Experimentation Cooperative Learning Student Team Achievement Division (STAD) Type Viewed From Learning Motivation

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ABSTRACT — *Need a way for students to love math, learning models have only focused upon the teacher to make students passive in understanding mathematics. Student Team Achievement Division (STAD) cooperative learning model is expected to provide better learning outcomes. This study is a quasi-experimental study. The study population was all students of class VIII SMP in Surakarta. Sampling was a stratified cluster random sampling. Sample size for this study was 186 students. Data collection method used is the method of documentation, questionnaire method, and the method of testing. There is a preliminary test with the balance test using the t test, and as a prerequisite t test is the test of normality with Lilliefor's test, and the test of homogeneity with Bartlett's test. Techniques of data analysis in this study using two-way Analysis of Variance with unequal cells, a prerequisite analysis using Lilliefor's test for normality test, homogeneity using Bartlett's test, with a significance level (α) = 5%. The result of Student Team Achievement Division (STAD) models provides better learning outcomes than conventional learning models on motivation high, medium or low.*

Keywords─ mathematics achievement, Student Team Achievement Division (STAD), conventional, learning motivation

1. INTRODUCTION

Mathematics is a field of study that studied by all students from elementary to high school and even in college. Learning mathematics in elementary - high school is meant to prepare students to use mathematics appropriately in daily life (Wardhani, 2008). In the ranking programme for International Student Assessment (PISA) stated that recent mathematical literacy Indonesian student was very low. Indonesia ranks 61 out of 65 participating countries ranking (Okezone, 2013). This is caused for serious concern, President of the Association of Mathematics Teachers of Indonesia (AGMI) Drs. Word of Shah Noor, M.Pd explained, based upon the results of the study Trends in International Mathematics and Science Study (TIMMS) conducted by Frederick KS Leung in 2003 is fewer well trained teacher in Indonesia is one of the main causes of students' mathematics literacy ratings are bottom (Okezone, 2013). This is proof, that math into something scary thing for our students in school. Need teachers who are creative and capable of be able to change the paradigm of the students during the school.

Based on the above facts, it should be observed, aspects, which allegedly have links with the learning of mathematics. So that aspects of the alleged effect can be considered in optimal student learning, then the learning of mathematics teachers should be able to choose exactly the model appropriate teaching, so that learning can take place smoothly and the students benefit from the learning activities.

Student success is influenced by many factors, can be derived from the students as well as teachers of teachers. Among other things, a teacher must have sufficient competence as managers of learning. A teacher who has the competencies expected to be better, and can create an atmosphere and an effective learning environment, so that student learning outcomes will be optimal. This is explained by Ruseffendi (1991:8), that in addition to the causes which partly depend on the students, there are also factors that come from teachers, among others, the ability (competence) teachers, the learning environment is created and the personality of the teacher as an educator.

Learning model into something important that the material can be received well by the students. In the process of teaching and learning, teachers can select and use some models of teaching, of course each learning model has advantages and disadvantages, but the lack of a model of teaching that can be closed with the other teaching models. Selection of learning models need to consider several things such as that conveyed subject, learning objectives, time available, the number of students, as well as other matters relating to the teaching and learning process, so expect goals of learning can be achieved with either.

One model of learning that puts students at the center is a cooperative learning model. Cooperative learning model is appropriate to make the students more active in understanding mathematics. Cooperative learning is a learning model where students learn together in small groups and help each other and work together to understand the subject of the lesson or task (Depdiknas, 2006: 5). In this case, learning is considered complete if every member of the group has mastered the lesson material. Zakaria and Iksan (2007:37) in his study entitled Promoting cooperative learning in science and mathematics education that the use of cooperative learning in math and science is very effective. Many types of cooperative learning models, such as: Student Team Achievement Division (STAD), Jigsaw, Group Investigation (GI), Think pair and share, and Make a match.

Based on the dissemination of math teacher in junior high, there are still many students who have difficulty in understanding the subject of Two Variables Systems of Linear Equations, particularly in determining the completion of the set of Two Variables Systems of Linear Equations. This is consistent throughout the data of the Ministry of National Education Assessment Center in 2009 for rayon Surakarta, the percentage value of the lowest absorption of all the mathematical subject in National Final Exam - it is the subject to the completion of the set of Two Variables Systems of Linear Equations, amounting to 35.71 percent.

According to Hudoyo (1998), a person is said to learn math if that person happens to a process activity that resulted in a change in behavior related to mathematics, where the behavior can be observed, which is obtained by a business person, it can also be said that a person said to learn if that person happens to change behavior related to mathematics, such as from not knowing to know about mathematics and be able to apply in daily life.

