EFFECTIVENESS OF COOPERATIVE LEARNING MODEL OF *KANCING GEMERINCING* TECHNIQUES ON MATHEMATICAL LEARNING OUTCOMES

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ABSTRACT

The researcher does this research because the result of the learning mathematics is still low. This research aims to find out the learning mathematics results by using the kancing gemerincing technique of the cooperative learning model on second-semester student grade VIII in SMP Negeri 4 Yogyakarta at Academic Year 2016/2017. The research population is all of the second-semester students grade VIII of SMP Negeri 4 Yogyakarta academic year 2016/2017, which consists of 5 classes: VIII A, VIII B, VIII C, VIII D, and VIII E with the number of 168 students. The sampling technique uses random sampling, where class VIII D as the experimental class I and class VIII B as the experimental class II. The data collecting techniques use documentation, interview, and test method. The testing instruments use validity tests, discriminating power tests, and reliability tests. The data analysis technique used for the prerequisite test uses the normality test with the chi-square and homogeneity test by Bartlet test formula. Moreover, the t-test is used for the hypothesis test. The result of the research shows at the 5% significance level and dk= 66 that (1) there are differences in mathematic learning result among the students who use the kancing gemerincing technique of cooperative learning model and who uses the TS-TS technique of cooperative learning model on second-semester students grade VIII of SMP Negeri 4 Yogyakarta in academic year 2016/2017. It is indicated by the result of t_{count} = 2,4339 and t_{table} = 1,9983, so $t_{count} > t_{table}$. (2) The kancing gemerincing technique of cooperative learning model is more effective than the TS-TS technique of cooperative learning model toward the mathematic learning result of the second-semester students grade VIII in SMP Negeri 4 Yogyakarta at academic year 2016/2017. It is showed by the result of t_{count} =2,4339 and t_{table} =1,6693, so $t_{count} > t_{count}$.

Keywords: Effectiveness, Kancing Gemerincing, TS-TS, Mathematics Learning Result

INTRODUCTION

Education is a conscious effort to develop human resources' potential by encouraging and facilitating through teaching and learning activities. One element that must be present in teaching and learning activities is students. By nature, each student is equipped with potential or ability. To develop its Course, each student has a variety of ways of learning. Some students can Some students cannot, some students can. There well by paying attention to what the teacher explains and taking notes, and there are also studen. There learn by being directly involved in learning activities. According to Biggs (in Shah, Muhibin, 2015: 67) in the introduction Teaching for Learning: The View from Cognitive Psychology defines learning in three kinds of formulations, namely: quantitative formulation, institutional formulation, qualitative formulation. So, according to him, learning is not only cognitive development activities, but the quality of teaching a teacher is also very influential on the acquisition of the quality of student learning and the quality of students' thinking power in solving problems faced by students.

Also, to achieve learning objectives, conducive learning environment conditions need to be created. This will relate to teaching. AM, Sardiman (2014: 48) defines teaching as an effort to create conditions conducive to students' ongoing learning activities. One of the teacher's roles in the learning process is to motivate students to be more passionate and active in the learning process. Learning sees that students must be actively involved in the learning process. Therefore, so that the learning process is

realized optimally, the teacher should also choose the right learning model to encourage students to be active and explore their potential optimally.

One learning model that provides space for students to participate in the learning process actively is cooperative. According to Slavin (in Sholeh, Moh, 2014: 76), cooperative learning is a learning model where learners work in teams or small groups to help one another in learning material. One of the techniques of cooperative learning models that can be applied to the subject of all subjects is the jingling button technique. The jingle button technique uses the button as its medium. Each student will be given several buttons. Each time the student finishes speaking or arguing, he must turn in one button and place it on the group table. If the button that one of the students has runs out, he is not allowed to talk until all his colleagues have also used up the button. If all the group members' buttons are gone while the task has not been completed, the group may agree to divide the buttons again and repeat the procedure.

This technique requires students to be brave to speak and contribute to the group discussions. Usually, in group work, some students are predominantly talkative, some students tend to be passive and rely on smart friends. Another advantage of the clinking button technique is to overcome the barriers of opportunity that often color in group work so that each student gets the same opportunity to participate so that this technique makes all students active in group discussion activities. Mathematics is one of the subjects taught at all levels of the school. Mathematics is very important in everyday life. Teaching mathematics in school is so that students can think logically, rationally, and critically in dealing with problems in everyday life. Given the importance of mathematics lessons, it is necessary to apply appropriate learning models in mathematics learning. The cooperative learning model of the clinking button technique becomes one of the alternative teachers in implementing mathematics learning. The success of mathematics learning is also primarily determined by the quality and ability of teachers in teaching.

