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Teacher Directions to Bring Out Students 'Mathematic Communication Skills

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ABSTRACT: This article describes the direction of the teacher to bring up students' mathematical communication skills when solving mathematical problems. The data is generated from direct observation of the actions of the research subjects when bringing up students' mathematical communication skills in solving math problems. Subjects in this study were mathematics teachers who had the ability to provide direction to students so that students had mathematical communication skills. In this study, 2 different characteristics were found when the teacher gave directions to students. First, the teacher's actions are in the form of giving directions to students to write down the questions given in their own language, giving directions to students to write down ideas with mathematical operations and mathematical procedures appropriately, giving directions to students to draw their ideas with pictures and lines, giving directions to students to re-examine the results obtained from the problem. Second, the teacher's actions are in the form of giving directions to students to write down what is known and what is asked in the problem, giving directions to students to write down ideas with mathematical operations and proper mathematical procedures, giving directions to students to draw their ideas with pictures and lines.

KEYWORDS: Teacher's Direction, Mathematical Communication Skills, Math Problems

1. INTRODUCTION

According to Syaifuddin et, al (2019), problems usually take the form of math problems or questions. The usual questions are given by the teacher to students when learning. From the questions given by the teacher, there is a possibility that students will be able to complete the problem and there is a possibility that students have not been able to solve the problem. According to Syaifuddin et, al (2019), students who are able to solve the problem, then the problem is not a problem for the student. Meanwhile, students who have not been able to solve problems, then the problem is a problem for students. According to Syaifuddin et, al (2019), a problem usually contains a situation that encourages students to solve it but do not know directly what to do to solve the problem. Therefore,

To solve mathematical problems, we need an ability that can support to solve them. One of these capabilities is mathematical communication skills. According to Hasanah et, al (2017), mathematical communication skills are one of the abilities that are highly needed by students to be able to solve mathematical problems. Mathematical communication has an important role in mathematics learning (Nofrianto, et, al, 2017). With mathematical communication possessed, students can convey ideas and understand the flow of mathematical problems faced. Therefore, if students do not have mathematical communication skills, then there is no thinking done by these students.

Based on the author's observations during the odd semester of 2019/2020 shows that students' mathematical communication skills are low. Likewise, according to Kurnia et, al (2015), students' mathematical communication skills are still relatively low. This results in students being unable to solve mathematical problems. This is in accordance with Syaifuddin's opinion (Syaifuddin, et, al, 2019) which states that there are still students who have not been able to solve mathematical problems. Therefore, actions are needed by the teacher to students to bring up students' mathematical communication skills so that they are able to solve mathematical problems.

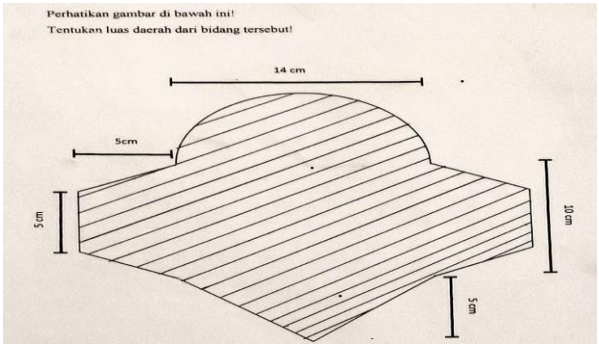
According to Syaifuddin, et, al (2019), to solve mathematical problems can be done in 4 steps, namely understanding the problem, planning to solve the problem, implementing the plan that has been made, and checking the results obtained. Polya (1973) states that there are 4 (four) steps to solve the problem, namely: (1) understanding the problem, (2) making a plan to solve the problem, (3) implementing the plan that has been made, (4) checking the results obtained.

According to Syaifuddin, et, al (2019), a mathematical problem usually contains a situation that encourages students to solve it but does not know directly what to do to solve it and to solve a problem requires creativity and knowledge that is ready.

Questions given to students and students immediately know how to solve them correctly, then the problem cannot be said to be a problem (Sitorus, 2009). Therefore, a mathematical question or problem is a problem depending on each individual student. In other words, for certain students a mathematical problem might be a problem while for other students it is not a problem. For example, consider the following problem:

Look at the picture below!

Determine the area of the area!



The problem above in this study is a problem for students. Because, students are unable to solve the problems above.

Mathematical communication ability is the ability of a person to convey his ideas of a mathematical problem both written and oral obtained by students from the results of their exploration of mathematical problems (Nofrianto, et, al, 2017). Mathematical communication skills are one's ability to convey ideas about a mathematical problem by writing, drawing, and mathematical expressions (Hodiyanto, 2017). Indicators of being able to communicate mathematically are able to organize and consolidate mathematical thinking and ideas, communicate their thinking logically and clearly to peers, increase mathematical knowledge by thinking about thoughts and strategies from peers, using mathematical language to give ideas correctly (NCTM, 2000) . Mathematical communication can be seen from how students connect real objects, pictures, or diagrams into mathematical ideas, how to explain ideas, situations and mathematical relations, orally or in writing, with real objects, pictures, graphs and algebra, how to express daily events. in mathematical symbols, listening to, discussing and writing about mathematics, reading written mathematics presentations and constructing relevant questions, and making conjectures, constructing arguments, formulating definitions and generalizations.

