THE EFFECT OF COOPERATIVE LEARNING MODEL TYPE OF STUDENT TEAMS ACHIEVEMENT DIVISIONS (STAD) BASED ON MIND MAPPING ON LEARNING OUTCOMES OF STUDENTS IN THE DYNAMIC ELECTRICS SUBJECTMATTER IN CLASS X EVEN SEMESTER SMA N 1 PERBAUNGAN A.Y. 2012/2013

Mas Andri Marbun and Mara Bangun Harahap
Physics Department Faculity of Mathematic and Natural Science
State University of Medan
masandrimarbun@gmail.com

Abstract

The purpose of this research is to know the results of student learning by using cooperative learning model of the type of Student Teams Achievement Divisions (STAD) based on mind mapping in experiment class and conventional models in the control class. Type of this research is quasi experimental. The population of this research is all the students class X even semester SMA Negeri 1 Perbaungan A.Y. 2012/2013 which consisted of 298 students and consisting of six classes regular and two classes excellent. A sample of this research was taken two classes are determined by means of cluster random sampling, namely class X4 as a experiment class and a class X5 as a control class that each class number 39 students and 41 students.

From the data analysis the results obtained average value of experimental class pretest was 34,1 with standard deviation 10.70 and the average value of the control's class pretest 32,94 with standard deviation 11.06, thus obtained $F_{count} < F_{table}$ (1,06 < 1,71). Then obtained $t_{count} < t_{table}$ (0,47 < 1,99). Results of hypothesis testing obtained $t_{count} > t_{table}$ (2,61 > 1,66) so the conclusion is that there is the effect of cooperative learning model type of student teams achievement divisions (STAD) based on mind mapping on the learning outcomes of students.

Key Word: STAD, learning outcomes, mind mappin

INTRODUCTION

Education has a very important role in generating human resource both as individuals and as the general public. Education in Indonesia in learning activities in schools is an activity that must be improved in order to reach a goal in the form of changes in behavior, knowledge, and skills in self-learners.

In improving the quality of education, the educators have a major role to improve the quality of student learning. In conducting learning activities, teachers as a educator besides knowing materials, certainly need to understand the learning model and selecting appropriate learning model to give course material and how

the characteristics of the students who received the course material.

In the teaching and learning process in the classroom some of teachers as a center of learning and not involve students so that students are less active. Learning often takes place in one direction without involving students. Due to the lack of an active role of students then students are less engaged in the lesson, not creative and not interested in following the lessons taught by the teacher. Basically, the teacher must acts as a motivator, facilitator, mediator and mentor students in learning. Teachers should be able to increase curiosity and makes the students more active in participating in the lessons.

Physics sciences as part of the Natural Sciences (IPA) is an interesting subject that studied natural phenomena around that often we experience in daily life. However, the physical science learning is often seen as an abstract science theories presented in the form of a less appealing and seem tough, assume that physics is so difficult to be understood and mastered. Learning physics has the objective to solve the problems faced by students in order to have a broader view and to have respect for the usefulness of physics as part of the natural sciences and technology (science and technology). However, reports from the bright print and electronic media showed unsatisfactory results on students' learning outcomes physics.

The interview and experience researcher in SMA N 1 Perbaungan seen that many students who are interested less in learn physics because of the formulas that we get in physics and assume that physics is hard because in both physics many things abstract and so students lost understanding of the physics behold often be found in daily life because physics not just learning about formulas but the natural phenomena happened.

Some teachers use only conventional learning in physics lessons taught in class. The teacher does not use the learning model that correspond to the competencies to be achieved by students in a physics lesson, so that teaching and learning are not giving good results to the students. Many students are not learning competence achieved in the classroom because it does not appropriate model used by teachers.

From the problems discussed above, educators need to do various learning model to foster interest in learning and students must comply with the competence to be achieved from these lessons. One can use the model of learning in the cooperative. Cooperative learning is a learning approach that focuses on the use of small groups of students to work together in maximizing learning conditions to achieve learning objectives. This learning model can be helping students acquire the academic content and skills to address important social and human relations goals and objectives (Arends, 2009).

