The Effect of Combination Cooperative Learning Models Toward Learning Result

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Abstract—**Required a model of learning that can improve students' understanding and learning outcomes. One way to overcome this is by applying a combination of cooperative learning models. This research aimed for knowing whether students learning result which was combined cooperative learning model STAD type (Students Teams Achievements Division) with NHT (Number Head Together) is higher than students learning result which was teaching by cooperative learning model STAD type on the colloid topic. This research has been done in the Senior High School. The research designed that been used was quasi experiment. Research sample has been determined with purposive sampling technic. On the experiment group I pretest average value was 35,71; posttest 77,86; and gain 0,7, the experiment group II pretest average value was 31,67; posttest 68,61; and gain 0,5. Hypothesis testing has known by using right side tes-t, therefore Hypothesis received was a student learning result which was teaching by using of cooperative learning model STAD type with NHT was higher than student learning result which was teaching by using cooperative learning model STAD type.**

Keywords—*learning result, combination larning model, coorperative*

I. INTRODUCTION

Education has an important role in preparing the quality of human resource. The science today should enable the students to meet the demands and face the challenges ahead in work environment of daily life. Not only knowledge but also communication skills, leadership quality, critical thinking, and listening skills are required to achieve excellence in work [1]. The assessment of learning and teaching process was often negligible and less attention than of learning result. Education and instruction was called be a success one when the different happen toward students because of the learning process experience [2]. The affected factor toward the low of student learning result was rarely using fun learning model and unvaried from teacher [3]. In line with the development of social solidarity among students, an individual approach in education needs to be balanced with an approach based on cooperation, solidarity and collaboration to develop students' skills in collaboration, and the ability to negotiate, communicate and ability to make decisions [4].

Cooperative learning (CL) model can be used because of demanding the cooperation and interdependence of student in the task structure, purpose structure, and reward structure. CL model was developed for reaching learning result such as academic achievement, tolerance, diversity acceptance, and social skill development [5]. CL is the instructional use of small groups in such a way that student's work together to achieve shared goals [6]. Johnson & Johnson (1999), defined CL as the instructional use of small groups so that students work together to maximize their own and each other's learning [6]. The student-centered approach of CL leads to learner autonomy. The positive impact of CL has far-reaching effects that extend beyond the classroom, into participants' professional and personal lives [7].

According to the explanation above, Cooperative learning model can be used is a STAD type (Student Teams Achievement Division) which was combined with NHT type (Number Head Together). Cooperative learning model STAD type has a great value that was can increase students cooperation, because student was giving an opportunity to discuss in heterogeneous group. The weakness of Cooperative learning model STAD type was when student making a study group sometimes there are several students not participating on that. It can be prevented by making combination from Cooperative learning model STAD type with cooperative learning model NHT type. Cooperative learning model NHT type was developed for increasing students responsibility. Every student in a group was giving a different task for discussing together then exercising them for uniting opinion [8].

From the Nawangsasi (2013) research, it showed that student learning result which was teaching using cooperative learning model STAD type which was combinated by cooperative learning model NHT type was known that student pre-test average value was 29,1 and post-test value was 80,1 [9]. The same as from Tuti Winarnik (2011) research showed that student learning result which was teaching using cooperative learning model STAD type which was combinated by cooperative learning model NHT type was 80% increase [10]. Moreover, this research was done by Annik Qurniati (2013) concluded that learning process which was using by cooperative learning model NHT has been increased on the chemistry learning result as 81,2% [11].

Based on that result, the writer purpose in doing this research was for knowing whether students learning result who was teaching with combinating cooperative learning

model STAD type with NHT was higher than cooperative learning model STAD type colloid material.

