THE EFFECT OF COOPERATIVE LEARNING TYPE TGT USING CONCEPT MAPS TOWARDS STUDENTS' LEARNING OUTCOMES ON FLUID DYNAMICS TOPIC GRADE XI SMA NEGERI 5 BINJAI A.Y. 2012/2013

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ABSTRACT

The purpose of this research is to know the effect of cooperative learning type TGT using concept maps towards students' learning outcomes on fluid dynamics topic grade XI SMA Negeri 5 Binjai A.Y. 2012/2013. The type of research is quasi experimental research. The population is all students of class XI IPA SMA Negeri 5 Binjai Academic Year 2012/2013, consist of four classes. Two classes is selected randomly as sample. One class as experiment class treatment using cooperative learning type TGT using concept maps and another class as control class using direct instruction. Data is tested is normal distribution and homogeny. To do hypothesis test used with t one tailed. Testing of hypothesis for posttest showed that $t_{count} > t_{table}$. Based on the observation about students' affective, psychomotor, and activity that done by observers showed that experimental class higher than control class. This case means there are differences of students' learning outcomes caused by effects of cooperative learning type TGT using concept maps on fluid dynamics topic grade XI SMA Negeri 5 Binjai A.Y. 2012/2013.

Key words: Cooperative learning type TGT, Concept Maps, Students Learning Outcomes

Introduction

The quality of education in Indonesia at now very concern. It proved that Indonesia's human development index decline. The quality of education in Indonesia was ranked 12th out of 12 countries in Asia. Indonesia has a low competitiveness, and still according to a survey by the same institution predicated Indonesia as a follower and not just as a technology leader of the 53 countries in the world. (Ganis, 2010).

In an effort to improve the quality of education, the teaching and learning activities has to be planned and executed in such a way optimally. Implementation of the learning activity encompass teachers, students, the learning environment and learning model used become one unit. The relationship between teachers and students when the learning process takes place should occur in both directions, not just centered on the teacher, but the student should also be actively involved, so that students are able to construct their own knowledge, teachers act more as a facilitator, motivator and mediator.

Education must be transformed from the passive, technical, and apolitical orientation that is reflective of most students' school-based experiences to an active, critical, and politicized life-long endeavor that transcends (the boundaries of classrooms and schools).

Physics is a science that is very interesting because it is closely related with facts and phenomena that occur in nature, requiring an understanding of the concept of an integrated and comprehensive for students to avoid misconceptions. But in reality most students still regard physics as a boring lesson. This is because students are not actively involved in the learning process. Most of them are only working on the problems of physics without understanding the concepts of physics itself. So they know physics just a sequence of complicated mathematical formulas with symbols of physics in it. Of course, directly affect student learning outcomes.

Based on preliminary studies conducted in SMA Negeri 5 Binjai by distributing questionnaires to 22 students, 54.54% said that physics lessons is ordinary, as 40.90% students like physics and 4.54% students stated that they do not like physics. The results of the interviews conducted for teachers of Physics SMA Negeri 5 Binjai obtained information that the physical value of the average of all students in grade XI, as much as 50% of students have not reached the KKM. This is due to the learning of teachers just use the conventional model of learning, where learning is a sequence of conventional lectures, discussion and assignment. The cooperative learning model requires student cooperation and interdependence in its task, goal, and reward structures (Arends, 2012).

From the preceding research that has been done with the same learning model, it turns out the learning outcomes of students with cooperative learning models type TGT higher learning outcomes of students taught conventionally. Research conducted by (Butar-Butar, 2011) obtained the average value of student learning outcomes after implementing the cooperative learning type TGT is 65.13 (on a scale of 10-100), then (Nasution, 2011) her research showed that t-test $t_{count} > t_{table}$ (3.70 > 1.67), which mean that Ha is received and students' activity in experimental class is appropriate with post-test. Also (Batubara, 2011) obtained the average value of student learning outcomes after implementing the cooperative learning type TGT in experiment class is 67.13 which in control class is 60.13. The weakness of they studies did not using concept maps.

