THE EFFECTIVENESS OF MODEL-ELICITING ACTIVITIES (MEAS) APPROACH TOWARD STUDENTS MATHEMATICS LEARNING OUTCOMES

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ABSTRACT

Monotonous and teacher-centered learning makes students passive and lacks the courage to express opinions in teaching and learning activities. Therefore, an appropriate model is needed to encourage student activeness, which is with model-eliciting activities. This study aims to determine whether there is a difference between learning by using model-eliciting activities and traditional class models. This model is more effective between the two models of the learning model on student learning outcomes. The population in this study consisted of class VII Muhammadiyah Junior High School Banguntapan (SMP Muhammadiyah Banguntapan), which consists of five classes. A sample of 2 classes with the number of 60 students was taken by purposive technique and obtained class VII C as the experimental class and class VII D as control class. The research instrument is a problem-solving test with data analysis using a two-part hypothesis test and a one-party hypothesis test. The results of a hypothesis test of the experimental class with a significant level of 5% and df=58 showed that: (1) There was a difference between students' problem-solving abilities using learning model eliciting activities with problem-solving skills of students learning using traditional class models and (2) eliciting activities model more effectively than traditional class models of problem-solving abilities.

Keywords: Effectiveness, Model-Eliciting Activities, Result of learning.

INTRODUCTION

At present we are living in modern times, which is very easy to be practical. The ease is obtained because of the existence of science and technology, which is increasingly advanced and developing rapidly. This situation forces us to take part in it. Therefore it is necessary to provide knowledge in the form of knowledge that can be obtained through education. In connection with this research, the intended education is formal education in schools. Based on Law Number 20 of 2003 article 1 paragraph 1, education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have spiritual, religious, self-control, personality, intelligence, noble character and the skills needed by himself, the community, the nation, and the State. Mathematics is a general subject that is always there and is taught at every level of education. This is because mathematics is the base of all science. All science requires mathematics as a basic science that must be mastered by students. However, often most students assume that mathematics is a frightening and challenging subject.

Based on interviews with mathematics subject teachers at SMP Muhammadiyah Banguntapan on December 6, 2016, information was obtained that in learning activities, teachers usually use traditional or conventional learning models. The teacher said that student mathematics learning outcomes are still low. This can be seen from the average value of the odd semester midterm 2016/2017 school year. Based on these data, the selection of learning models needs to be done to improve student mathematics learning outcomes. Because the learning model used by the teacher is very influential on the effectiveness of learning. Lefrancois, in Basleman, Anisah, and Syamsu, Mappa (2011: 7-9) argue that learning is a change in behavior that results from experience. Thus learning outcomes are results that are the result of changes in behavior that result from experience. Because student mathematics learning outcomes are still low, in this study, researchers intend to offer learning models to overcome this. The intended learning model is Model-Eliciting Activities.

According to Alfidah, Setiasih (2013: 33), MEAs are a mathematical learning model for understanding, explaining, and communicating mathematical concepts contained in a problem presentation through mathematical modelers. Model-Eliciting Activities aim to encourage students to be able to make mathematical models to solve complex problems. So as such, it will help improve student learning outcomes in mathematics. The learning steps used in the modeling activities are:

1) The teacher gives an introduction to the material.
2) The teacher presents examples of problems related to the material presented.
3) Students are grouped with 3-4 members in each group.
4) The teacher gives a Model-Eliciting Activities problem sheet in the form of a Student Activity Sheet.
5) Students are ready for questions based on the problem.
6) The teacher reads the problem with the students and ensures that each group understands what is being asked.
7) Students try to solve the problem.
8) Students present their mathematical models after discussing and reviewing solutions.

While the learning steps used in the traditional classes model are as follows:

1) The teacher gives an introduction to the material.
2) Students ask if there are things that are not yet understood.
3) The teacher checks whether students understand or not.
4) Students take notes and sample questions that have been explained by the teacher.
5) The teacher presents examples of problems regarding the material presented.
6) The teacher gives the problem of independent practice.
7) Students work on independent practice questions.
8) The teacher gives daily assignments that will be collected at upcoming meetings.

Also, learning with Model-Eliciting Activities (MEAs) can help students explore creativity in making mathematical models of a real problem and encourage students to participate during the learning process actively. Thus, students are expected not to feel bored, to improve student learning outcomes in mathematics. The results of a study conducted by Dewi, Ayu Trisna (2015) showed that learning using the eliciting activities model was more effective than learning using the STAD type cooperative learning model of mathematics learning outcomes for students of class XI IPA in the odd semester of MAN Sabdodadi in the 2015/2016 academic year. Based on the description above, it is hoped that Model-Eliciting Activities can improve student mathematics learning outcomes. Therefore, the author intends to conduct a study entitled Effectiveness of Model-Eliciting Activities (MEAs) on the Mathematics Learning Outcomes of Class VII Students of SMP Muhamadiyah Banguntapan on Quadrilateral Material.