Based on the results of an interview conducted on 23 December 2016 with a mathematics teacher in class VIII of SMP Negeri 4 Yogyakarta, several problems were found in the learning process including the fact that although the learning process had used group discussion-based learning, there were still students who had difficulty understanding mathematical concepts and did not all students participate in the group. One of the learning models that he has ever applied is the TS-TS cooperative learning model. However, the technique has not been enough to influence student learning outcomes. This technique will be reapplied in this study as the teacher has applied it.

Based on the data of the odd semester final results for the 2016/2017 school year, there are still many students who get math scores under the Minimum Completeness Criteria (CCM). Mathematics KKM for VIII grade at SMP Negeri 4 Yogyakarta is 78. Table 1 shows a summary of the data on the results of odd semester Final Examinations for mathematics subject at VIII grade at SMP Negeri 4 Yogyakarta.

Table 1. Summary of Data on Mathematics and Natural Sciences Level VIII Results of SMP Negeri 4 Yogyakarta Odd Semester for the 2016/2017 Academic Year

Class	VIIIA	VIIIB	VIIIC	VIIID	VIIIE
Score Max	94	84	96	96	92
Score Min	36	37	32	33	26
Mean	67,4545	63,2059	63,3529	62,2059	68,3030
Lots of Data	33	34	34	34	33
Total students completed	10	5	8	5	10
Total students not completed	23	29	26	29	23
Percentage (%) Completed	30,3030	14,7059	23,5294	14,7059	30,3030
Percentage (%) Not Complete	69,6970	85,2941	76,4706	85,2941	69,6970

(Data Source: SMP Negeri 4 Yogyakarta)

From the above description, the researcher is interested in researching with the title The Effectiveness of the Model of the Studying Technique of Clanging Buttons on Mathematics Learning Outcomes of Class VIII Students of SMP Negeri 4 Yogyakarta Even Semester 2016/2017 Academic Year.

Based on the background description of the problem, the following research problems can be formulated:1) Are there differences in mathematics learning outcomes between those who use the cooperative learning model of clanking buttons and those who use the cooperative learning model of TS-TS techniques in class VIII students of SMP Negeri 4 Yogyakarta even semester 2016/2017 academic year. 2) Is the jingle cooperative learning model more effective than the TS-TS cooperative learning model on the mathematics learning outcomes of Grade VIII students of SMP Negeri 4 Yogyakarta, even semester 2016/2017 academic year.

Based on the formulation of the problem, the research objectives to be achieved are as follows: 1) To find out whether or not there are differences in mathematics learning outcomes between those who use the cooperative learning model of clanking buttons and those who use the cooperative learning model of TS-TS techniques in class VIII students of SMP Negeri 4 Yogyakarta even semester 2016/2017 academic year. 2) To find out which is more effective between the clanging button cooperative learning model and the TS-TS technique cooperative learning model to the mathematics learning outcomes of Grade VIII students of SMP Negeri 4 Yogyakarta even semester 2016/2017 academic year.

METHODS

This research is experimental. The design in this study uses True Experimental Design form design with a posttest-only type control design. This study uses two classes, namely the class of experimentation I and class of an experimental II. In the experimental class, I was given treatment using a cooperative learning model of the button's technique. In the experimental class, II was given treatment using a cooperative learning model of the TS-TS technique. This research was conducted at SMP Negeri 4 Yogyakarta. The time of implementation is in the even semester of lesson 2016/2017. The schedule or time of the study was conducted on 10 April, 15 April, 25 April, 29 April, 9 May, 16 May, and 17 May. This study population comprises all students of grade VIII SMP Negeri 4 Yogyakarta, amounting to 168 students.

