



COMPARATIVE STUDY OF MATHEMATICS LEARNING STUDENTS OUTCOMES TAUGHT BY COOPERATIVE LEARNING MODEL TEAMS GAMES TOURNAMENT TYPE (TGT) AND TALKING STICK TYPE (TS)

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Abstract

This research method was Experimental Research. The Research aimed at determining whether there were differences on the student learning outcomes taught by cooperative learning model Teams Games Tournament type (TGT) and the students who were taught by cooperative learning model Talking Stick type (TS). This research was conducted at class VIII SMP Negeri 2 Kolaka in the academic year 2016/2017 consisting of 8 classes with total students was 199 students. VIII₅ Class was the first experimental class taught by cooperative learning model TGT type and VIII₃ Class was the second experimental class taught by cooperative learning TS type. Technique of Data Analysis used descriptive statistics and inferential statistics. The research findings were: (1) Mathematics learning outcomes of students taught by cooperative learning model TGT type consisting of 28 students obtained mean = 81,29, median = 84, mode = 85, standard deviation = 8,814, and variance = 77,693. In addition, 23 of 28 students (82.15%) had learning outcomes above KKM = 75, and 19 of 28 students (57.14%) had scores above mean = 81.29. (2) The learning outcomes of mathematics student taught by cooperative learning model of TS type consisting of 28 students obtained mean = 81,64, median = 84,50, mode = 87, standard deviation = 9,306, and variance = 86,605. In addition, 22 of 28 students (78.57%) had learning outcomes above KKM = 75, and 20 of 28 students (71.42%) had scores above mean = 81.64. Based on the findings above, it can be concluded that there was no difference in the mean of mathematics learning outcomes of students taught by cooperative learning model both TGT type and TS type. The models provided good learning outcomes and improved the students' engagement in the teaching and learning process.

Keywords: Mathematics Learning Outcomes, Teams Games Tournament, Talking Stick.

A. Introduction

In government act No. 20, 2003 year about National Education System, stated that "Education is a conscious and planned effort to create an atmosphere of learning and learning process so that

learners actively develop their potential to have spiritual power, self-control, personality, intelligence, and moral noble, as well as the skills required of himself, society, nation and state". Based on the author's observation during the observation at SMP Negeri 2 Kolaka in the learning process of mathematics low student learning outcomes by caused the way teachers tend to be monotonous, students only receive information that has been given by teachers consequently students cannot develop knowledge independently and make students less active and feel saturated. The method used is good, but the lack of variation in learning causes the lack of mastery of material and achievement of results is still far from expected. The result of learning mathematics is in low category seen from the average value of learning result is 49 if compared with value of KKM that is 75 mean, so that, still need improvement in learning process. A learning model that can be applied in achieving mathematics learning outcomes is a cooperative learning model. Cooperative learning Models is theoretically considered capable of developing not only academic achievement, but also non-academic such as interpersonal relationships and teamwork, (Rusman, 2012: 202).

Cooperative learning models that can be applied include cooperative learning model Teams Games Tournament (TGT) type and Talking stick (TS) type. TGT is a learning model that involves the activities of all students without having differences in status (high ability level, medium or low, tribe, etc.), involving the role of students as peer tutor and contains the element of the game. This learning model is designed to enable students to learn more relaxed as well as foster responsibility, cooperation, fair competition and learning involvement, (Shoimin, 2014: 203-204). Model of cooperative learning TS type is done with the help of a stick, who holds the stick must answer questions from the teacher after learners learn the main subject. This learning will create a fun atmosphere and make learners active and encourage learners to dare to express opinions, Suprijono (in Shoimin, 2014: 198). TS learning model could give a better effect on mathematics learning outcomes, this is reinforced by Diah Laila Khasanah research in 2013, indicating that the application of effective learning model TS to the mathematics learning outcomes.

Therefore, the study was compare the results of mathematics learning of students who were taught using TGT learning model and learning model of TS students of VIII grade SMP Negeri 2 Kolaka.

B. Literature Review

Teams Games Tournament (TGT)

Definition

The cooperative learning model of TGT type involves all student activities without difference any status, involving the role of the student as a peer tutor and containing the element of the game. In TGT students are formed in small groups of three to five heterogeneous students, both in academic, gender, race, and ethnic achievements. According to Slavin (in Binar, 2012: 11) "TGT is type cooperative learning consists of five steps: classroom, teams, game, (team recognition).

Based on what is revealed by Slavin (in Binar, 2012: 11), the cooperative learning model of TGT type have the following characteristics:

- a. Students work in small groups. Students are placed in 5 to 6 member study groups with different abilities, genders, and tribes or races.
- b. Games tournament in this game every competing student is a representative of his group. Students representing his group, each placed in tournament tables. Each tournament table is occupied by 5 to 6 participants, and it is endeavored to avoid any participants coming from the same group. In each table the tournaments are cultivated by each participant homogeneously. The game begins with notifying the rules of the game. After that the game begins by distributing the question cards to play (the question card and the key is placed upside down on the table so the problem and the keys are not readable). Where the determination of points obtained by each group member is based on the number of cards obtained by as shown in Table 1.

