# EFFECT OF COOPERATIVE TYPE STAD AIDED BY MACROMEDIA FLASH TOWARD STUDENTS' LEARNING OUTCOMES

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**Abstract**

The purpose of this research was to see the effect of Cooperative Learning Model Type STAD Aided by Macromedia Flash Media toward Students' Learning Outcomes in cognitive, affective, and psychomotor domain. The research method was quasi experimental. Using a pre-test-post-test comparison-group design and t test for independent samples, it was found that after approximately 3weeks students (n = 25) who were instructed using cooperative STAD aided by macromedia flash significantly higher scores on post-test than did students (n = 25) who were instructed using Direct Instruction model.Testing of hypothesis for postest showed that $t_{count} > t_{table}$. Using observation method in affective and psychomotor domain, it was found that average mark of affective and psychomotor students in experiment class was higher than control class. The study conclude that there was the significant effect of Cooperative Learning Model Type STAD Aided by Macromedia Flash Media toward Students' Learning Outcomes.

**Keywords:** Cooperative learning, STAD, Macromedia Flash, Learning Outcomes

## INTRODUCTION

Physics is a branch of nature science that underlies the development of advanced technologies and the concept of harmonious life with nature. But, as the matter of fact, it indicates that the Physics is considered as the most difficult subject among the other subjects of nature science by the students.

From preliminary study that have done by researcher through the direct observation by interviewing the teacher of physics and distributing questionnaires to students, nearly 60% of students are not able to achieve minimum completeness criteria (MCC). Those results are not satisfactory, remember that school have standards MMC for physics lower than other nature science subjects, namely 67 for the 1st grade.

The low outcomes of students in learning Physics are caused by many factors, they are: a intensive curriculum, the material in the textbook deemed too difficult to follow, the lack of media, the inadequate laboratories, the inappropriate use of instructional media chosen by teachers, the less optimal alignment of students themselves, or conventional way, where students are not involved actively in the learning process and the

class activity is largely dominated by the teacher (Supardi, 2008).

Based on result of questioner in preliminary study about how to make physics more interesting to learn, 43,75% students choose physics must be practiced directly, 20.08% students choose learning in group and 16.67% students choose using instructional media. Researcher thinks cooperative learning can solve the problem because in cooperative learning students can transfer knowledge that they get in learning each others.

One type of learning model that directs students to work together in a team is Cooperative type Student Team Achievement Division (STAD). To get the better result, this model can accompanied with instructional media

to make student more interest to learn physics. In this study, researcher chooses macromedia flash as a media to deliver information in learning.

Based on (Sanjaya, 2006) cooperative is learning model using small group system that is between four until six peoples who have background of academic ability, gender, tribes different (heterogeneous). Whereas (Slavin: 2005) state that constructivism approach apply cooperative learning intensively use assume that students will easy to find and understand difficult concepts, if they discuss the problems with their partner.

There are six main steps or stages in the teaching of the use of cooperative learning. The steps shown in the following Table 1.

Table 1. Learning Steps of Cooperative Learning Model Type STAD

| Phase | Teacher Behavior |
| --- | --- |
| **Phase 1** Presents the objectives and motivate students. | Teachers delivered all lesson objectives to be achieved in the lesson and motivate students to learn. |
| **Phase 2** Delivery Information. | Teachers present information to students with demonstration or through reading materials |
| **Phase 3** Organizing students into cooperative groups. | The teacher explains to students how to form study groups and assist each group in order to make the transition efficiently |
| **Phase 4** Guiding the group working and learning. | Teacher guide each groups as they do their work. |
| **Phase 5** Evaluation. | Teachers evaluate the learning outcomes of the material that has been learned or each group presented their work. |
| **Phase 6** Giving reward. | Teachers find ways to appreciate both the effort and the learning outcomes of individuals and groups. |

Source: (Trianto: 2010)

Although based on the studies of effective teachers, direct instruction has its theoretical origins in the

behavioral family, particularly in the thinking of training and behavioral psychologists. The instructional design

principles they propose focus on conceptualizing learner performance into goals and tasks, breaking these tasks into smaller component tasks, developing training activities that ensure mastery of each subcomponent, and, finally, arranging the entire learning situation into sequences that ensure adequate transfer from one component to another and achievement of prerequisite learning before more advanced learning (Sudjana, 2009).

