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The students' mathematical communication ability taught by cooperative script types at SMP Negeri 3 Kisaran

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Abstract. Mathematical communication ability is important owned by students' because a lack of ability of mathematical communication can lead to a lack of understanding of the mathematical concept or mathematical problem. Preliminary observation conducted by researchers in SMP Negeri 3 Kisaran found that the students aren't able to answer. It is clearly seen in the student's answer sheet that the student's mathematical communication ability is low lack of student's mathematical communication ability of SMP N 3 Kisaran is so related to the learning process which has been done by the mathematics teacher. To fix it is necessary to develop an approach to learning that is more effective, creative, and fun. On this basis, the authors try to apply cooperative learning Control Class type to improve mathematical communication ability. This research is quasi-experimental or quasi-experimental research with a quantitative approach. The conclusion found that there is an increase in students' mathematical communication ability taught by cooperative learning cooperative script type at SMP Negeri 3 Kisaran.

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INTRODUCTION

All countries in the world have always prioritize education. Efforts to improve the quality of education that has been done by the government including curriculum renewal, improvement of educational facilities, the use of teaching methods and to improve the quality and quantity of teaching materials. Mathematics is one of the subjects that are used as a reference for educational advancement of a country. Mathematics courses is given from grade 1 in elementary school, an early attempt to instill concepts, facts or principles of mathematics, which in turn is expect to improve the quality and quantity of learning outcomes in other education purposes. By the increased of the quality and quantity of learning mathematics, it will increase the students' ability to support their lives because there is no human activity unrelated to mathematics. This is in accordance with what Kamarullah (2017) said that mathematics has be a queen and a servant for other sciences. Mathematics is called the queen because, in its development mathematics never depend on other sciences. But mathematics always provides services to various branches of science for develop themselves, both in the form of theory, especially in its application. Lots applications in various disciplines also using mathematics, especially in aspect of reasoning. Therefore, the maturity of a science is determined by existence whether or not the science uses mathematics in the mindset and application development.

It shown how important learning mathematics is, NCTM (2008) said that one of the purpose learning mathematics is communicated ideas with symbols, tables, diagrams or other media to clarify the situation and problems. Therefore, mathematical communication must be well integrated into the classroom and students should be guided to express and write ideas, questions, and the definitions of mathematical communication mentioned before, it can be argued that mathematical communication is the ability to demonstrate mathematical ideas and symbols both verbally and in writing, pictures, or diagrams. In the early stage of mathematics formed from

human experience in the world of empirical ratios are then processed in the world, processed in the analysis and synthesis of the reasoning in cognitive structure, thus arrive at mathematics concept (Triana at al., 2019). In order to others understand the concept form and easily also appropriately manipulated, then use the notation and terminology carefully universally agreed upon and is known as language mathematics. Also confirmed by Ansari (2012) that mathematics is a tool that can clarify and simplify a condition or situation that is abstract into concrete ideas through language and mathematics idea as well as a generalization to easier to find the problem solving. Also agreed by Disasmitowati and Utami (2017) that with communication, students can express their own ideas. So, the use of students' mathematical communication skill is to understand, interpret, express, respond, and use mathematical symbols to present ideas in oral and written form.

It's shown that mathematical communication ability is important owned by students' because lack of ability of mathematical communication can lead to a lack of understanding the mathematical concept or mathematical problem. Without having the mathematical communication ability students will experience a lack of information, data and also the fact that it can be used in solving mathematical problems in higher order thinking skills. But in the fact in mathematics learning process, some teachers use the paradigm of transfer knowledge. Said by Ruseffendi in Ansari (2012) the biggest part learned by students in a school is not obtained through mathematical exploration, but through notification. In turn, students' mathematical communication ability of students in solving mathematics problems is very unsatisfactory, Preliminary observation conducted by researchers in SMP Negeri 3 Kisaran found that the students aren't able to answer. It clearly seen in student's answer sheet that student's mathematical communication ability is low. For example, problem number one: Write down every sentence below to be mathematical model by using x and y variable. (a) The result of multiple from two natural numbers 2 is 9, (b) Amount of Ikhsan and Bayu book is 11, while difference of their books is 1, (c) Circumference of a rectangular is 14m, when size of the length 3 feet longer than the width. The indicator of mathematical communication ability is students able to state problem in writing into mathematical model (Ansari, 2012), students can't form the mathematical model for the two natural number, also the sum and the difference of Ikhsan and Bayu book also they can form mathematical model from the circumstance of the rectangular. So, from this first problem we found that student's ability in stating problem in writing in mathematical model is very low.