Based on the above description of the problem, the authors is interested in doing research entitled: "**The Effect of Cooperative Learning Type TGT using Concept Maps towards Students' Learning Outcomes on Fluid Dynamics Topic Grade XI SMA Negeri 5 Binjai A.Y 2012/2013**".

Base on the problems that show above, the objectives in this research were:

- Knowing the effect of Cooperative learning type TGT using concept maps to the student's learning outcomes on fluid dynamics topic.
- Knowing the effect of Direct Instruction Learning Models to student's learning outcomes on fluid dynamics topic.

Knowing the different caused effect of Cooperative Learning Type TGT using Concept Maps towards learning outcome on Fluid Dynamic's Topic Grade XI Semester II SMA Negeri 5 Binjai

Methodology

This study had done at SMA Negeri 5 Binjai on May Academic Year 2012/2013. Population of this research is all students of class XI SMA Negeri 5 Binjai academic year 2012/2013 which consists of four parallel classes. Sample is taken from population with use cluster random This study includes the type of research experiments which is quasi-experiment. In its implementation involves two different treatments between the experimental class and the control class. To know the physics student learning outcomes by giving tests in both classes before and after given treatment.

The study design was as follows:

Table 1 Research Design Two Group (Pre-test and Post-test)

Class	Pre-Test	Treatment	Post-Test
Experiment	T_1	X_1	T_2
Control	T_1	X_2	T_2

Where:

T_1= Pre-test is given to the experimental class and control class before treatment. The test is given in the form of learning outcomes in fluid dynamics topic.

T_2= Post-test given to the experimental class and control class after treatment.

X_1= Learning by using the cooperative learning type TGT using concept maps.

X_2= Learning by using Direct Instructional models.

Research instrument used in this study is a test of student learning outcomes totaling twenty (20) validated.

Table 2 Specification of test physics learning outcome subject Fluid.

No	Sub-Matter Subject	Cognitive ability level						Amount
		C1	C2	C3	C4	C5	C6	
1.	The Continuity Equation	1,12	15	13,20	14,19	5,8,10		11
2.	Bernoulli's Equation		4,9		3	16		3
3.	The Application of Bernoulli's Principle	7		11,18	2	6	17	6
Amount		3	3	4	4	5	1	20

To hypothesis test, firstly compare average score of students learning outcomes both of class. Then the obtained data are tabulated then find the average value. Then determine mean, deviation standard, and variance of both of class. Obtained data tested by the normality test aims to determine whether a sample comes from a normally distributed population or not. To test, use test Liliefors. Homogeneity test performed to determine if the sample variance is homogeneous or not, and hypothesis test using t-test to get the conclusion.

For pretest is used Similarity test average pretest (two tailed test)

H_o : $\mu_1 = \mu_2$ Initial ability both of experimental and control class same.

H_a : $\mu_1 \neq \mu_2$ Initial ability both of experimental and control class different.

Test criteria Ho is accepted if $-t_{1-1/2\alpha} < t < t_{1-1/2\alpha}$ where $t_{1-1/2\alpha}$ get from t list distribution with dk = (n_1+n_{2-2}) and α = 0.05. For other value of t Ho unaccepted.

For posttest is used one tailed test test is used to know influence of physics learning outcome seen from the average value of student learning outcomes in students' posttest of experimental class and control class. Testing whether or not influence the result of posttest student t test was used one side (right side) with the hypothesis:

H_o : $\mu_1 = \mu_2$ Final ability both of experimental and control class same

H_a : $\mu_1 > \mu_2$ Final ability of experimental class greater than control class

to test the hypothesis t test was used with the formula :

Which significant level 0.05, hypothesis test criteria is accepted Ho if $t_{calculate} < t_{(1-\alpha)}$ obtained from t list distribution with degree of freedom (d_f) = (n_1+n_{2-2}) with probability (1- α), values for other t, Ho unaccepted. If data analysis show $t > t_1-\alpha$ or value of t calculate which obtained more than $t_{(1-\alpha)}$, so hypothesis Ho unaccepted and accepted Ha. Can be conclude physics learning outcome student in class experiment with used cooperative learning type TGT using concept maps higher than learning outcome student in control class using direct instruction, so cooperative learning type TGT using concept maps be told influence into student learning outcome.

