

THE EFFECTIVENESS OF COOPERATIVE LEARNING MODEL TYPE OF TWO STAY TWO STRAY (TSTS) AND INDEX CARD MATCH ON STUDENTS MATHEMATICS LEARNING ACHIEVEMENT IN GRADE VII

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ABSTRACT

The low student learning outcomes are influenced by several factors, one of which the model used in the less varied learning of mathematics is still centered on the teacher. This study aims to determine more effective learning between mathematics learning using cooperative learning model type two to stay two strays with learning mathematics with a cooperative learning model type index card match to students' mathematics learning outcomes. This study population was all seven grade students of State Islamic Junior High School 7 Sleman (MTs Negeri 7 Sleman) regency Academic Year 2016/2017, which consists of 5 classes. The sampling technique using a random sampling technique and selected class VII A as an experimental I class and class VII C as an experimental II class. The data was collected using the test method—tests using instrument validity and reliability. Data analysis techniques used for the analysis include the prerequisite test, normality test, and homogeneity test. Analysis of data used hypothesis testing. Based on mathematics learning result obtained that 1) $t_{\text{count}} = 2,90050$ and $t_{\text{table}} = t_{\frac{1}{2}(0,05)} = 1,99773$ which means $t_{\text{count}} > t_{\text{table}}$. This means that there is a difference in learning outcomes between learning mathematics using cooperative learning model type two stay two strays with mathematics learning using a cooperative learning model type index card match of seven grade students of MTs Negeri 7 Sleman in even semester regency Academic Year 2016/2017. 2) $t_{\text{count}} = 2,90050$ and $t_{\text{table}} = t_{(0,05)} = 1,66901$ which means $t_{\text{count}} > t_{\text{table}}$. This shows that the learning of mathematics with cooperative learning model type two stay two strays are more effective than the learning of mathematics using cooperative learning model type index card match towards mathematics learning outcomes in seven grade students of MTs Negeri 7 Sleman in even semester regency Academic Year 2016/2017.

Keywords: effectiveness, cooperative learning model type two stay two stray, cooperative learning model type index card 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 effort is needed to improve the quality of education to advance the nation's culture and raise the nation's degree in the eyes of the international world. The importance of the role of mathematics requires the mastery of mathematics from an early age. Therefore, mathematics is a subject given at every level of education, starting from basic education (elementary and junior high). Mathematics is also needed in daily life because an important aspect of mathematics is learning. Through learning problem solving, it is hoped that an analytical and logical thinking process can be formed. Considering the important role of mathematics, every level of formal education, students must be able to learn and master mathematics properly. Studying mathematics requires considerable time and good planning and is carried out with full concentration and structured; its implementation requires active individuals to gain experience and new knowledge.

Based on the importance of mathematics in school, it is necessary to strive for the results of mathematics learning to get good results. However, the fact of the results of the mathematics midterm exam at MTs Negeri 7 Sleman shows some students who get grades 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 in Mid Semester MTs Sleman Middle School Examination

Class	Total students		Percentage (%)	
	Complete	No Complete	Complete	No Complete
VII A	0	35	0%	100%
VII B	1	33	2,94%	97,06%
VII C	0	35	0%	100%
VII D	1	33	2,94%	97,06%
VII E	0	35	0%	100%

Source: MTs Negeri 7 Sleman

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

Based on information from one of the mathematics teachers at MTs Negeri 7 Sleman, namely Drs. Mudjiana, on December 8, 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. 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 the two staying two stray cooperative learning models and index card matches. According to Huda, Miftahul (2012: 140) states that the two stays two stray methods is a method with a structure of two staying two guests that allows each group to share information with other groups. In the implementation of the two stays, two stray methods, students work together and express ideas in their groups to get the correct answers. Two people from the group members will leave the group and go to another group to share ideas about the material they have worked on.

