THE EFFECTIVENESS OF MATH LEARNING USING COOPERATIVE LEARNING MODEL TYPE OF MAKE A MATCH ON STUDENTS MATHEMATICS LEARNING OUTCOMES IN GRADE VIII

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ABSTRACT

The low student learning outcomes are influenced by several factors, one of which is the model used in the less varied learning of mathematics still centered on the teacher. This study aims to determine more effective learning between mathematics learning using the cooperative learning model type to match mathematics learning using a direct learning model to students' mathematics learning outcomes. The population in this study were all eight grade students of Muhammadiyah Junior High School 2 Kalasan (SMP Muhammadiyah 2 Kalasan) in Academic Year 2016/2017, which consists of 5 classes. The sampling technique using a random sampling class and selected VIII E as an experimental class and VIII C as a control class. The data was collected used in the test method. Instrument testing used validity and reliability test. Data analysis techniques used for the analysis include the prerequisite test, normality test, and homogeneity test. To test the hypothesis in this study, a two-party t-test and one-party t-test with a significant level of 5% were tested. Based on mathematics learning result obtained that 1) t_{count} = 4,2948 and t_{table} = $t_{\frac{1}{2}(0,05)}$ = 2,0650 which means $t_{count} > t_{table}$. This means that there is a difference in learning outcomes between learning mathematics using a cooperative learning model type. It makes a match with mathematics learning using a direct learning model of eight grade students of Muhammadiyah Junior High school 2 Kalasan (SMP Muhammadiyah 2 Kalasan) of even semester in Academic Year 2016/2017. 2) t_{count} = 4,2948 and t_{table} = $t_{(0,05)}$ = 1,7116 which means $t_{count} > t_{tabel}$. This shows that the learning of mathematics with the cooperative learning model type *make a match* is more effective than the learning of mathematics using direct learning model towards mathematics learning outcomes in eight grade students of SMP Muhammadiyah 2 Kalasan of even semester in Academic Year 2016/2017.

Keywords: effectiveness, cooperative learning model type make a match, learning outcomes

INTRODUCTION

Education is a process to help humans develop their potential. Also, education is a place to produce good quality Human Resources (HR) in terms of religion, intelligence, and skills, so that efforts are needed to improve the quality of education to advance the nation's culture and elevate the nation's degrees. The importance of the role of mathematics requires the existence of mastery of mathematics from an early age. Therefore, mathematics is a subject given at every level of education, starting from primary education (elementary and junior high). Mathematics is also needed to meet practical needs in overcoming everyday problems. Given the very important role of mathematics, every level of formal education, students must be able to learn and master mathematics properly. Studying mathematics requires time, and good planning is carried out with full and composition, its implementation requires active individuals to gain experience and new knowledge.

Based on the role of mathematics in school, it is necessary to strive for the results of learning mathematics to get good results. However, from the mathematics midterm exam results at SMP Muhammadiyah 2 Kalasan, some students still score below the Minimum Completeness Criteria (MCC). The MCC for mathematics is 75. This can be seen in Table 1, which shows the completeness of the midterm scores:

Table 1. Completeness of Middle School Semester Semester Examination Muhammadiyah 2 Kalasan

Class	Total students		Percentage (%)	
	Complete	No Complete	Complete	No Complete
VIII A	1	29	3%	7%
VIII B	1	27	4%	6%
VIII C	1	26	4%	6%
VIII D	2	27	7%	3%
VIII E	0	29	0%	100%

Source :SMP Muhammadiyah 2 Kalasan

Table 1 shows that there are still many students who have not yet completed mathematics learning. One of the suspected causes is the use of inappropriate learning models.

Based on information from one of the mathematics teachers at SMP Muhammmadiyah 2 Kalasan, namely Mrs. Lailatul Fuah, S.Pd.Si. On November 10, 2016, it was found that the mathematics lesson that was carried out was more focused on the teacher and the learning model with the method of mundane, question and answer, and assignments. For learning with group discussion is not going well because of the lack of cooperation between students. Also, students are embarrassed to ask if they have difficulty in understanding the lesson. The result is an effect on student learning outcomes. Based on these problems, it is necessary to learn that it involves active students' role in teaching and learning activities to improve mathematics learning outcomes.

