THE EFFECTIVENESS OF COOPERATIVE LEARNING MODEL TYPE OF TWO STAY TWO STRAY AND MAKE A MATCH ON STUDENTS' MATHEMATICS LEARNING OUTCOMES IN CLASS VIII OF SMP MUHAMMADIYAH BOARDING SCHOOL YOGYAKARTA

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ABSTRACT

Learning by discussion among the group has been less effective, which makes low the mathematic learning results. The research aims to determine there are differences in mathematics learning outcomes between using model cooperative learning type Two Stay Two Stray and cooperative learning type Make a Match. And compare the effectiveness of model cooperative learning type two stay two stray and make a match in the VIII grade of Junior High School student of Muhammadiyah Boarding School Yogyakarta in the even semester academic year 2015/2016. This study uses a posttest-only control design. There is three class in the population of this study, samples were taken from two classes with random sampling techniques to the class. Data collection was conducted with the test model. The instrument used questions related to the subject of surface area and volume of the pyramid. Before analyzing data, there is a prerequisite test that consists of a normality test and a homogeneous test. To test the hypothesis in this study, the test was used one party with a significant level of 5%. The results of research on the significant level of 5% and dk = 64 indicates that: there are difference in the results of students mathematics leaning using cooperative learning model TSTS, and using cooperative learning Make a Match type. This is indicated by the value $t_{table} = t_{\frac{1}{2}(0,05)} = 1,99826$ and $t_{count} = t_0 = 2,087342$ which mean $t_0 > t_{\frac{1}{2}\alpha}(n_1 + n_2 - 2)$ and TSTS cooperative learning model is more effective than the cooperative learning model Make a Match type, against the mathematic learning student's results. This is indicated by the value $t_{table} = t_{(0,05)} = 1,66931$ and $t_{count} = t_0 = 2,08734$ which mean $t_0 > t_\alpha(n_1 + n_2 - 2)$.

Keywords: effectiveness, cooperative learning model Two Stay Two Stray type, cooperative learning model Make a Match.

INTRODUCTION

Education plays an important role in life to create and shape the younger generation to become the next generation that is strong, advanced, skilled and educated. Various efforts have been made to improve the level of success of students in the field of education, especially in improving the quality of mathematics education.

Mathematics as one branch of science that has an important role in everyday life. Given the importance of mathematics, it is not surprising that the government strives to improve the teaching of mathematics at every level of education, including primary, secondary and even tertiary education. In general, there are still many students who think mathematics is difficult because mathematics has abstract mind-objects.

Some students take mathematics lessons that are less active. Only some students dare to ask if they have difficulties so the learning process is not effective. When given a practice question, not all students work earnestly. Of course, this can affect student learning outcomes. This is shown by the implementation of teaching and learning activities of teachers using the direct learning model and still rarely uses the active learning model, the teacher still dominates in learning activities, causing the lack of student activity in participating in learning activities because teaching and learning activities are still teacher-centered. Therefore it is necessary to choose the right learning model in the teaching and learning process of mathematics which will facilitate students in receiving the material presented. There are various types of cooperative learning models that can be used by teachers including the Two Stay Two Stray type and the Make a Match type.

The problems in this study are: 1) Are there differences in mathematics learning outcomes using the Two Stay Two Stray cooperative learning model with the Make a Match type in the eighth grade students of the even semester of SMP Muhammadiyah Boarding School Yogyakarta in the academic year 2015/2016 ?. 2) Which is more effective between the Two Stay Two Stray cooperative learning model and the Make a Match type on the learning outcomes of the eighth grade students of the even semester of SMP Muhammadiyah Boarding School Yogyakarta 2015/2016?

The purpose of this study are 1) To find out whether or not there are differences in mathematics learning outcomes using the Two Stay Two Stray cooperative learning model with the Make a Match type. 2) To find out which is more effective between the Two Stay Two Stray type of cooperative learning model and the Make a Match type of learning outcomes.

THEORY

Mathematics is one branch of human science that is very useful in human life in the face of a problem. as expressed by Uno, Hamzah B. (2001: 129-130) that "A science which is a tool of thought, communication, a tool to solve various practical problems, the elements of which are logic and intuition, analysis and construction, generality and individuality, and has branches including arithmetic, algebra, geometry, and analysis ". According to Winkel in Purwanto (2011: 45) said that learning outcomes are changes that cause humans to change their attitudes and behavior.