Meanwhile, according to Suprijono, Agus (2015: 139) states that the index card match method is a method where students look for pairs of cards, quite fun to use to repeat the learning material that has been given previously. In the implementation of the index card match method, students are divided into two groups: the question card carrier group, and the answer card carrier group. After the student gets a card, then immediately find a match that matches the card he is holding. Students who have got a partner then sit close to / seat, and then perform/read whether the card pairs are suitable or not. Therefore, this study's learning model is a two-stay two-stray cooperative learning model and index card match. This research was conducted to determine the effectiveness of the two stays, two stray types of cooperative learning model, and index card match to the mathematics learning outcomes of seventh-grade students in the even semester of the 2016/2017 school year.

METHODS

The type of research used is quasi-experiment. The population in this study were all VII grade students of MTs Negeri 7 Sleman, totaling 173 students in 5 classes. The sample of this study was students of class VII A as the experimental class I and class VII C as the experimental class II.

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

Table 2. Research Design

Group (Class)	Treatment	Posttest
Experiment I (class VII-A)	X ₁	Y ₁
Experiment II (class VII C)	X ₂	Y ₂

Information :

Experiment I: Classes that use the two stays two stray cooperative learning model

Experiment II: Classes that use cooperative learning model index card type

X₁: There is a treatment (with the type two stay two stray cooperative learning model)

X₂: The treatment with cooperative learning model index card match type

Y₁: The results of the experimental class posttest I

Y₂: The results of the experimental class posttest II

(Sugiyono, 2012:112)

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

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

Sudjana (2005: 239)

Information :

\bar{x}_1 = the average value of experimental class I students

\bar{x}_2 = the average value of experimental class II students

n_1 = number of experimental class I students

n_2 = number of experimental class II students

s_1^2 = standard deviation of experimental class I students

s_2^2 = standard deviation of experimental class II students

The first hypothesis:

H₀: There is no difference in students' mathematics learning outcomes between students who use the two stays, two stray cooperative learning models, and students who use the index card match type cooperative learning model in class VII students of the even semester of MTs Negeri 7 Sleman 2016/2017 academic year.

H₁: There is a difference in students' mathematics learning outcomes between students who use the two stays two stray type of cooperative learning model and students who use the index card match type cooperative learning model in class VII students of the even semester of MTs Negeri 7 Sleman 2016/2017 academic year.

Rejection criteria H₀:

If $t_{count} < -t_{table}$ or $t_{count} > t_{table}$ then H₀ is rejected, with a significant level used $\alpha = 0.05$ and $dk = n_1 + n_2 - 2$.

The second hypothesis:

H₀: The two stay two stray cooperative learning model is no more effective than the index card match cooperative learning model on the mathematics learning outcomes of seventh-grade students of the MTs Negeri 7 Sleman academic year 2016/2017.

H₁: The two stay two stray types of cooperative learning model is more effective than the index card match type cooperative learning model of mathematics learning outcomes for seventh-grade students of MTs Negeri 7 Sleman academic year 2016/2017.

Rejection criteria H₀:

If $t_{count} \geq t_{table}$ then H₀ is rejected, with a significant level used $\alpha = 0.05$ and $df = n_1 + n_2 - 2$.

RESULTS AND DISCUSSION

Based on the research results at MTs Negeri 7 Sleman from May 17-24, 2017 obtained test scores on mathematics learning outcomes of experimental class I and experimental class II 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	Highest score	Lowest score	\bar{X}	S	S ²
Experiment I	83,3	50	70,4532	7,0978	50,3788
Experiment II	88,8	33,3	63,94	13,1134	171,9624

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

Table 4. Summary of Hypothesis Test Results of Two Parties

t_{count}	t_{table}	Significant Level	df	Conclusion
2,90050	1,99773	5%	64	H ₀ rejected

Based on Table 4, it is known that the $t_{count} = 2.90050$ and $t_{table} = 1.99773$ at the 5% significance level with $df = 64$, which means $t_{count} \geq t_{table}$, so H₀ is rejected and H₁ is accepted.

