [5]. Mathematical communication skills are one of the determinants of whether students already understand mathematical concepts that have been learned during the learning process. Which explains that communication skills are an essential part of mathematics and mathematics education [6]. Through the NCTM explanation, students communication skills are one of the most important abilities. By using communication skills, students can express their ideas about mathematics to the teacher. Communication is carried out between teacher and student or between student and student, this means that communication is also important to do the activity of teaching or when the teacher delivers material to students. *Communication is an essential element in teaching and learning of mathematics* [7]. As for the indicators or aspects that must emerge when improving students' mathematical communication skills proposed, namely: (1) Written Text; (2) Drawing, (3) Mathematical expression. With the existence of mathematical communication skills in vocational students, there will be no difficulty for students in understanding concepts or theories in mathematics learning [8].

Analysis of students' inability to solve the above problems that have been found, encourages researchers to study by analyzing the difficulty of high school students in solving spldv problems in terms of mathematical communication skills. It aims to describe some of the difficulties of learning mathematics experienced by students at SMK Negeri 1 Kalianda in the 2019/2020 Academic Year semester 1.

2. Method

This type of research is a descriptive qualitative research that aims to get a picture of the difficulties of students in terms of mathematical communication skills in one of the vocational schools in South Lampung in solving the problem of the Linear Two Variable Equation System (SPLDV). Descriptive research in which the data obtained does not have to be in the form of numbers or variable

coefficients but in the form of written words the results of the object under study [3]. The subjects in this study were 5 class X students of SMK Negeri 1 Kalianda majoring in Software Engineering (RPL) randomly selected. Data collection in this study was carried out by observation, tests, interviews and documentation. Triangulation in credibility testing is interpreted as checking data from various sources in various ways, and at various times [9]. Triangulation of this method uses two methods, namely interviews and documentation. Before an interview is conducted, the student's mathematical communication skills test is conducted . In addition, the analysis technique used in this study is a qualitative analysis model that refers to the concepts provided by Miles and Huberman [10] consisting of: data collection, data processing, data presentation, and drawing conclusions.

3. Results and Discussion

3.1 Result

The researcher presents a table that illustrates how many students out of 5 students at SMK Negeri 1 Kalianda who have difficulty in solving mathematical problems in terms of mathematical communication skills.

Tabel 1. Difficulty Learning Class RPL (Software Engineering)

Indicator	Students Answer Wrong	Percentage of Students Answer Wrong	Students Answer Right	Percentage of Students Answer Right
1	3 People	60%	2 People	40%
2	3 People	60%	2 People	40%
3	4 People	80%	1 People	20%

The percentage results mentioned above are taken from 3 questions from the instrument that has indicator questions including indicators on students mathematical communication skills.

3.2 Discussion

Problem number 1 with indicators of communication ability (Written Text) students are directed to describe the situation of the problem into a mathematical model.

Question :

1. A crossing ship can load 30 vehicles of the type of minibus and sedan with a weight of 100 tons. The average weight of minibuses and sedans are 4. 000 kg and 2,400 kg, respectively. If many minibuses are x and sedans y, the mathematical model of the problem is ...

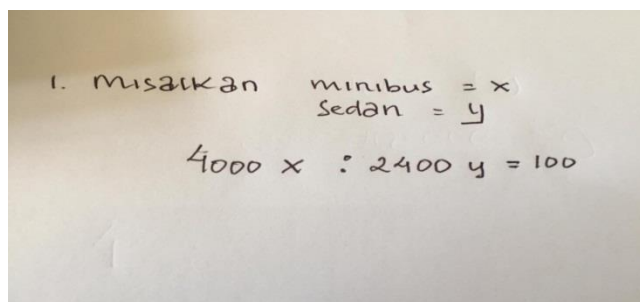


Figure 1. Answer by CA Subject

From a sample of 5 students, 40% of them answered the questions correctly. However, it appears in the figure that the CA subject answered the question a little wrong. Seen through the answer the subject is confused to determine the mathematical model of the problem. This is also consistent with the results of interviews conducted by researchers with CA subjects, such as the following:

- Researcher : Look at question number 1. What do you ask about that?
 CA : Math model, ma'am!
 Researcher : What is a mathematical model?
 CA : Short form of a story matter, ma'am!
 Researcher : What is the reason you answered as written on this paper?
 CA : Because there were 2 statements, ma'am, about the contents of a ship and the weight of minibuses and sedans so I chose one.
 Researcher : Do you remember the Two Variable Linear Equation System?
 CA : Remember mom!
 Researcher : What does the system mean?
 CA : Forgot mam.