For the problem number two the indicator for the mathematical communication ability is explaining problem in writing into figure and stating problem in writing into mathematical model (Ansari, 2012). The problem to test the indicator is: Indicate the $5\frac{1}{2}$ apples in picture form. It can be seen that the student is still difficult to determine half of the apple and the majority students are only focused to solve the problem half of the apple. Even partially other students are able to describe the half of apple properly. This indicates that the ability of mathematical communication in explaining problem and writing into figure is also week. The indicator of mathematical communication ability in problem number three stated by Ansari (2012) is explaining problem situations by own words and doing calculation. Based on the student's answers, it can be seen that students can do calculations but cannot clearly explain the meaning of the numbers on their sheets. In addition, students make syrup and instant noodles into one, even though syrup and instant noodles are different types. Students also find it challenging to convert the number problem at point c into a mathematical model, meaning that the ability of students to explain the situation in their own words and perform calculations is also weak. From this initial observation, it can be concluded that students' mathematical communication skills are still weak and unsatisfactory. This is also happened because student's lack of understanding of algebra and the system of linear equation. Besides that, their lack of mathematical communication ability because they not familiarized to change something abstract becomes real problem in form of mathematical model.

Lack of student's mathematical communication ability of SMP N 3 Kisaran is so relates with learning process which has done by the mathematics teacher. Teacher designs the unsuitable

learning model to increase students' activity in the learning process. Then, the next happen is the lack of reflect of the leaning mathematics itself. It's can also mean the model that teacher use isn't suitable or need by students in terms to increase the student's activity in class. As said by Paulo (in Suprijono, 2009) teacher do the things, learners imagine how to act in accordance with his teacher action. It means that everything that teachers say it's true also teachers known everything when students know nothing. Because teachers use this old paradigm of learning mathematics, the mathematical communication ability of students is decreasing. Teachers only transfer the knowledge that they know and students passively accept everything. This kind of learning behavior already used really long time in Indonesia learning process.

To fix it, is necessary to develop an approach to learning that is more effective, creative, and fun. On this basis, the authors try to apply cooperative learning Control Class type to improve the mathematical communication ability. According to Istarani (2012) that model of learning in which students work in pairs and take turns verbally summarize, the parts of the material being studied. Cooperative learning model type Control Class begins with the delivery of teaching materials that start with giving a discourse or a summary, then given an opportunity to the students to read it for a moment and provide, input or new ideas into teaching materials being studied.

So, cooperative learning type Control Class also one of an alternative learning model that appropriate to develop the student's mathematical communication ability by give students opportunities to answer an also provide, input or new ideas in material that supplied.

METHODS

This research is a quasi-experimental or quasi-experimental research with a quantitative approach. Quasi-experimental research is used because this research is research to cause a situation or event, meaning that this research was conducted with the intention of seeing a result of a treatment to a group or more (Arikunto, 2009). In this study, the research sample was two class students in SMP Negeri 3 Kisaran grade VII, which one class given treatment with cooperative learning Control Class type and the others as control class. To see if there is an increase in mathematical communication ability, a pretest-posttest one group design was used. Gliner & Morgan (2009) stated that in this design each group was measured before being given treatment and after being given, through this design it is hoped that it will allow researchers to evaluate the comparison of the new treatment with the old treatment that has been used previously or other new treatments.

RESULTS AND DISCUSSION

The research held in five meeting. Where three meeting use for class to learn and the first and last meeting held for the test, pre-test and post-test given. The test is to know the students' mathematical communication ability before and after doing the treatment. In table below show the data of mathematical communication ability which obtained by the control class and the experimental class.

