THE EFFECT OF COOPERATIVE LEARNING MODEL GROUP INVESTIGATION (GI) TYPE TO CONCEPTUAL KNOWLEDGE STUDENT'S IN TOPIC OPTIC GEOMETRY GRADE X SMAN 1 PERBAUNGAN ACADEMIC YEAR 2014/2015

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ABSTRACT

The objective of this research was to analysis the Cooperative Learning Model to student's learning outcomes by using cooperative learning model Group Investigation type to conceptual knowledge. In experimental class used cooperative learning model GI type while in the control class used conventional learning model. In each class used pre-test and post-test, after that was done the data analysis technique like average value, standard deviation, normality test, homogeneity test, hypothesis test. The results were showed the increasing of student learning outcomes that used model GI type in conceptual knowledge with post-test value was higher 78.37 in the class experiment than 69.68 in the control class, the active of students and then the conceptual knowledge when the model of GI type were happened. From the research get the conclusion that there was effect of Cooperative learning model Group Investigation type to conceptual knowledge students.

Key word: cooperative, group investigation, conceptual knowledge, student's learning outcome

Introduction

According to Indonesian dictionary education words have meaning or how to process or act of educating. In the learning process of teachers are required to be able to choose appropriate learning models according to the circumstances of the student in order to achieve success in learning. Physics is one of the science subjects in schools that teach a variety of knowledge that can develop the power of reason, the analysis, so that almost all of the problems connected with nature can be understood so interesting to learn.

Based on interview the researcher to one of physic teacher at SMAN 1 Perbaungan at October 16th, 2014 when researcher is training teacher in that school, she stated that during the learning and teaching using only conventional learning to explain the learning material coupled with the provision of independent tasks to students after giving an explanation in the classroom. Value achieved by students categorized enough, but not purely from the results of their own learning abilities but has additional from teacher, including the assessment of teachers to personal tasks, student attendance, and student discipline during the process of learning. The problems faced by students in the learning process that students are difficult in understanding the material taught by teachers using learning model that has not enable all students. They assume that physics is the most difficult lesson and when they face various types of formula and calculation the physics. Students are also difficult to investigate the questions of physics when they face the problem to answer the questions. In the learning process involves the variety of activities to do to get optimal results. To solve the problem, the researcher changes the conventional learning model with cooperative learning model and also the conceptual knowledge is used about the learning outcome by using the Andersons' cognitive start from C4 until C6 about analyze, evaluate and create. Cooperative learning models have some types. One type of cooperative learning model to build students' confidence and encourage their participation in the classroom is a Group Investigation cooperative learning model. It is one form of cooperative learning that emphasize the participation and activities of the students to find their own materials (information) lesson will be studied through the suitable materials, from a textbook or students can search through the internet. It is often seen as the most complex model and the most difficult to implement in a cooperative learning. It involves students from planning, both in determining the topic as well as a way to learn through investigation. It requires the students to get a good ability to communicate well in a group process skill (Lie, 2010).The teachers who use it generally divided in to five till six students with heterogeneous characteristics. The division of the group can be also based on the pleasure of friends or common interest to a particular topic. The students choose the topics that they want to learn, following a thorough investigation of the various sub topics, then preparing and

presenting a report to the class at all (Slavin, 2005).

In some of the studies that have been done to apply the cooperative model of type Group Investigation obtained improving student learning outcomes. As Fauzi (2012) who conducted research in SMAN 1 Sumbul with dynamic electric materials have different results when using the cooperative model of GI type with direct learning model that has 16.37% increase in the average results of his study reached 60.63 become 72.50. Weakness obtained by researcher is the lack of planning early in the organization of the group and the capability of beginning students.

Based on explanation above the writer wants to analysis the Cooperative Learning Model to student's learning outcomes by using cooperative learning model Group Investigation type to conceptual knowledge Student's in topic Optic Geometry.

Research Method

The research would be done in SMAN 1 Perbaungan at Jl. Teuku Rizal Nurdin Perbaungan Academic Year 2014/2015. The population of this research were all students in grade X IPA 1 semester 2 in SMAN 1 Perbaungan, that consist of 40 students and students in grade X IPA 2 in SMAN 1 Perbaungan, that consist of 31 students. The sample in this research were taken with cluster random sampling. The sample were X IPA 1 as an experimental class used cooperative learning model group investigation type to conceptual knowledge and X IPA 2 as a control class used conventional learning.

This research conducted in experimental design and divided into two groups, experimental group which is applying cooperative learning model type group investigation and control group which is applying conventional learning. Pre-test and post-test are administered to both experimental group and control group before and after treatment. The design of research can be shown in Table 1.