Based on data obtained from test and interview results it appears that students already understand how to make mathematical models but do not yet understand the SPLDV concept material. This means that students understand the commands in a problem but the subject does not know the concept of the material [3].

Problem number 2 with indicators of drawing communication skills, where students are asked to solve mathematical problems regarding the two-variable linear equation system using methods that have been studied previously.

Question :
 If a and b satisfy the system of equations
 $5x + 3y + 7 = x + 2y$
 $3x - y - 8 = 5x + 7y$
 Value of $2a + 3b =$

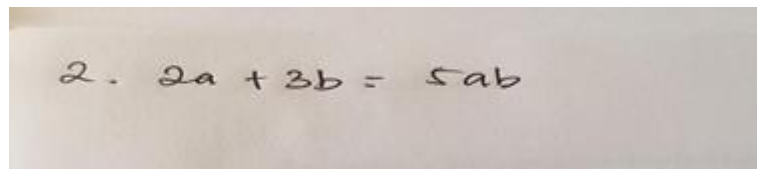


Figure 2. Answer by FH Subject

Based on Figure 2, we can observe that the subject of FH is still having difficulty in solving mathematical problems related to SPLDV material. The problem is directed so that the subject of the researcher looks for first the set of solutions of the equation system then substitutes it into algebraic form. Through the answers given by the research subjects above, it can be concluded that the research subjects have verbal difficulties which means they do not understand the commands of the problem itself [3]. This is also consistent with the results of interviews conducted by researchers with FH subjects, such as the following:

- Researcher : Look at question number 2!
 FH : Yes mom how?
 Researcher : what is the command of the problem?
 FH : We were told to find out the results of $2a + 3b$ mom.
 Researcher : how to find a solution?
 FH : I forgot mom.

Based on the results of interviews with FH subjects, it was very clear that FH did not yet understand what was the order in the matter. In addition, FH also did not know the methods used to resolve the SPLDV problem.

Problem number 3 with indicators Mathematical expression, in this problem students are directed to connect mathematical concepts about SPLDV with daily life and other material that is comparative material.

Question:

Rita's age of five years is 1.5 years old. If 10 years from now the ratio of Rita and Ben's age is 6: 5, Rita's age is now ...

3. Rita = 5 tahun = 1,5 tahun usia bimo
 bimo = 3 tahun 2 bulan
~~6 x ...~~
 = 5 + 10 tahun dari sekarang
 = 15 tahun umur rita

10 tahun dari sekarang
 = 13 tahun 7 bulan umur bimo

Figure 3. Answer of RS Subjects

Based on Figure 3 we can see that the subject of the hospital is still having difficulty in solving mathematical problems related to SPLDV material. Based on the results of the research above, it can be found that students with conceptual difficulties and verbal difficulties in solving problems related to SPLDV both make mathematical models (written text), find the set of solutions and relate them to algebraic material (drawing), and connect SPLDV material with Comparative material is caused because students still consider that the mathematics material being studied is material that is separated from each other and unrelated so that students have difficulty in determining formulas and solving problems. This is also consistent with the results of interviews conducted by researchers with RS subjects, such as the following:

- Researcher : Look at question number 3!
 RS : Yes, mom, how about it?
 Researcher : what is the command of the problem?
 RS : We were told to find out Rita's age, mom.
 Researcher : how to find a solution?
 RS : I don't know, mom.

Based on the results of tests and interviews, it can be said that the mathematical communication skills of SMK Negeri 1 Kalianda students in class X on SPLDV material still need to be improved. The mathematical communication skills of students in Indonesia in general are still very low. Especially in linking mathematical problems with daily life on SPLDV material [11]. Thus, the factors that cause the occurrence of concept difficulties and verbal difficulties in solving mathematical problems are the low communication skills possessed by students. Therefore, as a teacher it is better to use an approach or learning technique that is interesting so that it makes students happy to learn mathematics which will lead to the application of concepts on a regular basis.

4. Conclusions and suggestions

The most dominant type of difficulty experienced by students at Kalianda 1 State Vocational School in solving problems with the Linear Two Variable Equality System (SPLDV) in terms of mathematical communication skills is concept difficulties and verbal difficulties. This is due to the lack of mathematical communication skills of students at Kalianda 1 State Vocational School, especially class X Software Engineering (RPL). For this reason, it is recommended to improve students' mathematical communication skills, because students' mathematical communication skills are very important in supporting student learning processes by having good communication skills that will make it easier for students to understand the material and strengthen the concept of thinking that they have. Mathematical communication can help students develop and sharpen mathematical thinking skills [12].

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