THE EFFECTIVENESS OF COOPERATIVE LEARNING MODEL TYPE OF THINK PAIR SHARE TOWARD ABILITY OF STUDENT COOPERATION IN LEARNING MATHEMATICS

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ABSTRACT

The learning model used in Junior High School (SMP) Muhammadiyah 1 Yogyakarta has not been optimal to develop student cooperation. This research aims to determine (1) the presence or absence of difference in the ability of student cooperation in learning mathematics taught using cooperative learning model type of TPS with taught using direct learning model and (2) which learning model is more effective between cooperative learning model type of Think Pair Share (TPS) direct learning model toward the ability of student cooperation. This research is experimental. The population is the students of class VII SMP Muhammadiyah 1 Yogyakarta even semester academic year 2016/2017. By random sampling, samples selected class VIIF as the experimental class and class VIIG as the control class. Instrument data collection using the ability of student cooperation observation sheet. The observation sheet has been by construct validity. The prerequisite analysis test used a normality test using the Chi-square formula and a homogeneity test using the Bartlett test. Data analysis used is the hypothesis test using a t-test with a significant level of 5% and degrees of freedom 61. Based on the result of the hypothesis, I test obtained $t_{count} = 4{,}4395$ and $t_{table} = 1{,}9996$. Because $t_{count} > t_{table}$, so H_0 is rejected. There are differences in student cooperation in learning mathematics, taught using a cooperative learning model type of TPS with a direct learning model. Furthermore, the results of the hypothesis II test is obtained $t_{count} = 4{,}4395$ dan $t_{table} = 2{,}6589$. Because $t_{count} > t_{table}$, so H_0 is rejected. Thus, TPS's cooperative learning model type is more effective than the direct learning model toward student cooperation.

Keyword: Cooperative Learning Model Type of Think Pair Share, Direct Learning Model, Ability of Student Cooperation

INTRODUCTION

The process by which teachers teach and learners are called learning. One of the subjects students must have is mathematics. Mathematics learning has several problems, one of which is the students' assumption that mathematics is difficult and tedious. Haryono in Kompri (2009: 23) said, Before teachers do the teaching and learning process, teachers need to formulate learning goals that must be mastered by students after they finish following the lessons. The use of exciting learning models and field conditions provides its points in achieving learning objectives' success. Learning in schools should build students who have a high social life and share and work with others.

Based on observations and interviews conducted on Tuesday, October 18, 2016, at SMP Muhammadiyah 1 Yogyakarta, it can be seen that the students' collaborative abilities are not yet optimal. This is seen from students who study independently, do not interact, and are entirely passive with their friends. This shows that there is no interaction between helping each other when encountering problems or problems in learning. Also, students cannot discuss answers, questions, or opinions when studying independently.

Based on the description above, it can be concluded the formulation of the problem as follows: 1) Is there a significant difference between students' collaborative abilities in learning mathematics using the TPS type of cooperative learning model and those using direct learning models in class VII students of SMP Muhammadiyah 1 Yogyakarta Semester II in the 2016/2017 school year?. 2) Is the TPS type of cooperative learning model more effective than the direct learning model of students'

ability to collaborate in learning mathematics in class VII of SMP Muhammadiyah 1 Yogyakarta Semester II in the 2016/2017 school year?

Cooperation with students can be interpreted as a relationship of mutual respect, mutual care, mutual assistance, and mutual encouragement to achieve learning objectives. One effort to improve students' collaborative abilities in learning mathematics is to use cooperative learning models of the TPS type. Arends in Trianto (2011: 61) states that 'TPS is an effective way to vary the atmosphere of class discussion patterns.'

METHODS

The data collection technique used is the observation method for data collection instruments using observation sheets. The purpose of using this observation sheet is to determine the level of student collaboration ability between experimental class students and control class students. Table 1 shows the indicators for the observation sheet, viz.

Table 1. Observation Indicators and Descriptions

No	Indicator	Observation Description
In a couple		
1	How to share ideas/opinions	Students share ideas/opinions with their partners.
2	How to share questions	Students share questions with their partners.
3	How to share answers	Students share answers with their partners.
4	How to share opinion responses	Students share opinion responses with their partners.
Between couples		
5	How to share ideas/opinions	Students share ideas/opinions with other partners.
6	How to share questions	Students share questions with other pairs.
7	How to share answers	Students share answers with other pairs.
8	How to share opinion responses	Students share opinion responses with other partners.