Research Result And Discussion

From the pretest data obtained the average value in experimental class is 38.33 while deviation standard is 8.92 whereas in control class the average value is 37.4 and deviation standard as 6.63. After the both of classes are given treatment, based on the data of research result**,** the mean value after applied cooperative learning type TGT using map concept model is 75.63 and the deviation standard is 9.01. While in control class obtained the mean value of student's post-test is 65.40 and deviation standard is 13.38.

- **Pretest**

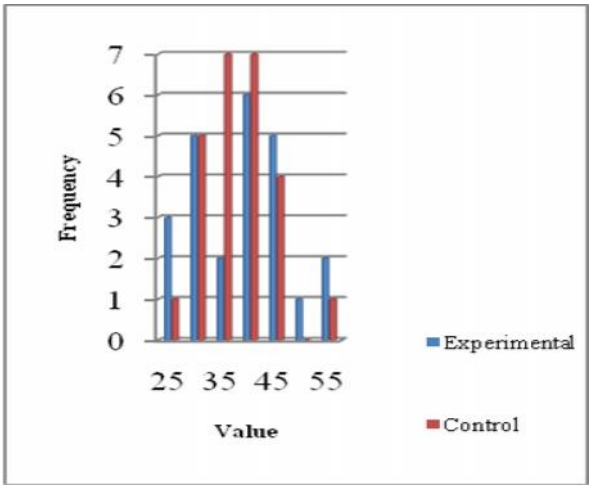

Figure 1 Cylinder Chart of Pre-test Data in Experimental and Control Class.

Normality test using Liliefors test in experimental class Lcount 0.1571 and Ltabel is 0.190, in control class L count 0.0113 and L table 0.173. the result show that Lcount < Ltable thus be concluded that pre-test data of both classes are normally distributed.

Homogeneity show that F_{count} 0.55 and F_{table} 2.00, $F_{count} < F_{table}$ which means that the sample used in this research revealed as homogeneous or can represent the entire population.

Hypothesis test in here is used t-test two tailed. Testing criteria is H_o is accepted if t_{count} between -2.013 and 2.013 and H_o is rejected if t_{count} has another score. Because t_{count} = 0.417. So H_o is accepted and H_a is rejected. It means that there is aren't significant differ of students initial learning outcome both experimental and control class.

- **Post-test**

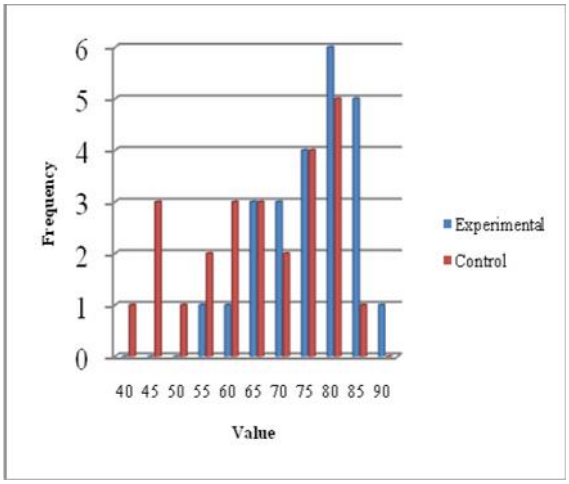

Figure 2 Cylinder Chart of post-test Data in Experimental and Control Class.

Normality Test of Post-test Data show by the table below

Table 3 Posttest Data Normality Test of Experimental and Control Class

Class	Pre-test Data		Conclusion
	L_{count}	L_{table}	
Experimental	0.10	0.19	Normal
Control	0.09	0.17	Normal

Based on table 4.3. that $L_{count} < L_{table}$ so it can be concluded that post-test data of both classes are normally distributed.

