THE EFFECTIVENESS OF USING COOPERATIVE LEARNING MODEL OF GROUP INVESTIGATION AND THINK PAIR SHARE ON THE MATHEMATICS LEARNING OUTCOMES OF THE EIGHT-GRADE STUDENTS

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ABSTRACT

Mathematic learning for the eighth-grade students at Muhammadiyah Junior high School Banguntaoan (SMP Muhammadiyah Banguntapan) Yogyakarta uses lecture method, discussion, and question and answer, which resulted in the students less enthusiastic during the mathematic lessons. Also, the mathematics lesson that is considered difficult, and the method is considered less fun is an obstacle for students to get a satisfactory mark. This research aims to find whether there are differences on students' result of learning mathematics using group investigation learning model and think pair share learning model and to compare the effectiveness of both models on the result of learning mathematics of the eighth-grade students of even semester at SMP Muhammadiyah Banguntapan Yogyakarta in the academic year 2016/2017. This research population is the eighth-grade students of SMP Muhammadiyah Banguntapan, which are class VIIIA, VIIIB, and VIIIC. The sample of this research is taken from two classes using a random sampling technique for the classes. It is obtained from the experiment class VIIIB and the experiment class VIIIA. The design of this research is the posttest-only control design. The data collection is obtained using the test method. The instrument is tested using validity, reliability, and different potency test. The data analysis technique used for prerequisite analysis tests is the normality test, homogeneity test, and hypothesis test. The result of this research at a significant level 5% and df= 60 indicates that: (1) There are differences in the students' learning mathematics results using the group investigation learning model and Think Pair Share learning model. It is showed by the value of $t_{count} = 4,24100$ and $t_{table} = 2,00030$ so that $t_{count} > t_{table}$ and (2) group investigation learning model is more effective than Think Pair Share learning model on the students' result of learning mathematics. It is indicated by the value of $t_{count} = 4,24100$ and $t_{table} = 1,67065$ so that $t_{count} > t_{table}$.

Keywords: Effectiveness, group investigation learning model, think pair-sharing learning model, and the result of mathematics learning.

INTRODUCTION

　　　Education is one of the keys to the formation of quality human resources. To develop one's potential with diverse competencies, one must go through an educational process implemented in the existing learning process. The existence of formal and nonformal education as one of the government programs to develop human resources can be developed through mathematics education. Mathematics is the king of all science; learning mathematics will consciously train the ability to think critically, logically, analytically, and systematically. The existence of mathematics can make it easier to solve problems in everyday life. Until now, mathematics in schools is still an obstacle in some students. Mathematics is still considered challenging, less enjoyable, and monotonous methods become one of the obstacles for students to get satisfactory grades. Many students have not yet reached the specified mathematical competency standard.

　　　This can be seen from the results of the Middle Semester Grade VIII students of mathematics subjects in the even semester of the SMP Muhammadiyah Banguntapan, Bantul in the 2016/2017 school year. There are still many students who get grades below the Minimum Completeness Criteria (MCC) set at the school, 72. The subjects will determine the success or failure of the learning process. These determinants consist of teachers and students; as educators, the teacher's task is not only limited to

delivering the material and guaranteeing that the material can be understood and understood by students. Teachers can create proper classroom management, one of which is the learning model used during the learning process.

According to Suprijono, Agus (2009: 46), the learning model is a pattern that is used as a guide in planning learning in class and tutorials. In learning, the teacher is expected to choose a learning model by the material and competency standards and basic competencies in content standards. The learning process of students can be done individually or in groups because not all students learn individually. The learning model that is done in groups and requires collaboration is called the cooperative learning model. According to Suherman, Erman.dkk (2003: 260), cooperative learning includes a small group of students who work as a team to solve a problem, complete a task, or do something to achieve another common goal. Cooperative learning models have several types, including group investigation (GI) and think pair share (TPS). According to Sharan in Slavin, Robert E (2005: 24), Group Investigation is a common classroom arrangement plan where students work in small groups using cooperative questions, group discussions, and cooperative planning and projects. According to Sharan in Taniredja, Tukiran. Et al. (2011: 75-76), the unique characteristics of group investigations are the integration of four basic features: investigation, interaction, interpretation, and intrinsic motivation. According to Slavin, Robert E (2009: 218), there are six stages in this learning model, namely, identifying topics and organizing students into groups, planning tasks to be studied, carrying out investigations, preparing final reports, presenting final reports and finally evaluations. According to Shoimin, Aris (2014: 208-209), Think pair share (TPS) is a cooperative learning model that gives students time to think and respond and help one another. This model introduces the idea of thinking time or waiting time, which is a substantial factor in increasing students' ability to respond to questions. Cooperative learning of the Think Pair Share model is relatively more uncomplicated because it does not take up a long time to arrange seating or group students. This learning trains students to dare to think and respect the opinions of friends.