Table 1. Games Score Criteria

Criteria	Score
Highest	40
High	30
Medium	20

Low	10
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Group awards, the first step before awarding a group award is to calculate the group average score. To select the average group score is done by summing the scores obtained from each group member divided into the number of group members. The award is based on the average points earned by the group. Where this award will be given to teams that meet the category of points can be seen in Table 2.

Table 2. Team Reward Criteria

Score	Criteria
30 to 39	Less Good Team
40 to 44	Good Team
45 to 49	Best Team
More than 50	Special Team

Steps

- Teacher presents the material.
- Teacher gives form heterogeneous groups and arrange student seats so that each group member can meet each other face to face.
- Teacher distributes LKS.
- If there are questions from students, teacher could to ask group friends one question first, before asking the teacher.
- The teacher goes around supervising group performance.
- The teacher acts as a resource / facilitator.
- Teacher gives answer key from LKS so that learners check their own answer.
- Teacher provides a game that is mathematical to be played by learners with other group members to gain additional score of their team.
- Teacher gives awards to the students who answered correctly and the group that got the highest score.
- Teacher makes form a homogeneous group for the tournament.
- Teacher gives the problem to be worked out in each tournament table and the question between the table one different from the other table problem.
- Teacher dismisses the group and asks the students to return to their original place.
- Teacher provides assignment or homework individually.

Talking Stick (TS)**Definition**

The cooperative learning model of talking stick type is done with the help of a cane, who holds the stick must answer questions from the teacher after learners learn the main subject. Learning stick talk is very suitable for students of elementary, junior high, and high school or vocational school. In addition to training in speaking, this learning will create a fun atmosphere and make learners active. This strategy begins with the teacher's explanation of the subject matter to be learned later with the help of the sticking stick that learners are required to reflect or repeat the material learned by answering questions from the teacher. Who holds the stick, it is who obliged to answer the question (Talking), (Shoimin, 2014: 198).

Steps

- The teacher explained the purpose of learning at the time.
- The teacher formed a group of 5 people.
- The teacher prepared a stick that was 20 cm long.
- After that, the teacher presents the main subject that will be studied, then give the group opportunity to read and learn subject matter within the specified time.
- Students discussed the issues contained in the course.
- After the group finishes reading the subject matter and learns the content, the teacher invites the group members to cover the contents of the reading.
- The teacher takes a stick and gives one of the group members, after which the teacher asks questions and the group members holding the stick must answer it, and so on until the majority of students get a part to answer each teacher's questions.
- Other students may help answer questions if group members cannot answer questions.

- i. After all have their turn, the teacher makes a conclusion and evaluates both individual and group. And after that closed learning process.

C. Methodology

Types of Research

The type of this research is Experiment Research that is research used to find the influence of certain treatment to other in controlled condition, (Sugiyono, 2015: 109). The type of research was conducted by comparing the results of mathematics learning of students with different treatment. The research was conducted by researcher who directly acted as teacher as well as observers in learning with the aim to see the difference of mathematics learning outcomes of students taught by cooperative learning model both TGT type and TS type.

This research was conducted on May 10 - May 23, 2017 of academic year 2016/2017 in SMP Negeri 2 Kolaka.

The population in this study is all students of class VIII even semester SMP Negeri 2 Kolaka 2016/2017 academic year, it consists of 9 classes with the number of students 199 people. To determine the sample of research first conducted homogeneity test population. Homogeneity test is done to know homogenous population or not. Homogeneity test was performed using Levene test with the help of SPSS. The criterion is if the value of $\text{sig.} > \alpha = 0,05$ then homogeneous population and vice versa if $\text{sig. value} < \alpha = 0,05$ then the population is heterogeneous. The result of homogeneity test with levene test shows 1,789 value with P_{value} (Sig) $\alpha = 0,091$, because P_{value} (Sig) $\alpha = 0,091 > \alpha = 0,05$ so it concluded that homogeneous population group. Since the homogenous population group is the class chosen as the sample is class VIII₅ and VIII₃. The determination of which class is the TGT experiment class and the TS experiment class is performed by randomization. The result of the randomization is class VIII₅ as TGT experiment class and class VIII₃ as TS experimental class.

Variables

The variables in this research were students' learning outcomes, cooperative learning model Teams Games Tournament Type (TGT), and cooperative learning model Talking Stick Type (TS).

