Effect of Learning Model on Location of School Student Mathematical Communication Skills

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Abstract
The purpose of this study is to determine: (1) The effect of the learning model to the students' mathematical communication skills, (2) Effect of location of the school on students' mathematical communication skills, (3) The interaction between the learning model and the location of the school on students' mathematical communication. The study population was ten schools in the city of Medan and ten schools in the area Rantauprapat 2018/2019 school year. The research sample is taken two classes selected. Other research instrument used was a test of mathematical communication kemapuan Shiva. Data were analyzed by Anova two lanes. The results of this research show that: (1) There is a learning model influence on students 'mathematical communication skills, (2) influences of the location of the school on students' mathematical communication skills,
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1. PRELIMINARY

Mathematics with various roles it as science is very important, and one role of mathematics is as help students think for delivering students understand math concepts being studied.

Learning mathematics dijenjang primary and secondary education is to prepare students to be able to face the changing circumstances in the life of the ever-evolving world, through the practice of acting on the basis of thinking logically, rationally, critically, careful, honest, efficient and effective.

National Research Council (NRC) (1989) of the United States has stated: "Mathematics is the key to opportunity." Mathematics is the key to the direction chances of success. For a student to learn success will open the door a brilliant career. For citizens, the math will support appropriate decision making, and for a country, the math will prepare its citizens to compete and compete in the field of economics and technology. So it concluded that: "Mathematics is a science of patterns and order." That is, mathematics is a science that addresses the pattern or regularity (pattern) and levels (order).

Math is very important that the title of queen of science. As a queen she was serving the king (in this case science). This means that all require knowledge of mathematics. NCTM (in Adhar, 2012: 2) sets of five standard mathematical ability to be possessed by the students, the ability of problem solving (problem solving), mathematical communication (communication), the ability of the connection (connection), reasoning (reasoning), and the ability of representation (representation). Of the five standard mathematical ability NCTM described the mathematical communication skills including the inside of the highlights of this research.

In mathematics, a student who was able to communicate what he had seen, that such understanding through problem-based learning can be understood by others. Students can improve mathematical understanding to communicate mathematical ideas to the lain.yang facing humanity, a way of using the information. Using knowledge of the counting, and most importantly, to the man's own self to see and use the relationships (Hasratuddin (2015: 28)), in addition to mathematics is also a contributing factor in the pace of development and competition in various fields. In accordance also proposed by the National Research Council (NRC, 1989: 1) states: " Mathematic is the key to oppurtunity, " mathematics is the key towards the chances of success.

A teacher in developing communication skills in students is not easy, but it should not be quick to give up because somebody in order to understand how to communicate well is determined by the environment in which it lives. Mathematical communication skills is a prerequisite to solve the problem (Hasratuddin 2015: 116). In line with the proposed Baroody (1993: 99) mentions sedikitnhya there are two important reasons, mengappa communication in mathematics needs to be owned by the students. First, mathematic as language, meaning that mathematics is not just a tool to think (a tool aid thinking), tools to find patterns, resolve problems or draw conclusions, but mathematics as well as a valuable tool to communicate ideas in a clear, precise and meticulous , Second, mathematics learning as a social activity; meaning as a social activity in mathematics, mathematics as well as a vehicle for interaction among students and between teachers and students kounikasi.

Mathematics communication needs to be a focus of attention in the study of mathematics, because through communication students can organize and consolidate mathematical thinking (NCTM, 2000a), and students can explore mathematical ideas (NCTM, 2000b). Also according to Atkins (in Umar, 2012: 3) verbal communication mathematics (mathematical conversation) is a tool to measure improvements in student understanding, enabling

students to learn to construct mathematical understanding of other students and gives students the opportunity to reflect on their math understanding. Through communication, someone will be able to express ideas, findings or even feelings of others.

2. LITERATURE REVIEW
2.1 Nature of Learning Mathematics
Learning can simply be interpreted as an attempt to influence the emotional, intellectual, and spiritual someone to learn at his own will (Nata, 2009: 85). Learning in humans occurs from birth until leaving this world. Walker (in Riyanto, 2009: 5) which states that

According Wulan (2012: 5), learning is programmed activities of teachers in instructional design, to make learners active learning that emphasizes the provision of learning resources. Meanwhile, according to Sagala (2009: 62) learning as a learning process built by teachers to develop creative thinking can improve thinking ability of students to improve the ability to construct new knowledge in an effort to improve a good mastery of the subject matter.