Based on the existence of these problems the author tries to do research in an effort to improve student learning outcomes by applying the model type cooperative learning model Student Teams Achievement Divisions (STAD) based on mind mapping. With these students can be more active in learning and understanding the concepts of physics itself is not just a physics formula and they can understand the purpose and concept of the formula.

The results of research that review before is done by Novita (2009) that uses kind of classroom cooperative obtained that study result of the student with average 73,33. Novita (2009) declaring that the influence significant between use kind of classroom cooperative type STAD against study result of the students.

The difference in general previous research with this study is the student is unable to provide the required media while learning so that the learning process less attractive. In this study, in addition to determine the effect of cooperative learning model type STAD as well as to make the learning process interesting, so students do not easily get bored in learning physics.

Type STAD cooperative learning is one type of cooperative learning model with less use of small groups with a total membership of each group of 4-5 students heterogeneously. Starting with the delivery of learning objectives, presentation, group activities, quizzes, and awards groups (Trianto, 2009).

In the model of cooperative learning type STAD, students more easily find and understand difficult concepts if they were discussing the matter with his friend. So with cooperative learning, students were hit on an issue, can ask his friends without shame, than if he should ask the teacher directly. This will enhance the student's motivation to learn so as to obtain a better understanding of both the material being studied by searching, finding and developing the group concept.

The cooperative learning technique that has been extensively researched and assessed specifically on academic achievements, attitudes, social interactions and interpersonal relationships is the STAD.

STAD is one of the simplest and most extensively researched all forms of cooperative learning techniques and it could be an effective instrument to begin with for teachers who are new to the cooperative learning technique.

According to Slavin (1994) "the main idea behind STAD is to motivate students to encourage and help one another master the skills presented by the teacher".

Procedure type STAD cooperative learning is based on cooperative measures which consist of six steps or phases. Phases in this study as in Table 1.

Table 1. Phases of Cooperative Learning Type STAD

Phase	Activity Teachers
Phase 1 Delivering objective and motivate students	Delivering all the goals you want to get the lessons on these subjects, and motivating students.
Phase 2 Presenting / convey information	Presenting information to students by way of demonstrate or through reading material.
Phase 3 Organize students into groups to learn	Explain to students how to form study groups and help each group to make the transition efficiently.

Phase 4 Guiding the work and study	Guiding the study groups when they are doing their job.
Phase 5 Evaluation	Evaluate the learning outcomes of the material that has been taught or each group present their work.
Phase 6 Reward	Finding ways to appreciate the effort and the learning outcomes of individuals and groups.

(Source: Trianto, 2009:71)

Award may be made by the group's success with the following stages: (1) Calculate an individual score; (2) Calculating the score group; and (3) Reward and recognition score group.

Score of this group is calculated by make the average score development group members, ie by adding up all the scores obtained by the development of the group members divided by the number of members of the group. After predicate group, the teacher gives prizes/awards group to each group according to the predicate.

From the overview of the type STAD cooperative learning shows that type STAD cooperative learning is a type of cooperative learning is quite simple and can be done to increase students' interest in learning in the classroom.

METHODS OF RESEARCH

Location of Research is SMA I Perbaungan. Time research is held in May 2013. The population in this study were all students in grade X semester SMA Negeri I Perbaungan academic year 2012/2013 consisting of 6 parallel classes and 2 excellent class and the average number of students per class consisted of 40 people. So the total number of students was 298 students.

From the eight classes, the sample in this research is the student / class X student of SMAN I Perbaungan Academic Year 2012/2013 of the selected two classes of eighth class. Sampling technique with a random (cluster random sampling), where each class of the population have the opportunity to be a research sample because all class X in SMA I Perbaungan is homogeneous or no class rank. Classes are subject to investigation (experiment) is determined by lottery from 6 parallel classes. One class with type STAD cooperative learning model and the other class with conventional teaching class.