Before the instrument is given, it needs to be tested for its validity. A valid instrument means the measuring instrument used to obtain the data is valid in this study using the contract validity testing to test the instrument. To test the construct validity, judgment experts can be used. The experts were asked for their opinions on the instruments that had been prepared. The experts will then give opinions, instruments that will be used without repairs, need to be repaired, or changed everything.

Data analysis is divided into prerequisite tests and hypothesis tests. The prerequisite tests used in this study are:

1. Normality Test. Normality test is carried out to ensure that students' collaborative ability in each class is usually distributed or not by using t-test. Test Criteria:
   a. If $\mathcal{X}^2{}_{\text{count}} \leq \mathcal{X}^2{}_{\text{table}}$, then the population is normally distributed.
   b. If $\mathcal{X}^2{}_{\text{count}} > \mathcal{X}^2{}_{\text{table}}$, then the population is not normally distributed.

Table 2. Summary of Normality Test Results for Students' Cooperation Capabilities

Description	Experimentation Class	Control class
$\chi^2{}_{\text{count}}$	1,3454	4,1609
$\chi^2{}_{\text{table}}$	9,4877	5,9915
α	5%	5%
dk	4	2
Testing Criteria	Samples are normally distributed if $\chi^2{}_{\text{count}} < \chi^2{}_{\text{table}}$	
Information	Normal	Normal

The homogeneity test is intended to determine that the study sample starts from the same or homogeneous conditions. This study using two samples, which will be tested whether the two samples have the same variance or not. For homogeneity test using the Bartlett test. Test Criteria:

a. If $\mathcal{X}^2{}_{\text{count}} \leq \mathcal{X}^2{}_{\text{table}}$, then H_0 accepted, H_1 rejected.
b. If $\mathcal{X}^2{}_{\text{count}} \leq \mathcal{X}^2{}_{\text{table}}$, then H_0 rejected, H_1 accepted.

Table 3. Summary of Test Results of Homogeneity in Student Cooperation Capabilities

Description	Results
$\chi^2{}_{\text{count}}$	0,0603255
$\chi^2{}_{\text{table}}$	3,8415
α	5%
dk	1
Testing Criteria	Homogeneous sample if $\chi^2{}_{\text{count}} < \chi^2{}_{\text{table}}$
Information	Homogeneous

Homogeneous:

1. First Hypothesis

   To prove the hypothesis that there is a significant difference between students' ability to collaborate using the TPS type of cooperative learning model and the direct learning model, a hypothesis test is conducted with an average test of two parties.

   The null hypothesis (H_0) and its counterpart (H_1) submitted for the two-party test are as follows:

   (H_0): $\mu_1 = \mu_2$

   (H_1): $\mu_1 \neq \mu_2$

   H_0: There is no significant difference between students' ability to collaborate in mathematics learning using TPS cooperative learning models and those using direct learning models for VII grade students of SMP Muhammadiyah 1 Yogyakarta in semester II of the 2016/2017 school year.

   H_1: There is a significant difference between the ability of students to collaborate in mathematics learning using TPS cooperative learning models and those using direct learning models in class VII students of SMP Muhammadiyah 1 Yogyakarta in the second semester of 2016/2017 school year

   Test Criteria:

   a. If $-t_{\text{table}} < t_{\text{count}} < t_{\text{table}}$ then H_0 aaccepted, H_1 rejected.
   b. If $t_{\text{count}} < -t_{\text{table}}$ or $t_{\text{count}} > t_{\text{table}}$, then H_0 rejected, H_1 accepted.

   Based on value $t_{\text{count}} = 4{,}4395$ and $t_{\text{table}} = 1{,}9996$ obtained that value $t_{\text{count}} > t_{\text{table}}$, then H_0 rejected, H_1 accepted.

   This shows a significant difference between students' ability to collaborate in learning mathematics using cooperative learning models of the TPS type and those using direct learning models in class VII students of SMP Muhammadiyah 1 Yogyakarta in the second semester 2016/2017 school year.

2. Second Hypothesis

   To prove the TPS type of cooperative learning model is more effective than direct learning models of students' collaborative abilities, hypothesis testing is performed with an average test of one party.