In this research, mathematical communication ability is the ability of a person to convey mathematical thinking ideas using operations and procedures in mathematics appropriately and describe mathematical thinking ideas using pictures and lines.

According to Syaifuddin, et, al, (2019), teachers can give action to students to facilitate students who have difficulties so students are able to solve mathematical problems. In addition, teachers must be able to anticipate and be prepared with responses to facilitate students when students experience obstacles in thinking. According to Syaifuddin, et, al (2019), there are 4 steps to solve the problem, namely: (1) understanding the problem, (2) planning to solve the problem, (3) solving the problem in accordance with the plan that has been made, and (4) re-examining the results obtained .

In this study, to understand the problem can be done by writing down what is known in the problem, writing down what is asked in the problem, and rewriting the problem using his own words. Meanwhile, to make a plan to solve the problem can be done by choosing a strategy that suits the problem.

2. MATERIALS AND METHODS

To obtain data, the authors directly observed the directions given by the research subjects. Observations are made when the research subject provides directions so that students are able to bring up mathematical communication skills to solve mathematical problems. Observations were made to obtain data about the behavior of the research subjects when giving directions. The direction of the research subject observed is the effort made by the research subject so that students are able to understand the problem, students are able to plan to solve problems, students are able to solve problems according to the plans that have been made, and students are able to re-examine the results obtained.

Teacher Directions to Bring Out Students 'Mathematic Communication Skills

Research subjects are selected by looking at the directions given by the research subject so that students are able to bring up mathematical communication skills to solve math problems. The subjects of this study were 2 mathematics teachers. Furthermore, the two teachers are symbolized by S1 and S2

There are 2 different characteristics when the subject provides directions to bring up mathematical communication skills in solving math problems. Following are the actions of the two research subjects:

2.1 S1 Directions Bring up Students' Mathematical Communication Ability so that Students are Able to Solve Problems

To bring up mathematical communication skills so that students are able to solve mathematical problems, there are 4 directions given by S1 to students, namely (1) directing to understand the problem, (2) directing to plan problem solving, (3) directing to carry out the plans made,
(4) directs to check the results of problem solving. The following is the S1 dialogue with students when directing to understand the problem, namely by leading the students to rewrite the questions using self-composed sentences, writing down what is known and what is asked in the problem.

S1 : Try about that you write back in your own words, write what is known and write what is asked in the matter!

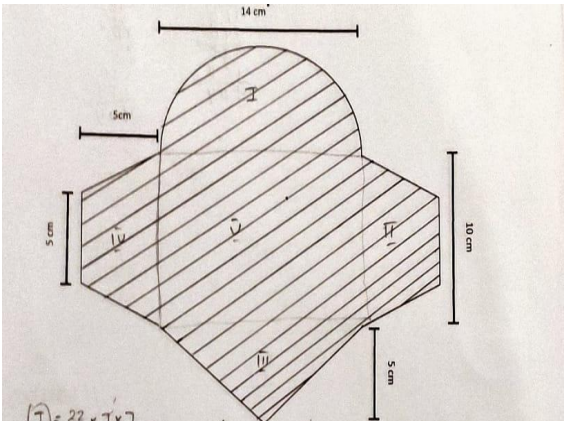
Student :There is a plane consisting of a half circle with a diameter of 14 cm, a trapezium with a height of 5 cm and two sides parallel to the length of 5 cm and 10 cm respectively, isosceles triangle with a height of 5 cm and a base of 14 cm, a rectangle with a length of 14 cm and 10 cm wide.

The second and third S1 directives direct students to plan to solve the problem and solve the problem. S1 directs students to write mathematical thinking ideas using operations and procedures in mathematics appropriately and describes mathematical thinking ideas using pictures and lines. The following is the dialogue for S1 and students:

S1 : After knowing what is known and what is asked, then how many fields make up the field then? Try to show!

Student :there is 5 fields (while showing pictures)

The following pictures are made by students:



S1 : Furthermore, from the five fields, you need to find what broad areas?

Student : There is one half circle, trapezium there are 2 planes, isosceles triangle there is one, and rectangle there is one.

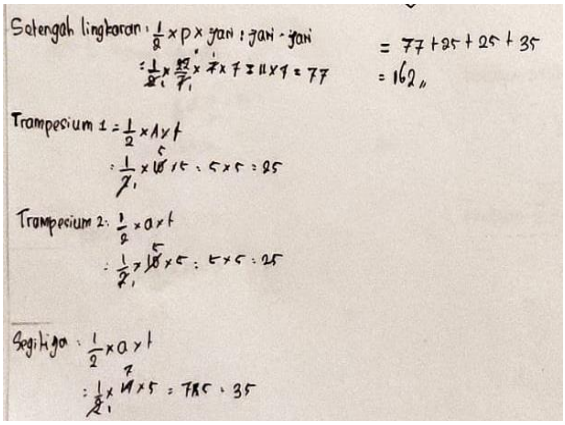
S1 : Still remember the broad formula of the five fields?