II. METHOD

A. Research Overview

The research designed that been used was quasi experiment First. On the early research, the activity that has been done was location determine, time, population, sample, preparing learning tools, and instrument. In the research implementation phase, the early student knowledge test experiment (*pretest*) has been done at sample. It was done for knowing student understanding toward colloid. Furthermore, doing a treatment on that sample. Ultimately, the activity which was done was finaly test experiment (*posttest*). It was done for knowing student achievement in learning process. Assessment on the learning process became an important point for final result from it. The overview of the research is summarized in Figure 1.
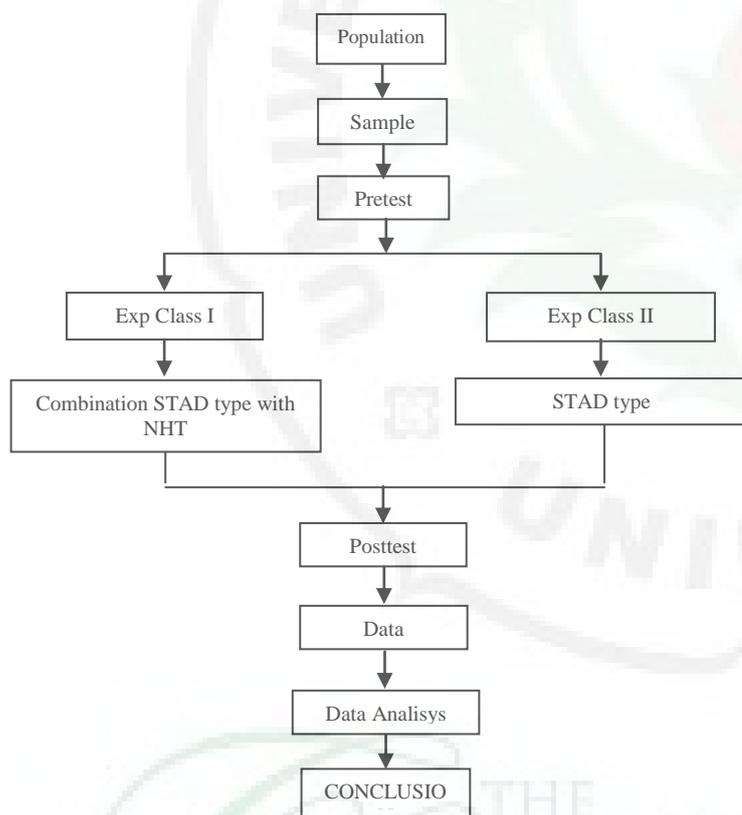
The overview of the research to increase student's achievement on the learning chemistry to senior high schools students

B. Population and Sample

The study was conducted in the Province of North Sumatera, Indonesia, at academic year 2013/2014. The objects to study are including: (1) Chemistry teachers with has experience in teaching of science high school students, and (2) students of senior high school. The populations are senior high school students in Madrasah Aliyah Negeri (MAN) 2 Model Medan with major in science. Sample in the school targets are then divided into two groups, one group is named as an experimental class I and another group is a experimental class II. The students to be included in the study were selected based on their performance on chemistry in pretest.

C. Research Instruments

The instruments used in this study are evaluation tests for pretest and posttest. The evaluations is provided in multiple choice tests, they are arranged based on the colloid topics, and the items in the tests have been standardized. A set of evaluation test contains 20 questions that are distributed with variation from simple to difficult questions. They questions is designed to cover all chemistry topics in the chapter colloid and be able to measure students achievement in chemistry.

D. Research Procedures

Research procedure has done on the several phases that was early phase and research implementation phase. In the research implementation phase, Experiment class I using combination cooperative model STAD type with NHT and experiment class II using cooperative model STAD type. Before doing a learning process in the experiment class I, the students will be numbering first for each student at the group. Then, the students was involved for finishing the task together, every group was giving an opportunity to be constructing their knowledge with connecting the information or knowledge that was saved with the new study experienced for enriching students learning. The teacher giving enough time during 30 minutes for doing a discussion to the giving task. After finishing the discussion, they would do the mastery of understanding of students with calling one of the number which was giving to the students from each group for presenting discussing results. When the presentation begun, the students had to responsible in the results to get maximum score. The steps that we can do if STAD type was combined with NHT showed on the Table I.

For the experiment class II, the students weren't given the numbering. In the cooperative learning STAD type every group was giving an opportunity for constructing their knowledge. Researchers as a teacher as well was giving same time with the experiment class I that was 30 minutes for discussing the task. After finishing it, the students would be presentation about discussion results. STAD learning steps consist of: (1) Create a group of 4 heterogeneous members (mix by achievement, gender, ethnicity, etc.); (2) The teacher presents lessons; (3) Teachers assign tasks to groups to be undertaken by group members. Members who have understood can explain to other members until all members in the group understand; (4) Teacher gives quiz/question to all students. When answering a quiz can not help each other; (5) Evaluate; (6) Conclusion.

