

The Effect of Cooperative Learning and Learning Motivation on Mathematical Learning Outcomes

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Abstract— The aim of this study was to find out : (1) Student learning outcomes of cooperative learning type of Student Teams Achievement Divisions model were higher than co-operative learning type send greetings and questions, (2) Mathematics learning outcomes of students who had high learning motivation are better than students who had low learning motivation, (3) There were interaction between co-operative learning learning models and learning motivation in influencing mathematics learning outcomes. This study used a quasi experimental method. The sample of this study was all students of Class VI Public Elementary School 105324 Ujung Serdang, Subdistrict of Tanjung Morawa, Deli Serdang Regency with a total of 59 people. The sample consists of two classes, class VIA amounts 30 students treated cooperative learning type of STAD (experimental group) and class VIB amounts 29 students treated cooperative learning type of send greetings and questions (control group). The instruments were multiple choice tests and learning motivation questionnaire This study used factorial 2 x 2 design with 2 lane ANAVA technique. The results showed that : (1) Mathematics learning outcomes taught with the co-operative learning type STAD model are higher than students taught with co-operative learning type send greetings and questions model. Sig 0,000 <0.05, (2) There is a difference in the results of learning mathematics students who have high motivation better than students who have low motivation. Sig 0,000 <0.05, (3) There was interactions between cooperative learning models with learning motivation in influencing learning outcomes shown. Sig. 0,000 < 0,05.

Keywords: Cooperative Learning Type STAD, Cooperative Learning Type Send Greetings and Questions, Learning Motivation, Learning Outcomes

I. INTRODUCTION

Education plays a very important role in the progress of a nation, because education is able to develop the quality of human resources from various field. This is also in line with the contents of Law No. 20 of 2003 article 1 which states that education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have religious spiritual strength, self control, personality, intelligence, noble morals and the skill needed by them, society, nation and state. School is one of the formal education facilities provided by the government and the private sector which is organized and aims to create quality human beings in terms of knowledge,

attitude and skills. The qualities that humans have will be useful for creating a better life than before.

But apparently, there are so many problems that must be faced by schools in the process of creating quality human beings. These problems can arise from various parties including students, teachers, school facilities and infrastructures, the school environment and even parents of students. There are various scientific studies that must be conveyed by the teacher to students. For elementary school level, the teacher acts as a homeroom teacher who must be able to master a variety of knowledge in accordance with the elementary curriculum. One of the subjects teacher must teach to students is mathematics. Mathematics is a very important sciences from the beginning until now. This is caused because mathematics is always needed in all conditions of daily life. This is as stated by : Cokfort in (Uno 2009: 108) revealed that: mathematics needs to be taught to students because it is very needed and useful in everyday life, for science, commerce and industry, and because mathematics provides a power, a brief and unambiguous communication tool and serves as a tool to describe or predict.

But in reality, students' mastery of mathematic is still far from expectations. This is consistent with observations made by researchers at SDN 105324 Ujung Serdang where the average learning outcomes of grade VI students in the elementary school for 2 years in a row are always below the minimum completeness criteria. From several interviews conducted by researchers with students, they admit that they are less interested in learning mathematics because mathematics is one of the subjects that is very difficult to understand. Mathematics lessons are not fun, many use formulas that are less understood by students and difficult to memorize as well as complex questions to work on. One of the materials in mathematics lessons that are difficult for students to understand in grade VI is mixed count operation material. In addition, the learning model used is not suitable to support the achievement of learning objectives. In the learning process the teacher still uses traditional methods, for example lectures, questions and answers and assignments. The learning process is still centered on the teacher. Another factor that causes the low learning outcomes of mathematics is the low motivation to learn in students.

In addition to the low motivation to learn students, the teacher also lacks various ways to increase student motivation in learning, for example rewarding students who are considered to excel, praising students sincerely, giving punishment fairly, giving smiles to students or giving words of motivation and reinforcement to students. In addition to the low motivation to learn students, the teacher also lacks various ways to increase student motivation in learning, for example rewarding students who are considered to excel, praising students sincerely, giving punishment fairly, giving smiles to students or giving words of motivation and reinforcement to students. In this case, the teacher is required to be more careful and more careful in choosing various models, methods or learning strategies that can motivate students in learning and actively involve students in the learning process.

In this learning model, students will learn in groups, each group is heterogeneous because it consists of students who have high ability, medium ability and low ability. In addition, each group must consist of various ethnic groups and cultures, religions and gender differences. The division of students into their respective groups is the task of the teacher. It is feared that if students choose their own group members, there will be homogeneous groups. Lie (in Sanjaya 2006: 246) explains the co-operative learning, there are several benefits that can be obtained by students and teachers. First, heterogeneous groups provide opportunities for mutual teaching with peers (peer teaching) and mutual support. Second, this group increases relations and interactions between races, religions, ethnicities and gender. Third, heterogeneous groups facilitate classroom management, because with at least one person of high academic ability, the teacher gets an assistant for each group.

