THE EFFECT OF INQUIRY LEARNING MODEL ON STUDENT MATHEMATICAL COMMUNICATION SKILLS GRADE VII SMP SWASTA USIA TAMA LESSON YEAR 2016/2017

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Abstract

The research conducted at the SMP Swasta Usia Tama aims to determine the effect of the inquiry learning model on mathematical communication skills students grade VII SMP Swasta Tama Lesson Year 2016/2017 The population in this study were all seventh graders consisting of 2 classes. The sample in this study were class VII-1 as many as 30 people and class VII-2 as many as 30 people. To obtain the data needed in this study, an essay test was used to see students' mathematical communication skills. Before the test is established as a data collection tool, it is first tested to see the validity and reliability of the test. The results of the validity test with rtable = 0.320 obtained that the pretest and posttest questions were valid. The reliability test of the pretest problem was obtained at 0.774 which means the question was reliable and for the posttest question it was obtained 0.776 which means that the question is reliable. Data analysis techniques using regression tests. Before hypothesis testing, the normality and homogeneity of the test were tested first. Normality was tested using the Liliefors technique and homogeneity by using the F test. From the tests performed, it was found that the two samples were normally distributed and homogeneous. The results showed that the average mathematical communication skills of students taught using the Inquiry learning model were higher than those taught by conventional models. The test results of the communication skills of the experimental class students obtained an average pretest of 42.67 and the posttest average of 74. Whereas in the control class the average pretest was 40.5 and the posttest average was 71.33. The hypothesis in this study was tested using regression analysis. Before testing the hypothesis, the regression significance test and regression linearity test are carried out first. From the tests performed, it was found that both regression equations were meaningful and linea. Where the experimental class regression equation = 58.09 + 0.37X and the control class = 59.67 + 0.28X After the regression equation fulfills significance and linearity, the hypothesis test is carried out, with the results of hypothesis testing obtained tcount> t table ie 1.84> 1.694 at the level. This means that there is an influence of inquiry learning model on students' mathematical communication skills. The magnitude of the effect of Inquiry learning on students' mathematical communication skills is 0.4628 or 46.28% classified as quite high and the magnitude of the influence of conventional learning is 0.2292 or 22.92% classified as low.

Keywords: Inquiry, Mathematical Communication

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A. Introduction

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines and advances the power of human thought. It can be said that the main foundation of science and technology is mathematics. To master and create technology in the future requires a strong understanding of mathematics early on. As stated by Bahri (2009: 78) states that "Mathematics subjects do need to be conveyed to students early because mathematics provides an important role in developing the ability to think logically, analytically, systematically, critically, creatively and collaboratively. These competencies are very necessary for students to develop the ability to obtain, manage and use information to survive in competitive and uncertain conditions. Besides that, it is also expected that students can use mathematics to solve problems and communicate ideas with the help of symbols, tables, diagrams and other communication media. Conditions that are not much different can be found in class VII of the SMP Swasta Usia Tama. Based on the results of the interview on 30 September 2016 with one of the mathematics study teachers who taught in class VII, information was obtained that the mathematics learning outcomes of students in class VII in the last few years were still far than expected. In general, the condition of students in class VII is to have a conceptual understanding that is still lacking, learning motivation that is lacking, passive in learning, having low mathematical communication skills characterized by most students having difficulty pouring their ideas either in writing or verbally, class who is silent without sound and so on. This condition is thought to be the cause of low student learning outcomes. One of the causes of failure of mathematics learning which results in low student learning outcomes is due to the use of learning strategies / approaches and inappropriate delivery methods. Besides the use of strategies / approaches and inappropriate learning methods, other factors that greatly influence the high and low of students 'mathematics learning outcomes are students' mathematical communication skills. The low communication skills make it difficult for students to learn mathematics, students have difficulty understanding mathematical languages that are full of symbols. As revealed by Bambang R (2007: 7) that: "Many factors cause mathematics to be

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considered a difficult lesson, including the characteristics of mathematics that are abstract, logical, systematic, and full of confusing symbols and formulas. In addition, some students do not like mathematics because mathematics is full of counts and poor communication ". Mathematical communication skills are very important in learning mathematics to communicate a concept to others, as stated by Bruner in Edward (2006: 40) who said that: "To understand the concepts there is a need for language. Language is needed to communicate a concept to others ". Mathematical communication ability is the ability / ability of a student to be able to express and interpret mathematical ideas verbally, in writing, or demonstrate what is in mathematical questions (Departemen Pendidikan Nasional, 2008:24). So it requires mathematical communication that aims to train students to express events in everyday life into the language of mathematics. The explanation above indirectly states that students' mathematical communication skills really need to be considered and improved. According to Baroddy in Ansari (2009: 64) there are at least 2 important reasons that make communication in mathematics learning need to be the focus of attention, namely (1) mathematics as language; mathematics is not just a thinking tool, a tool for finding patterns, or solving problems but mathematics is also a valuable tool for communicating various ideas clearly, precisely and meticulously and (2) mathematics learning as social activity; : meaning as a social activity in learning mathematics, also as a vehicle for interaction between students and also communication between teachers and students ".