The objectives to be achieved in this study are:

1) To find out whether or not there is a difference between student learning outcomes in mathematics using the model of eliciting activities and problem-solving abilities of students who use the traditional classes model.
2) To discover which learning is more effective between model-eliciting activities and model-traditional classes on mathematics learning outcomes for Grade VII students of SMP Muhammadiyah Banguntapan on Quadrilateral.

METHODS

This study is an experimental study with two independent variables: the model-eliciting activities and the traditional classes model and one dependent variable, the results of learning mathematics. The sampling technique in this study is the nonequivalent control group design. According to Sugiyono (2015: 116), this design is almost the same as the pretest-posttest control group design. Only in this design, the experimental group and the control group were not randomly chosen. The implementation of this research was located at SMP Muhammadiyah Banguntapan in the even

semester of the 2016/2017 school year. For approximately 14 days. The population in this study was seventh-grade students of the even semester of SMP Muhammadiyah Banguntapan. Sampling in this study was carried out persuasively by taking into account the advice of the mathematics teacher in SMP Muhammadiyah Banguntapan selected class C as an experimental class and class D as a control class. The number of students for the experimental class and control class was 30 students each. Data collection techniques used in this study were tests. The test is the pretest given before being given treatment to the control class and the experimental class and posttest after being treated with a different learning model. Test the validity of the test is done using the content validity of Purwanto (2008: 120) in consultation with material experts.

At the beginning of the meeting, students were given contextual questions in the form of the pretest. It aims to measure student learning outcomes before being given treatment by using a different learning model. Furthermore, to find out whether the data are typically distributed, homogeneous and whether there is a difference or not between the initial abilities of students, then the normality test (Sudjana, 2002: 273), homogeneity test (Sudjana, 2002: 263), and hypothesis testing of two parties (Sudjana, 2002: 239) on the pretest value data. After testing, it was concluded that the pretest value data were normally distributed, homogeneous, and there were no differences in initial ability between the two classes. The next step is giving different treatment to the control class and the experimental class. The control class is treated using the traditional classes model, while the experimental class uses model-activities activities. After giving treatment using different learning models in the two classes with the intensity of the meeting as much as three times face-to-face, the next posttest is given to find out the results of learning mathematics from both classes. Posttest value data were tested using a normality test, homogeneity test, two-party hypothesis test, and one-party hypothesis test.

RESULTS AND DISCUSSION

The normality test results of the pretest value are obtained in the experimental class $\chi^2{}_{\text{count}} = 0.3445$ and $\chi^2{}_{\text{table}} = 11.0705$. While in the control class obtained $\chi^2{}_{\text{count}} = 0.7104$ and $\chi^2{}_{\text{table}} = 11.0705$. The calculation results show that the pretest value data in the experimental and control classes are typically distributed. Then the homogeneity test of the pretest value data is done in the experimental class and the control class. Homogeneity test results obtained in the pretest value of the experimental class and class control obtained $\chi^2{}_{\text{count}} = 0.2814$ and $\chi^2{}_{\text{table}} = 3.8415$. These calculations indicate that the pretest value data in the experimental class and the control class are homogeneous. Furthermore, the two-party hypothesis test of pretest value data in the experimental class and the control class was conducted to determine whether there were differences between students' initial abilities in the control class and the experimental class.

In testing the two-party hypothesis, the pretest value obtained is $t_{\text{count}} = -0.6714$ and $t_{\text{table}} = 2.0024$, then H_0 is accepted, and H_1 is rejected. So it can be concluded that there is no difference between the pretest value of mathematics learning outcomes of experimental class students (VII C) and control class students (VII D). The results of the normality test posttest values obtained in the experimental class $\chi^2{}_{\text{count}} = 3.0626$ and $\chi^2{}_{\text{table}} = 11.0705$. While in the control class obtained $\chi^2{}_{\text{count}} = 0.7856$ and $\chi^2{}_{\text{table}} = 11.0705$. The calculation results show that the posttest value data in the experimental class and the control class are normally distributed. Furthermore, the homogeneity test of the posttest value data was carried out in the experimental class and the control class.

Homogeneity test results posttest values obtained in the experimental class and class control obtained $\chi^2{}_{\text{count}} = 0.0810$ and $\chi^2{}_{\text{tabel}} = 3.8415$. The results of these calculations indicate that the posttest value data in the experimental class and the control class are homogeneous. Furthermore, the two-party hypothesis test posttest value data in the experimental class and the control class to determine whether there is a difference between the results of student mathematics learning in the control class and the experimental class.