Table 1. Data of mathematical communication ability test

Statistics	Experimental Class (Cooperative Script)	Control Class
N	30	30
Mean	74.91	61.48
Standard Deviation	8.07	10.98
Varians	60.39	120.65
Max Score	91.67	83.33
Min Score	61.11	41.67

To know the increased of students' mathematical communication ability, researcher makes the score for each indicator of mathematical communication ability. Where the indicator is: (1) the

ability of stating mathematical problem in writing into figure, (2) the ability of explaining mathematical problem by own words, (3) the ability of stating mathematical problem in writing into mathematical model and solving it given in test after the treatment, where the indicator orderly in code 1, 2, 3. The following table shows the mean score of three indicators of mathematical communications ability after the treatment done.

Table 2. Mean of mathematical communication ability indicators

Indicators	Experimental Class	Control Class	Ideal Score
1	3.23	2.77	4.00
2	2.49	1.91	4.00
3	3.27	2.70	4.00

The next to test the normality of the data by using *Lillifors* test, the condition that need fulfill is, if the $L_o < L_{table}$ then the data come from normal distribution. From the data mathematical communication ability researcher get the L_o (0.0641) < L_{table} (0.161) then the data from experimental class who taught by cooperative learning Control Class type has normal distribution. From the data mathematical communication ability post test in the control class researcher get the L_o (0.0960) <L_{table} (0.161) then the data from control class has normal distribution.

After the normality test has been done the next was the homogeneity test whose has the purpose for knowing is the sample data comes from populations whose homogenous variance or not. To make a decision of the homogeneity of the data, condition need to fulfill is if the Significance (Sig.) based on mean is bigger than α (0.05) then H_0 is accepted and vice versa. From the result of homogeneity by using SPSS 23.0 it shows that significance (Sig.) value which in the row based on mean is 0.075, this Sig. value is higher than α (0.05). It means H_0 is accepted it means that the students' sample data comes from populations whose homogenous variance.

After the data fulfil the normality and homogeneity, after that doing the test to find the analysis result. By posttest data by comparing the difference average of posttest between students who taught by cooperative learning Control Class type and the control class. Then, by using SPSS 23 through one-sample-t-test is obtained the result like table below.

Table 3. The result of hypothesis test

One-Sample Test

	Test Value = 60					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Score	5.467	59	.000	8.19467	5.1953	11.1940

Known the Hypothesis in this research are:

H_0: There is no increased in students' mathematical communication ability which taught by cooperative learning Control Class type.

H_a: There is increased in students' mathematical communication ability which taught by cooperative learning Control Class type.

From the result of hypothesis table above is obtained the significance (Sig.) value is less than α. As the condition can be fulfill if Sig. value is less or equals than α then reject H_0. From the table found that Sig. is .000, which less than 0.05 (Sig. ≤ α) then reject Ho and accept H_a. So, it can be concluded that there is the increased in students' communication ability taught by cooperative learning Control Class type.

To find the increased in Characteristic of Student's Answer after accepted the treatment cooperative learning Control Class can be seen by the way students answer the questions. Here the statistics of students answer for problem number 1 and 1st indicator. In the experimental class students make the answer more clear start from the information, what the thing need to find out and then make the answer, in control class students just figure the scheme of the ship. It's not quite different in problem no.2. For problem no.3, the student's answer it's quite different

In Control Class type class, the way student's figure the land owned by Mr. Syamsuddin has many varieties answer. But in control class students figure much influence from the statement that the length of the land 3 is total amount of the side of land 1 and width of land 2, it's turn out that the figure of one and other students almost same.

In indicator two which is the ability of explaining problem situations by own words. The student's answer is different. First, we can see the number of students answer rightly higher in Control Class. Experiment class students explain more, in control class they just mention the properties of the rectangle, also the same with the ways they answer for problem No.2 indicator 2. For problem no.2 the students in cooperative script class has higher value in answer than students in cooperative class. It showing that students in cooperative script class have more ways to explain the reason.