Meanwhile, according to Pius and Dahlan (1994: 623) achievement is a result that has been achieved. Learning achievement is the acquisition of knowledge or skills developed by the subjects as indicated by the value of a teacher (Poerwadarminta, 1997: 787). So that mathematics achievement is the level of student mastery of knowledge or skills acquired after studying mathematics in the form of value.

The purpose of learning mathematics in school is so that learners have the following capabilities: (1) Understanding mathematical concepts, explains the relationship between concepts and applies concepts or algorithms flexibly, accurately, efficiently, and appropriately, in solving the problem, (2) Using the reasoning in patterns and properties, perform mathematical manipulations in making generalizations, compile evidence, or explain mathematical ideas and statements; 3) Solve problems that include the ability to understand the problem, devised a mathematical model, solve the model and interpret the obtained solution, (4) Communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem; (5) Have respect usefulness of mathematics in life, which is curious, attention, and interest in studying mathematics, as well as a tenacious attitude and confidence in solving problems (Depdiknas, 2006: 388). Mathematics achievement of students in order to work well, each student is expected to master the fifth goal of learning mathematics.

Cooperative learning model developed to achieve three learning goals: 1) academic achievement, 2) receipt and 3) development of social skills (Arends, 1997: 111). Cooperative learning model Student Team Achievement Division (STAD) developed by Robert Slavin and his friends at the Johns Hopkins University (Slavin, 1995) is the simplest cooperative learning, and suitable for use by teachers who are just beginning to use cooperative learning. From several studies that have been conducted regarding the Student Team Achievement Division (STAD) cooperative learning models that use this learning to improve student achievement. Armstrong (1998:4), in his research through the use of the Student Learning Model Student Team Achievement Division (STAD) Level 12 in Mississippi Suburbs area, stating that the use of Student Team Achievement Division (STAD) model of learning becomes fun and learning materials to be easily understood. SUMARMO (2011) in his research through the use of the Problem Solving learning model designed Student Team Achievement Division (STAD) cooperative in class XI Science Hydrolysis of Salts on the subject, stating that the use of the Problem Solving learning model designed Student Team Achievement Division (STAD) cooperative learning outcomes better than students taught by the learning model of Problem Solving set up individually.

Motivation to learn is needed during the study. Therefore, teachers should be able to raise students' motivation to learn. Winkel (1983: 270) defines that the overall motivation is the driving force in the rise in the student activities and gives direction on learning activities. While McClelland suggests that achievement motivation has contributed 64 percent of academic achievement (Triluqman: 2007) and according to Sardiman (2007) study, the result will be optimal if there is motivation. Based on some of these opinions can be concluded that the motivation was instrumental to the success students. Motivation to make students want to learn, so the learning achievements will be achieved. Furthermore, the motivation to make students focus more on learning so that the learning outcomes will be optimal.

The purpose of this study is to determine which of the two models, namely learning Student Team Achievement Division (STAD) cooperative learning model and conventional learning models that produce mathematics learning achievement better if the review of students' motivation.

2. METHODOLOGY

The sampling procedure in this study as follows. The population in this study were junior high-school students in the town of Surakarta, as many as 27 junior high school are sorted first by passing the national exam rank junior presentation Surakarta in 2009. Samples were taken with Cluster Stratified Random Sampling. This study is a quasi-experimental study. The design used in this study is two-way Analysis of Variance design different cells. The design used in Table 1 below.

Table 1: Two-way Analysis of Variance design

		Motivation (B)		
		Low (B_1)	Medium (B_2)	High (B_3)
Learning Model (A)	Student Team Achievement Division / STAD (A_1)	AB_{11}	AB_{12}	AB_{13}
	Conventional (A_2)	AB_{21}	AB_{22}	AB_{23}

The study used three methods to collect the data that the method of testing, questionnaires and documentation. Test methods used to collect students' mathematics achievement data. Questionnaire method to determine the students' motivation to learn mathematics. Documentation methods used to obtain the initial data in the form of name and value of math midterms the first half of the eighth grade. Techniques of data analysis in this study using the Two-Way Analysis of Variance with unequal cells. As for determining the normality of the data using Lilliefor test and to determine the homogeneity of the data using the Bartlett test, with a significance level (α) = 5%.

3. RESULTS AND DISCUSSION

Before the samples used in this study, the ability of the samples tested beginning with the prerequisite and balance tests. Prerequisite test consists of tests of normality and homogeneity tests. The data is taken from the initial ability Mid-Semester grades during the first semester of eighth-grade math.

