

EFFECTIVENESS OF DISCOVERY LEARNING MODEL TOWARD MATHEMATICS LEARNING OUTCOMES IN STUDENTS CLASS VII

Irma Puji Lestari^a, Uus Kusdinar^b

Program Studi Pendidikan Matematika Universitas Ahmad Dahlan
Jalan Ring Road Selatan, Tamanan, Banguntapan, Bantul, Yogyakarta

^airmaplestari@gmail.com, ^buus.kusdinar@pmat.uad.ac.id

ABSTRACT

The teacher-centered learning process of mathematics will cause students not to be actively involved in the learning process. Discovery Learning model is expected to change the learning activities of teacher-oriented into student oriented so that the effect on student learning outcomes. This study aims to determine the Discovery Learning model of mathematics learning outcomes of students of class VII SMP Muhammadiyah 2 Yogyakarta, even semester of the academic year 2016/2017. This type of research is experimental research using Posttest-Only Control Design. The research sample is class VII E as an experimental class, and class VII B as a control class was taken by cluster random sampling technique. The experimental class is the class that is treated using the Discovery Learning model, while the control class is a class that uses the direct learning model. In this study, data collection using written tests and instruments of data collection using test questions. The data obtained were analyzed using a t-test. The study results at a significant level of 5%, and degrees of freedom = 51 indicate (1) there are differences in learning outcomes between students using the Discovery Learning model, and students using direct learning models. This is shown by $t_{table} = 2,00758$, and $t_{count} = 4,24125$, so $t_{count} > t_{table}$, and (2) Discovery Learning model is more effective than learning using direct learning model. This is indicated by the value $t_{table} = 1.67528$, and $t_{count} = 4.24125$ so that $t_{count} > t_{table}$.

Keywords: effectiveness, discovery learning model, direct learning model, learning outcomes.

INTRODUCTION

Education is an important thing in the process of state development. Educational factors influence the progress or failure of a country. The quality of education means that education graduates have the appropriate abilities to make a high contribution to the country's development. The learning process mainly determines the quality of education. Learning activities are educational processes that allow students to develop their potential to become increasingly increasing capabilities (Permendikbud: 2013).

The curriculum is one element that contributes to realizing the process of developing the inherent quality of these students. The 2013 curriculum follows the basic view that knowledge cannot be transferred from teacher to student. For this reason, learning activities are no longer teacher-centered but student-centered. In learning, the teacher must use a student-centered approach. The approach that characterizes the 2013 curriculum is to use a scientific approach. The scientific approach can be delivered through a discovery-based learning model, problem-based learning, and project-based learning (As'ari: 2016).

Mathematics learning for students is not only limited to knowing or memorizing formulas, but students are expected to be able to understand mathematical concepts, use patterns as conjectures in problem-solving, and be able to make generalizations based on phenomena or existing data, communicate ideas, reasoning, and be able to compile mathematical proofs using complete sentences, symbols, tables, diagrams or other media to clarify the problem. Also, students are expected to be able to train to be human beings who are conscientious, careful, not careless, patient, and not easily discouraged. Therefore, by applying the 2013 curriculum, it is expected that the actual mathematics learning process can be achieved.

Based on the interviews conducted with one of the mathematics teachers of SMP Muhammadiyah 2 Yogyakarta on 22 October 2016. It is known that the school has implemented the 2013 curriculum, but in applying, it is still an obstacle that students can not directly engage in the active learning process. In the process of learning mathematics, teachers use method lectures and discussions. However, it is more likely to use lecture methods, which in the learning process, some students pay less attention to teacher explanation. Also, interest in learning mathematics on students is low because so far, students consider that mathematics is a tricky subject. This results in low math learning outcomes, as well. It is proven from the achievement of students in the middle semester mathematics in class VII, SMP Muhammadiyah 2 Yogyakarta, shown in table 1.

Table 1. Student Achievement Level VII SMP Muhammadiyah 2 Yogyakarta school year 2016/2017

Class	Score		Total students
	< CCM	≥ CCM	
VII A	27	1	28
VII B	24	2	26
VII C	22	4	26
VII D	17	11	28
VII E	21	6	27
VII F	20	5	25
VII G	7	20	27
Total	138	49	187
Percentage (%)	73,80	26,20	

(Source: SMP Muhammadiyah 2 Yogyakarta)

Table 1 shows that 73.8% of students have not reached the value of the CCM (minimal completeness criteria) math subjects established by the school of 76. Therefore, it is necessary to overcome these problems—teachers as an important role in learning mainly. Teachers of mathematics subjects must be able to create a learning atmosphere that is fun and active. So the math learning process does not feel annoying and stressful for students. One step to solving the problem is using the Discovery Learning model.

According to Kosasih, E (2015:83-84), The Discovery Learning model aims to transform the passive learning conditions into active and creative. They are transforming the teacher-oriented learning process into student-oriented. Changing the expository mode of students who only receive the teacher's overall information into the student mode finds themselves. So that students can gain knowledge by discovering concepts and principles through their mental process. From the process of finding slow students, thinking will always be motivated to learn so that the material learned will be imprinted in the brain. It is expected to improve student learning outcomes.