For the problem No.3 students in cooperative script class explain the problem more clearly and completely, it's also the reason students in cooperative script class has more students answer in higher level, For the students in control class they know what to do but hard to explain the ways in statement that's why they score in middle level. In the third indicator which is the ability of stating mathematical problem in writing into mathematical model and doing calculation. In first problem students in both classes find in with the same way by using the circumference of rectangle formula. The difference is just the students in cooperative script class explain more. That's why the distribution of students answers in each level between experimental class I and experimental class II don't have much different.

For the problem no.2 the difference it's not much. The students in cooperative script find the amount of paving that needed by using step by step. They find the area of yard first, after that they find the area of paving. The next they divided the area of yard with the area of paving. But the students in control class right away do the calculation. They found the area of yard and paving when they calculate the amount of paving that needed. So, it makes many of them get the calculation wrong. In the last problem, students in cooperative script class answer clearly and solving rightly it's the same for students in cooperative class. The difference is just the students in cooperative script do the calculation step by step, the same way as they write down how to find the length side. But students in control class just right away do the calculation.

The learning model which used in experimental class have the steps that possible to encourage and help students in achieving the mathematical communication ability. For Cooperative Learning Cooperative Script Type has step to read their SAS first and doing the discussion. In the discussion only the one who namely in the script can talk and give their opinion. Beside to increasing their mathematical communication ability also increasing their focus in listening to other people, when listening is also one of the factors that influence the mathematical communication ability. Also in this step, student has a right to speak their opinion even it's wrong then also can be help each other to find the best way to presented their opinion or answer. After the discussion end both students and teacher together make conclusion about the right answer. It may be possible that the students will modify and link their own cognitive between their answer and teacher answer by their own words.

As said before all steps can influence students' mathematical communication ability starts from their mathematical understanding when their read and also try to understanding the topic and all the aspect of communication like listening when hearing friends and teacher explanation, when they read the SAS and their book, next is discussing when their share their thought and the last is writing when they make their own definition and material about the topic. It makes all the

the factors or indicators is automatically satisfied. As said by Damayanti et al (2018) that the reason to use cooperative script method is cooperative script offers an opportunity for students to give support and encouragement to one another in a positive way. It helps students learn to accept responsibility for their behaviors. It also gives students practice in becoming assertive and specific in their feedback toward one another when problem solving. The Cooperative script releases teachers of the responsibility of handling minor disputes since students are instructed to bring those problems and conflicts to the circle. Insignificant issues are quickly discarded when students learn to determine what is really important.

It also relevant to the result get by Nur (2016) that the results showed that the mathematical communication skills of students who received script cooperative learning were better than the mathematical communication skills of students who received conventional learning. Agreed by Laily et al (2020) based on the results of his research, it was concluded that the average post-test of each question in the experimental class using the script-type cooperative learning model was higher than the control class using the direct learning model. This means that the experimental class students' mathematical communication skills are better than the control class students' mathematical communication skills. In line with this, research conducted by Hasim et al (2019) showed that the application of the cooperative script method could improve student learning outcomes.

In carrying out this research, there were several problems faced by researchers and partners during the observation. On the first day of entering the experimental class and teaching using the guidelines from the lesson plans and the supervising teacher, it was found that some students did not pay much attention when the discussion started. Some of them rely solely on other team members. Students who give their thoughts or opinions are always the same person and other students who are not interested in the discussion make the discussion a plan. Also, when they accept the cooperative scripting method, many of them are a little embarrassed to give their opinion or opinions. So, the result of this research is that the mathematical communication skills taught by cooperative learning type cooperative script are increasing well.

CONCLUSION

From the studies explained earlier, found that there is increased in students' mathematical communication ability taught by cooperative learning cooperative script type at SMP Negeri 3 Kisaran, also there are the difference in students' ways to answer the problem in experimental class taught by cooperative learning cooperative script type with the control class. Found that the students' which taught by the cooperative script has the better way to answer the question, more complete, more clearly and doing the calculation rightly.

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