Think pair share (TPS) has procedures that explicitly give students time to think, answer, help one another. Thus, students are expected to work together, need each other, and are interdependent on small groups cooperatively. According to Suprijono, Agus (2009: 91) the syntax or stages of TPS implementation are as follows: (1) The teacher asks questions or issues related to the lesson for students to think about (2) The teacher allows them to think about their answers (3) The teacher asks students to pair up (4) The teacher allows the pairs to discuss (5) The results of the discussion of the pairs are discussed with the whole class and (6) Questions, and answers are expected.

The problems in this study are: 1) Is there a difference between the learning outcomes of students who take part in learning using Group Investigation (GI) cooperative learning models with the mathematics learning outcomes of students who take lessons using Think Pair Share (TPS) type cooperative learning models for students class VIII even semester 2016/2017 SMP Muhammadiyah Banguntapan? 2) Which is the more effective learning model between the cooperative learning model of the Group Investigation (GI) type and Think Pair Share (TPS) type towards the learning outcomes of students of class VIII in the even semester of SMP Muhammadiyah Banguntapan, Bantul in the 2016/2017 school year?

The purpose of this study is to find out: 1) To find out whether there is a difference between the learning outcomes of students who take part in learning using Group Investigation (GI) cooperative learning with students who take lessons using Think Pair Share (TPS) type cooperative learning models in VIII grade students even semester of SMP Muhammadiyah Banguntapan, Bantul, 2016/2017 school year. 2) To discover the most effective learning model from the two learning models of the Group Investigation (GI) type and Think Pair Share (TPS) type towards the mathematics learning outcomes of VIII grade students in the even semester of SMP Muhammadiyah Banguntapan in the 2016/2017 school year.

METHODS

This research is classified as quantitative research. The research site was conducted at SMP Muhammadiyah Banguntapan, Bantul, Yogyakarta, with research subjects in class VIII, even semester 2016/2017 academic year. The population in this study were Class VIII students of SMP Muhammadiyah Banguntapan Bantul Yogyakarta in the 2016/2017 school year, with 119 students divided into four classes. While the sample in this study was determined randomly to the class, namely using a random sampling technique after the drawing of the population consisting of 4 classes obtained class VIII B with 30 students as experimental class A (group investigation) and class VIII A with 32 students as experimental class B and VIII C with 30 students as a test class. The variables in this study were Think Pair Share (TPS) learning model and Group Investigation (GI) learning model and mathematics learning outcomes for Grade VIII students of SMP Muhammadiyah Banguntapan in the even semester of the 2016/2017 school year. In this study, the data collection instrument used was a test. The instrument test was conducted to determine whether the test items had proper question qualifications, namely, valid and reliable items. The next step after the test questions have been tested, namely analyzing the test items. The analysis includes item validity tests, different power, and reliability test with the KR-20 formula.

Analysis prerequisite test with normality test with Chi-squared formula and Homogeneity test with Bartlet test formula. After carrying out the analysis prerequisite test, then the hypothesis test is then performed on the data. The first hypothesis test uses a two-part hypothesis test; this test is conducted to prove the hypothesis that there is a real difference regarding the average learning outcomes of students who use Think Pair Share (TPS) learning model with the results of learning mathematics students who use Group Investigation type learning models (GI) VIII grade students of Even Semester SMP Muhammadiyah in Banguntapan Yogyakarta in the 2016/2017 Academic Year. After that, the second hypothesis test is a one-party hypothesis test; this test is conducted to prove the mathematics learning hypothesis that uses the Group Investigation (GI) type of learning model is more effective than the mathematics learning model that uses the Think Pair Share (TPS) type.

RESULTS AND DISCUSSION

The summary of normality ability test results in early mathematics can be seen in Table 1.

Table 1. Normality Test Results

Class	χ^2_{count}	χ^2_{table}	Df	Info
GI	1,5528	5,9915	2	Normal
TPS	1,8444	5,9915	2	Normal

From the normality test at a significant level of 5% $\chi^2_{count} < \chi^2_{table}$, the distribution of data obtained on each variable is normally distributed.

