Analysis Effectiveness of Using Problem Posing Model in Mathematical Learning

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Abstract

This study aims to determine whether the learning using Problem Posing model effective in grade XI students viewed from Student's Completeness, Achievement of Special Learning Objectives. And reciprocal relationships between teachers and students. The sample in this study is the students of class XI-TKR I which consists of 37 people. Instrument research in the form of test questions, observation sheets for student activities and teacher ability, and questionnaires for student responses. From the results of research that has been done, the percentage of learning mastery in the classical test at the first test of 40.54% and in the second test obtained results of 89.19%. Analysis of percentage results for teachers' ability with the first Problem Posing model of 67.71% and the second observation of 82.29%. For the results of the calculation of percentage analysis of student activity in learning on the first observation was obtained at 51.16% and on the second observation result of 75.87%. For the results of calculation analysis of student responses in learning with Problem Posing model that is equal to 82.03%. So it can be concluded that the learning model using Problem Posing is effective in students SMKN 2 Medan Lesson 2016/2017.

Keywords: effectiveness; problem posing; mathematical learning.

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1. Introduction

Mathematics is one of the most important branches of science. According to [1] "Students need to learn math because of its importance in everyday life". In addition, mathematics is also very necessary for students to learn and understand other subjects, but in fact many students feel less interested in the subjects of mathematics. According to [2] "Mathematics is generally not preferred as it is seen as a difficult and boring subject ". So many students have difficulty in learning mathematics, especially in understanding the concept which is the basic understanding.

From the results of interviews to teachers of mathematics in schools, obtained data on learning outcomes is the average value of 65, While the minimum completeness criteria to be achieved is 71, So it can be said the average value of students do not reach the minimum mastery criteria so that learning outcomes are not in accordance with what Which teachers expect, that is, the value that students get below the average. Thus the expected learning objectives do not match what is expected. Learning is said to be effective when achieving the desired goals, both in terms of learning objectives and student achievement is maximized.. According to [3] "he level of individual motivation interacts with learning affects their time, and connects the experiences that will arise that most of the positive impacts have on effectiveness while   According to [4] "Effectiveness is the level of achievement of a predetermined goal ". As for the indicators of effectiveness in learning are: (1) Student learning completeness, complete if the students achieve a score of 65% and above and classically achieve the score of 85% and above (2) Achievement of Special Learning Objectives (TPK). And (3) Reciprocal Relationships between teachers and students.

Some causes of low learning outcomes include the lack of effective use of the Model by the teacher, the student does not pay attention to the teacher explains the subject that is delivered, when the lesson takes place, the teacher at the beginning of the lesson does not perform apperception, the teacher directly writes the material on the blackboard, then the students are told to record , After the teacher finished reading the material on the board. At the time the teacher read the material many students who do not notice even there are students who fall asleep. According to Babar [5] "If the math teacher has knowledge of the subject matter and does not know how to transfer effective knowledge to the students, then it cannot effectively teach mathematics. Effective mathematics teaching demands a perfect relationship between subject knowledge and delivery to students ", whereas According to Perry [6] "Two criteria of teaching effectiveness are the desired learning outcomes in the learning and learning processes they expect ". So it needs to apply learning techniques to stimulate students to be active, creative and innovative in following the learning activities and can find the results by itself.

One alternative model of learning that can be used in learning mathematics is the problem posing. According to [7], "*Problem posing can give one a chance to develop independent thinking processes*".. The problem here is certainly a problem in mathematics. Reference [8]argued that by examining the "Problem Posing Approach" students tend to be innovative, skilled and knowledgeable in problem solvers. According to [9] Arguing that the benefits of problem formation changed the way traditional math learning became a guide for generating questions from a number of diverse imaginative ideas endless. Reference [10] Found that when teachers with problem posing interventions, the classroom became more centered on students and students more actively

involved in creating and solving their own problems. On the other hand, problem posing gives students ownership of problems that have been produced or formulated [11]. Reference [12] States that when students create new problems, they increase a sense of responsibility because they build their own knowledge in critiquing and refining problems with classmates.