Macromedia Flash has a number of advantages. Some advantages of Macromedia Flash are: (1) Animation and graphics are consistent and flexible to window size and screen resolution regardless of the user's monitor. (2) The picture quality is maintained. (3) Loading time of program is relative quick. (4) Interactive program produced. (5) Easy to make animations. (6) Can be integrated with other programs. (7) Can be used to create short films or cartoons, presentations, etc (Maizora, 2011).

### RESEARCH METHOD

The study involved two classes treated differently. To determine the students' learning outcomes was done by giving a test on both classes before and after treatment. The study design was as following Table 2.

Table 2 Two Group Pretest-Post test Design

| Class | Pretest | Treatment | Postest |
|-------|---------|-----------|---------|
| Experiment | $X_{1_E}$ | $T$ | $X_{2_E}$ |
| Control | $X_{1_C}$ | $O$ | $X_{2_C}$ |

Where:

$X_{1_E}$ = Initial test in experiment class (Pretest)

$X_{2_E}$ = Final test in experiment class (Posttest)

$X_{1_c}$ = Initial test in control class (Pretest)

$X_{2_E}$ = Final test in control class (Pretest)

$T$ = Treatment with Cooperative learning model Student Team Achievement Division (STAD) with macromedia flash as media.

$O$ = Direct Instruction model

The types of instrument used in this research are: a). Esay Test with 10 question, as instrument to measure learning outcomes of students in Cognitive Domain, b). Observation sheet to observe Affective and Psychomotor Domain of students.

Implementation stages of this research are:
(i).Preparation Phase,consist of (a) giving supervisor approval letter and discuss about the problem and title of research. (b) Doing a preliminary study to school, (c) Determining sample of two classes, (d) Discussing with teachers about teaching topic (d) Teaching methods (f) Schedules and media (g) Making instructional media using macromedia flash program (h) Preparing test instrument (i) Validating the test instrument with the help of validator (j) Testing the instrument test to students that have learned the material (k) Arranging the lesson plans.

(ii). Implementation phase, consist of : (1) Conducting the pretest to the

second class to determine students' initial ability of the material being taught. (2) Doing pretest the data analysis is to test for normality and homogeneous test. (3) Providing treatment to the two classes, namely: (a)In the experimental class will be teach by using cooperative learning model Student Team Achievement Division (STAD) with macromedia flash as media. (b)In the control will be teach by using conventional methods. (4) Doing observation to Affective and Psychomotor Domain with helped by observer. (5) Providing post-test to both classes to know the students' learning outcomes of the topic that has been taught. (6) Doing processing to posttest data with the normality test, homogeneity test and hypotheses test to know effect of cooperative learning model Student Team Achievement Division (STAD) with macromedia flash as media toward students' learning outcomes. (7) Concluding the results of research.

Data Analysis for cognitive domain (test) that used in this research is t-test. T test that used in this research are 2 kind,namely: (a). T-test two side in pre test to known both of

class have same initial ability in begining of research. (b) T-test one side in post test to testing the hypotesis. But, before the data testing with t-test, the data must be normal and homogen. So, the data must analyze with liliefors test and F-test before.

Like explanation before, beside cognitive domain, researcher also seen affective and psychomotor the students along learning process with observation methods. Observation done by two observer used observation sheet which arranged by researcher before.

## RESULT OF RESEARCH AND DISCUSSION

In the beginning of this research, experiment and control class were given pretest which aim to see initial learning ability of students in both of that classes. Result of pretest in experiment and control class was in the frequency distribution table form, we can see in the Table 3 and Figure 1.