STAD co-operative learning is a learning model that demands cooperation among students while still calculating the success of each individual and is able to increase student motivation because of the rewards that will be received by the group that is considered the most successful. Through this type of STAD co-operative learning, students are encouraged to exchange information and opinions, discuss problems together, compare their answers and correct things that are less precise so as to foster student motivation in learning.

While the greeting and question sending model is a learning model that also prioritizes cooperation and also the creativity of students when greeting when visiting other groups and also creativity when creating questions. This model gives students the opportunity to practice their knowledge and skills. Because they make their own questions, students will also feel challenged to answer the questions given by other groups.

This model is also very beneficial, if given that the learning process that occurs between students so far is individuality and competitive. Students learn only to educate themselves and regard other students as rivals and even obstacles to achieving achievement.

In connection with the above, the purpose of this study is :
(1). To analyze the effect of cooperative learning models on

mathematics learning outcomes (2) To analyze the effect of learning motivation on learning outcomes in mathematics (3) To determine the effect of the interaction between the co-operative learning model and learning motivation on mathematics learning outcomes

II. METHOD

This study was conducted in Class VI of State 105324 Ujung Serdang which consisted of 2 classes with 59 students, of which there were 30 students in class VI-A and 29 students in class VI-B. Because the population is considered homogeneous, the researcher takes a simple random sampling technique and takes the entire population into a sample.

The method used in this research is the experimental method (quasi experiment). The research design used is the factorial design 2×2 .

TABLE 1. RESEARCH DESIGN

Learning motivation (B)	Cooperative Learning Model (A)	
	STAD (A ₁)	Send greeting and question (A ₂)
High (B ₁)	A ₁ B ₁	A ₂ B ₁
Low (B ₂)	A ₁ B ₂	A ₂ B ₂

Information:

A1B1 is the result of students' mathematics learning taught with STAD cooperative learning model for students who have high learning motivation

A1B2 is the result of students' mathematics learning taught with STAD cooperative learning model for students who have low learning motivation

A2B1 is the result of students' mathematics learning taught with send greeting and question cooperative learning model for students who have high learning motivation

A2B2 is the result of students' mathematics learning taught with send greeting and question cooperative learning model for students who have low learning motivation

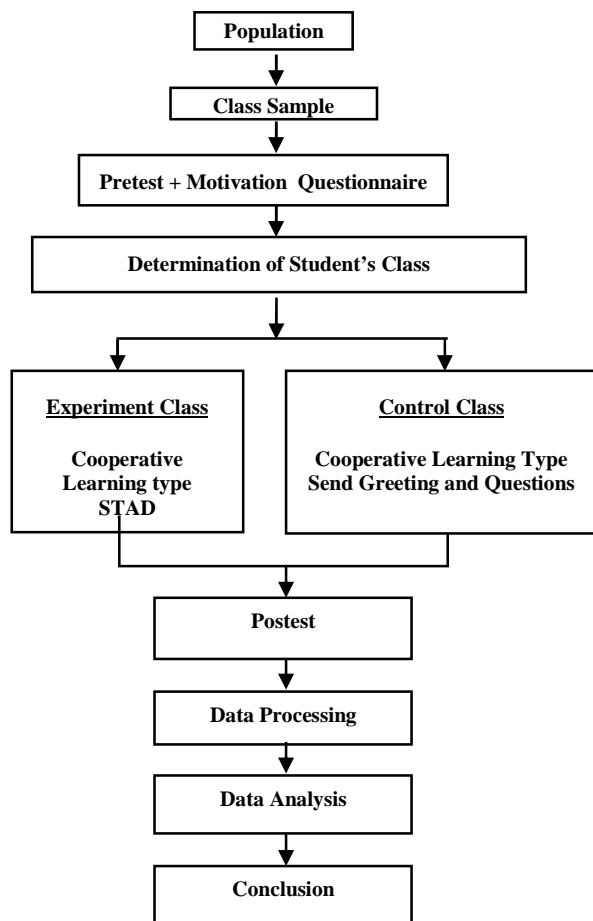


Fig. 1. Research Procedure

III. RESULT AND DISCUSSION

The results obtained in this study include scores on learning outcomes and student motivation questionnaires that are taught with the cooperative learning model type STAD for experimental class and cooperative learning type sending greetings and questions for the control class.

TABLE 2. PRETEST AND POSTTEST LEARNING RESULT

Class	N	Average	Average
Eksperiment	30	44	85,5
control	29	44,17	78,62

Table 2 above showed that average pretest of student learning outcomes of both classes has the same initial ability. From the mean data of student posttest in the second grade of the class showed that there were data of student learning result that was taught with cooperative learning model STAD was higher than the mean of student achievement which was taught with cooperative learning model send greetings and question.