TABLE IV.   SYNTAX MODEL OF COOPERATIVE MODEL LEARNING STAD TYPE WITH NHT

Phase	Teacher Activities
PHASE I Delivered goals and Student motivated	Teacher telling about all subjects goal what to achieve on that subject and motivating student in
PHASE II Given/Delivered Information	Teacher served an information to student by demonstrating or from something in the book
PHASE III Student organizing into study group	Teacher divided student into several group in 4-5 people heterogently (mixed from them achievement, gender, tribe, etc) and giving a number so that every student in a group having a different number
PHASE IV Giving tasks	Teacher given task toward group for doing by member
PHASE V Guding /Helping groups on work and study	Teacher given instruction toward group member who ha been understanding so they can hep others
PHASE VI Evaluation	Teacher called a number and all student in every group by the same numbet standing and answering the question which has given to all students class
PHASE VII Giving Appreciation	Teacher looked all the way for appreciating their efforts individually and group

III.   RESULTS AND DISCUSSIONS

A. Analysis of Research Data (Pretest and Posttest)

After doing a research phases which was from the early then doing the research, therefore the data was getting from two classes. They were pretest and posttest value that has been doing for knowing student learning increase. When we get it, hence we will know research hypothesis.

The number of students who become the sample of research in this class amounted to 21 people. While the number of students who were sampled in experiment class II amounted to 18 people. The number of students is obtained from several considerations after the pretest. Considerations are determined by normality and homogeneity tests.

Research data indicate that the average value of pretest in experiment class I is 35,71 and student's average posttest value is 77,86. Based on the value of the completeness of chemistry lesson that is equal to 65, then the value of posttest students who are over the completeness criteria there are 20 people and who do not reach the completeness criteria there is 1 person. Because that student was absent two times, but the students remain enthusiastic in doing the homework assigned.

Average pretest value in the experiment class II students was 31,67 and post test value in the experiment class II students was 68,61. Students in experimental class II that reached the completeness criteria amounted to 13 people and who do not reach the completeness criteria there is 5 people. Based on observations made during the learning activities in the experiment class II, there were some students who were less enthusiastic in collaboration with their group members. They are just silent and not involved in doing the task given by the teacher. This is the cause of the value of learning some students do not meet the criteria mastery of chemistry lessons. Comparison of pretest and posttest averages for both classes can be seen in Figures 2.

Average of pretest and posttest class of experiment I and experiment class I
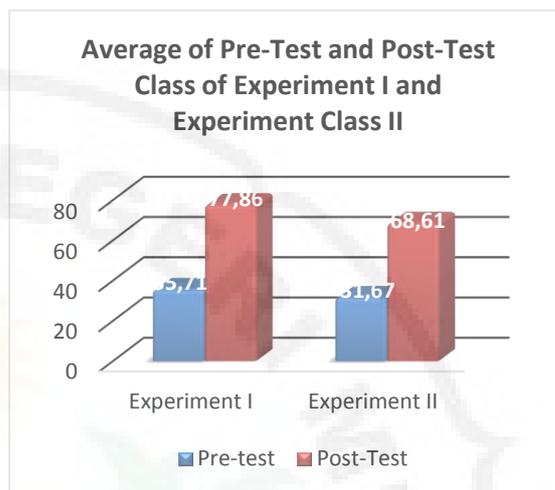
Then based on the diagram above can be seen that the learning outcomes in experimental class I is better than the experiment class II. Meaning learning of chemistry on colloid topics by using combination of cooperative learning model with STAD-NHT type better than learning by using cooperative learning model type STAD.

B. Value of Improved Learning Outcomes (Gain)

Gain is the difference between the posttest and pretest values of the student. gain indicates increased understanding or mastery of student concepts after learning. The purpose of testing the value of increased learning outcomes (gain) is to determine the success of the learning process undertaken by students. The percentage increase in learning outcomes can be calculated from the average increment of all students for each class.

The average value of gain in the experiment class I was 0,65; while the average gain in the experiment class II students is 0,53. Then from the average value of gain can be determined the percentage of increase in experiment class I is 65% and the experiment class II is 53%. Hence, the difference of study result increase between two classes was 12,10%. The difference in the percentage of profit gained between the two classes is not far adrift. But this proves a difference in the increase of learning outcomes between the two classes. Based on the data it can be concluded that the percentage of gain in the experiment class I students is higher than the experiment class II students.

Based on the gain criteria shown in Table II, there are three categories: low with G < 0,3; medium 0,3 < G > 0,7; and high. G > 0,7. Then it can be concluded that the gain criteria in the experiment class I students are in the medium category. While the gain criteria in the experiment class II students are also in the medium category, it means that the improvement of student learning outcomes in both classes has good criteria.