Design

Experimental design was used in this research is Posttest-only Control Group Design with research scheme as follows:

R	KE ₁	X ₁	O ₂	(Sugiyono in Supratman, 2016: 48)
R	KE ₂	X ₂	O ₄	

R	:	Random
KE ₁	:	First Eksperimental Class
KE ₂	:	Second Eksperimental Class
X ₁	:	Treatment for First Experimental Class
X ₂	:	Treatment for Second Eksperimental Class
O ₂	:	Students' Learning Outcomes of the First Eksperimental Class after Treatment
O ₄	:	Students' Learning Outcomes of the Second Eksperimental Class after Treatment

Technique of Data Analysis

Descriptive analysis of data on the mean, variance and standard deviations and categories of mathematics learning process. To find out and classify high, medium and low students' scores, it can be seen on table in the learning outcomes category, (Depdikbud, 2009) as follows:

Table 3. Mathematics Learning Outcomes Category

Score	Category
85 – 100	Very High
65 – 84	High
55 – 64	Enough
35 – 54	Low
0 – 34	Very Low

Inferential statistical analysis is used to test the research hypothesis, with the hypothesis to be tested is to compare the average parameters of learning outcomes. The test statistic to be used depends on the data obtained.

- a) Normality Test

The data normality test is intended to determine whether the population is normally distributed or not. For this purpose, Kolmogorov-Smirnov test statistic used 5% or 0.05 is applied.

b) Homogeneity Test

To find out whether the data obtained from the two groups have the same variance or not, then homogeneity test of variance used Test F (Fisher) with the formula

$$F_{count} = \frac{\text{Highest of Variance}}{\text{Lowest of Variance}} \quad \text{Kadir (2015:162)}$$

c) Statistical Hypothesis

Statistically, the statistical hypothesis in this study is formulated as follows:

$$H_0 : m_1 = m_2 \quad \text{or} \quad H_1 : m_1 \neq m_2$$

d) Hypothesis Test

After the normality test and homogeneity test of mathematics result data of students who were taught with TGT learning model and TS learning model then tested the hypothesis (t-test) with formula

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

where:

$$s_{tot} = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}} \quad (\text{Sundayana, 2014: 146}).$$

D. Finding and Discussion

1. Findings

Descriptive Analysis Results

The result of data from learning Mathematics in VIII class of SMP Negeri 2 Kolaka is presented in table 4 below.

Table 4. Descriptive Analysis Results

	First Experiment Class (TGT)	Second Experiment Class (TS)
N	28	28
Mean	81,29	81,64
Median	84	84,50
Mode	85	87
Standard Deviation	8,814	9,306
Variance	77,693	86,605
Minimum	59	59
Maximum	95	95

Next categorized student learning outcomes as in table 5 below

Table 5. Category Analysis of Learning Outcomes

First Eksperimen Class (TGT)			Second Eksperimen Class (TS)		
Score	Group	Ket	Score	Group	Ket
85 – 100	Very High	13 Students	85 – 100	Very High	14 Students
65 – 84	High	14 Students	65 – 84	High	13 Students
55 – 64	Enough	1 Students	55 – 64	Enough	1 Students
35 – 54	Low	-	35 – 54	Low	-
0 – 34	Very Low	-	0 – 34	Very Low	-

Inferential Analysis Results

Data on Students' Learning Outcomes were analyzed inferentially to generalize the results obtained against the population of study. The result of inference analysis as follows

a. Normality Test

Test of normality data in this research used kolmogorov-Smirnov test statistic. For the TGT class obtained $D_{count} = 0,192$ while from the table on $\alpha = 0,05$, $n = 28$ obtained $D_{table} = 0,250$. thus the sample of the TGT class score is normally distributed. For the TS class obtained $D_{hitung} = 0,207$

while from the table on $\alpha = 0,05$, $n = 28$ obtained $D_{tabel} = 0,250$. thus the TS class sample is distributed normally.

b. Homogeneity Test

The homogeneity test of variance was used to find out whether the variance of both groups of mathematics learning outcomes of students is homogeneous or not. Obtained $F_{count} = 1,114$. While from the table on $\alpha = 0,05$, $dk_1 = 27$, $dk_2 = 27$ obtained $F_{table} = 1,90$. Because $F_{count} = 1,114 < F_{table} = 1,90$, So H_0 accepted. it can be concluded that the variance of both groups of data is homogeneous.

c. Hypothesis Test

Based on the results on $dk = 54$, $\alpha = 0,05$ obtained $t_{count} = -0,147 \leq t_{table} = 2,004$, hence findings of hypothesis with t test can be concluded there is no difference of students mathematics learning outcomes taught by cooperative learning model Teams Games Tournament type and cooperative learning model Talking Stick type.