In testing the two-party hypothesis the pretest value obtained is $t_{count} = 2.3700$ and $t_{table} = 2.0024$, then H_0 is rejected, and H_1 is accepted. So it can be concluded that there is a difference between the posttest value data of students' learning outcomes in the experimental class (VII C) and the control class students (VII D). Furthermore, the one-party hypothesis test of the posttest value data in the experimental class and the control class to determine whether the mathematics learning outcomes of students who use model-eliciting activities is more effective when compared to the results of learning mathematics students who use the traditional classes model or not. Hypothesis test results of the two parties pretest value obtained $t_{count} = 2.3700$ and $t_{table} = 1.6719$, then H_0 is rejected, and H_1 is accepted. So it can be concluded that the model-eliciting activities are more effective than the traditional classes model of mathematics learning outcomes for seventh-grade students of the even semester of SMP Muhammadiyah Banguntapan in the 2016/2017 school year.

In this study, researchers applied two learning models, namely the eliciting activities model and the traditional classes model, each applied to the experimental class (VII C) and the control class (VII D). The number of students in each sample class is 30 (a list of student names can be seen in annex 2.1 and annex 2.2. Learning with eliciting activities and traditional class models has been applied by each model's learning steps by the steps that have been explained in chapter II.

This study aims to find out which learning is more effective between model-eliciting activities and traditional classes models of learning outcomes in mathematics. After conducting the pretest, the average value was 28.5083 in the experimental class and 30.7350 in the control class. Then at the end of the meeting, a mathematics learning outcomes test was also conducted in the form of the posttest, and an average score of 65,7083 for the experimental class and 54,44350 for the control class was obtained. Based on these data, it can be seen that there is an increase in the average value of mathematics learning outcomes in each sample class. The researcher's initial step in processing data is to test the normality and homogeneity of the data on the pretest and posttest results of mathematics learning in each sample class. After conducting a normality test on the data of the pretest and posttest values in each sample class, it was concluded that the data were normally distributed. Then in the homogeneity test of pretest and posttest values, the conclusion is that the data is homogeneous.

To find out whether there is a difference between the experimental class and the control class, a two-party hypothesis test was performed on the mathematics learning pretest value data so that the $t_{count} = -0.6714$ and $t_{table} = 2.0024$ were obtained. Based on these results, the $-t_{table} < t_{count} < t_{table}$, which means that there is no difference between the pretest value of mathematics learning outcomes of experimental class students (VII C) and control class students (VII D). Meanwhile, to find out whether there is a difference between the eliciting activities model and the traditional classes model, a two-party hypothesis test of the posttest value of mathematics learning results is obtained so that $t_{count} = 2.3700$ and $t_{table} = 2.0024$. Based on these results, then $t_{count} > t_{table}$, which means that there is a difference between the learning outcomes of students learning mathematics using eliciting activities models with the results of learning mathematics students learning using the traditional classes model VII class even semester of SMP Muhammadiyah Banguntapan in the 2016/2017 school year. This is because there are differences in the treatment of each class sample at the time of the study.

To find out more effective learning models, the researchers conducted a one-party hypothesis test. Based on the calculations that can be seen in attachment 7.15, it is obtained $t_{count} = 2.3700$ and $t_{table} = 1.6719$. These results indicate that $t_{count} > t_{table}$, which means that the eliciting activities model is more effective than the traditional classes model of mathematics learning outcomes for seventh-grade students of the even semester of SMP Muhammadiyah Banguntapan in the 2016/2017 school year.

In learning by modeling activities, the teacher conveys material and examples of questions with interactive lectures. Then students are grouped with 3-4 members in each group. Each group of students was asked to discuss and work on the questions at the worksheet given by the teacher. The final step applied to this learning model is that student representatives in some groups are asked to present the results of their group discussions. Other groups respond to the results of the presentations delivered.

Thus, students will more readily accept explanations from the teacher. Also, this learning model will be more fun and improve the ability to work together among group members, foster self-confidence, and train students' courage in expressing opinions. Unlike the model-eliciting activities, in the traditional classes model, the teacher conveys the material and examples of questions by lecturing, and then the students are given independent question exercises. In this model, students very rarely ask or express their opinions. So this learning is monotonous and makes students bored.

Based on the description above regarding modeling activities and traditional class models, there is a difference between the two learning models. This difference causes a difference between the learning outcomes of mathematics with model activities and traditional classes. So the existence of these differences will lead to one of the more effective learning models. In this study, it was clear that the modeling activities were more effective than the traditional classes model of the mathematics learning outcomes of seventh-grade students of the even semester of SMP Muhammadiyah Banguntapan in the 2016/2017 school year. The results of this study are consistent with the results of research conducted by Dewi, Ayu Trisna (2015) which states that learning using the eliciting model activities is more effective than learning by using the STAD type cooperative learning model of mathematics learning outcomes of students in class XI IPA odd semester MAN Sabdodadi 2015/2016 school year. Thus, the researcher concludes that the use of eliciting activities models can improve problem-solving abilities. So it would be better if this model was reapplied to improve problem-solving abilities.

CONCLUSION

Based on the results of research and discussion, the following research conclusions can be drawn:

1. There is a difference in student learning outcomes in mathematics using model-eliciting activities with student mathematics learning outcomes in using traditional class models.
2. Model-eliciting activities are more effective than traditional classes models for student mathematics learning outcomes.

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