Research on Discovery Learning has already been conducted, namely by Nurjanah, Tri Dewi (2016) under the title Effectiveness of Model learning Interactive Conceptual Instruction, and Discovery Learning to the ability of concept understanding Students to study mathematics at SMP Negeri 3 Dolopo. The results of the study concluded that the model of Interactive Conceptual Instruction and Discovery Learning models was equally effective in improving the ability to understand students' mathematical concepts. Pratiwi also conducted other research, Hana (2016), under the title Effectiveness of Model learning Discovery Learning towards student learning outcomes. Class VIII, SMP Negeri 2 paste 2015/2016 in Sleman Regency Learning Discovery Learning, is more effective than a direct learning model of student's mathematical learning outcomes.

The research aims to: 1) to know there is no difference in model discovery and direct learning model of students learning outcomes of grade VII SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017. 2) to know the learning discovery Learning model's effectiveness from the direct learning model in class VII SMP Muhammadiyah 2 Yogyakarta, even semester 2016/2017 school year.

RESEARCH METHODS

This type of research is experimental research using Posttest-Only Control Design. According to Sugiyono (2016:112), In this design, two groups are randomly selected (R). The first group of treatments (X) is called the Experiment Group, a class that uses the discovery learning model. The second group is not given a treatment called the control group, which is a class that does not use discovery learning. In this study, the control class uses a direct learning model. The influence of treatment is to analyze post-test group experiments and control groups.

This study was held at SMP Muhammadiyah 2 Yogyakarta in class VII. The time of this study was carried out in the even semester 2016/2017 school year. The population in this study is all students of Class VII SMP Muhammadiyah 2 Yogyakarta consisting of 187 students divided by seven classes. In this study, sampling techniques used Cluster Random Sampling. This technique is carried out by a randomly selected cluster or class. In this study, researchers registered clusters or classes, then randomly with the selected draw of two classes to be sampled, i.e., experimental classes and control classes. Obtained results of class VII E as an experimental class, and class VII B as the control class.

Data collection techniques using written tests. In this study, the instrument used was a test of formative tests aimed at knowing students' learning outcomes or learning success. Test trials are conducted to obtain data about the validity, reliability, and power of difference so that the details of the problem used to be used as a measuring instrument in data collection. The prerequisite test of data analysis techniques includes the normality test and homogeneity test, and data analysis techniques for hypothesis testing using T-tests.

RESULTS, and DISCUSSION

Before conducting data analysis (POSTTEST) first conducted a prerequisite test. A prerequisite test is the normality test and homogeneity test. The Data obtained is a normal and homogeneous distribution, then the hypothesis testing using the T-test.

The first hypothesis test is used to determine if there is a difference in the value of students' mathematical learning outcomes using the Discovery Learning model. Students who use a direct learning model. The results of the hypothesis test calculation show that for a significance 5% level with $df = 51$ acquired $t_{(0,025)(51)} = 2,00758$. Since $t_{count} = 4,24125 > t_{table} = 2,00758$, the H_0 hypothesis is rejected, so it can be said that there is a difference in learning outcomes between students using the Discovery Learning model, and students using direct-to-speech models.

The second hypothesis test is used to determine which learning models are more effective among the use of the discovery learning model with live learning models. The result of the hypothesis calculation indicates that for a significant 5% level with $df = 51$ obtained $t_{(0,05)(51)} = 1,67528$. Since $t_{count} = 4,24125 > t_{table} = 1,67528$, the H_0 hypothesis is rejected, so it can be said that the Discovery learning model is more effective than a direct learning model.

Research conducted at SMP Muhammadiyah 2 Yogyakarta aims to determine the learning outcomes of students who use the Discovery Learning model with students using direct learning models. It aims to compare the effectiveness of Discovery Learning models with students who use a direct learning model of student's mathematics learning outcomes in SMP Muhammadiyah 2 Yogyakarta. Learning mathematics using the Discovery Learning model was conducted in the VII E class, which amounted to 27 students who were divided into six learning groups later in the learning. After the group has been divided, researchers give the students the duty of the student worksheet to be done by each group. Students in the group discussion decide which answers are considered most appropriate based on the invention, and then communicate the outcome of the discussion. Indirect learning is applied in class VII B, which amounted to 26 students. Researchers convey lesson materials and allow students to inquire about the unresolved issues of the material being taught and provide opportunities for writing. Researchers assign assignments to students to exercise questions.

Based on the data displayed in the previous sub-sub, there are differences in student mathematics Learning (post-test) between classes of experimentation with control class after treatment.

The average value of experimental student Mathematics (post-test) students using the Discovery Learning model is higher than that of the control class using a live learning model. This suggests that experimental classes using the Discovery Learning model are more effective in improving student learning outcomes.

The Discovery Learning model emphasizes the students' activities in the learning process by emphasizing the students' direct experience of discovering the principal material, and concept material through its mentality, and The teacher's learning process is only a facilitator and mentor. Unlike live learning models where students are only given ideas or theories without being allowed to find answers themselves, and teachers only like information presenter. According to Carin, and Sund (in Suprihatiningrum, Jamil 2016:244 – 245) The Discovery Learning model can develop intellectual potential, through the Discovery of slow learning students will know how to arrange, and investigate, besides The material learned is longer to be used because students are involved in the discovery process. So students can maintain their built-in memory with its discovery process. This has a positive impact when the post-test results in a higher yield than what the class uses a live learning model.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded as follows:

- 1) There are differences in learning outcomes between students using the Discovery Learning model, and students using a direct learning model in-class students VII SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 school year.
- 2) Discovery Learning models are more effective than learning that uses a direct learning model in grade VII students SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 school year.

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