THE EFFECT OF COOPERATIVE LEARNING MODEL OF GROUP INVESTIGATION (GI) TYPE USING ANIMATION IN INCREASING PHYSICS LEARNING OUTCOMES OF STUDENTS MAN 3 MEDAN A.Y. 2014/2015

Nurul Wahida and Jonny H. Panggabean
Physics Department, Faculty of Mathematics and Natural Science
nurul_niedlich@yahoo.com

ABSTRACT

The purpose of this research is to know the effect of Cooperative Learning Model through GI type using animation media in increasing the physics learning outcome of student MAN 3 Medan in the material fluid dynamic class XI Academic Year 2014/2015, the type of research is quasi experimental research. The population were all the student of class XI MAN 3 Medan academic year 2014/2015, consist of 5 class. Two class is selected random cluster sampling as sample. One class as experimental class was treatment by Cooperative Learning Model through GI type using animation media and another class as control class was treatment by conventional learning. Instrument that used as learning result test, namely objective test as the amount is twenty items that contains of five options and already valid. To test the hypothesis, used the t test after normality and homogeneous test.After test it was obtained the are significant difference between the physics learning outcomes of student in experimental class and in the control class. Because of the difference it means there are significant effect of cooperative learning model through GI type using animation media in increasing the physics learning outcome of student MAN 3 Medan class XI Academic Year 2014/2015 in higher learning outcomes than conventional learning.

Keywords: *cooperative learning model, group investigation (GI), animation,*

.

INTRODUCTION

In achieving learning outcomes that expected, it is necessarily to consider factors that affect the learning process. One of them is the strategy of teachers in choosing a model of learning, so that the appropriate teaching and learning strategies will provide a satisfactory student learning outcomes, As expressed by Ramadhan, (2008), "Physics lesson taught with the aim to prepare students to be able to apply the concepts of physics in daily life by practicing, doing the observations, doing the experiments, discussing, and drawing the conclusions from the activities". So that the students discover, prove, realize and apply the concept in daily life. Thus it doesn't emphasize the physics lesson result only,but the process to get the results preferred.

Based on the experience of teaching at SMA Negeri 1 Perbaungan when implementing teaching training it appears that in physics learning in class XII-Science,students tend to be passive to the teaching provided by teachers, it make the student have low interest in studying physics.

According to the results of observation done to the mark of student's MAN 3 Medan, itshow that the general test results achieved by students in physics as an indicator of cognitive competence achievement is quite disappointing the teacher. The physics average mark obtained by the

students didn't reach the Complete Minimal Criteria.

Based on the results of interviewing the teachers of physics at MAN 3 Medan, she revealed that the difficulty in learning is difficult to motivate and encourage the students' interest to do the exercises of physics. Then, the students are less motivated and less active in asking questions and issuing their arguments during the process of learning physics. The students aren't motivated to learn in groups, they felt it was difficult to solve the problems of physics, and students more often memorizing mathematical formulasof physics than trying to understand the concepts and principles of physics. There are many students argue that the physics is not attractive and it is the most difficult. These factors influence student learning outcomes become low.

The conditions that occur in the classroom that researcher obtained when observing one of the classes, the learning process is still teacher center (teacher-oriented) that teachers act as a major subject in the teaching learning material by conventional and lecturing method, and the studentsjust receive what's given by the teacher. This is why the learning outcomes are not in line of expectations, since students only get theoretical knowledge and act passively, while teachers are active in providing information.

One of part that plays an important role in the resolution of this problem is the teacher. The teacher as a facilitator role in providing services to facilitate students in learning activities. It is very urgent for teachers to understand the characteristics of the subject matter, learners or students, and learning methodologies in the learning process, especially about the selection of a modern learning models (Trianto, 2010)

One of alternative that can be developed by teachers to improve students' physics learning outcome is using teacher's approaching in choosing the way of learning that able to give motivation to increase the students interest of physics to be more active and creative in learning.