Efforts in improving mathematics learning outcomes can be made by developing various models and methods of learning. One learning model that can be applied is cooperative learning models. Cooperative learning is often defined as the formation of small groups consisting of students who are required to work together and enhance each other's learning and the learning of other students (Huda, Miftahul, 2012: 31). Through cooperative learning, students can express their thoughts, exchange opinions, and work together with friends. Also, cooperative learning can create a pleasant learning atmosphere and the realization of cooperation between students to affect student learning outcomes in mathematics. One learning model that suits these conditions is a make a match type of cooperative learning model. According to Huda, Miftahul (2012: 135) states that making a matching method is a method where students look for a partner while learning a certain concept or topic in a pleasant atmosphere. Therefore, the learning model used in this study is a make a match type of cooperative learning model, where students are divided into three groups, namely the question card carrier group, the answer card carrier group, and the assessment group. After the student gets a card, then immediately find a match that matches the card he is holding. Students who have gotten a pair then show the assessment group to read whether the pair of cards is suitable or not.

METHODS

The research design used is a posttest-only control design. As for the design of this study can be seen in Table 2.

Table 2. Research Design

Group (Class)	Treatment	Posttest
Experiment (class VIII E)	X_1	Y_1
Control (class VIII C)	X_2	Y_2

Information :

Experiment: Classes that use the make a match type cooperative learning model

Control: Classes that use the direct learning model

X_1: There is treatment (with a make a match type cooperative learning model)

X_2: Treatment with direct learning models

Y_1: The results of the experimental class posttest

Y_2: The results of the control class posttest

(Sugiyono, 2012: 112)

Test statistics for testing hypotheses are t-tests with the formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$$

Sudjana (2005: 239)

Information :

$\bar{x}_1$ = the average grade of the experimental class students

$\bar{x}_2$ = the average value of control class students

n_1 = number of experimental class students

n_2 = number of control class students

$s_1{}^2$ = standard deviation of the experimental class students

$s_2{}^2$ = standard deviation of control class students

The first hypothesis:

H_0: There is no significant difference between the mathematics learning outcomes of students who use the make a match cooperative learning model and those who use the direct learning model.

H_1: There is a significant difference in students' mathematics learning outcomes using the cooperative learning model type to match those using the direct learning model.

Rejection criteria H_0:

If $-\frac{w_1 t_1 + w_2 t_2}{w_1 + w_2} > t > \frac{w_1 t_1 + w_2 t_2}{w_1 + w_2}$ then H_0 is rejected. With a significance level used $\alpha = 0.05$.

with: $w_1 = \frac{s_1^2}{n_1}$; $w_2 = \frac{s_2^2}{n_2}$; $t_1 = t_{\left(1-\frac{1}{2}\alpha\right),(n_1-1)}$ and $t_2 = t_{\left(1-\frac{1}{2}\alpha\right),(n_2-1)}$.

The second hypothesis:

H_0: The make a match type of cooperative learning model is no more effective than the direct learning model of mathematics learning outcomes for students of class VIII of SMP Muhammadiyah 2 Kalasan even semester 2016/2017 school year.

H_1: The make a match type of cooperative learning model is more effective than the direct learning model of the mathematics learning outcomes of Grade VIII students of SMP Muhammadiyah 2 Kalasan even semester 2016/2017 school year.

Rejection criteria H_0:

If $t > t_{1-a}$, then H_0 is rejected. With a significance level of $\alpha = 0.05$ and degrees of freedom df, respectively $(n_1 - 1)$ and $(n_2 - 1)$.

RESULTS AND DISCUSSION

Based on the results of research conducted at SMP Muhammadiyah 2 Kalasan from 10-18 May 2017 obtained the value of the mathematics learning test results of the experimental class and control class students. A summary of the description of mathematics learning achievement test scores is in Table 3.

Table 3. Summary Description of Learning Outcomes Test Scores

Class	Max score	Min score	$\bar{X}$	S	S^2
Experiment	66,7	22,2	51,8667	9,775	95,5467
Control	66,7	11,1	36,5542	14,838	220,1692

Table 3 shows the minimum value, maximum value, and the average value of the experimental and control classes. It can be seen that the average value of the experimental class is greater than the average value of the control class.