2.2 Interaction
The interaction comes from the word inter (between) and action (activity), so that interaction is a reciprocal activity. Kerlinger (2006: 398) states that, "Interaction is a collaboration of two or more independent variables to affect the dependent variable".

According Minium, King & Bear and Ruseffendi (in maulana, 2016: 236) interaction is defined as a: a) the combined effect between the two dependent variables, b) the combined effects between independent variables and control variables on the dependent variable, c) the combined effect between the two factor to influence the dependent variable that is different at each level.

2.3 Problem Based Learning Model
Nurhadi (2004) said the problem-based learning is a teaching that uses real-world problems as a context for students to learn about critical thinking and problem solving skills, as well as to acquire knowledge and essential concept of the subject matter. According to Dewey (in Trianto 2009) "learning by problem is the interaction between stimulus and response, is a two-way relationship between learning and the environment". Environment provide feedback to students in the form of aid and problems, while the nervous system of the brain function effectively interpret the aid so that the problems encountered can be investigated, assessed, analyzed, and sought to solve well. Arends (2000) explain the meaning of problem-based learning are:

> "Problem-based instruction Strives to help student Become independent and autonoumous learner. Book by teacher who repeatelly encourage and reward them for asking question and seeking solutions to real problems on their own. Student learn to perform a task indenpedently Reviews These late in life. "

According to Dewey (in Trianto, 2011: 91). "Learning by problem is the interaction between the stimulus response, a two-way relationship between learning and the environment ". The environment gives feedback to the student in the form of aid and problems, while the nervous system of the brain function effectively interpret the aid so that the problems encountered can be investigated, assessed, analyzed and sought to solve well.

2.4 Application of Problem Based Learning
Problem-based learning is not designed to help teachers provide as much information to the learners. Problem-based learning is developed to help learners develop their intellectual abilities, thinking skills, and problem solving that learners encounter in everyday life.

According to Ibrahim (in Trianto, 2010: 97), the role of the teacher in the classroom by using problem based learning strategies include the following:
a. Asking problem or orient students to authentic problems, namely the problem of real life everyday;
b. Facilitate / lead investigation example observe or perform experiments / trials;
c. Facilitate student dialogue; and
d. Support student learning.

2.5 Discovery Learning
Joyce and Weil in (Rusman, 2012: 132) states that the learning model is a plan or pattern that can are used to form the curriculum (long-term learning plan), designing materials - learning materials, and guiding learning in the classroom or the other.

Discovery learning model is derived from the discovery that means finding. Saefuddin (2014: 556) defines that the discovery learning model is a learning process that occurs when students are not presented in its final form, but through the process of finding. Students are expected to organize their own learning experience.

3. RESEARCH METHODS

This study was conducted in ten (10) school in Newbury (SMP Negeri 1 Rantau North Junior High School 2 Rantau North, SMP Negeri 3 Rantau North, SMP Negeri 1 Rantau South Junior High School 2 Rantau South, Junior Private Bhayangkari, Junior Private Catholic, Junior Private Methodist 1, Junior Private Methodist 2, Junior Private Local Government) and ten (10) school in Medan (SMP Negeri 17 Medan, SMP Negeri 27 Medan, SMP Negeri 35 Medan, SMP Negeri 12 Medan, SMP Negeri 13 Medan, Junior Private love Culture Terrain, Private SMP Methodist 9 Medan, Private junior Christian Methodist Romal Best Terrain, Junior Private Planting hope Medan, Medan Dharma Wiyata Private SMP). Implementation will be done in the form of learning activities that are tailored to the education calendar as many as four meetings, three meetings for the implementation of learning and one meeting to posttest.

3.1 Research Design

The method used is an experimental method that the research methods used to find a specific treatment effect against the other in a runaway condition (Sugiono, 2015: 107).

Variance analysis can be extended to issues / cases involving two variables. If a lot of the same population for eachcombinations of possible categories (one category and each variable), the experiment is called a factorial experiment. In this analysis can test hypotheses about differences between categories in the variables in the variable A or B. If the observations for each combination of more categories and one, can also hypothesis test for a population mean the interaction between the variables category A and category B. variables

Table 3.2 Research Design

Var A		V ariabel B	
		X_1	X_2
	Y_1	$X_1 Y_1$	$X_2 Y_1$
	Y_2	$X_1 Y_2$	$X_2 Y_2$

(Modification: Sugiyono, 2012)

Information:

X_1 = PBL learning model to communication

X_2 = Model Discovery learning to communication

Y_1 = Location provincial schools

Y_2 = School area

4. RESULTS

4.1 Hypothesis testing 1,2, and 3

The first hypothesis that to be tested is there a difference mathematical communication skills students acquire learning Problem Based Learning by teaching students who obtain Discovery Learning.

