

## EFFECTIVENESS OF COOPERATIVE LEARNING MODEL TYPE THINK PAIR SHARE (TPS) AND TYPE TWO STAY TWO STRAY (TSTS) ON MATHEMATICS LEARNING OUTCOMES STUDENT CLASS VIII

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### ABSTRACT

The teacher's learning model can influence the low learning outcomes of students. The research aimed to determine the effectiveness of the cooperative learning model of TPS type with cooperative learning model TSTS type on mathematics outcomes. The population in this study were students of class VIII State Junior High School 2 Patikraja (SMP Negeri 2 Patikraja) consisted of 6 classes. The sampling technique used a random sampling technique to class, obtained class VIII C as experimental class I, which uses a cooperative learning model of type TPS and VIII B as experiment class II, which uses a cooperative learning model of type TSTS. Data collection techniques used were documentation and tests. 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, using a two-party t-test and one-party t-test. Based on the calculation of two-test and one-party t-test with 5% significant level and degree of freedom 68 on the calculation of t-test two parties obtained value  $t_{count} = 2.693058071 > t_{table} = 1,99863$ , indicating that there are differences in learning outcomes mathematics students using cooperative learning models type TPS with students using cooperative learning models type TSTS. On the calculation of one t-test,  $t_{count} = 2,693058071 > t_{table} = 1,99863$  indicates that the TPS type is more effective than the TSTS type cooperative learning model in grade VIII students in even semester of SMP Negeri 2 Patikraja Banyumas regency teachings 2016/2017.

**Keywords:** Effectiveness, Think Pair Share, Two Stay Two Stray

### INTRODUCTION

Mathematics is one branch of science that underlies the development of science and technology, so it has an important role in human life. 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 from elementary, middle, high school, and university. Even though mathematics has been taught since elementary, junior high, high school, and tertiary levels, mathematical thinking cannot be easily achieved, considering mathematics is still considered difficult by some students. The difficulty for some students in understanding mathematical material is the lack of active students and students' shame to ask the teacher in the learning process of mathematics. This is caused by the lack of effectiveness of the learning process so that the learning outcomes of mathematics are still low.

One way that is currently being applied in teaching and learning to overcome student learning difficulties and improve learning achievement is to use cooperative learning models. Cooperative learning in the teaching and learning process is used to improve the achievement of student learning outcomes, can develop relationships between groups, acceptance of weak classmates in the academic field, and increase a sense of self-esteem (Slavin, 2011: 4-5). Based on the observations of mathematics learning conducted in class VIII on October 17-18, 2016, SMP Negeri 2 Patikraja, Banyumas Regency, most students still lack an understanding of mathematical concepts. This is shown when the teacher students give students questions still do not understand and are still experiencing difficulties in working on these problems. Also, students are still reluctant and to ask the teacher if experiencing difficulties. Based on the results of interviews with students, it was found that students still considered mathematics a tedious and challenging subject. Difficulties in attending mathematics will result in unsatisfactory

student learning outcomes. This is proven based on the midterm test scores of the 2016/2017 academic year, showing that many of the eighth-grade students' mathematics scores are below the expected Minimum Completeness Criteria (MCC), which can reach 75 meaning that some students still get grades under Minimum Completeness Criteria (MCC) set by the school. This shows that student mathematics learning outcomes are still low. As shown in Table 1

**Table 1.** Value of the Middle Semester II Middle Examination Results in 2 Patikraja Mathematics Subjects for 2016/2017 Academic Year

Class	Average	Total students		Percentage (%)	
		Complete	No Complete	Complete	No Complete
VIII A	44,59	0	34	0	100
VIII B	49,72	3	33	8,33	91,67
VIII C	55,3	7	27	20,59	79,41
VIII D	51,03	3	33	8,33	91,67
VIII E	47,8	1	33	2,94	97,06
VIII F	47,2	2	33	5,71	94,29

Source : SMP Negeri 2 Patikraja Kabupaten Banyumas

Based on information from mathematics teachers at SMP Negeri 2 Patikraja, Banyumas Regency, the mathematics learning process is still teacher-centered while students are passive and less active. So it is necessary to use learning models that can increase the activeness and help students understand mathematical concepts. To increase student activity in the process of learning mathematics is not easy. Moreover, some students are still ashamed to ask the teacher. Also, the learning process in SMP Negeri 2 Patikraja is still teacher-centered while students are passive and less involved in learning. With these problems, teachers are required to provide clear teaching materials with good and appropriate models. So the cooperative learning model of Think Pair Share (TPS) and Two Stay Two Stray (TSTS) models were chosen.