Table 3 Frequency distribution of Pretest Result in Experiment Class and Control Class

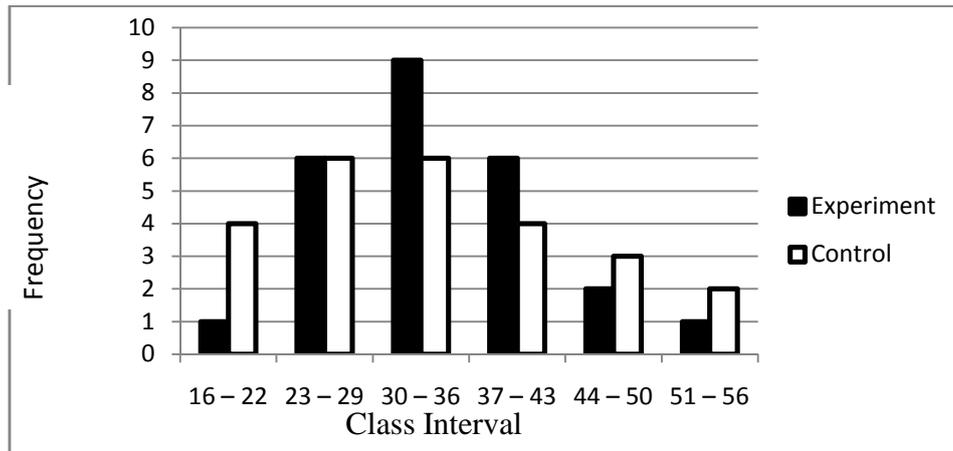| No. | Class Interval | Frequency | |
|-----|----------------|------------|---------|
| | | Experiment | Control |
| 1 | 16 – 22 | 1 | 4 |
| 2 | 23 – 29 | 6 | 6 |
| 3 | 30 – 36 | 9 | 6 |
| 4 | 37 – 43 | 6 | 4 |
| 5 | 44 – 50 | 2 | 3 |
| 6 | 51 – 56 | 1 | 2 |
| **Total** | | 25 | 25 |

Figure 1 Chart of Pretest result experiment and control class

In the end of learning process, the classes, experiment class and control class, were given posttest to see the final learning ability of students in both of the classes.

Result of posttest in experiment and control class is in the frequency distribution table form, we can see in the Table 4 and Figure 2.

Table 4  Frequency distribution of Posttest Result in Experiment Class and Control Class

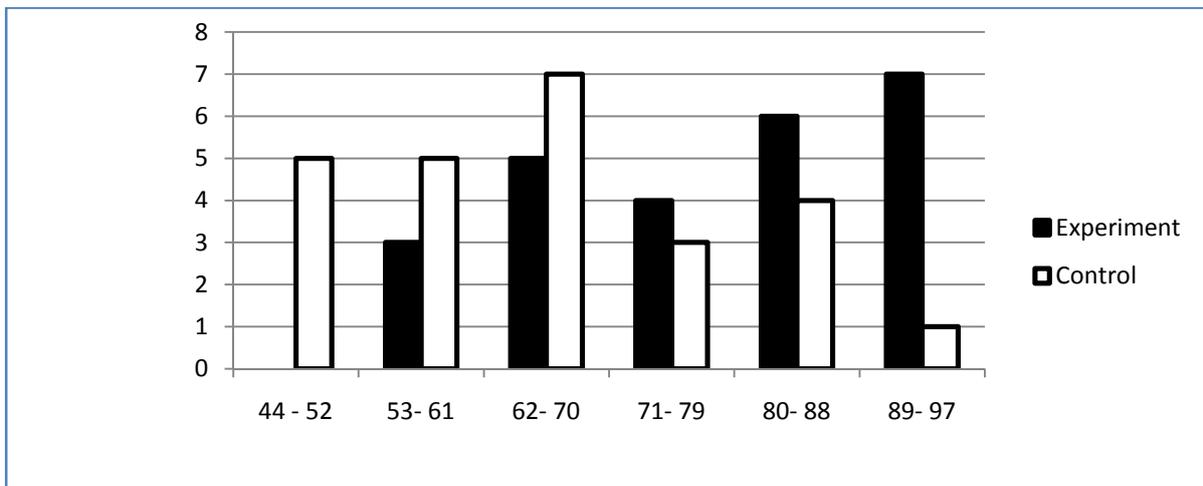| No. | Class Interval | Frequency | |
|---|---|---|---|
| | | Experiment | Control |
| 1 | 16 – 22 | 0 | 5 |
| 2 | 23 – 29 | 3 | 5 |
| 3 | 30 – 36 | 5 | 7 |
| 4 | 37 – 43 | 4 | 3 |
| 5 | 44 – 50 | 6 | 4 |
| 6 | 51 – 56 | 7 | 1 |
| | **Total** | 25 | 25 |