Statistical Hypothesis 1:

$H_0 = \propto_1 = \propto_2 = 0$

$H_1 = one\ less\ \ \propto_i \neq 0$

Information :

: Mathematical communication skills to influence learning model.$\propto_1, \propto_2$

Hasil ANOVA two-lane calculation can be found in Appendix .... and a summary of the results can be seen in Table 4:15.

Table 4.1 Calculation Results Anova Two Line Data Communications Post-test Mathematical Ability Students

Source Variance	JK	db	RJK	Fcount	Ftable ($\alpha = 0.05$)
Learning (A)	739.160	1	739.160	5.297	5.286
Layout Area (B)	1771.906	1	1771.906	12.698	5.286
Learning * Layout Area (AB)	1195.729	1	1195.729	8.569	5.286
In	8372.794	60	139.546		
Total	12079.589	63			

Berdasarkan Table 4.11 for the calculation of the learning model (A) obtained value of F (A) of 5.297.

Because of F (A) is greater than the value Ftabelα= 0.05 is 5.297> 5.286, H0 is rejected. That is a significant difference between the learning model to the students' mathematical communication skills.

The second hypothesis to be tested is the location of the school there is an influence on students' mathematical communication skills:

Statistical Hypothesis 2:
$H_0 = \beta_1 = \beta_2 = 0$
$H_1 = one\ less\ \beta_j \neq 0$

Description: influence on the location of the school students' mathematical communication skills.β_1, β_2

Based on Table 4:15 for the calculation of inter Layout Area (B) obtained value Fhitung (B) amounting to 12.698. Because of F (B) is greater than the value Ftabelα= 0.05 is 12.698> 5.286 H0 was rejected. That is a significant difference between the location of the school on students' mathematical communication skills.

The third hypothesis to be tested is contained inetraksi between learning model on the ability of communication based on the location of the location (Medan and Rantauprapat) school students.

Statistical Hypothesis 3:
$H0$: $(\propto \beta)_{ij} = 0,\ i = 1,2;\ j = 1,2$
Ha: At least one $(\propto \beta)_{ij} \neq 0,\ i = 1,2;\ j = 1,2,$
Information:
$(\propto \beta)_{ij}$Interactions betweenlearning model of the communication ability based on the location of the school,

Table 4:15, for the calculation of learning model of the communication ability based on the location of the school found that the value of F $(_{AB})$amounting to 8.569. Because of F (AB) is greater than the value Ftable α= 0.05 is 8.569> 5.286, then H0 is rejected. This means that therethe interaction between learning model of the communication ability based on the location of the school,

Results of testing the hypothesis 1, 2 and 3 was also confirmed by using SPSS 20, with the testing criteria if the value of 0.05 then rejected. Test Results Anava two lines of the data post-test students' mathematical communication skills using SPSS 22 can be seen in Table 4.16.$< H_0$

Table 4:16 Calculation Test Anova Two Line Data Communications Post-test Mathematical Ability Students
Tests of Between-Subjects Effects
Dependent Variable: Mathematical Communications Capabilities

source	Type III Sum of Squares	df	mean Square	F	Sig.
corrected Model	3706.796a	3	1235.599	8854	.000
intercept	346947.687	1	346947.687	2486.250	.000
Learning model	858 230	1	858 230	6,150	.016
layout Area	1771.906	1	1771.906	12 698	.001
Model_pembelajaran * Layout Area	1195.730	1	1195.730	8569	.005
Error	8372.794	60	139 547		
Total	363506.250	64			
corrected Total	12079.590	63			

a.   R Squared = .307 (Adjusted R Squared = .272)