One learning model that involves students actively is the Inquiry learning model. Hidayah (2009: 12) states that the Inquiry learning model is a learning model that is developed based on an innovative way of thinking that is drawing conclusions based on observed data. This means that in the learning process, students are directed by the teacher to carry out Inquiry activities until finally they can explain the findings. Gulo in Trianto (2010: 68) states that: "Inquiry does not only develop intellectual abilities but all existing potential, including emotional development and Inquirer's skills, is a process that starts from formulating problems, formulating hypotheses, collecting data, analyzing data, and making conclusions. To create such

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conditions, the teacher acts as a motivator, facilitator, questioner, administrator, director, manager, and rewarder ". Learning with this Inquiry approach is student-centered so that students are truly actively involved in the learning process. The active involvement of students in the learning process is able to encourage students to get a better understanding of mathematical concepts or principles so that students will be more interested in mathematics. In this learning, students are guided to be able to communicate their mathematical ideas, concepts, and skills that they have learned to find new knowledge. From the description above, researchers are interested in carrying out research with the title ''Effecf of Inquiry Learning Model On Mathematical Communication Skills of Students Grade VII SMP Swasta Tama Lesson Year 2016/2017 ''. Many experts define learning, including: Dimyati and Mujiono (2013: 27) suggest that: "learning is a complex action and student behavior. As an action, learning is only experienced by students themselves. Students as a determinant of the occurrence or non-occurrence of the learning process ". Djamarah (2006: 12) states that: "learning can bring change to actors both changes in knowledge, attitudes, and skills and these changes help actors solve problems in life and adjust to their environment". According to Turmudi (2008: 78) states that: "Communication is an essential part of mathematics and mathematics education". Furthermore, according to Abdulhak Nunun Elida (Jurnal UNSIKA Vol. 1 Number 2 2012) said that "communication is the process of delivering messages from the sender of the message to the recipient of the message through certain channels with a specific purpose". Wahyudin in Dwi Rachayani (Jurnal UNSIKA Vol. 2 Number 1 2014) states that "communication is a way of sharing ideas and clarification of understanding." Communication in mathematics is a fundamental ability students and teachers must possess while studying, teaching, and evaluating mathematics. Communication in mathematics is communication skills related to students 'abilities and skills in communication. Greenes and Schulman in Ansari (2009: 10) explain the standards that measure students' mathematical communication, namely the first ability to express mathematical ideas by speaking, writing, demonstrating and describing them in the form visual, both understand, interpret and assess mathematical

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ideas presented in a visual form, third use vocabulary / language, notation and mathematical structure to express ideas, describe relationships and make strategies. According to Baroddy in Ansari (2009: 11) there are five (5) aspects of communication, namely: representing, listening (listening), reading (discussing), discussing (discussing) and writing (writing).

B. Method

The location of this study is SMP Swasta Usia Tama . The time of the study was carried out on the genester semester of the school year 2016/2017. The population in this study were class VII students, amounting to 60 students. Given the population is only 60 people, then sampling is done by total sampling technique, namely the overall population used as research samples. The variables in this study are inquiry learning models as independent variables and students' mathematical communication skills as the dependent variable. The research design patterns used were Randomized Subjects, Pretest-Posttest Control Group Design. This study involved two classes, namely the experimental class and the control class that was given a different treatment. The experimental class (VII-1) was given treatment that is the inqury learning model while the control class (VII-2) was given the conventional learning model treatment. To be more clearly seen in table.1

Table. 1 Research design

Eksperimen	O_1	X	O_2
Kontrol	O_3	-	O_4

Information :

X: The treatment given in the control class with the Inquiry inquiry model

O1: Pre test (initial test) in the experimental class

O2: Post test (final test) in the experimental class

O3: Pretest test (initial test) in the control class

O4: Post test (final test) in the control class

This study the tests given to students aim to determine students' mathematical communication skills. The mathematics communication

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ability test given is in the form of a description (essay test) consisting of 5 pretest questions and 5 post test questions. Before the test of mathematical communication ability is used, an instrument test is carried out first to find out the validity (reliability), the reliability (releability) of the measuring instrument. The prerequisite test used is the normality test using the Lilliefors technique and the variance homogeneity test using the F test. Data analysis techniques are carried out using simple linear regression analysis. The hypothesis proposed in this study is: "There is an 'Effecf of Inquiry Learning Model On Mathematical Communication Skills of Students Grade VII SMP Swasta Tama Lesson Year 2016/2017 "