Figure 2 Chart of Posttest result experiment and control class

Normality test of pretest data in experiment and control class was conducted by using Liliefors test. The result of normality test for pretest and posttest data in both of the class is realized in Table 5.

Tabel 5 The result of normality test in experiment and control class

| Group | Pretest Data | | Posttest Data | | Conclusion |
|---|---|---|---|---|---|
| | $L_{count}$ | $L_{table}$ | $L_{count}$ | $L_{table}$ | |
| Experiment | 0.1686 | 0.173 | 0.1362 | 0.173 | Normal |
| Control | 0.0844 | 0.173 | 0.1481 | 0.173 | Normal |

Furthermore, homogeneity test of pretest and post test data was conducted by using two variance similarity tests. It showed that data from the two classes were homogeny that means the obtained data represented all population. For the result of homogeneity test for pretest data in the two classes realized in the Table 6.

Tabel 6 Conclusion of homogeneity test result of the two classes

| Data | $F_{count}$ | $F_{table}$ | Conclusion |
|---|---|---|---|
| Pretest | 1.78 | 1.94 | Homogen |
| Posttest | 1.003 | 1.94 | Homogen |

After the data normal and homogeny, the data was ready to testing with t-test. The conclusion of t-test can see in Table 7.

Table 7 Conclusion of t test calculation

| | Class | Average | $T_{count}$ | $t_{table}$ | Conclusion |
|---|---|---|---|---|---|
| Pretest Data | Experiment | 34.68 | | | Both of classes have same initial ability. |
| | Control | 33.24 | 0.52 | 2.012 | |
| Posttest Data | Experiment | 78.72 | 4.03 | 1.67 | There was significant difference |
| | Control | 64.28 | | | |

Observation in Affective domain aims to observe students' behaviour during learning process by using one of the type of cooperative learning namely STAD added by Macromedia Flash. Observation is conducted by two observers. The learning activity is held into two meetings.

Table 8  Result of Affective domain

| Sample | Meeting | | Average |
|---|---|---|---|
| | I | II | |
| Experiment | 76.32 | 80.16 | 78.24 |
| Control | 70.67 | 69.33 | 70.00 |

This observation in psychomotor domain aims to observe students' activity during learning process by using one of the types of cooperative learning namely STAD added by Macromedia Flash.

Table 9 Result Calculation of Psychomotor domain

| Sample | Meeting | | Average |
|---|---|---|---|
| | I | II | |
| Experiment | 71.84 | 78.72 | 75.28 |
| Control | 66.4 | 67.2 | 66.8 |