The research involved two experimental classes and the classes that control class treated differently. In the classroom teaching experiments that treated using STAD cooperative learning model type and the control class is treated using conventional learning teaching.

To determine student learning outcomes, obtained by applying the two treatments were then given a test on students. The study design was as follows as in Table 1.

Table 3. The Design of Experiments

Group	Pretest	Treatment	Posttest
Exp	X_{Exp}	P_1	Y_{Exp}
Control	X_{con}	P_2	Y_{con}

Description:
X: Pretest
Y: Posttest
$P_{1:}$ Learning to type STAD cooperative learning model
$P_{2:}$ Learning with the conventional method

To know whether a normal distribution of the data relating to the data analysis used Lilliefors test. Then to test whether the two groups of homogeneous. The similarity of its homogeneity of variance or it will be tested with the formula:

$$F = \frac{S_1^2}{S_2^2}$$

Where: S_1^2 = highest variances; S_2^2 =smallest variances. If $F_{count} < F_{tabel}$ then both population have same variance.

Hypotesis test is used to determine the two-party power parity initial sample of students in both groups with formula:

$$t_{count} = \frac{\overline{X_1} - \overline{X_2}}{S\sqrt{(\frac{1}{n_1} + \frac{1}{n_2})}}$$

Where deviation standard combined is:

t = distribution of t
$\overline{X_1}$ = average value of experimental classes
$\overline{X_2}$ = average value of the control class
n_1 = size of experimental class
n_2 = size of control class
S_1^2 = experimental class variance
S_2^2 = control class variance

Criteria testing, accept Ho if $t < t_{1-\alpha}$, where $t_{1-1/2\alpha}$ get from distibution list of t with dk = $(n_1 + n_2 - 2)$ and probability $(t_1-\alpha)$ and $\alpha = 0.05$. for the value of t the others H_o rejected.

RESULT OF RESEARCH

Based on the data of research result obtained the mean value of the pre-test in experimental class before given treatment by using cooperative learning model type of STAD based on mind mapping is 34 and the standard deviation is 10.7. While the mean value of pre-test obtained in control class is 32.9 and the standard deviation is 11.06. After obtaining data from student's pre-test from experimental and control class, firstly conducted the testing of data analysis, they are normality and homogeneity test of pre-test data to determine their feasibility before given the treatment.

Based on Liliefors-test by significant standard = 0.05 if obtained $L_{count} < L_{table}$ this result conclude that the data were in normal distribution. For pretest, experimental class obtained $L_{count} < L_{table}$ (0.025 < 0.141) and control class obtained $L_{count} < L_{table}$ (0.001 < 0.138). This data concluded that the data for pretest were in normal distribution. For posttest, experimental class obtained $L_{count} < L_{table}$ (-0.2514 < 0.141) and control class obtained $L_{count} < L_{table}$ (0.00431 < 0.138). This data concluded that the data for posttest were in normal distribution.

Homogenity test of data done using F test on pre-test data of both samples obtained $F_{count} < F_{table}$ (1,06 < 1,71). This situation means that variant of pre-test both samples is from the homogenous population.

Hypothesis testing calculating by used formula of t test obtained $t_{count} > t_{table}$ (2,6 > 1,66) , thus Ho rejected and Ha accepted. We get conclusion that there is effect of cooperative STAD type learning model on Student's Physics Learning Outcomes in X grade SMA N 1 Perbaungan in Electric Dynamic subject matter.

DISCUSSION

The result of research show that there was the difference of student's learning achievement by using cooperative learning model of Student Teams Achievement Divisions (STAD) based in mind mapping with Direct Instruction learning model in Dynamic Electric at X grade SMA N 1 Perbaungan. This was reinforced by the acquisition of the mean value of 76.5 post-test in experimental class with a standard deviation of 10.7. Where as in control class the mean values obtained post-test of 70.4 with a standard deviation of 10.77. From the data above, average posttest value of experiment class is bigger than control class. The increasing of posttest value is caused by after pretest done, student gived the treatment. In experiment class gived the treatment using cooperative learning model type of STAD based in mind mapping and control class gived the treatment using Direct Instruction model.