Samples in this study used random sampling techniques. The result of random sampling is VIII D with 34 students as experimental class I and class VIII B with 34 students as experimental class II. In this study, there were three variables of the cooperative learning model of the technical buttons given to the experimental class I and the model of cooperative learning techniques of TS-TS in experimental class II and students ' mathematical learning outcomes. The data collection techniques used are interviews, documentation, and tests. Interviews in this study were conducted to obtain data on the variables contained in this study in which the interview data was the backdrop of the research. Documentation is used to obtain data about the initial student's ability in mathematics prior to the experiment. In this study, test techniques were used to obtain the data of students ' mathematical learning results after experimentation. Analysis of the test instruments using the validity test of the content by the study and validity of the grain problem with the correlation formula of product-moment (Arikunto, Suharsimi, 2014:213). To test the differentiator power using the formula of Discrimination Index (Arikunto, Suharsimi, 2012:228). As for the reliability test using the formula KR-20 (Arikunto, Suharsimi, 2014:231). Data analysis techniques use normality testing with chi-squared formula, homogeneity test with Bartlet formula test, and hypothesized test with test-t formula. The test-T formula is as follows:

$$t_{count} = \frac{\bar{X}_1 - \bar{X}_2}{S_{Combined}\sqrt{\frac{n_1+n_2}{n_1 n_2}}}$$

$$\text{with } S_{Combined}\sqrt{\frac{(n_1-1)s_1{}^2+(n_2-1)s_2{}^2}{(n_1+n_2)-2}}$$

$\bar{X}_1$: Average grade with cooperative learning jingling button techniques

$\bar{X}_2$: Average grade with TS-TS cooperative learning techniques
n_1: Many students group the cooperative learning model of the clank button technique
n_2: Many students group TS-TS cooperative learning models
$s_1{}^2$: Variances of students value with cooperative learning of button-tinkling techniques
$s_1{}^2$: Student value variances with the TS-TS Engineering Cooperative Learning
$S_{combined}$: Composite standard deviation
(Sundayana, Rostina: 2015).

RESULTS AND DISCUSSION

Before the experiments were conducted, the average students ' primary grades were tested in advance. From the initial proficiency analysis results, the average value of the initial ability of the experimental class I was 62.2059 and the II experimental class of 63.2059. Furthermore, the test results of the normality of the initial capability values can be seen in table 2.

Table 2. Test summary normality of initial ability value

Class	χ^2_{count}	χ^2_{table}	df	Information
Experiment I	0,0758	5,9915	2	Normal
Experiment II	4,2144	7,8147	2	Normal

The criterion of data distribution is normal if $\chi^2_{count} < \chi^2_{table}$. Table 2 shows that in the experimental class, I, with a significant level of 5% and degree of Freedom 2, obtained $\chi^2_{count} = 0.0758 < \chi^2_{table} = 5.9915$. So that the initial capability grade data of experimental class I is a normal distribution. In experimental class II with a significant level of 5% and Freedom Degree 3, it obtained $\chi^2_{count} = 4.2144 < \chi^2_{table} = 7.8147$. The initial ability of class II experimentation grade data is a normal distribution, as for the summary test homogeneity, the value of early math students can be seen in table 3.

Table 3. Summary test homogeneity value early capability

χ^2_{count}	χ^2_{table}	df	Information
0,5167	3,8415	1	Homogeneous

A homogeneous sample criterion if $\chi^2_{count} < \chi^2_{table}$. From table 3 It appears that $\chi^2_{count} = 0.5167$, $\chi^2_{table} = 3.8415$ at a significant level of 5% and degrees of freedom 1, thus $\chi^2_{count} < \chi^2_{table}$, this suggests that the variance of data of the initial ability value of students in the sample class is homogeneous research. A further summary of the results of the two-party hypothesis test calculation can be seen in table 4.

Table 4. Two-party hypothesis test summary initial proficiency value

t_{count}	t_{table}	df	Information
0,3086	1,9983	66	H_0 accepted

Based on the result of the calculation done with a significant level 5% and df = $n_1 + n_2 - 2 = 34 + 34 - 2 = 66$, retrieved $-t_{table}$ =-1,9983 ≤ t_{count}= 0,3086 ≤ t_{table} = 1,9983. Then H_0 is accepted, and H_1 is rejected, so it can be concluded that there is no difference in the value of early students between using a cooperative learning model of buttonhole techniques that use a technique cooperative learning model TS-TS.