For that aim, it is necessary to use a model of learning in hopes of student learning outcomes can be improved, especially in the teaching of dynamic fluid,. There is a possibility of less precise application of learning models as a factor in the lack of the ability of students to solve problems of dynamic fluid. If the learning model is not appropriate, then it will have a negative impact on learning outcomes. So that it is necessary to use a suitable model of learning in hopes of student learning outcomes can be improved, especially in solving problems of dynamic fluid, and one of the many valuable learning model is effective in improving student learning outcomes is a model of Cooperative Learning.

Cooperative Learning Model is a model of learning is done in groups to achieve shared learning, where students are actively communicating it in the form of group and discussed jointly with another group. Research conducted in Solihatin (2009), found that "Applying the model of cooperative learning, it develops students' attitudes and behavior towards democratic atmosphere in the classroom". In addition, the use of small groups of students to encourage students more excited and motivated to learn science. Solihatin's Research (2009), found that "the use of cooperative learning models are very encouraging 20% increase in student achievement and can enhance students' ability to learn independently".

The results of the above research shows that cooperative learning models have a very high effectiveness for the acquisition of student learning outcomes, in terms of its influence on the mastery of the subject matter as well as training and developing of attitudes and social skills that are

beneficial to students in his community life.

Sanjaya (2011) said that the cooperative learning model can be used by teachers when:

a. She stressed the importance of a collective effort on the side of individual effort in learning
b. If the teacher requires all students (not just smart students only) toget success in learning.
c. If teachers want instilling that students can learn from other friends,andlearn from other people's assistance.
d. If the teacher wants to develop communication skills as part of the curriculum content
e. If the teacher wants to increase motivation of students and increase their level of participation
f. If the teacher requires the development of students' ability to solve problems and find solutions solving.

The success of learning according to the model of learning is not just determined by the ability of the individual as a whole, but rather the acquisition of learning it will get better when done together in small learning groups are structured properly.

The rapidly development of information and technology now, able to apply as media that support in creating the helping device in learning process. Using of software that developed with interactive animation program that is visualized can make the students able to understand the real physics concept.(Ramadhan, 2008)

The combination of Cooperative Learning Type GI that use the game tournament with animation media will make physics learning more attractive and it can take students' interest and become love physics as science so that they learn physics enthusiastic and enjoy it as funny learning and at last it increase their achievement and physics learning outcomes than use conventional learning.

Based on the background above, the researcher are interested in doing research with the purpose to know the significant effect in physics learning outcomes of the student that was taught using cooperative learning model through GI type using animation media in Dynamic Fluid material.

METHOD OF RESEARCH

This research is quasi experimenttoknow the effectof thelearning modelin increasing student learning outcomes. Quasi experiment is the development of true experimental design that difficult to do. This design has control class but it can't be entirely used to control external variable that effect the experiment. The research will be held totwoclass/group ofsamples thoseareexperimentalclassanda control class

Sample will be taken from population with use simple random sampling. This means that of the five classes of the population will be taken two class become randomly sampled by using raffle way. One of the class will be takenas theclass experiment class and the other one class will be taken as the control class. The experiment class will be taught with cooperative learning model type GI using animation media and the control class will be taught by conventional learning in topic Dynamic Fluid.

The researcher use the questions/problems of pretest and posttest as the instrument of research which amount of questions is 20 questions. For each question, if it's answered correctly, it will be given 1 score and if it's answered incorrectly, it will be given 0 score.And for psychomotor to assess the inquiry skills it used the instrument of Inquiry skills descriptor.

The hypothesis test that used to know the effect of cooperative learning modeltype GI using animation in

increasing physics learning outcomes of students, is two mean different test that is t-student test. It has the conditions that to be allowed use this test. The conditions are the each data are taken from the normal distribution, the data are homogeneous, and taken randomly. So that it should be tested of conditional test that are normality test and homogeneity test. After tested, it was obtained that the data are normally distributed and homogeneous. Thus it allowed to use different test (t-test)

RESEARCH RESULTS AND DISCUSSION

Research Result

Based on the results of the pretestdataobtained experimental class andcontrol class as shown in the Table 1:

Table1. Data of Pretest in Experimental class and Control class

Experimental Class			Control Class		
Value	Mid Point	Freq	Value	Mid Point	Freq
15-22	18.5	4	30-32	31	2
23-30	26.5	4	33-35	34	4
31-38	34.5	3	36-38	37	1
39-46	42.5	8	39-41	40	9
47-54	50.5	4	45-47	43	10
55-62	58.5	7	48-50	49	4
Σ		30	Σ		30
Mean		41.17	Mean		40.8
Standard of deviation		13.79	Standard of deviation		4.92
Variance		190.16	Variance		24.16

The detailed results of the pretest the both classes can be viewed at the following bars,with the first graph is about the result of pretest data in Experimental class

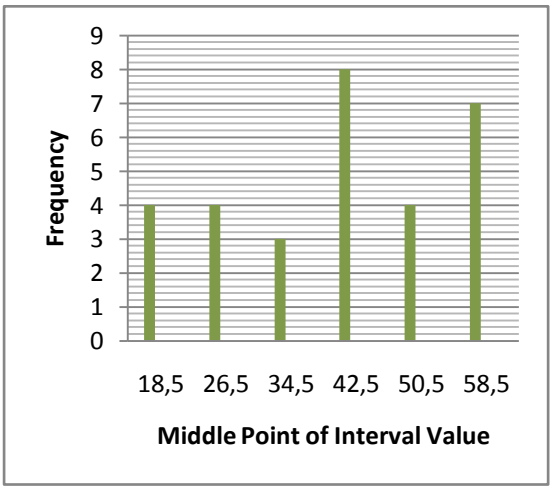

Figure1.Graph of Frequency Distribution of Pretest Data in Experimental Class

The frequency distribution of Pretest data in Control class shown as in the graph below:

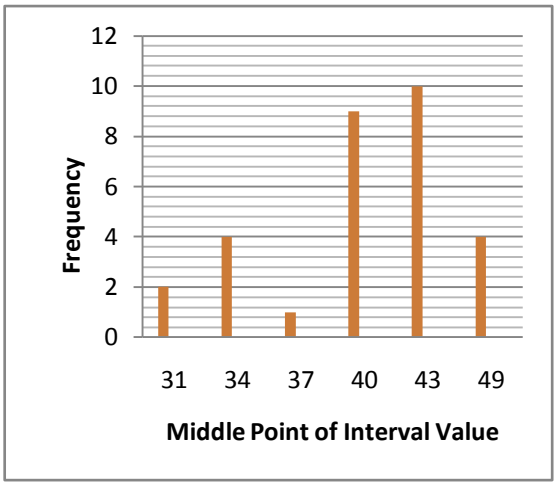

Figure 2.Graph of Frequency Distribution of Pretest Data in Control Class

It can be seen if the same class then the other class using *t test* – two sample marks average pretest both classes. The test results obtained with $\alpha = 0{,}05$, mark $t_{count} = 0.35$ and $t_{table} = 1{,}84$ (hypothesis test calculation in appendix 11). By comparing t_{count} and t_{table}, in order to obtain $t_{count} < t_{table}$, or $0.35 < 1{,}84$, which means the two classes together as same. Hypothesis testing results can be seen in the following Table 2 :

Table 2. Summary of the calculation of *the t – test*

No.	Data	Mean	t_{count}	t_{table}	Conclusion
1.	Pretest Exp class	41.17	0.513	2.00	$H_o$accepted H_a rejected
2.	Pretest control class	40.8			

It show whether there is any difference in Cooperative Learning Model through GI Type using animation media model's on result student learning in a dynamic fluid material after the samples is given a different treatment (given the experimental class treatment with *Cooperative Learning Model through GI Type using animation media* and control class were treated using Conventional learning.