2. Methods

Research location at SMKN 2 Medan, this study was conducted in a structured and systematic manner in the odd semester of the academic year 2016/2017. In this study the population is the students of class XI. The sample of this research is the students of class XI TKR 1 which amounts to 37 people. This research variable is independent variable (X) that is effectiveness model of problem posing. Data collection using 3 instrument tool that is:

I.   The test result of learning in the form of a description of 5 questions.

Lattice test result of learning on linear program material can be seen in table 1 below:

Table 1: Grid Test Resulting Mathematics Learning Linear Program Content

No.	Submaterials	Classification				Total Score
		C1	C2	C3	C4	
1	Change the story (verbal sentence) into a mathematical sentence.	1,2	3,4,5			5
2	Determining the completion area of the mathematical sentence.		6,7	8 ,9,10		5
Total Score		**2**	**5**	**3**		**10**

Information: C1 = Knowledge   C3 = Application

               C2 = Understanding   C4 = Analysis

II.   Observation here is an observation on the subject of research conducted to determine the activities of teachers and students in the process of teaching and learning activities.

Grid grating teacher activity observation in learning using problem posing on linear program material can be seen in table 2 following.

Grid lattice observation of student activity in learning using problem posing on linear program material can be seen in table 2 this follow.

Table 2: Master's Observation Grid

No.	Indicator	Activities observed	
1.	Achievement opens lessons	1.	Opening the lesson
		2.	Explain the purpose of learning
		3.	Provide motivation
2.	Presentation of Material	1.	Mastering Materials
		2.	Presentation clearly
		3.	Systematic presentation
3.	Managing the Learning Time and Model	1.	Managing Time and Learning Model
		2.	Provide the necessary teaching aids
		3.	Using time and learning effectively and efficiently
		4.	Using the Problem Posing model according to the indicator
		5.	Problem Posing model is used systematically
		6.	Using learning media in accordance with learning objectives
4.	Class management	1.	Attempts to discipline students
		2.	Involving students in question and answer
		3.	Organize the physical class
5.	Communication with students	1.	Provide questions clearly and briefly
		2.	Giving of thought time
		3.	Motivate students to ask questions
		4.	Respond to student inquiries
6.	Conducting Evaluation	1.	Give praise to students who answer the questions nicely
		2.	Ask students to do their own work without the help of others.
		3.	Providing motivation to students who still have not answered the problem well
7.	Closes Learning	1.	Summarize and draw conclusions from the content of the lesson.
		2.	Provide homework and plan follow-up.

Table 3: Grid Observing Student Activity

No	Indicator
1	Listening to explanations and questions from the teacher
2	Enthusiastic and enthusiastic to follow the lesson
3	Ask the teacher and friends about the materials covered
4	Actively speaking in group discussions on the subject matter
5	Able to make images according to the questions given from the teacher
6	Provide positive responses to friends' answers
7	Students make a summary of the material learned

III. Questionnaires in this study aims to find out how much student response to mathematics lessons, especially in linear program materials using problem posing model.

In data analysis techniques used to determine students' learning completeness used the test instrument of student learning outcomes obtained from the work of students in doing the exercises given by teachers. The formula for calculating students' learning mastery is:

$$\text{KB} = \frac{T}{Tt} \times 100\%$$

(1)

Where :

KB = Mastery learning

T = Number of scores obtained by the students

Tt = Total score

From the results of observations that have been done researchers, conducted analyzer by using the formula:

$$P_i = \frac{\text{The total number of aspects observed}}{\text{Many aspects are observed}}$$

(2)