The summary of the homogeneity results of the initial mathematical abilities can be seen in Table 2.

Table 2. Homogeneity Test Results

χ^2_{count}	χ^2_{table}	df	Info
0,46766	3,8415	1	Homogeneous

Based on the table above at a significant level of 5%, it can be seen that the results of $\chi^2_{count} < \chi^2_{table}$, then the initial ability value of the two classes, namely the GI experimental class TPS experimental class has the same variance (has a homogeneous variance).

The summary of the average ability test results of the initial mathematical ability of students in the GI experimental class and the TPS Experiment class can be seen in table 3.

Table 3. Similarity Test Results

t_{count}	t_{table}	Df	Info
1,89951	2,00030	60	$H_0\ accepted$

Based on the calculation in the table above with a significant level of 5% obtained $t_{count} < t_{table}$, then H_0 is accepted, and H_1 is rejected, which means that there is no difference in the average initial mathematical ability of students between the GI experimental class and the TPS experimental class.

The summary of the results of the normal mathematical ability test can be seen in Table 4.

Table 4. Normality Test Results in Mathematics Learning Outcomes

Class	χ^2_{count}	χ^2_{table}	df	Info
GI	0,4319	5,9915	2	Normal
TPS	0,0365	5,9915	2	Normal

From the normality test at a significant level of 5%, $\chi^2_{count} < \chi^2_{table}$, this means that the distribution of data obtained on each variable is normally distributed.

Table 5. Homogeneity Test of Mathematics Learning Outcomes

χ^2_{count}	χ^2_{table}	Df	Info
0,97005	3,8415	1	Homogeneous

Based on the table above at a 5% significance level, it can be seen that the results of $\chi^2_{count} < \chi^2_{table}$, then the value of the mathematics learning outcomes of the two classes, namely the GI experimental class TPS experimental class has the same variance (has a homogeneous variance).

The summary of the first hypothesis of the test scores of students' mathematics learning outcomes in the GI experimental class and the TPS experimental class can be seen in Table 5.

Table 5. The First Hypothesis Test Results

t_{count}	t_{table}	Df	Info
4,24100	2,00030	60	H_0 rejected

Based on the results of the analysis conducted in the first hypothesis test as in table 5 with a significant level of 5% obtained $t_{count} < t_{table}$, then H_0 is rejected, and H_1 is accepted, which means that there are differences in student learning outcomes in mathematics learning using Group Investigation learning models with student mathematics learning outcomes whose learning uses Think Pair Share learning models for students of class VIII SMP Muhammadiyah Banguntapan Bantul even semester 2016/2017 Academic Year. Because there are differences, then one-party hypothesis testing is performed to determine which learning model is more effective.

The summary of the results of the second hypothesis of the mathematics learning achievement test scores of the GI experimental class and the TPS experimental class can be seen in Table 6.

Table 6. Second Hypothesis Test Results

t_{count}	t_{table}	df	Info
4,24100	1,67065	60	H_0 rejected

Based on the results of the analysis conducted as in table 6 with a significant level of 5%, the results of $t_{count} > t_{table}$ are accepted, H_0 is rejected, and H_1 is accepted, which means that the Group Investigation learning model is more effective than the Think Pair Share learning model for the mathematics learning outcomes of VIII grade students of SMP Muhammadiyah Banguntapan Bantul even semester 2016/2017 Academic Year.

CONCLUSION

Based on the analysis of the experimental data and its discussion, this activity concludes the following:

1. There is a difference in mathematics learning outcomes using the Group Investigation learning model and those using the Think Pair Share learning model in class VIII students of SMP Muhammadiyah Banguntapan Bantul, even semester 2016/2017 school year. This is indicated by the results of the first hypothesis test at a significant level of 5% and the degree of freedom = 60 obtained. The value of $t_{table} = 2.00030, t_{count} = 4.24100$ to obtain $t_{count} > t_{table}$.

2. The Group Investigation learning model is more effective than the Think Pair Share learning model for the mathematics learning outcomes of Grade VIII students of SMP Muhammadiyah Banguntapan Bantul on the even semester of the 2016/2017 school year. This is indicated by the results of the second test of 5% significance level and degrees of freedom = 60 obtained $t_{table} = 1.67065, t_{count} = 4.24100$, so $t_{count} > t_{table}$.

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