Student :still remember

S1 : Try to do it!

Student : (students look for the fifth area of the field)

Following are the results of student completion:



The fourth S1 directive directs students to examine the results of problem solving. Following is the dialogue for S1 and students:

S1 *:From the results you got, is that correct? Try to check again*

Student *:Yes, true*

2.2 **S2** Direction Reveals Students' Mathematical Communication Ability so that Students are Able to Solve Problems

To bring up mathematical communication skills so that students are able to solve math problems, there are 3 directions given by S2 to students, namely (1) directing to understand the problem, (2) directing to plan problem solving, (3) directing to carry out the plans made. Next is the S2 dialogue with students when directing to understand a problem, namely by asking students to write down what is known and what is asked in the problem.

S2 *: Try to write down what is known and write down what is asked in the matter!*

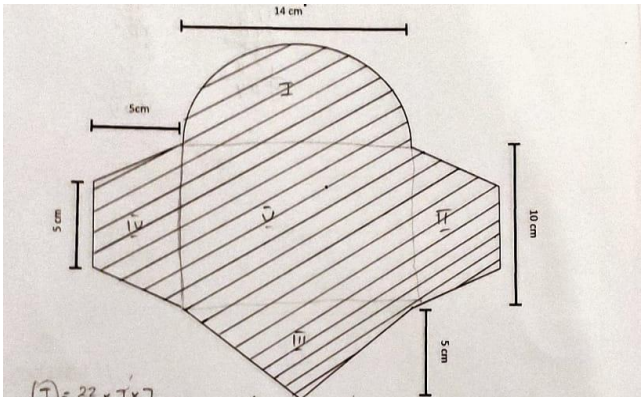
Student *:Known half circle with a diameter of 14 cm, trapezium with a height of 5 cm and two sides parallel to the length of 5 cm and 10 cm respectively, isosceles triangle with a height of 5 cm and a base of 14 cm, rectangle with a length of 14 cm and width of 10 cm . The area of the five fields was asked.*

The second and third S2 directives direct students to plan to solve the problem and solve the problem. S2 directs students to write down mathematical thinking ideas using operations and procedures in mathematics appropriately and describes mathematical thinking ideas using pictures and lines. The following is the S2 and student dialogue:

S2 *: how many fields make up this field? Try to show!*

Student *: there are 5 fields (while showing pictures)*

The following pictures are made by students:



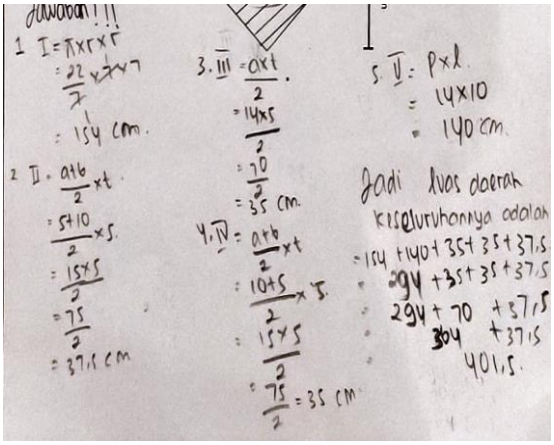
S2 *: Furthermore, you have to search for any area?*

Student *: Half circle, trapezium, isosceles triangle, and rectangle.*

S2 *: Try to write the formula area of the five fields and then you find the area of the five fields*

Student : (students write the broad formula for the five fields and look for the width of the five fields)

Following are the results of student completion:



3. CONCLUSIONS

To bring up mathematical communication skills so that students are able to solve math problems, the teacher provides directions. This direction is a step for the teacher to provide problem solving strategies.

According to Syaifuddin [10], there are 4 actions taken by the teacher to bring up students' thoughts in solving mathematical problems. The step is to provide action to understand the problem, to plan the solution of the problem, to carry out the plan that was made, and to check the results of the settlement. This is consistent with the opinion of Syaifuddin[10], When the teacher gives directions to students to bring up students' mathematical communication skills so that they are able to solve math problems, there are 2 different characteristics. First, the teacher's actions are in the form of giving directions to students to write down the questions given in their own language, giving directions to students to write down ideas with mathematical operations and mathematical procedures appropriately, giving directions to students to draw their ideas with pictures and lines, giving directions to students to check again the results obtained from the problem. Second, the teacher's action is in the form of giving directions to students to write down what is known and what is asked in the problem, giving directions to students to write ideas down with mathematical operations and proper mathematical procedures, giving directions to students to draw their ideas with pictures and lines.

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