2. Discussion

Mathematics Learning Outcomes

Based on data that has been analyzed descriptively, the data in table 5 can be described in the form of bar charts as in Figure 1 below

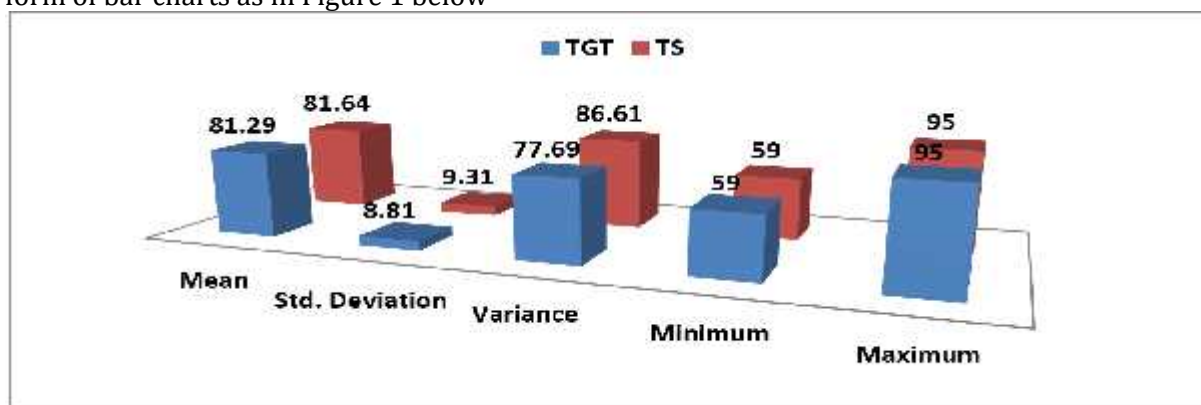


Figure 1. Descriptive Analysis of Student Mathematics Learning Outcomes

Based on the diagram shows the mean of the students' mathematics learning outcomes in the first experimental class (TGT) is 81,29. The median score = 84, implies 50% of students had mathematics learning outcomes more than 84, and 50% of students had mathematics learning outcomes less than 84. The mode = 85, The standard deviation = 8,814 and the variance = 77,69 indicate the level of data diversity. Students mathematics learning outcomes of TGT class is included in either category. This is because students are active and eager to follow the learning process. In the process of learning TGT leads to more games and tournaments so that students feel happy and interested to learn. In addition, in the process of learning TGT groups who get the highest points were awarded as teacher's appreciation.

Table 4 was showed mean of students' mathematics learning outcomes in second experimental class (TS) is 81,64. The median score = 84,50 implies 50% of students had mathematics learning outcome more than 84,50, and 50% of students had mathematics learning outcome less than 84,50. The mode = 87. The standard deviation = 9,306 and the variance = 86,608 indicate the level of data diversity. The Students mathematics learning outcomes of TS class included in either category. In the learning process TS students play with a rotating stick. Every student where the baton stops rotating must answer the questions given by the teacher. With the rotating stick makes students interested and trained to do the problem. Students are also more prepared to answer questions when the stick stops in the hands of the student. Beside TS learning process to train students have more responsibility on each group. Based on the descriptive analysis of the two learning models, it can be concluded that the mean of students' mathematics learning outcomes with the TS learning model is higher than the mean of students' mathematics learning outcomes with the TGT learning model.

In general, cooperative learning model TGT type and TS Type there is no fundamental difference, the mean is only different by 0.35. Some of the contributing factors are (1) Whether in the cooperative learning model of TGT or TS type, the teacher provides the opportunity for the learning students who are designed in the form of groups. In a group of students trying to

find their own concept with teacher supervision so that learning is more meaningful and easy to remember learning materials. This is in accordance with the constructivism learning theory proposed by Nur (in Khasanah, 2013: 75), that one of the most important principles in educational psychology is that students must build their own knowledge in their minds; and (2) In both TGT and TS type of cooperative learning model, group division is done heterogeneously. This is in accordance with Vygotsky's learning theory (in Khasanah, 2013: 76) that there is a relationship between cognitive and socio-cultural ability, it is seen from the quality of students 'thinking is built in the classroom while the students' social activities are developed in the form of cooperation among students.

This is supported by the findings of inferential analysis that mathematics learning outcomes of TGT class and TS class shows the value of $t_{\text{count}} = -0,147$ at $\alpha = 0,05$ by $dk = 54$ obtained $t_{\text{table}} = 2,004$. Since $t_{\text{count}} \leq t_{\text{table}}$, then H_0 is accepted. Thus, inferentially this means there was no difference in the mean of mathematics learning outcomes of students taught by cooperative learning model both TGT type and TS type. The models provided good learning outcomes and improved the students' engagement in the teaching and learning process.

E. Conclusion

Based on the findings and Discussion of the Research, it can be concluded that there was no difference in the mean of mathematics learning outcomes of students taught by cooperative learning model both TGT type and TS type. The models provided good learning outcomes and improved the students' engagement in the teaching and learning process.

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