TABLE V.   PERCENTAGE AND GAIN CRITERIA IN EXPERIMENT CLASS I AND EXPERIMENT CLASS II

	Criteria	Exp I	Exp II
Σg	G < 0,3= Low	13,70	9,57
Average	0,3 < G > 0,7=	0,6524	0,5314
% gain	Medium	65,2%	53,1%
Information	G > 0,7= High	Medium	Medium

The average value and percentage of profit presented in Table II are obtained from the profit value of each student in experimental class I and experiment class II. The pretest, posttest, and gain values of each student in both classes are presented in Table III. Based on the table can be seen in the experiment class I, there are 15 people have a gain value in the medium category and 6 people have a gain value in the high category. In the experiment class II, there are 17 people in the medium category and 1 person with low profit rate in this category. this shows that students in experimental class I are able to master the concept of chemistry lesson on colloid topics by using combination of STAD-NHT type cooperative learning model. Therefore, the combination of STAD-NHT learning model is very well used in chemistry learning on colloid topics.

On the students learning process in the experiment class I and experiment class II showed the same attitude that was making a question and doing an interaction with group mate. It was because there are teacher motivation toward students that was a value was done to the all of group member. Therefore, every students in a group have a responsibility on the group success. It was demanding students for more responsible toward the task which was given to them.

TABLE VI.   VALUE OF PRETETS, POSTTEST, AND GAIN IN EXPERIMENT CLASS I AND EXPERIMENT CLASS II

Name	Exp I Pre test	Post test	Gain	Name	Exp II Pre test	Post test	Gain
KI	65	85	0,57	RD	45	65	0,36
TR	50	85	0,70	DK	45	60	0,27
MA	45	70	0,45	AF	40	75	0,58
DS	45	80	0,64	RM	40	60	0,33
RA	45	90	0,82	ZA	40	75	0,58
RP	45	80	0,64	AR	35	75	0,62
CN	40	80	0,67	SA	35	60	0,38
AS	40	85	0,75	WR	35	75	0,62
NH	40	75	0,58	AR	35	55	0,31
IM	40	75	0,58	DA	30	80	0,71
SI	35	85	0,77	SA	30	65	0,50
WA	35	75	0,62	NS	30	75	0,64
AP	30	80	0,71	MD	30	65	0,50
HK	30	85	0,79	RU	25	75	0,67
QS	30	70	0,57	DW	25	80	0,73
SM	25	75	0,67	MF	20	75	0,69
MF	25	75	0,67	FZ	20	65	0,56
FR	25	70	0,60	BA	10	55	0,50
NH	25	75	0,67				
RP	25	60	0,47				
LA	10	80	0,78				
ΣX	750	1635		ΣX	570	1235	
Average	35,71	77,86		Average	31,67	68,61	

The experiment class I, communicating between group mate in the class will be effective in making conducive situation in the class. Group communication in the experiment class II was different with the experiment class I, there were several students didn't active on the discussion process. It was because there are Free Rider in the experiment class II that means the students who has not a personal responsible on the group task, they just following others. Besides Free Rider there are the term of Diffusion of Responsibility, where the several member unable to follow the discussion process and be ignored from others.

C. Hypothesis Test Results

Hypothesis results from this research has been calculating with using right t-test. For knowing whether this research hypothesis was approved of refused. Testing criteria when $t_{count} > t_{table}$ so alternative hypothesis was approved, whereas zero hypothesis was refused.

Hypothesis testing results has been price obtained $t_{count} > t_{table}$ that was $3,76 > 1,68$ with the significant side 5% ($\alpha = 0,05$) so that hypothesis was approved. Therefore, student learning results who was teaching used combination cooperative learning model STAD-NHT was higher that coorperative learning model STAD in the colloid material. The obtained result can be said that coorperative learning model STAD type with NHT was better to increase learning results on the chemistry subject.

Acording to the research which has been done in MAN 2 Model Medan, it can be concluded that student learning results who was taught by cooporative combination learning process STAD-NHT type was higher than coorporative combination learning process STAD on the colloid material.

IV.   CONCLUSION

Based on the average posttest value, gain and hypothesis test it can be concluded that the combination of cooperative learning model type STAD-NHT can provide improvement to the students learning outcomes in the chemistry lesson with colloid topics.

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