Thus, there are differences in students' mathematics learning outcomes between students who use the two stays two stray cooperative learning model and students who use the index card match type cooperative learning model in class VII students of the even semester of MTs Negeri 7 Sleman 2016/2017 academic year.

Table 5. Summary of One-Party Hypothesis Test Results

t_{count}	t_{table}	Significant Level	df	Conclusion
2,90050	1,66901	5%	64	H ₀ dejected

Based on table 5, it is known that the $t_{count} = 2.90050$ and $t_{table} = 1.66901$ at the 5% significance level with $df = 64$, which means $t_{count} \geq t_{table}$, so H₀ is rejected and H₁ is accepted.

Thus, the two stay two stray types of cooperative learning model is more effective than the index card match type cooperative learning model of mathematics learning outcomes for seventh-grade students of MTs Negeri 7 Sleman in the academic year of 2016/2017. It is assumed that if the student's mathematics learning outcomes are good, the learning process with the learning model applied is successful or effective.

Before the experimental class, I and experimental class II were given treatment, first paying attention to the sample's initial ability. Initial skills are obtained from the Midterm Examination (UTS) scores. Based on the UTS results obtained, an average value of UTS experimental class I $\bar{X} = 70.4532$ while the average value of UTS experimental class II $\bar{X} = 63.9400$. For the homogeneity test, the initial ability is obtained $\chi^2_{count} = -212,4205$ while the value of $\chi^2_{table} = 3,8415$ this shows $\chi^2_{count} \ll \chi^2_{table}$ that both classes have the same initial capability variance values.

After learning is finished, then posttest is carried out both in the experimental class I and experimental class II 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 70.4532, and for the experimental class II is 63.99400. Based on these results, it can be seen that the experimental class I and experimental class II have relatively different final abilities. After testing the hypothesis of two parties at a significant level of 5% and $df = 64$ obtained $t_{count} = 2.90050 > t_{table} = 1.99773$. This means that there is a significant difference between mathematics learning outcomes using the two stays two stray cooperative learning model and those using the index card match type cooperative learning model in class VII students of the even semester of MTs Negeri 7 Sleman 2016/2017 academic year. After testing the hypothesis of one party at a significant level of 5% with $df =$

64, obtained $t_{count} = 2.90050 > t_{table} = 1.66901$. This means that the two stays two stray types of cooperative learning model is more effective than the index card match type cooperative model of mathematics learning outcomes for seventh-grade students of MTs Negeri 7 Sleman in the academic year of 2016/2017.

Based on the results of data analysis and the assumptions above, it can be concluded that learning with the two stays two stray cooperative learning model is more effective than learning with the index card match cooperative 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 two stays two stray cooperative learning model and those using the index card match type cooperative learning model in seventh-grade students of the seventh semester of MTs Negeri 7 Sleman in 2016/2017 teaching. This is shown from the results of the two-party t-test student test results obtained $t_{count} = 2.90050 > t_{table} = 1.99773$ at a significant level of 5% and $df = 64$, then H_0 is rejected, and H_1 is accepted. For the two stays, two stray types of cooperative learning models are more effective than the index card match type cooperative learning model of the mathematics learning outcomes of seventh-grade students of the MTs Negeri 7 Sleman academic year 2016/2017. This is shown from the results of one-party t-test student test results obtained $t_{count} = 2.90050 > t_{table} = 1.66901$ at a significant level of 5% and $df = 64$ H_0 is rejected, and H_1 is accepted.

REFERENCES

- Huda, Miftahul. 2012. Cooperation Learning. Yogyakarta: Pustaka Pelajar.
Sudjana. 2005. Metode Statistika. Bandung: Tarsito Bandung.
Sugiyono. (2012). Metode Penelitian Pendidikan. Bandung: Alfabeta.
Suprijono, Agus. 2015. Cooperative Learning. Yogyakarta: Pustaka Belajar.