Two Stay Two Stray (TSTS) is a teaching and learning technique for two to two guests. According to Lie in Shoimin, Aris (2014: 222) "The structure of the two left two guests gives the group the opportunity to share results and information with other groups". The stages of the implementation of the Two Stay Two Stray learning model: 1) The teacher divides students into several groups, each of which consists of four students. The group formed is also a heterogeneous group, for example, one group consists of 1 high ability students, 2 medium ability students, and 1 low ability student. This is done because cooperative learning type TSTS aims to provide opportunities for students to learn from each other (Peer Tutoring) and support each other. 2) The teacher provides sub-topics for each group to be discussed together with each group member. 3) Students work together in groups of four people. It aims to provide opportunities for students to be actively involved in the thought process. 4) After finishing, two people from each group leave their group to visit another group. 5) Two people living in the group are tasked with sharing their work and information with guests from other groups. 6) Guests excuse themselves and return to their own groups to report their findings from other groups. 7) Groups match and discuss the results of their work. 8) Each group presents their work. The advantages of using the Two Stay Two Stray type of cooperative learning model are as follows: 1) Easily broken into pairs. 2) More tasks that can be done. 3) The teacher is easy to monitor. 4) Can be applied to all classes/levels. 5) Students' learning tendencies become more meaningful. 6) More active inactivity. 7) It is expected that students will dare to express their opinions. 8) Add student cohesiveness and confidence. 9) Students' speaking ability can be improved. 10) It helps increase interest and learning achievement.

The make a match learning model in Shoimin, Aris (2014: 98) is a learning model developed by Loma Curran. The main characteristic of the make a matching model is that students are asked to look for pairs of cards which are answers or certain material questions in learning. One of the advantages of this technique is that students look for partners while learning about a concept or topic in a pleasant atmosphere. As for the preparation of the learning model according to Huda, Miftahul (2013: 251-252) is as follows: 1) Make a number of questions in accordance with the material being studied (the amount depends on the learning objectives) and then write them in question cards. 2) Generate the answer keys from the questions that have been made and write them on the answer cards. It would be better if the question card and answer card are different colors. 3) Make a rule that contains rewards for successful students and sanctions for students who fail (here, the teacher can make these rules together with students). 4) Provide a sheet to record successful pairs as well as scoring presentations. The steps for implementing the Make a Match learning model: 1) The teacher prepares several cards containing several concepts or topics that are suitable for the review session, instead of one part of the question card and the other part

of the answer card. 2) Every student gets one card. 3) Each student thinks of answers/questions from the cardholder. 4) Every student looks for a partner who has a card that matches the card (answer questions). 5) Every student who can match the card before the deadline is given points. 6) After one round of cards are shuffled again so that each student gets a different card than before. 7) Concluding remarks.

The advantages of using the Make a Match type of cooperative learning model are as follows: 1) An atmosphere of excitement will grow in the learning process. 2) Collaboration between students is dynamic. 3) The emergence of mutual cooperation dynamics that are evenly distributed across students.

METHODS

This type of research uses a two-party t-test conducted to determine whether or not there is a difference in learning outcomes using the Two Stay Two Stray cooperative learning model and Make a Match. , 2012: 112). In this study using two classes, namely experimental class I and experimental class II. In the experimental class, I learning is done by using the Two Stay Two Stray cooperative learning model and in experimental class, II learning is carried out using the Make a Match type cooperative learning model.

The population in this study were all female students of class VIII of Muhammadiyah Boarding School in Yogyakarta in the academic year 2015/2016 consisting of VIII E, VIII F, VIII G, VIII H, and VIII I totaling 154 female students. While the sample in this study was class VIII F as the experimental class I and class VIII E as the experimental class II, the sampling technique used was Random Sampling. The data analysis technique used is the test technique with the instrument in the form of objective questions in the form of multiple choice. The analysis prerequisite test is the Chi-square formula normality test and the homogeneity test uses Bartlett. Research hypothesis testing uses the first hypothesis test and the second hypothesis. Test the first hypothesis. While the second hypothesis test using a one-party t-test was conducted to find out which is more effective between the Two Stay Two Stray cooperative learning model and Make a Match.

RESULTS AND DISCUSSION

1. Initial Ability

The summary of the results of the initial ability normality test can be seen in Table 1.

Table 1. Summary of Normality Test Results for Initial Ability

Class	X^2_{count}	X^2_{table}
Experiment I	7,425	7,815
Experiment II	5,661	7,815

From the normality test at a significant level of 5% and degrees of freedom = 3, it can be seen that X^2_{count} =7,425 and $X^2_{table} = 7,815$ so that $X^2_{count} < X^2_{table}$ which means that the experimental class I have initial ability data that is normally distributed. While the normality test at a significant level of 5% and the degree of freedom = 3, it can be seen that $X^2_{count} = 5,661$ and $X^2_{table} = 7,815$ so that $X^2_{count} < X^2_{table}$ which means that the experimental class II has initial ability data that is normally distributed.

The summary of the results of the initial ability homogeneity test can be seen in Table 2.

Table 2. Summary of Homogeneity Test Results Initial Ability

X^2_{count}	X^2_{table}
2.81549	9.4877

Based on homogeneity tests that have been carried out in class VIII E A, VIII F, VIII G, VIII H and VIII I can be seen that $X^2_{count} = 2,81549$ and $X^2_{table} = 9,4877$ which means that all five classes have the same variance.