Group	Pretest	Treatment	Post test
E	T_1	X	T_2
C	T_1	O	T_2

Table 3.1 The design of the research

Note:

E = Experimental group
C = Control group
T_1 = Pre-test for experiment class and control class
T_2 = Post-test for experiment class and control class
X = Applying cooperative learning model type group investigation
O = Applying conventional learning.

To test the homogeneity of the used formula (Sudjana, 2002:249) :

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

Description:
S_1^2 = Bigger Variance
$S_2^{\,2}$ = Smaller Variance

The test criteria are received Ho: the data come from a homogeneous population if $F_{count} < F_{table,}$ where the $F_{table} = F_{(1-\propto)(n-1)} < F <$

$F_{\frac{1}{2}\propto(n_1-1,n_2-1)}$ obtained from the distribution list F with α = 0.1. Hypotesis test calculate with 2 kinds are :

a. Pre-test ability test. T test is used to determine the similar ability of student in both sample

The form of hypothesis test is :

H_0 : $\mu_1 = \mu_2$: Experiment class and control class have same similar ability

$$t = \frac{\overline{X_1} - \overline{X_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

With S is combination of deviation standart can calculate with the formula according to Sudjana (2002):

$$S^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

where :

$\overline{X1}$ = The mean score of student's achievement in the experiment class

$\overline{X2}$ = The mean score of student's achievement in control class

n_1 = total student in experiment class

n_2 = total student in control class

S^2 = Variants two of class

T = Value of t

b. Post-test ability test. T-test two parts used to knowing the influence of Cooperative learning model type group investigation on students' learning outcome.

The form of hypothesis will be test is: H_o : $\mu_1 > \mu_2$: Student learning outcome by using cooperative learning model group investigation type is better than conventional learning If distribution normal data have the variance homogeny so the hypothesis in the research use t test (Sudjana, 2002).

Research Result

This research is the experiment research with obtained 2 classes consist of 40 students and 31 students, one class is taken as the experimental class and other class as the control class. After the pretest the researcher conducts pretest in experiment and control class to find out the result of students achievement. Two of samples applied different treatments are; 1) Experiment class has treatment with Cooperative Learning Model of Group Investigation type to Conceptual knowledge, 2) Control class has treatment Conventional Learning.

From the result of research, the pre-test of students in Experiment and Control Class on score range from 0 until 100 get of average pre-test value in Experiment class is 39.62 with standard deviation is 6.54 while the average pre-test value in control class is 37.90 with standard deviation is 6.42. In hypothesis test showed that the different increasing of students' learning outcome in experiment and control class. The students' learning outcome is better in experiment class. So, can be concluded that have effect of cooperative learning model Group Investigation (GI) type to Conceptual Knowledge Student's in topic Optic Geometry Grade X SMAN 1 Perbaungan Academic Year 2014/2015.

In some of the journals that have been done to apply the cooperative model of group

investigation type obtained improving student learning outcomes as Doymus (2010) about The Effects of Two Cooperative Learning Strategies on the Teaching and Learning tell that group investigation and jigsaw technique were more effective in increasing academic Achievement and then Simsek, (2013) about the effects of cooperative learning methods on students' academic achievements in Social Psychology Lessons tell that tell the main purpose of reading texts offered to student during reading is to increase the Amount of time allocated to the student to think.

At the initial stage, the teacher suggested objectives and an overview of the linear motion, then give student worksheet to students. Student worksheet is organized in a systematic way in order to assist students in understanding the principles or concepts independently and train the students' ability to think of the Optic Geometry. In the later stages, students investigating and then discuss the results and answer the questions contained in the student worksheet then the students put forward a new principle or concept.

In the implementation process of control class learning by applying Conventional Learning using the lecture method. In the early stages of the teacher to explain to students the linear motion, then the teacher gives the example problems and the solution. The teacher provides the opportunity for students to ask questions about things that are not yet understood. After all the students learned, then the teacher gives exercises to students.

Conclusion

Based on research result and data collection, can be concluded that: the average value of pre-test of experiment class is 39.62 with standard deviation 39.62, after given by treatment then students are given posttest, the average value of posttest in experiment class using cooperative learning model group investigation type to conceptual knowledge become 78.37 that's category good, the average value pretest of control class is 37.90 with standard deviation is 6.42, after given by treatment then the students are given post test, the average value posttest in control class with conventional learning model 69.68 that's category enough with standard deviation 6.57 and the last Student's learning outcomes in experimental class higher than in control class, so it can be concluded that there is effect of cooperative learning model Group Investigation type to conceptual knowledge student's in topic Optic Geometry grade X SMAN 1 Perbaungan 2014-2015.

Suggestion

Based on discussion of research result and conclusion above, researcher gives suggestion to school as below: to help the teacher in teaching and learning process about the type model and improve the models to use cooperative in group investigation to conceptual knowledge then for materials input to physics teachers in selecting appropriate learning model

and make discussion by cooperative during the lessons.

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