Based on the results in Table 4:16 ANOVA information can be obtained as follows:
● Corrected Model, tested to see the effect of all independent variables (learning, location of the location, and the location of the location of learning *) on the dependent variable (matemaatis communication skills of students). It can be seen that the significance value is 0.000, it means that all independent variables affect the ability of students' mathematical communication.
● Intercept, tested to see if the average of students' mathematical communication ability is not equal to zero. In other words, the value changes in students' mathematical communication capabilities without the influence of the independent variables. The statistical model of the design of this study are:
$$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk};\ with$$
$$i = 1,2;\ j = 1,2;\ k = 1,2,3, \ldots, n,$$
On testing Intercept tested is that the average value of the post-test.μ
● The learning model, tested to see the effect of mathematical communication skills based learning (Problem Based Learning and Discovery Learning), denoted as. From Table 4:16 shows that the significant value of the learning model 0016 is smaller than the value of sig. 0.05 then rejected and accepted. So it can be concluded that there are differences in mathematical communication skills of students who received Probelem learning

Based Learning and Discovery Learning models.$\alpha H_0 H_a$

● Layout Location, tested to see the effect of mathematical communication ability Siwa based on where the location, denoted as. From Table 4:16 shows that the value of the significance lies less than 0,001 locations sig. 0,005 will be rejected and accepted, which means that there are significant mathematical communication abilities of students based on where the location of the school in Medan and Rantauprapat.$\beta H_0 H_a$

● * Layout Area Learning Model School, tested to see the effect of the interaction of the learning model and the location of the location of the school on students' mathematical communication skills, denoted as αβ. From Table 4.16 shows that the significant value of the learning model learning models * lies the 0,005 school locations smaller than the sig. 0.05 will be rejected and accepted, which means that there are significant interactions between the learning model and the location of the location of the school on students' mathematical communication skills. It also means that the difference between the average value of students' mathematical communication skills with the location of the school location (Medan and Rantauprapat) who acquire learning Problem Based Learning different significance to the students who received Dicovery learning model Learning. In the graph,$H_0 H_a$
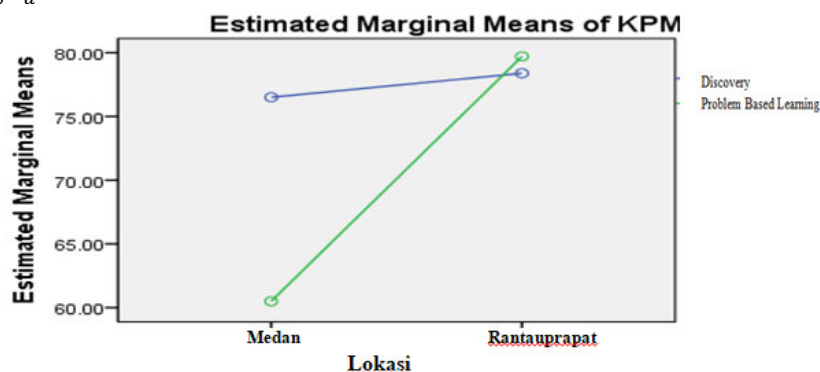

Figure 4.5 Graph Interaction between the layout of Area Learning Communication Skills Mathematical School to Students

Based on Figure 4.5 indicates that the learning model of problem based learning, the average value of the post-test students' communication abilities in the area of Medan lower than the students in the area Rantauprapat. And the Discovery Learning learning model, the average value of the post-test students' mathematical communication skills in the area of Medan lower than the students in the area Rantauprapat. When viewed from the difference between the average value of learning a second post-test, for the difference in the average number of students in the city field is 16.00 while the average difference between students who were in Korta Rantauprapat is 1.32. This means that the difference between the average value of students' mathematical communication skills with the location of the school location is in Medan and Rantauprapat between the gain learning Problem Based Learning and Discovery Learning quite different. This can be seen in Figure 4.5 that the graph model of learning Problem Based Learning is not parallel and intersect with the learning graph Discovery Learning which means suspected effect interaction. Thus we can conclude there are significant interactions between the learning model (Problem-based Learning and Discovery Learning) with the location of the location of the school on students' mathematical communication skills. 5 that the graph model of learning Problem Based Learning is not parallel and intersect with the learning graph Discovery Learning which means suspected effect interaction. Thus we can conclude there are significant interactions between the learning model (Problem-based Learning and Discovery Learning) with the location of the location of the school on students' mathematical communication skills. 5 that the graph model of learning Problem Based Learning is not parallel and intersect with the learning graph Discovery Learning which means suspected effect interaction. Thus we can conclude there are significant interactions between the learning model (Problem-based Learning and Discovery Learning) with the location of the location of the school on students' mathematical communication skills.

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