Think Pair Share (TPS) cooperative learning model is a simple learning model, which was first developed by Frank Lyman of the University of Maryland. First of all, students are asked to sit in pairs. Then, the teacher asks one question/problem to them. Each student is asked to think individually about the answers to these questions, then discuss his thoughts with the pair next to him to get a consensus that represents both of their answers. After that, the teacher asks students to share, explain, or describe the results of the consensus or answers that they have agreed on with other students in the classroom (Huda, 2015: 132). By using the cooperative learning model type Think Pair Share (TPS), students better understand mathematical concepts and have no difficulty in working on the questions given by the teacher so students are more active and student learning outcomes are improved. Besides, this learning model is assumed to reduce student shame because each student is allowed to share or convey ideas.

The Two Stay Two Stray (TSTS) type of cooperative learning model or the method of staying two guests is a learning model. Learning with this method begins with the division of groups. After the group is formed, the teacher gives assignments in the form of problems to which they should discuss the answers. After the group discussion was over, two people from each group left the group to visit other groups. Group members who do not get assignments as ambassadors (guests) must receive guests from a group. Their job is to present the results of his group's work to the guest. Two people serving as guests are required to visit all groups. When they finished their work, they returned to their respective groups. After returning to the homegroup, both the students on duty and those on duty receive guests to match and discuss their work (Suprijono, 2015: 112-113). By using the cooperative learning model type Two Stay Two Stray (TSTS), students will not feel bored in the process of learning mathematics because, in this learning model, student learning tendencies are more meaningful, and the shame of asking students will decrease because it will increase student cohesiveness and confidence. So students become more active and can increase student interest and achievement.

## 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

	Class	Treatment	Learning Outcomes Tests (posttest)
<b>R</b>	Experiment I	X <sub>1</sub>	O <sub>1</sub>
<b>R</b>	Experiment II	X <sub>2</sub>	O <sub>2</sub>

Information:

R: Random

X<sub>1</sub>: Treatment using the TPS type of cooperative learning model

X<sub>2</sub>: Treatment using the TSTS type of cooperative learning model

O<sub>1</sub>: learning outcomes using the TPS type of cooperative learning model

O<sub>2</sub>: learning outcomes using the TSTS type of cooperative learning model

(Sugiyono, 2015:112)

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

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$\text{With } S^2 = \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1+n_2-2}$$

Information :

t: Price t

$\bar{x}_1$ : The average value of students with Think Pair Share learning models (experimental class I)

$\bar{x}_2$ : The average value of students with the Two Stay Two Stray learning model (experimental class II)

n<sub>1</sub>: Number of students in Think Pair Share learning models (experimental class I)

n<sub>2</sub>: Number of students in the Two Stay Two Stray learning model (experimental class II)

S<sub>1</sub><sup>2</sup>: Variation of student Think Pair Share learning models

S<sub>2</sub><sup>2</sup>: Variance of students in the Two Stay Two Stray learning model

S: Standard deviation combined

(Sudjana, 2005: 239)

Two-Party Hypothesis Test:

H<sub>0</sub>: There is no difference in mathematics learning outcomes using cooperative learning models of the Think Pair Share (TPS) type with learning outcomes in mathematics using the Two Stay Two Stray learning model (TSTS) in class VIII students in the second semester of SMP Negeri 2 Patikraja, Banyumas Regency 2016 Academic Year / 2017.

H<sub>1</sub>: There is a difference in mathematics learning outcomes using cooperative learning models of Think Pair Share (TPS) type and learning outcomes in mathematics using Two Stay Two Stray learning models (TSTS) in class VIII students of semester II of SMP Negeri 2 Patikraja, Banyumas Regency 2016 Academic Year / 2017.