Normality test of early knowledge applied to the experimental group and the control group. Normality test using Lilliefors test and the results is presented in the following table:

Table 2: Normality test results of initial capabilities

Normality Test	L_{obs}	$L_{0,05;n}$	Conclusion	Decision
experimental group (Student Team Achievement Division / STAD)	0,0773	0,0914	Accept H_0	Normal
control group	0,0891	0,092878	Accept H_0	Normal

Based on Table 2 above, in each of the samples obtained Lobs < L0,05; n so that H_0 is accepted. This means that each sample would be treated and a control in this study comes from a normally distributed population.

Homogeneity test used to determine whether the samples are to be treated and a control in this study have the same variance. Bartlett homogeneity test using the statistical method of Chi Square test. Homogeneity test results of initial ability between the experimental and control groups obtained values of $x^2_{obs} = 0,4$ and $x^2_{0,05;1} = 3,841$. With critical areas =$\{x^2 | x^2 > 3,841\}$; $x^2_{obs} = 0,4 \notin$ critical areas so that H_0 is accepted. This means that the samples will be subject to treatment and a control in this study had a homogeneous variance.

Based on the test results, samples will be used during this study were normally distributed and had homogeneous variance. Then the balance test to determine whether the experimental group and the control group had the same initial ability.

The result of the balance test between the experimental group and the control group, t value = 1.7 and t table = 1.96. So that the two groups of samples have the same initial ability or balanced.

Prior to analysis of variance in the data of this study, there is the prerequisite test, the normality and homogeneity. Normality test is used to determine whether the sample comes from a normally distributed population or not. Normality Test using Lilliefors test. Normality test results in the experimental group, the control group and the motivation high, medium and low with a significance level (α) = 5% are as follows:

Table 3: Normality test results

Normality Test	L_{maks}	$L_{0,05;n}$	Conclusion	Decision
Experimental Group (Student Team Achievement Division (STAD))	0,071	0,091384	Accept H_0	Normal
Control Group	0,071	0,092372	Accept H_0	Normal
Low Learning Motivation	0,068	0,099058	Accept H_0	Normal
Medium Learning Motivation	0,072	0,080545	Accept H_0	Normal
High Learning Motivation	0,087	0,097842	Accept H_0	Normal

Based on the results of tests of normality in Table 3 above, we see that Lmaks in each experimental group and the learning motivation is less than $L_{0,05;n}$. This means at the 0.05 significance level, the null hypothesis is accepted. It can be concluded that the data in each group are from populations that are normally distributed.

Then the homogeneity test to determine whether the learning model and motivation levels have the same variance. Homogeneity test with Bartlett method using Chi-Square test statistics. The results of homogeneity test with a significance level (α) = 5% as follows:

Table 4: Homogeneity Test Results

Homogeneity Test	k	χ^2_{obs}	$\chi^2_{0,05;n}$	Conclusion	Decision
Learning Model group	2	1,668	3,841	Accept H_0	homogeneous
learning motivation level	3	0,922	5,991	Accept H_0	homogeneous

From Table 4 above, we see that learning model and learning motivation is smaller than $\chi^2_{0,05;n}$, thus making the H_0 test is accepted. It can be concluded that both groups learning models,

and the motivation level has the same variance (homogeneous).

Hypothesis testing procedures for this study using Two-Way Analysis of Variance (ANOVA) with different cell. The results from the calculations are presented in Table 5 below.

Table 5: The Summary of Two-Way Analysis of Variance (ANOVA) with the different cell

Source	JK	dK	RK	Calc. F value	F table	Decision
Learning Model Group (A)	8,760	1	8,759	4,182	3,84	Reject H_0
Learning Motivation Level (B)	1,018	2	0,510	0,243	3	Accept H_0
Interaction (A*B)	2,848	2	1,424	0,680	3	Accept H_0
Error	387,487	185	2,10	-	-	-
Total	401,012	190	-	-	-	-

Based on Table 5 above for learning models Fa = 4.182> F = 3.84, the null hypothesis is rejected that learning model effect on students' mathematics achievement. As for the motivation to learn Fb = 0.243 <F table = 3.00, there was no difference in students' mathematics achievement and learning motivation a low, medium or high. On the interaction between learning and motivation models Fb = 0.680 <F table = 3.00, there is no influence between the model of learning and motivation to learn the mathematics achievement of students.

4. CONCLUSION

Student Team Achievement Division (STAD) model in learning mathematics can improve student mathematics achievement compared to conventional learning models on motivation high, medium or low. Student Team Achievement Division (STAD) learning model can be an alternative learning model. However, the suitability of the material should be viewed with a learning model that will be used. The use of alternative models of teaching and learning need to be added to the students, so that students can more easily understand the material.

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