C. Research Results

From the results of the pretest given the average value of the pretest of the experimental class students was 42.67 with the highest score of 65 and the lowest value of 20 and the standard deviation of 11.79, while the average value of the pretest in the control class was 40.5 with the highest score of 65 and lowest value 20 and standard deviation of 13.08. In summary the results of the pretest of the two groups are shown in table 2 below

Table 2. Pretest Data of Experimental Classes and Control Classes

	Eksperiment Class	Control Class
Total of Student	30	30
Amount of Score	1280	1215
Average	42,67	40,5
SD	11,79	13,08
Varian	139,19	171,29

From the results of the pretest given the average value of the pretest of the experimental class was 42.67 with the highest score of 65 and the lowest value of 20 and the standard deviation of 11.79. While the average value of the pretest of the control class was 40.5 with the highest score of 65. and the lowest value of 20 and the standard deviation of 13.08. In summary the results of the pretest of the two groups are shown in table 3 below:

Table 3. Data on Postest Score of Experimental Class and Control Class

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	Eksperiment Class	Control Class
Total of Student	30	30
Amount of Score	2220	2140
Average	74	71,33
SD	8,03	7,76
Varian	64,68	60,23

In complete summary the results of the calculation of the pretest and posttest normality test in the two experimental classes are presented in table 4

Table 4. Summary of Data Normality Test Results with Liliefors

Class	Pretest		
	L_{hitung}	L_{tabel}	
Eksperiment	0,1577	0,161	Normal
Control	0,1493	0,161	Normal
	Post Test		
Eksperimen	0,1309	0,161	Normal
Control	0,1577	0,161	Normal

From table 4. it can be seen that both in the experimental class and in the control class the pretest and posttest values were normally distributed where $L_{hitung} < L_{tabel}$.

Testing homogeneity of data to find out whether the sample used in the study came from a homogeneous population or not. In complete summary the results of the calculation of the pretest and posttest homogeneity tests in the two experimental classes are presented in table 5.

Table 5. Homogeneity Test Results Data

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Data	F_{hitung}	F_{tabel}	
Pretes	1,23	1,858	Homogen
Postes	1,07	1,858	Homogen

From table 4.4 it can be seen that both the pretest data and the posttest F_{count} data $<F_{table}$. This means that both samples come from homogeneous populations.

H₀: There is no significant effect of Inquiry Learning Model On Mathematical Communication Skills of Students Grade VII SMP Swasta Tama Lesson Year 2016/2017.

Hₐ: There is a significant effect of Inquiry Learning Model On Mathematical Communication Skills of Students Grade VII SMP Swasta Tama Lesson Year 2016

Hypothesis testing for mathematical communication skills is carried out on posttest data and tested through simple linear regression analysis. The test results on the level obtained

t $_{count}$ >t $_{table}$ then H₀ is rejected and Hₐ is accepted. Regression equation in the experimental class and the regression equation in the control class,

namely $\hat{Y}$ = a + bX. In the experimental class the regression equation that

occurs is. In the experimental class the regression equation that occurs is $\hat{Y}$ = 58,09 + 0,37X. The value of b = 0.37 and has a positive sign, this means that for every increase in one pre test value, then there is an increase in the posttest average value of 0.37. While the regression equation control class

that occurs is: $\hat{Y}$ = 59,67 + 0,28X. The value of

b = 0.28 and has a positive sign means that for each increase in one pretest value then the posttest value added occurs at 0.28. Based on the results of the regression significance test in the experimental class obtained F_{count} (12.003)> F_{table} (4.20) and in the control class obtained F_{count} (10.42)> F_{table} (4.20). This shows that both linear regression equations mathematical

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communication skills of the experimental class and the control class are meaningful.

Based on the regression linearity test results in the experimental class obtained F_{count} (1.165) <F_{table} (2.45) and in the control class obtained F_{count} (1.17) <F_{table} (2.45). This means that the two regression equations are the mathematical communication skills of the experimental class and the linear control class. And after the regression equation meets the significance and linearity of the regression, the hypothesis test can be done with a t-test statistic with H_o accept criteria if t_{count} <t_{table} and accept Ha if $t_{count} \geq t_{table}$ at the level of confidence = 0.05 The test results on the level obtained t_{count} > t_{table} is 1.84> 1.6944, then H_0 is rejected and H_a is accepted.

Thus it can be concluded that there is a significant difference in the use of the inquiry learning model with conventional learning on the mathematical communication skills of students in class VII of the SMP Swasta Usia Tama on set material.

D. Conclusions

Based on the results of the research and data analysis, conclusions were obtained, namely there was a significant effecf of inquiry learning model on mathematical communication skills of students grade VII SMP Swasta Tama Lesson Year 2016/2017. This is evidenced by the results of hypothesis testing where t $_{count}$> t $_{table}$ is 1.84 > 1.694.

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