The average test criteria for two parties at a significant level of 5% with degrees of freedom df = n<sub>1</sub> + n<sub>2</sub> - 2, namely:

If  $-t_{\text{table}} < t_{\text{count}} < t_{\text{table}}$ , then H<sub>0</sub> is accepted, and H<sub>1</sub> is rejected.

If  $t_{\text{count}} < -t_{\text{table}}$  or  $t_{\text{count}} > t_{\text{table}}$ , then H<sub>0</sub> is rejected, and H<sub>1</sub> is accepted.

(Sudjana, 2005: 239-240)

One-Party Hypothesis Test:

H<sub>0</sub>: Mathematics learning outcomes using Think Pair Share (TPS) type cooperative learning model is not effective compared to mathematics learning outcomes using Two Stay Two Stray learning

models (TSTS) in class VIII students of semester II of SMP Negeri 2 Patikraja, Banyumas Regency 2016 Academic Year / 2017.

$H_1$ : Mathematics learning outcomes that use Think Pair Share (TPS) type cooperative learning model are more effective than mathematics learning outcomes using Two Stay Two Stray learning models (TSTS) in class VIII students of semester II of SMP Negeri 2 Patikraja, Banyumas Regency 2016 Academic Year / 2017.

The criteria for an average test of one party at a significant level of 5% with degrees of freedom  $df = n_1 + n_2 - 2$  namely:

If  $t_{\text{count}} \geq t_{\text{table}}$ , then  $H_0$  is rejected, and  $H_1$  is accepted.

If  $t_{\text{count}} < t_{\text{table}}$ , then  $H_0$  is accepted, and  $H_1$  is rejected.

(Sudjana, 2005: 243)

## RESULTS AND DISCUSSION

Based on the results of research conducted at SMP Negeri 2 Patikraja 2 from May 22 to 22, 2017, obtained test scores on the 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

Variable	Experiment Class I	Experiment Class II
Many students	34	36
The highest score	100	100
Lowest Value	47,37	52,67
Average	79,567	71,93
Standard Deviation	12,069	11,803
Variance	145,664	139,316

Table 3 shows the number of students, highest grade, the lowest grade, average grade, standard deviation, and variance 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 Normality Test Results

Learning	$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	Significant Level	df (k - 1)	Info.
Experimentation Class I	7,329644752	7,8147	5%	3	Normal
Experimentation Class II	4,120316972	5,9915	5%	2	Normal

The sample criteria are normal if  $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ . Based on the calculation of the normality test in Table 4 above it appears that in the experimental class I  $\chi^2_{\text{count}} = 7,329644752$  and  $\chi^2_{\text{table}} = 7,8147$  so  $\chi^2_{\text{count}} < \chi^2_{\text{table}}$  with a significance level of 5% and degrees of freedom three then the test scores of mathematics learning outcomes in experimental class I are normally distributed. In the experimental class II  $\chi^2_{\text{count}} = 4,120316972$  and  $\chi^2_{\text{table}} = 5,9915$  so  $\chi^2_{\text{count}} < \chi^2_{\text{table}}$  with a significance level of 5% and degrees of freedom 2, the test scores for mathematics learning outcomes in experimental class II usually are distributed.

**Table 5.** Summary of Homogeneity Test Results

$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	Significant Level	df (k - 1)	Info.
0,01686574503	3,8415	5 %	1	Homogeneous

Homogeneous sample criteria if  $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ . Based on Table 5 above, it can be seen that  $\chi^2_{\text{count}} = 0,01686574503$  and  $\chi^2_{\text{table}} = 3,8415$  so that  $\chi^2_{\text{count}} < \chi^2_{\text{table}}$  with a level significant 5%

and degrees of freedom 1, then the variance of students' mathematics learning achievement-test data in research is the same or homogeneous.

**Table 6.** Summary of Hypothesis Test Results of Two Parties

$t^2_{\text{count}}$	$t^2_{\text{table}}$	Significant Level	df	Info.
2,676175546	1,99758	5 %	68	$H_0$ rejected, and $H_1$ accepted.