Where : P_i = Observations at the meeting to-i

3. Result of The Research

For classical learning completeness obtained by the percentage of classical mastery (PKK) on the first test by using problem posing model of 40.54% or as many as 15 people who get the value of ≥ 70 and the second test of 89.19% or as many as 33 students who obtained Value ≥ 70. So the completeness of student learning by classical using Problem Posing model on Linear Program material has been fulfilled and has been completed. Values obtained by comparing the number of students who have been said to complete learning ≥ 70 divided by the total amount. Can be seen from Figure 4.1 below:
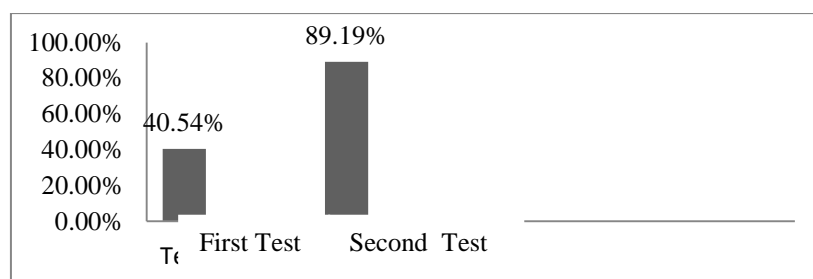

Figure 1: Completed Learning at First and Second Test

The result of the calculation of percentage of student activity in learning can be seen from the observation result at appendix 15 and appendix 16. Percentage effectiveness of student activity in learning at first observation is 51,16% and second observation is 75,87%. For more details can be seen in the picture below:
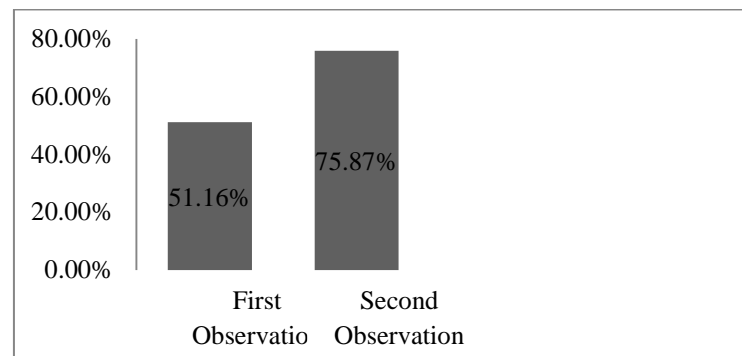

Figure 2: Percentage of Student Activity in Learning Per Observation

Based on the data and images above, student activity in learning has good category in math lesson. So it can be said that the learning of mathematics by using Problem Posing model effective in this research.

The result of percentage analysis on teacher observation in processing of learning can be seen from the result of observation in appendix 17 and appendix 18. The percentage of a teacher's ability to process learning in mathematics with Problem Posing model at first observation is 67,71% and second observation is 82,29%. For more details can be seen in the picture below:
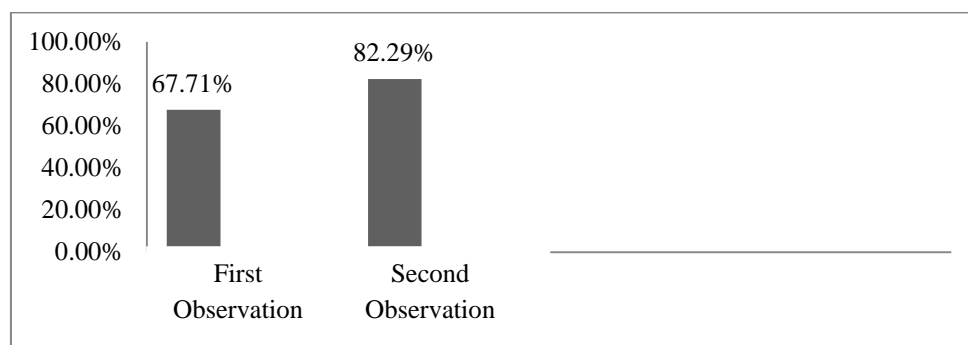

Figure 3: Percentage of Teachers' Ability to Teach at Any Observation

Based on the data and images above, the criteria set included into the category very well in processing learning. Factors that are supportive to the quality of learning model Problem Posing is the availability of good teaching materials and can be understood students on the subject linear program. The result of students' individual or classical completeness level on linear program material using problem posing model is good, has been fulfilled, and complete. If the effectiveness factors are fulfilled seen from the mastery of students using problem posing model in learning mathematics is very good, it can be said that the quality of a mathematics learning has been achieved and effective.

