

THE EFFECT OF COOPERATIVE LEARNING ON MATHEMATICAL LEARNING OUTCOMES IN TERMS OF LEARNING ACTIVITIES FOR CLASS X STUDENTS OF SMK

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ABSTRACT

Implementing mathematics learning in class X Muhammadiyah Vocational High School (SMK Muhammadiyah) 2 Yogyakarta with a cooperative learning model is less than optimal. Students do activities that are not related to learning activities during the learning activity to disturb learning concentration. This research aims to determine the influence of cooperative learning on the learning outcomes of mathematics in class X students of SMK Muhammadiyah 2 Yogyakarta in the 2017 / 2018 odd semester. This research population is the students of class X Office Administration of SMK Muhammadiyah 2 Yogyakarta, which consisted of two classes. This research sample is taken from the entire population, determining the experiment class of research using random sampling. To get data of research, will use observation methods for learning activity data and test data methods on learning mathematics. Research instrument test: validity test, different power test, and reliability test. Analysis prerequisite tests include the normality test and homogeneity test. Data analysis using two-way variance analysis with unequal cell numbers. The results showed no significant effect of cooperative learning model factors on students' mathematics learning outcomes. This can be seen in the calculation with a significant level of 5%, dk: $V_1=1$ dan $V_2= 58$, $F_{count} = 0,000677 < F_{table} = 4,038$. There is a significant influence on learning activity factors on students' mathematics learning outcomes. This can be seen from the calculation results at a significant level of 5%, dk: $V_1=1$ dan $V_2=58$ we can get $F_{count} = 7,972814 > F_{table} = 4,038$. There is no significant interaction between cooperative learning models and learning activities on students' mathematics learning outcomes. This can be seen from the calculation results at a significant level of 5%, dk: $V_1=1$ dan $V_2=58$ so that $F_{count} = 1,67158 < F_{table} = 4,038$, so the third hypothesis has been tasted by rejecting $H_{1,3}$.

Keywords: Learning Activities, Cooperative Learning, Mathematics Learning Outcomes

INTRODUCTION

Education is closely related to learning and learning because it is through learning and learning that knowledge transfer is contained, which is the meaning of education at large. In the implementation of learning activities, the learning process engineering can be designed in such a way by a teacher by using several models, strategies, methods, and learning techniques. From the data on the learning outcomes of students of SMK Muhammadiyah 2 Yogyakarta Academic Year 2017/2018, it appears that the average grade of mathematics in class X Office Administration is still below the Minimum Mastery Criteria set by the school. This proves that mathematics is still complicated for students to understand.

Table 1. Mathematics Learning Outcomes

No	Class	Average value
1	Office Administration 1	45,10
2	Office Administration 2	36,98

Based on the results of the author's interview with the mathematics subject teacher, information is obtained that in the learning activities of the teacher uses the STAD type cooperative learning model. However, in the implementation of learning has not been effective. Based on the results of observations made by researchers found various activities undertaken by students during learning activities, where the activities carried out by students tend to be activities that reduce the concentration of learning, most

students do activities that are not related to learning activities, such as chatting with friends, playing handphone, sleep in class, and permission to leave the classroom. In addition to activities that interfere with learning activities, there are also student activities related to learning activities, such as listening to the teacher's explanation, answering questions given by the teacher, and asking when experiencing difficulties.

According to Majid (2014: 174), Cooperative learning is a form of learning using student's learning and working in small groups. Collaboratively group members in cooperative learning have different or heterogeneous abilities. Majid (2014 174) said That its members consist of 4 to 6 people, with a heterogeneous group structure. So cooperative learning is learning activities in small groups with different members' abilities. According to Sardiman (2007: 100), what is meant by learning activities are activities that are physical and mental. Piaget, in Sardiman (2007: 100), explains that a child is thinking as long as he does. Without deeds means the child does not think. So it can be concluded that the activity is physical and spiritual; the close relationship between them will lead to optimal learning activities. The interpretation of learning outcomes, according to Purwanto (2013: 44), is that Learning outcomes can be explained by understanding the two words that form them, namely results and learning. Understanding the results (Product) refers to acquisition due to the conduct of an activity or process that results in changes in functional input. From these opinions, it can be said that learning outcomes are changes that occur in people due to the learning process.

METHODS

This type of research used in this research is experimental research. The design of interrelationships between variables is organized as follows:

	Y	
	High	Low
A	Learning outcomes	Learning outcomes
B	Learning outcomes	Learning outcomes

Figure I. Research Design

Information:

Y: Learning activity

A: STAD

B: TSTS

This research was conducted at SMK Muhammadiyah 2 Yogyakarta class X Office Administration odd semester of 2017/2018. The population in this study were all students of class X Office Administration at SMK Muhammadiyah 2 Yogyakarta odd semester of the academic year 2017/2018, consisting of 2 classes with a population of 58 students. Samples were carried out using random sampling techniques. The sample of this study was class X Office Administration students with 24 students. Data collection techniques using non-test instruments and test instruments. A non-test instrument in the form of a questionnaire is used to determine learning activities, peer environment, and learning interests. Test instrument to find out the results of learning mathematics with Root Form material. The validity test using item analysis is done using the product-moment formula. Reliability test using the Cronbach Alpha formula. Analysis prerequisite test with normality test using Chi-Square formula, and homogeneity test using Bartlett. The research hypothesis testing uses two-path variance analysis with unequal samples.