Homogeneity Test Result of post-test F count 2.20 and F table 2.00, value of $F_{count} > F_{table}$ which means that the sample used in this research are not homogeneous or unable to represent the entire population.

Hypothesis Testing is used t-test one tailed. Testing criteria is H_o is accepted if t_{count} between -2.013 and 2.013 and H_o is rejected if t_{count} has another score. Because t_{count} = 3.263. So H_o is rejected and H_a is accepted. It means that there are significant effect in student who learn by Cooperative Learning type TGT using concept maps compared by student who got direct instructional learning in fluid dynamics material at class XI Semester II SMA 5 Binjai.

Discussion

Student who used cooperative learning type TGT using concept maps model has a better learning outcome than students who used direct instruction learning. The differences is possible because cooperative learning type TGT using concept maps model giving a chance for students to learn freely and independence, student directly active in learning process, learn how to make a prediction, sharing or discussion and cooperate in group, and express the opinion. Group learning in classroom teach student to interact socially. It appropriate to Sudzina in Cohen reports that cooperative learning is effective in reducing prejudice

among students and in meeting the academic and social needs of students at risk for educational failure.

Based on theory, cooperative learning type TGT model is better than Direct Instruction learning model because in cooperative learning type TGT model students discuss with the other member in group. In addition, each group consist of student with heterogeneous ability, which every student in each group with better ability could help other student. Students will be more focused and feel responsible for solving and working problems and discuss together in group. Beside that cooperative learning type TGT model using concept maps more emphasis on the concepts and students will be more active in class and students understand the subject matter easily. While in control class that use Direct Instruction learning model students just sit and listen to the teacher's explanations without trying to solve its own problems though also given worksheets.

This is evident from researcher who have conducted research about cooperative learning type TGT model, including; , it turns out the learning outcomes of students with cooperative learning models type TGT higher than learning outcomes of students taught conventionally. Research conducted by (Butar-Butar, 2011) to obtain the average value of student learning outcomes after implementing the cooperative learning type TGT is 65.13 (on a scale of 10-100). then (Nasution,2011) her research showed that t-test tcount > t table (3.70 > 1.67), which mean that Ha is received and students' activity in experimental class is appropriate with post-test. Also (Batubara, 2011) obtained the average value of student learning outcomes after implementing the cooperative learning type TGT in experiment class is 67.13 which in control class is 60.13

Although cooperative learning type TGT using concept maps can improve student's learning outcomes whether it from cognitive domain, affective domains, and psychomotor also activity 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 tournament. 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. For addition, attention to the steps in learning to achieve the improved of learning outcomes and anticipate the time addition of the research.

Conclusion

Conclusion of this research based on data of research result, data analysis, and discussion so can conclude that student's learning outcome of physics which use Cooperative Learning Type TGT using Concept Maps on Fluid Dynamic's Topic Grade XI SMAN 5 Binjai AY. 2012/2013 before given treatment average of pretest as lower than after given treatment, student's learning outcome of physics which use

Direct Instruction Learning Models on Fluid Dynamic's Topic Grade XI SMAN 5 Binjai AY. 2012/2013 before given treatment average of pretest also lower than after given treatment and there are different caused the effect of Cooperative Learning Type TGT using Concept Maps towards learning outcome on Fluid Dynamic's Topic Grade XI SMAN 5 Binjai AY.2012/2013 which t count greater than t table at significant level 0.05.

Suggestion

Based on research result and discussion before, researcher give suggestions as to the next researcher who want to do research about cooperative learning type TGT suggested more direct, or guide student to be more active while work in group by ask to every student in group about what student already do in group so student will be motivate to be active in solving group assignment and for the next researcher suggested before start teaching learning process, firstly should be explained to student how the implementation of cooperative learning type TGT using concept maps, so at teaching learning process is occur student already know what will do then for the next researcher who will to do research about cooperative learning type TGT using concept map suggested to use time effectively as possible.

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