Table 4. Summary of Hypothesis Test Results of Two Parties

t_{count}	t_{table}	Significance level	$(df_i) = n_i - 1$	Conclusion
4,2948	2,0650	5%	$(df_1) = 26$ $(df_2) = 23$	H_0 rejected

Based on Table 4, it is known that the value of $t_{count} = 4.2948$ and $t_{table} = 2.0650$ at the 5% significance level with df1 = 26 and df2 = 23, which means $t_{count} = 4.2948 > t_{table} = 2.0650$, so H_0 is rejected and H_1 received.

Thus, there is a significant difference between mathematics learning outcomes using the make a match type cooperative learning model and those using direct learning models in class VIII students in the even semester of SMP Muhammadiyah 2 Kalasan for the 2016/2017 school year.

Table 5. Summary of One-Party Hypothesis Test Results

t_{count}	t_{table}	Significance level	$(df_i) = n_i - 1$	Conclusion
4,2948	1,7116	5%	$(df_1) = 26$ $(df_2) = 23$	H_0 rejected

Based on Table 5, it is known that the value of $t_{count} = 4.2948$ and $t_{table} = 1.7116$ at the 5% significance level with $df_1 = 26$ and $df_2 = 23$, which means $t_{count} = 4.2948 > t_{table} = 1.7116$, so H_0 is rejected and H_1 received.

Thus, the make a match type of cooperative learning model is more effective than the direct learning model of mathematics learning outcomes for students of class VIII in the even semester of SMP Muhammadiyah 2 Kalasan for the 2016/2017 school year. It is assumed that if the student's mathematics learning outcomes are good, then the learning process with the learning model applied is successful or effective. Before the experimental class and the control, the class is given treatment. First, pay attention to the sample's initial ability. Initial skills are obtained from the Midterm Examination scores. Based on the UTS results obtained, the average value of the experimental class $\bar{X} = 43.2759$ while the average value of the UTS control class $\bar{X} = 43.2407$. For the homogeneity test, the initial ability is obtained $\chi^2_{hitung} = 3,9820$ while the value of $\chi^2_{tabel} = 9,4877$ this shows the $\chi^2_{hitung} < \chi^2_{tabel}$ that both classes have the same initial ability variance values.

After learning is finished, the posttest is carried out both in the experimental and control classes to determine student learning outcomes. Based on the results of calculations from the posttest data, it is known that the average value of the posttest results for the experimental class is 51.8667, and the control class is 36.5542. Based on these results, it can be seen that the experimental class and the control class have relatively different final abilities. After testing the hypothesis of two parties at a significance level of 5% with degrees of freedom $(df_1) = 26$ and $(df_2) = 23$ obtained tcount = 4.2948> ttable = 2.0650. This means that there is a significant difference between mathematics learning outcomes that use the make a match type cooperative learning model and those that use direct learning models in class VIII even semester SMP Muhammadiyah 2 Kalasan for the 2016/2017 school year. After testing the hypotheses of one party at a significance level of 5% with degrees of freedom $(df_1) = 26$ and $(df_2) = 23$ obtained $t_{count} = 4.2948 > t_{table} = 2.0650$. This means the learning outcomes of experimental class students whose learning applies the make a match type cooperative learning model more effectively than the control class whose learning applies the direct learning model. Based on the results of data analysis and the assumptions above, it can be concluded that learning with a make a match type of cooperative learning model is more effective than learning with a direct learning model.

CONCLUSION

Based on the results of research and discussion, it can be concluded that there are significant differences between mathematics learning outcomes using the make a match type cooperative learning model and those using direct learning models in class VIII even semester of SMP Muhammadiyah 2

Kalasan for the 2016/2017 school year. This is shown from the results of the two-party t-test student test results obtained $t_{count} = 4.2948 > t_{table} = 2.0650$ at the level of significance with degrees of freedom $(df_1) = 26$ and $(df_2) = 23$ H_0 rejected and H_1 accepted.

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