Results of this study showed that cooperative learning model type of STAD based on mind mapping is better compared to conventional learning model, it is obtained from the t-test performed show that the difference is real with $t_{count} = 2,6 > t_{table} = 1,66$.

The effect of the learning to use cooperative learning model type of STAD based on mind mapping is better because of this learning model is a model of cooperative learning designed to influence the pattern of student interaction as we know that in the model of cooperative learning type of STAD, students more easily find and understand difficult concepts if they were discussing the matter with his friend. So with cooperative learning, students were hit on an issue, can ask his friends without shame, than if he should ask the teacher directly. This will enhance the student's motivation to learn so as to obtain a better understanding of both the material being studied by searching, finding and developing the group concept.

Advantages of cooperative learning model type of STAD was to give the opportunity to students to share ideas and consider the most appropriate answer. Moreover, this type also encourage students to improve the morale of their fellow. This type can be used in all subjects and for all levels of student age.

Although cooperative learning model of STAD can improve student's learning outcomes whether it from cognitive domain and effective for using, but as long as learning takes place there are still constraints encountered, the noisy of students in forming a group whether if when forming the origin or expert group. In addition there are students who are less concerned with what is assigned to him and less active in learning. This happens because there are students who felt himself unsuitable with the other members of the group so that students are not active in the group. There are also students who keep silent because do not understand the given task. The other constraint is the lack of time in this research so not all groups can present results of their discussion.

Therefore it is desirable for further researcher to be better observed and guide students for working in groups by asking questions to each student about what he had done in groups and constraints faced by students during discussions. In additions, attention to the steps in learning to achieve the improved of learning outcomes and anticipate the time addition of the research.

CONCLUSION

Based on the analysis of the results obtained conclude that (1) Learning outcomes students experiment class are given preferential treatment by using cooperative learning model type of STAD in Electric Dynamic subject matter in class X semester II SMA Negeri 1 Perbaungan A.Y. 2012/2013, with an average value of 34,1 pretes and average value of postes 76,56 include in the good category. (2) Learning outcomes students control class are given preferential treatment by using conventional learning model in Electric Dynamic subject matter in class X semester II SMA Negeri 1 Perbaungan A.Y. 2012/2013, with an average value of 32,94 pretes and average value of postes 70,48 include in the good category. (3) There is any effect of the model type of cooperative learning model type of STAD based on mind mapping on learning outcomes of students in the Dynamic Electrics subject matter class X semester II SMA Negeri 1 Perbaungan A.Y. 2012/2013.

SUGGESTION

Based on result of research and conclusion, thus furthermore the suggestion from this research is (1) The cooperative learning model of the type STAD in order to better direct the students more actively in the discussion groups. (2) The cooperative learning model of the type STAD in order to better guide students in discussion groups. (3) The type of cooperative learning STAD furthermore, in order to use the time as effectively as possible.

REFERENCES

Arends, Richard I. 2009. *Learning to Teach Eighth Edition*. Mc Graw-Hill. New York.

Joyce, B. & Marsha W.1980. *Model of Teaching Second Edition*. Prentice-Hall. USA.

Novita 2009. Pengaruh Model Pembelajaran Koperatif Tipe STAD Terhadap Hasil Belajar Siswa Pada Materi Pokok Gerak Lurus di Kelas X SMA N 1 Hamparan Perak T.P 2009/2010. *Skripsi*. FMIPA, UNIMED. Medan.

Slavin, R. 1994. *Cooperative Learning*. Nusa Media. Bandung.

Trianto 2007. *Model-model Pembelajaran Inovatif Berorientasi konstruktivistik.* Prestasi Pustaka Publisher, Jakarta.