The relation of affective, psychomotor, and posttest of experiment class showed by bar chart in figure below:
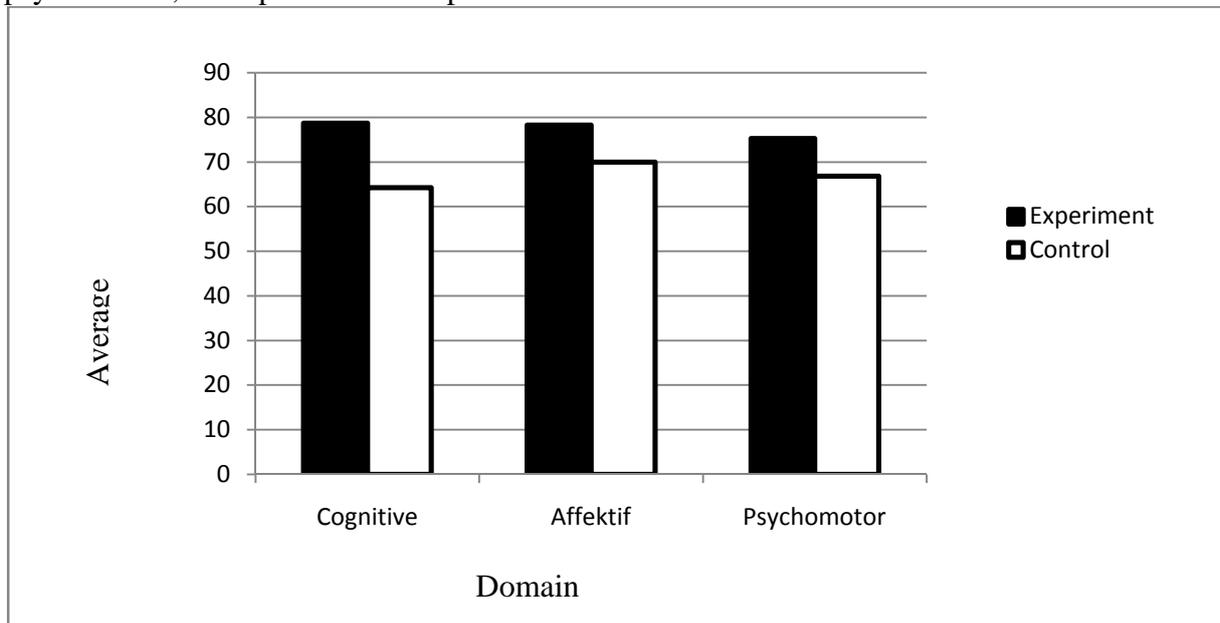


Figure 3 Chart Cognitive, Affective, and Psychomotor of students in experiment and control class.

## DISCUSSION

The results in Cognitive, Affective, and Psychomotor of students showed that there was significant effect of using Cooperative Learning model type Students Team Achievement Division (STAD) aided by macromedia flash media on Electrodynamics topics at $1^{st}$ Grade students in SMA 5 Binjai. This result appropriates Slavin's argue that students work together in member teams can master material initially presented by the teacher. Because like Slavin state there are three elements central to all Student Team Learning methods – team rewards, individual accountability, and equal opportunities. All of elements can be found in Cooperative Learning type STAD. Team rewards on cooperative learning research indicates that if students are rewarded for doing better than they have in the past, they will be more motivated to reach than if they are rewarded for doing better than others. Because students will work together towards a common goal and their learning efforts will help their teams succeed

Individual accountability means that the success of a team relies on the learning of every individual in all team members. Accountability focuses the team member's activity on helping others learn and making sure that team members are ready for a quiz without teammate's help. Equal opportunities for success mean that students can contribute to their teams by improving over their past performance. This ensures that all the students, including high, average, and low students are equally to do their best to value individual contributions. All reason that explained before makes students mastery the Electrodynamics material and macromedia flash as a media also makes concept that abstract to students becomes clear through simulation.

Cooperative learning not just influence in cognitive students but also in social Independence's students. Social Independence theory stated by Johnson & Johnson, that is social interdependence

exists when individuals share common goals and each individual's outcomes are affected by the actions of others". Social interdependence can be differentiated from social dependence and social independence. Social interdependence occurs when each person's gains and losses influence the gains or losses of other individuals. From this viewpoint, learning takes place through social interaction and communication. Group members who have positive interactions will bring about good results. When both social interdependence and social dependence are absent, there are only individual efforts. Affective domain's observation result showed that behavior students in experiment and control class in good category, but average value of affective domain in experiment class higher than control class. So, the theory of social interdependence theory applied when researcher using cooperative learning models type STAD aided by macromedia flash media.