Based on posttest results obtained the following data as viewed in the Table 3:

Table 3. Posttest data Experimental Class and Class Control

Experimental Class			Control Class		
Value	Mid Point	Freq	Value	Mid Point	Freq
48-56	52	4	20-30	25	4
57-65	61	5	31-41	36	3
66-74	70	2	42-52	47	7
75-83	79	7	53-63	58	5
84-92	88	6	64-74	69	10
93-101	97	6	75-85	80	1
Σ		30	Σ		30
Mean		77.2	Mean		53.23
Standard of deviation		15.57	Standard of deviation		16.26
Variance		242.4	Variance		264.4

The detailed results of the posttest the two classes can be viewed at the following bars in the Figure3 :

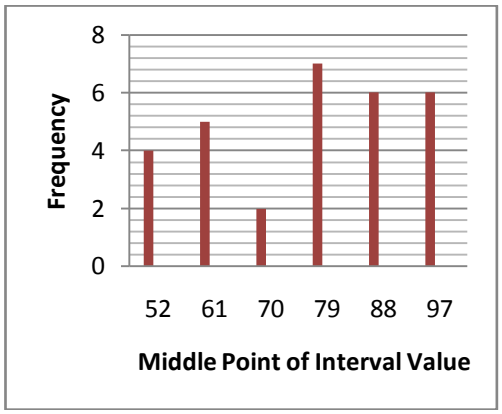

Figure 3.Graph of Frequency Distribution of Posttest Data Experimental Class

The frequency distribution of Pretest data in Control class shown as in the graph below:

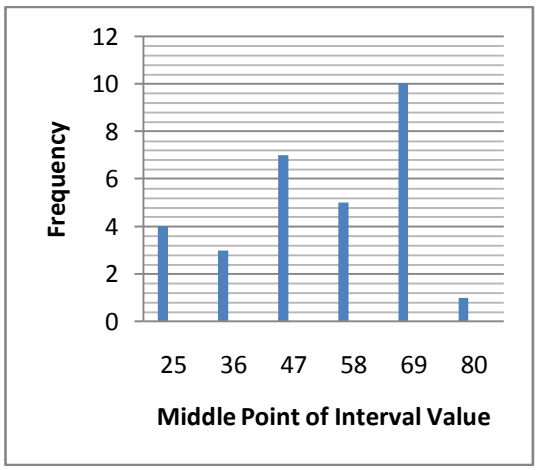

Figure4.Graph of Frequency Distribution of Pretest Data in Control Class

We able to know the effect of cooperative learning model Type GI using animation media in increasing physics learning outcomes of students, it used two mean in different test that is t-student test. Hypothesis testing results can be seen in the following Table 4:

Table 4.Summary of the calculation of *the t – test*

No			t_{count}		Conclusion
1.	Posttest exp. class	77.2	5.70	2.00	H_a accepted H_o rejected
2.	Posttest control class	53.23			

Testing the hypothesis posttest marks using *t - tests* that distinguish average posttest experimental and control groups with the purpose to determine whether there is any difference in cooperative learning model through GI type using animation media on result student learning. Results of hypothesis testing at α = 0,05 obtained by t_{count} = 5.70 and t_{table} = 2.00 (hypothesis test calculation in appendix 14). By comparing t_{count} and t_{table}, so the obtained $t_{count} > t_{table}$ or 5.70 > 2.00 which means that H_a accepted and H_o rejected, so we concluded that there are significant differences using Cooperative Learning Model using Animation in Increasing the Physics learning outcomes in a dynamic fluid material of students MAN 3 Medan A.Y. 2014/2015. The differences cause the effect of the Cooperative Learning Model using Animation in Increasing the Physics learning outcomes in a dynamic fluid material of students MAN 3 Medan A.Y. 2014/2015.

Discussion

The results showed that there are significant differences using Cooperative Learning Model using animation in Increasing the Physics learning outcomes in a dynamic fluid material of students MAN 3 Medan A.Y. 2014/2015.

This is strengthened by the acquisition mark average pretest students in the experimental class was higher than control class.

Pretest was held to identify the initial students' ability. Pretest was held for a subject meeting or 45 minutes. After pretest was held, the sample member was given treatment that was in the experiment class by Cooperative Learning Model of GI type using Animation and in the control class given by conventional learning. The learning process in the experiment class done for five meeting hours it means the total is five times forty five minutes and in the control class for five meeting hours it means the total is five times forty five minutes

The learning start in the experiment class by giving information and demonstration about the material by using animation and then the students were divided into seven heterogeneous groups for each group was about five until six students. The researcher given some subtopics to the each group to be chosen as their investigation. After that, they were given students worksheet to be done together in each group. Then they do the simple experiments that related to the material according to do students worksheet instructions. The animation also showed the simple demonstration that related to the simple experiment that existed in the students worksheet. So the animation helped the students to understand the basic concepts of the subject material. After do the experiment according to students worksheet instructions, the students done the report and answered the questions in the students worksheet together. They helped each other to solve the question in the students worksheet. In the control class, the students just given the Conventional Learning that means the learning is teacher center. The students just listened the teachers explanation in front of the class and they solve the question according to the examples of question given by the teacher.