The summary of the results of the first hypothesis test initial ability data can be seen in Table 3.

Table 3. Summary of the Results of the First Hypothesis Test Initial Values

t_{count}	t_{table}
0,08447	1,99826

Based on the analysis results obtained value $t_{stat} = 0,08447$ and $t_{table} = 1,99826$ then H$_0$ accepted and H$_1$ rejected, which means that there is no significant difference in the initial ability scores of students in class VIII E and class VIII F even semester of Yogyakarta Muhammadiyah Boarding School Middle School, academic year 2015/2016. So it can be said that both classes have the same ability.

2. **Mathematics Learning Outcomes**

The summary of the normality of mathematics learning outcomes can be seen in Table 4.

Table 4. Summary of Normality Test Results Mathematics Learning Outcomes

Class	X^2_{count}	X^2_{table}
Experiment I	0.942	7.815
Experiment II	4.195	7.815

From the normality test at a significant level of 5% and degrees of freedom = 3, it can be seen that $X^2_{count} = 0,942$ and $X^2_{table} = 7,815$ so that $X^2_{count} < X^2_{table}$ which means that the experimental class I has mathematical learning outcomes data that are normally distributed. While the normality test is at a significant level of 5% and the degree of freedom = 3, it can be seen that $X^2_{count} = 4,195$ and $X^2_{table} = 7,815$ so that $X^2_{count} < X^2_{table}$ which means that the experimental class II has mathematical learning outcomes data that are normally distributed.

The summary of the results of the initial ability homogeneity test can be seen in Table 5.

Table 5. Summary of Homogeneity Test Results Mathematics Learning Outcomes

X^2_{count}	X^2_{table}
0,4188	3.8415

From the homogeneity test at a significant level of 5% and degrees of freedom = 3, it can be seen that $X^2_{count} = 0,4188$ and $X^2_{table} = 3,8415$ so that $X^2_{count} < X^2_{table}$ which means that the learning outcomes of both classes have the same variance (homogeneous).

The summary of the results of the first hypothesis test data on the value of mathematics learning outcomes can be seen in Table 6.

Table 6. Summary of First Hypothesis Test Results Learning Outcomes Value

t_{count}	t_{table}
2,087342	1,99826

Based on table 6 obtained $t_{table} = t_{\frac{1}{2}(0,05)} = 1,99826$ and $t_{count} = t_0 = 2,087342$ which means $t_0 > t_{\frac{1}{2}\alpha}(n_1 + n_2 - 2)$ then H_0 rejected and H_1 received. So, it can be concluded that there is a significant difference between the learning outcomes of mathematics using the Two Stay Two Stray cooperative learning model and those using the Make a Match type cooperative learning model for class VIII students in the even semester of SMP Muhammadiyah Boarding School Yogyakarta in the academic year 2015/2016.

The summary of the results of the second hypothesis test data on the value of mathematics learning outcomes can be seen in Table 7.

Table 7. Summary of Second Hypothesis Test Results Learning Outcomes Value

t_{count}	t_{table}
2,08734	1,66931

Based on the analysis results obtained $t_{table} = t_{(0,05)} = 1,66931$ and $t_{count} = t_0 = 2,08734$ which means $t_0 > t_\alpha (n_1 + n_2 - 2)$ then H_0 rejected and H_1 received. So, it can be concluded that the Two Stay Two Stray cooperative learning model is more effective than the Make a Match cooperative learning model towards the mathematics learning outcomes of VIII grade students of the even semester of SMP Muhammadiyah Boarding School Yogyakarta in the academic year 2015/2016.

CONCLUSION

1. There is a significant difference between the learning outcomes of mathematics using the Two Stay Two Stray cooperative learning model and those using the Make a Match type cooperative learning model for class VIII students in the even semester of SMP Muhammadiyah Boarding School Yogyakarta in the academic year 2015/2016.
2. Learning using the Two Stay Two Stray type of cooperative learning model is more effective than the Make a Match type of cooperative learning model towards the mathematics learning outcomes of VIII grade students of the even semester of SMP Muhammadiyah Boarding School Yogyakarta in the academic year 2015/2016.

REFERENCES

Huda, Miftahul. 2013. *Model-Model Pengajaran dan Pembelajaran:Isu-isu Metodis dan Paradigmas*. Yogyakarta: Pustaka Pelajar.

Purwanto. 2013. *Evaluasi Hasil Belajar*. Yogyakarta: Pustaka Pelajar.

Shoimin, Aris. 2014. *68 Model Pembelajaran Inovatif dalam Kurikulum 2013.* Yogyakarta: Ar-Ruzz Media.

Sugiyono. 2012. *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R&D)*. Bandung : Alfabeta.

Uno, Hamzah B. 2011. *Model Pembelajaran Menciptakan Proses Belajar Mengajar yang Kreatif dan Efektif.* Jakarta: Bumi Aksara.