Cooperative learning model type STAD is much more effective in cognitive, affective, and psychomotor compared with the Direct Instruction. Both of these models were found to be beneficial to develop cognitive, affective, and psychomotor. Yet, cooperative type STAD showed relatively much more benefits in cognitive, affective, and psychomotor as compared with the conventional one. Same like result of research that taken by researcher before, they also get data result like in this research. The first is, Micheal M van Wyk (Wyk, 2012), he is got result that Cooperative type STAD effect on student achievement, attitude and motivation in economics education. Second, Muhammad Iqbal Majoka (Majoka, 2010), got the data Cooperative Learning model effective use in Mathematics Lesson. On retention test, again the experimental group was a little bit superior in achievement but there was no significant difference between the mean scores of the experimental and the control

groups. Hence, ultimate result of the study indicated that STAD (Student Team Achievement Division) was more effective instructional paradigm for mathematics as compared to the traditional method of teaching. Due to its provision for higher learning engagement, it proved to be an active learning strategy. And third, Zaheer ahmad and Nasih Mahmood (Ahmad, 2010) conclude that Cooperative Learning is both enjoyable and effective teaching strategy and it results in significantly higher learning gains and positive learning experience as compared to TI. It provides the students opportunity to interact with their classmates and such interaction develops in them feelings of cooperation and care for others.

## CONCLUSION AND SUGGESTION

Based on the research result, data analysis, and discussion so can be concluded that: There is significant different of students' learning outcomes using Cooperative Learning Model Type STAD and Direct instruction model. Not just in cognitive domain but also in affective and psychomotor domain.

Based on the research results that have conducted, researcher gives the following suggestions: (1) make a better of instructional media which use to teach the topics, to support Learning Model Type STAD. (2) For the next researcher in order to give more attention and guidance to students who are less active. (3) For the next researcher who wants research Cooperative learning model type STAD so that prepare one observer for each group, to get more accurate data.

## REFERENCES

Ahmad, Z. and Mahmood, A., 2010, Effects of Cooperative Learning vs. Traditional Instruction on Prospective Teachers' Learning Experience and Achievement. *Journal of Faculty of Educational Sciences, year: 2010, vol: 43, no: 1*

Maizora, S., 2011, *Pembuatan Media Pembelajaran Dengan Macromedia Flash 8 (syahfdiichiemaizora.files.wordpress.com/2011/01/pengenalan-flash.pdf.*

Majoka, M., I., 2010, Student Team Achievement Division (STAD) As An Active Learning Strategy: Empirical Evidence From Mathematics Classroom. *Journal of Education and Sociology*, ISSN: 2078-032X.

Sanjaya, W., 2006, *Kurikulum Pembelajaran Teori dan Praktik Pengembangan KTSP*, Jakarta: Kencana

Slavin, R. E., 2006, *Educational Psychology: theory and practice (Eight edition)*. USA: John Hapkins University.

Sudjana, 2005, *Metoda Statistika*. Bandung: Tarsito.

Sudjana, N, 2009, *Penilaian Hasil Proses Belajar Mengajar*. Bandung: PT Remaja Rosdakarya.

Supardi, 2008, *Pengaruh Media Pembelajaran Dan Minat Belajar Terhadap Hasil Belajar Fisika*. *Jurnal Formatif* 2(1): 71-81 ISSN: 2088-351X.

Trianto, 2010, *Mendesain Model Pembelajaran Inovatif dan Progresif*. Jakarta: Kencana Prenada Media Group.

Wyk, Michael M van, 2012, The Effects of the STAD-Cooperative Learning Method on Student Achievement, Attitude and Motivation in Economics Education. *Journal of Department of Curriculum and Instructional Studies, College of Education, University of South Africa*, 33(2)