TABLE 3. GROUP POSTEST VALUE OF STUDENT BASED ON MOTIVATION LEVEL

Group	N	Average
High Motivation	32	86,72
Low Motivation	27	76,67

Based on table 3 above, it can was explained that the average student achievement who have high motivation higher than the average results of students who have low motivation.

TABLE 4. STUDENT POSTEST VALUE BASED ON MOTIVATION LEVEL IN EXPERIMENT CLASS (STAD)

Group	N	Average
High Motivation	18	91,94
Low Motivation	12	75,83

TABLE 5. STUDENT POSTES VALUE BASED ON MOTIVATION LEVEL ON CONTROL CLASS (SEND GREETINGS AND QUESTION)

Group	N	Average
High Motivation	14	80
Low Motivation	15	77,33

Based on table 4 and table 5 above, it can was explained that the average of student achievement in the STAD class was higher than the class of send greetings and question both in high motivation categories.

After the data collected and analyzed statistics, then performed hypothesis tested. This hypothesis test used two- track ANAVA test which calculated by SPSS 25 for windows. From the test data obtained learning results, calculated the average of each group and then compiled as two-lane ANAVA table.

TABLE 6. ANAVA 2 X 2

Motivation	Average Learning Outcomes		Average
	STAD	Send Greetings and Question	
High	91,94	80	86,72
Low	75, 83	77,33	76,67
Average	85,50	78,62	

To see the difference of motivation and student achievement to the learning given, two way Anova test is used by selecting General Linear Model (GLM) univariate on SPSS 25. This test also aimed to see how the influenced of motivation on student achievement, whether students with high motivation have high learning outcomes or vice versa,

and whether there was interaction between learning model and motivation in influenced student achievement.

TABLE 7. TWO PATH LINES ANAVA TEST RESULTS

Source	Type sum of Squares	df	Mean Square	F	Sig
Model	393,836	1	393,836	11,449	,001
Motivation	1273,015	1	1273,015	37,007	,000
Model* Motivation	652,576	1	652,576	18,971	,000
Total	402375,000	59			

Based on the table 7, two way anava test results, it can be concluded that there was the effect of cooperative learning model type STAD on students achievement of mathematic. This proved through calculations that showed significant differences on student achievement between students taught with the model cooperative learning STAD and cooperative learning type send greetings and question. There was an effect of learning motivation in on student achievement mathematic. This was evident through the calculation of average student achievement who have high motivation was better than student achievement who have low motivation. There was an interaction between the learning model and the motivation in learning in influenced on student achievement of mathematic

The result of interaction between learning model with motivation in influencing students achievement can be presented in graphic form in fig.2, below this :

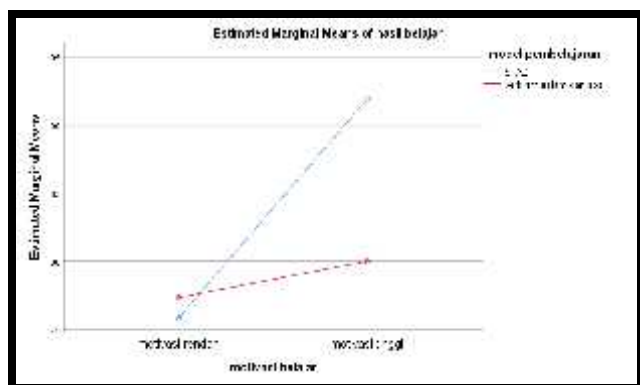


Fig 2. Interaction Chart between Cooperative Learning Type STAD and Send Greeting and Questions with Motivation

IV. CONCLUSION

The data in table 7 above, was used to test the hypotheses proposed in this study. The following was a description of the results of the hypothesis test.

1. First Hypothesis

Based on the results of Anava in table 6, obtained value of learning model significance of 0.001, because sig. 0.001 < 0.05

then the hypothesis tested results rejected H₀ or received H_a in the level of 5% alpha. This showed that there was an effect of cooperative learning model type STAD on students achievement of mathematic. Based on Table 6, posttest average of mathematic learning outcomes students in cooperative learning type STAD model (85,50) was higher than posttest average of mathematic learning outcomes students in cooperative learning type send greeting and question (78,62)

2. Second Hypothesis

Based on the results of Anava in table 6 obtained significance value of learning motivation of 0.000, because sig. 0.000 < 0.05 then the hypothesis tested results rejected H₀ or received H_a in the level of 5% alpha. This showed that there was an effect of motivation in learning on students achievement of mathematic. Based on Table 6, mathematic learning outcomes of students who had high motivation (86,72) was better than students who had low motivation (76,67) .

3. Third Hypothesis

Based on the results of Anava in table 4, obtained value significance learning model of students motivation in learning of 0.000, because sig. 0.000 < 0.05 then the hypothesis tested results reject H₀ or receive H_a in the level of alpha 5%. This showed that there was an interaction between learning model and motivation in learning on students achievement of mathematic.

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