RESULTS AND DISCUSSION

A normality test is used to test the distribution of data obtained on each variable with normal distribution or not. The normality test in this study uses the chi-square statistical test (χ^2). Decision-making criteria used are the distribution of data obtained on each variable normally distributed if

$\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$ with a significance level of 5% and degrees of freedom (k-1) where k is many interval classes. Normality test results of learning outcomes can be seen in Table 2 as follows:

Table 2. Normality Test Results

Class	χ^2_{count}	χ^2_{table}	df	Info.
STAD	7,327	7,815	3	Normal
TSTS	0,101	5,992	2	Normal

From Table 2, it is known that the learning outcomes are normally distributed.

A homogeneity test is carried out to determine whether the variances in the free variable group samples in which the amount of data per group can be different and are randomly drawn from population data that is normally distributed are different. The test that will be used in this research is the Bartlet test. The criteria for decision making is. K samples are said to be homogeneous if $\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$ with a significance level of 5% and degrees of freedom (k-1) where k is the number of sample groups. The summary of homogeneity test results can be seen in Table 3.

Table 3. Summary of Homogeneity Test Results

χ^2_{count}	χ^2_{table}	df	Info.
2,8636	3,8415	1	Homogeneous

Hypothesis testing uses a two-way analysis of variance with non-exemplary samples. The results of hypothesis testing are presented as follows.

a. First Hypothesis

With the analysis of variance that has been done, $F_{\text{count}}(A) = 0,000677$ and $F_{0,05(1,48)} = 4,038$. Because $F_{\text{count}}(A) = 0,000677$ and $F_{0,05(1,48)} = 4,038$ then $F_{\text{count}}(A) < F_{0,05(1,48)}$ so $H_{0,1}$ is accepted, which means that there is no the influence of cooperative learning models on mathematics learning outcomes of students of class X Office Administration odd semester SMK Muhammadiyah 2 Yogyakarta in the academic year 2017/2018

b. Second Hypothesis

By analyzing the data that has been done, it is obtained $F_{\text{count}}(B) = 7,972814$ and $F_{0,05(1,48)} = 4,038$. Because $F_{\text{count}}(B) = 7,972814$ and $F_{0,05(1,48)} = 4,038$ then $F_{\text{count}}(B) > F_{0,05(1,48)}$ so $H_{0,2}$ is rejected, which means that there are an influence significant learning activity factors towards the learning outcomes of students of class X in Muhammadiyah 2 Yogyakarta in the odd semester of 2017/2018.

c. Third Hypothesis

The analysis of the data that has been done is obtained $F_{\text{count}}(AB) = 1,671585$ and $F_{0,05(1,48)} = 4,038$. Because $F_{\text{count}}(AB) = 1,671585$ and $F_{0,05(1,48)} = 4,038$, then $F_{\text{count}}(AB) < F_{0,05(1,48)}$ so that $H_{0,3}$ is accepted, which means that there is no significant influence of interaction between cooperative learning models and learning activities on mathematics learning outcomes of students of class X SMK Muhammadiyah 2 Yogyakarta 2017/2018.

CONCLUSION

1. There is no significant influence of the cooperative learning model factors on Grade X Office Administration students' mathematics learning outcomes in the odd semester of SMK Muhammadiyah 2 Yogyakarta in 2017/2018. This can be seen in the calculation obtained $F_{\text{count}} = 0,000677$ while $F_{\text{table}} = 4,038$ at a significant 5% level of freedom $V_1=1$ and $V_2= 58$. So $F_{\text{count}} < F_{\text{table}}$ thus, the first hypothesis has been tested by accepting $H_{0,1}$, which means the learning model cooperative does not affect mathematics degrees.
2. There is a significant influence of learning activity factors on mathematics learning outcomes of students of class X in Muhammadiyah 2 Yogyakarta, odd semester 2017/2018. This can be seen

from the calculation results obtained by $F_{\text{count}} = 7,972814$, while $F_{\text{table}} = 4,038$ at a significant level of 5% degrees of freedom $V_1=1$ and $V_2= 58$. So $F_{\text{count}} < F_{\text{table}}$ thus, the hypothesis must be tested by accepting $H_{1,2}$, which means that learning activities significantly affect mathematics learning outcomes.

3. There is no significant interaction between cooperative learning models and learning activities on mathematics learning outcomes of class X students of SMK Muhammadiyah 2 Yogyakarta odd semester 2017/2018. This can be seen from the calculation results obtained by $F_{\text{count}} = 1,671585$, while $F_{\text{table}} = 4,038$ at a significant level of 5% degrees of freedom $V_1=1$ and $V_2=58$. So that $F_{\text{count}} < F_{\text{table}}$ thus, the third hypothesis has been tested by rejecting $H_{1,3}$. This means that the interaction between cooperative learning models and learning activities does not significantly influence mathematics learning outcomes.

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