After obtaining the results, the initial ability value analysis further analyzes the learning outcomes' test value data. Based on the results of the analysis of data conducted, we obtained a description of the value of learning outcomes, test normality, and test homogeneity. From the results of the description of Math learning test value is achieved an average of the results of the study of the class I was higher than 84.0074 than the average of the outcome of the experimental grade II study result of 77.3897. A summary of the test results normality of learning outcomes can be seen in table 5.

Table 5. Summary test the normality value of learning outcomes

Class	χ^2_{count}	χ^2_{table}	df	Information
Experiment I	5,4882	5,9915	2	Normal
Experiment II	2,2720	5,9915	2	Normal

The criterion of data distribution is normal if $\chi^2_{count} < \chi^2_{table}$. Table 5 shows that in the experimental class, one, with a significant level of 5% and degree of Freedom 2, obtained χ^2_{count} = 5.4882 < χ^2_{table} = 5.9915. Thus, the data of the learning outcomes of class I have a normal distribution. In experimental class II with a significant level of 5% and 2 degrees of freedom, it obtained χ^2_{count} = 2.2720 < χ^2_{table} = 5.9915. So the data of the experimental class II learning result value is a normal distribution. The next summary of the results of the homogeneity test result of learning value can be seen in table 6.

Table 6. Summary test of homogeneity value of learning outcomes

χ^2_{count}	χ^2_{table}	df	Information
0,9442	3,8415	1	Homogeneous

A homogeneous sample criterion if $\chi^2_{count} < \chi^2_{table}$. From table 6 It appears that χ^2_{count} = 0.9442, χ^2_{table} = 3.8415 at a significant level of 5% and degrees of freedom 1, thereby $\chi^2_{count} < \chi^2_{table}$, this indicates that the data variances of the initial ability value of students in the homogeneous sample class of research. A further summary of the results of the two-party hypothesis test calculation can be seen in table 7.

Table 7. Two-party hypothesis test summary learning Outcomes

t_{count}	t_{table}	df	Information
2,4339	1,9983	66	H_0 accepted

Based on the result of the calculation done with a significant level 5% and df = $n_1 + n_2 - 2 = 34 + 34 - 2 = 66$, retrieved $-t_{table}$ =-1,9983 ≤ t_{count}= 2,4339 ≤ t_{table} = 1,9983. Then H_0 rejected, and H_1 accepted, so it can be concluded that there is a difference in the value of student learning outcomes between those using cooperative learning models of buttonhole techniques that use a cooperative learning model of TS-TS techniques on Students of Grade VIII SMP Negeri 4 Yogyakarta in the first semester of lesson 2016/2017. A further summary of the results of one party hypothesis test calculation can be seen in table 8.

Table 8. Summary of one-party hypothesis test learning outcomes

t_{count}	t_{table}	df	Information
2,4339	1,6693	66	H_0 accepted

Based on the result of the calculation done with a significant level 5% and df = $n_1 + n_2 - 2 = 34 + 34 - 2 = 66$, retrieved$-t_{table}$ =-1,6693 ≤ t_{count} = 2,4339 ≤ t_{table} = 1,6693. Then H_0 rejected, and H_1 accepted so that it can be concluded that the cooperative learning model of button technique sparkling is more effective than the cooperative learning model of the TS-TS technique against the results of mathematics learning class VIII SMP Negeri 4 Yogyakarta in the even semester of lesson 2016/2017.

CONCLUSION

Based on the analysis of research results, the following research conclusions can be taken:

1. There are differences in mathematics learning outcomes among those who use the cooperative learning model of buttons in the technique of the learning of the students who use the model of cooperative learning techniques TS-TS in grade VIII students SMP Negeri 4 Yogyakarta The even semester of lesson 2016/2017. This is demonstrated by the acquisition of two-party hypothesis test

results with a significant level of 5% and DF = 66, obtained t_{count} = 2,4339 and t_{table} = 1,9983, so $t_{count} > t_{table}$, which means H_0 rejected, and H_1 accepted.

2. The Cooperative learning model is a more effective buttonless button technique than the TS-TS cooperative learning model of students ' mathematical learning outcomes of grade VIII Junior Secondary School 4 Yogyakarta semester in the year's lesson 2016/2017. This is demonstrated by the acquisition of a one-party hypothesis test result with a significant level of 5% and df = 66, obtained t_{count} = 2,4339 and t_{table} = 1,6693, so $t_{count} > t_{table}$, which means H_0 rejected and H_1 accepted.

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