Analysis of the calculation of the level of interest of students to the Problem Posing model in the mathematics lesson can be seen from the results of the questionnaire calculation. The level of interest of students in learning with Problem Posing model of 82.03% and the criteria set included in the category agreed to the use of Problem Posing model in learning mathematics.

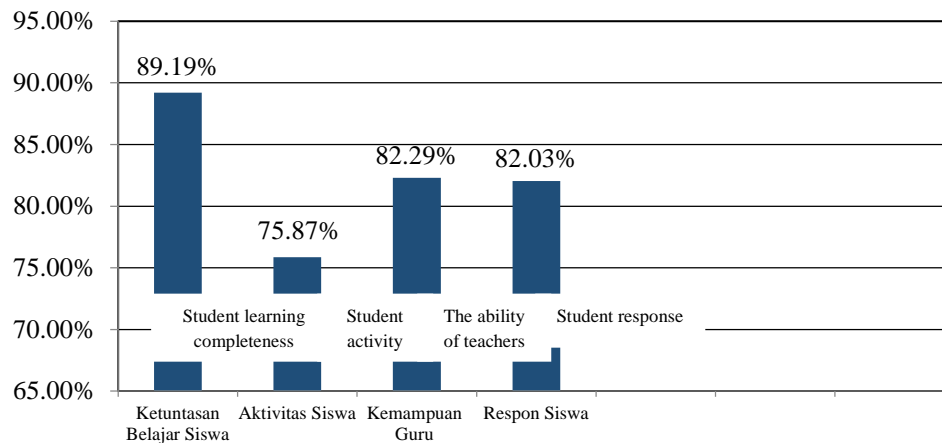From the description and analysis of all data above can be seen by using the picture below:

Figure 4: Results Description and Analysis of Research Effectiveness Problem Posing Model

4. Discussions

Overall, what we want to know in this research is to see how the effectiveness of using problem posing model in mathematics learning. According to Killpatrick and his colleagues [13], one of the cognitive foundations in problem posing is the association of students' tendency to use the first response as a foothold to ask the second, third, and so forth. Furthermore, According to [14] in Problem posing activity, when there is an association process between new information with cognitive structure owned by someone, then the next process that happened is assimilation and accommodation process.

The use of *problem posing* model is effective in students of class XI-TKR 1 especially in linear program material because the achievement of effectiveness indicator with the result of student learning completeness percentage 89.19%, student activity 75.87%, teacher ability 82,29% and student response 82,03%.

Bruner considers that studying discovery is in accordance with the active search for knowledge by humans and by itself gives the best result. Trying to solve the problem and the accompanying knowledge, produce the knowledge that is really meaningful. The results of this study are in line with the theory of According to Piaget, cognitive development largely depends on how far the child actively manipulate and actively interact with the environment.

In addition, this study is also supported by research conducted [15], which states that the learning Problem Posing is effectively viewed from the creative thinking skills of students. This is also shown by the results of

Handayani research [16] that the use of effective problem posing model of learning outcomes.

5. Conclusions

Based on the description of research results can be concluded that the learning model using problem posing effective in students class XI-TKR 1, especially on linear program materials. This statement can be seen from the achievement of effectiveness indicator based on the percentage of the student's grade and the average grade of the students on the material presented and based on the observation sheet of the students activity and the teacher activity which is the reciprocal relationship between the teacher and the student.

6. Suggestions

Some suggestions that need to be submitted are teachers should know and learn the appropriate model of learning and effective in learning mathematics students. Therefore, teachers should be more creative and active to follow various training (workshop) about learning model one of them is model problem posing. For the next researcher who want to research more about this problem posing model of learning, to pay more attention to the weaknesses in this learning so that can be obtained better result.

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