The learning- the researcher give the Posttest to the members of sample

after each class was given by the different treatment- in this research. Posttest was held to measure the result of treatment that given to each class. After all of the posttest data was collected than the researcher do the data analyzing. The students in experimental class also given by the worksheet that they done together in their own group, it was to support their understanding about the material.

It is necessary to check the data conditional test to know which one the statistical formula that suitable to use for data analyzing in this research before calculating the data to measure the difference of the learning result. To use the parametric test especially t-test, there are three condition that should be obey. First, the data must be taken from normally distributed data. The second, the data is homogeneous, and the third, the sample was taken by cluster random sampling. And for this data of posttest, the researcher found that the three condition was be obeyed so that it can use the t- test for hypothesis test.

The hypothesis test done in significance level α = 0.05 by using t-test and it obtain t_{count} = 5.07 and t_{table} = 2.00 thus $t_{count} > t_{table}$ = 5.07 > 2.00, so that the Ha accepted and Ho rejected. It show there was the significant different between the result of treatment in experiment class that given Cooperative Learning Model of GI Type using animation media to the control class that given by conventional learning. Because there was the difference it means there was the significant effect of the treatment given to the experimental class that is Cooperative Learning Model of GI Type using animation.

These result represent that the Cooperative Learning Model of GI Type Using Animation is better and more effective to be implemented in the physics especially in Dynamic Fluid material, it was proved that is it can increase the students physics learning outcomes. The contribution of each member of the group makes the outcome better than it would be if the students were working individually. Sharan and Sharan (1999) also support this statement : "Group Investigation is a very successful model of teaching because it puts the students in charge of the learning and allows them to investigate what interests them about the subject most"

Despite the cooperative learning model of GI type using animation success to increase the students physics learning outcomes, but there were some constraints of this model, probably while teaching and learning process, student unusual to learning cooperative with their group and there were some students didn't participate actively in their group. So, there were the students didn't reach increasing score of posttest. But more a half of students have increasing the score of posttest. So, as the suggestion to the others who necessary to study with this learning model to guide more the students while learning process.

CONCLUSIONAND SUGGESTION

Based on the the results of analysis, statistical testing, and discussion, it can be conclude that the learning in Dynamic Fluid material in increasing the physics learning outcomes of students MAN 3 Medan A.Y. 2014/2015 are there are significant effect between the students Physics learning outcomes that were learned by the Cooperative Learning of GI Type usinganimation is higher than the average mark of the students Physics learningoutcomes that were learned by the conventional learning because there are significantdifference between the students Physics learningoutcomes learned by the Cooperative Learning of GI Type usinganimation the students Physics learningoutcomes that were learned by the conventional learning.

Based on the research result and discussion before, researcher give suggestion as follows: to the next

researcher who want to do the research about cooperative learning of GI type suggested to be more directly or guide the students to be more active while work in group by ask to every student in group about what student already do in group so the students will be motivated to be active in solving the group students worksheet and investigation.

REFFERENCE

Ramadhan, S. 2008. *Pembelajaran Fisika Berbasis Multimedia.* http://www.budakfisika.com. Accesed februari 2015.

anjaya, W.2011, *Pembelajaran Berorientasi Standar Proses Pendidikan.* Jakarta :Kencana

Sharan, S. 1999. *Handbook of cooperative learning methods,* New York :Praeger

Solihatin, E. 2009. *Cooperative Learning Analisis Model Pembelajaran IPS*, Jakarta: PT Bumi Aksara.

Trianto, 2010.*Mendesain Model Pembelajaran Inovatif Progesif: Konsep, Landasan, dan Implementasinya pada KTSP,* Jakarta :Kencana,