Based on Table 6, it is known a significant level of 5% and a degree of freedom 68, then obtained  $t_{\text{count}} = 2,676175546$  and  $t_{\text{table}} = 1,99758$ , so  $t_{\text{count}} > t_{\text{table}}$ , then  $H_0$  is rejected, and  $H_1$  is accepted. It means that there are differences in learning outcomes between students who take learning using TPS type cooperative learning models and students who take learning using TSTS type cooperative learning models in class VIII even semester of SMP Negeri 2 Patikraja Banyumas Regency 2016/2017 school year.

**Table 7.** Summary of One-Party Hypothesis Test Results

$t^2_{\text{count}}$	$t^2_{\text{table}}$	Significant Level	df	Info.
2,676175546	1,99758	5 %	68	$H_0$ rejected, and $H_1$ accepted.

Based on table 7, it is known that a significant level of 5% and a degree of freedom 68, then obtained  $t_{\text{count}} = 2,676175546$  and  $t_{\text{table}} = 1,99758$ , so  $t_{\text{count}} > t_{\text{table}}$ , then  $H_0$  is rejected, and  $H_1$  is accepted. Means the TPS type cooperative learning model is more effective than the TSTS cooperative learning model for mathematics learning outcomes in eighth-grade students of the second semester of SMP Negeri 2 Patikraja Banyumas Regency 2016/2017 school year.

Through cooperative learning type, TPS students can play an active role in the learning process, are more meaningful to students because students are allowed to share or share ideas with their groups and are easier to form groups, so students better understand the concept of the topic during the discussion and increase student confidence. Based on the researchers' observations, when using the cooperative learning model, TPS type of learning activities look smooth, and students look earnest to understand the material or problems provided and are more confident to ask friends and teachers and present their group work. When students are given test questions, they can work on test questions smoothly and produce good learning outcomes. While the TSTS type of cooperative learning model is a learning model using groups of two stayings and two visiting. With this learning, students will obtain various information and can share information with other students. However, in applying TSTS learning, some students tend not to want to learn in groups so that students are less active in solving the given problems. Then because this model takes too long while the learning time is limited, so students do not understand the material provided. When given the test questions, some students are confused when working on the questions, and the learning results are not good.

The description above illustrates that learning using the TPS cooperative learning model has a positive influence on learning outcomes. This is indicated by the increase in mathematics learning outcomes of students who take learning using TPS type cooperative learning models compared to students who take learning using TSTS type cooperative learning models on the subject of prism and pyramid class VIII of SMP Negeri 2 Patikraja, Banyumas Regency 2016/2017. As Nurkhasanah's research, Wiwit (2014) concluded that the TPS type of cooperative learning model positively influenced learning achievement. This means that the learning achievement of students who received the TPS type of cooperative learning model was better than the Snowball Throwing learning model in calculating fraction operations in class VII students of SMP PGRI 1 Buluspesantren in the Academic Year 2013/2014. At the same time, research conducted by Nurfaik, Erik Mukhamad (2013) concluded that the type of cooperative learning model TPS has a positive influence on learning achievement. This means that student achievement with the type of TPS cooperative learning model is better than learning with the expository method on the linear one-variable inequality material.

## CONCLUSION

Based on the results of research and discussion, it can be concluded that: (1) There are differences in the results of mathematics learning of students who take learning using TPS type cooperative learning models with the results of learning mathematics students who take lessons using TSTS type cooperative learning models in class VIII students in the second semester SMP Negeri 2 Patikraja Banyumas Regency 2016/2017 school year. This is indicated by the results of the two-party hypothesis test with a significant level of 5% and a degree of freedom 68, obtained value of  $t_{\text{count}} = 2,676175546$  and  $t_{\text{table}} = 1,99758$ , where  $t_{\text{count}} > t_{\text{table}}$ . So  $H_0$  is rejected, and  $H_1$  is accepted. (2) TPS type cooperative learning model is more effective than the TSTS type cooperative learning model for mathematics learning outcomes in eighth-grade students of the second semester of SMP Negeri 2 Patikraja Banyumas Regency 2016/2017 school year. This is indicated by the results of the one-party hypothesis test with a significant level of 5% and degrees of freedom 68, the obtained value of  $t_{\text{count}} = 2,676175546$  and  $t_{\text{table}} = 1,99758$ , where  $t_{\text{count}} > t_{\text{table}}$ . So  $H_0$  is rejected, and  $H_1$  is accepted

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