   The null hypothesis (H_0) and its counterpart (H_1) submitted for the one-party test are as follows:

   (H_0): $\mu_1 = \mu_2$

   (H_1): $\mu_1 > \mu_2$

   H_0: The TPS type of cooperative learning model is no more effective than the direct learning model of the ability of students to collaborate in learning mathematics in class VII SMP Muhammadiyah 1 Yogyakarta in the second semester of the 2016/2017 school year

   H_1: The TPS type of cooperative learning model is more effective than the direct learning model of the ability of students to collaborate in learning mathematics in class VII SMP Muhammadiyah 1 Yogyakarta in the second semester of the 2016/2017 school year

   Test Criteria:

   c. If $t_{count} < t_{table}$, then H_0 accepted, H_1 rejected.

d. If $t_{count} > t_{table}$, then H_0 rejected, H_1 accepted.
Based on value $t_{count} = 4{,}4395$ and $t_{table} = 2{,}6589$ obtained that value $t_{count} > t_{table}$, then H_0 rejected, H_1 accepted.
This shows that the TPS type of cooperative learning model is more effective than the direct learning model of students' ability to collaborate in learning mathematics in class VII SMP Muhammadiyah 1 Yogyakarta in the second semester of the 2016/2017 school year.

RESULTS AND DISCUSSION

This study aims to determine whether or not there are significant differences in students' ability to cooperate in learning mathematics by using cooperative learning models TPS type (TPS) in class VII students of SMP Muhammadiyah 1 Yogyakarta in the second semester of the 2016/2017 school year.

In the normality test regarding the ability of students to collaborate with a significant level of 5% in the cooperative learning, model TPS type obtained value $\chi^2{}_{\text{count}} = 1{,}3454$ and $\chi^2{}_{\text{table}} = 9{,}4877$ and direct learning model obtained $\chi^2{}_{\text{cout}} = 4{,}1609$ and $\chi^2{}_{\text{table}} = 5{,}9915$ so $\chi^2{}_{\text{count}} < \chi^2{}_{\text{table}}$. This shows that both sample classes are normally distributed.

Furthermore, the homogeneity test of students' collaboration ability was obtained $\chi^2{}_{\text{count}} = 0{,}0603255$ and $\chi^2{}_{\text{table}} = 3{,}8415$ so $\chi^2{}_{\text{count}} < \chi^2{}_{\text{table}}$. The conclusion that the data is homogeneous. Both prerequisite tests are fulfilled.

Hypothesis testing I used the t-test with a significance level of 5%, obtained $\text{t}_{\text{count}} = 4{,}4395$ and $\text{t}_{\text{table}} = 1{,}9996$, so $\chi^2{}_{\text{count}} > \chi^2{}_{\text{table}}$ then H_0 was rejected. The results of the hypothesis I show there is a significant difference between the ability of students to collaborate in learning mathematics using cooperative learning models TPS type and those using direct learning models in class VII students of SMP Muhammadiyah 1 Yogyakarta in semester II of the 2016/2017 school year meaning that both classes after treatment not the same.

Hypothesis II test uses t-test with a significance level of 5% obtained $t_{count} = 4{,}4395 > t_{table} = 2{,}6589$ then H_0 is rejected. Hypothesis II results show that the TPS cooperative learning model is more effective than the direct learning model of student collaboration skills in Mathematics learning in class VII of SMP Muhammadiyah 1 Yogyakarta in the second semester of the 2016/2017 school year.

Based on the explanation above, it illustrates that learning using the Cooperative Learning model TPS type of student collaboration skills in learning mathematics VII grade SMP Muhammadiyah 1 Yogyakarta in the second semester of 2016/2017 academic year on the subject of a quadrilateral is effective, because students learn more active when collaborating with other students.

CONCLUSION

1. There is a difference between students' ability to collaborate using the TPS type of cooperative learning model and those who use the direct learning model in Mathematics class VII semester II of SMP Muhammadiyah 1 Yogyakarta 2016/2017 school year.
2. The TPS type of cooperative learning model is more effective than the direct learning model of students' ability to collaborate in learning mathematics in class VII semester II of SMP Muhammadiyah 1 Yogyakarta in the 2016/2017 school year.

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