THE EFFECT OF COOPERATIVE LEARNING MODEL TYPE GROUP INVESTIGATION TOWARD STUDENT LEARNING OUTCOMES ON CIRCULAR MOTION AT X SMA NEGERI 18 MEDAN ACADEMIC YEAR 2018/2019

Rio Mahera Lumbantoruan dan Derlina

Jurusan Fisika FMIPA Universitas Negeri Medan
riomahera46@gmail.com

ABSTRACT

The purpose of this research was to know how student learning outcomes using cooperative learning model type group investigation toward student learning outcomes on circular motion at X SMA Negeri 18 Medan Academic Year 2018/2019. This research used a quasi experiment method with the design of two Pretest and Posstest groups. The population in this study were all students of class X consisting of six classes. In the study sample selected two classes with random techniques, obtained class X MIA 3 as the experimental class and X MIA 6 as the control class with a total of 35 students. And this research uses instruments, namely 20 multiple choice questions. The results of the data obtained are pretest for experiment class and control class is experimental class bigger than control class. Then the normality and homogeneity tests are normally distributed and homogeneous. So it can be said that the initial abilities in both classes are the same. The result posttest for experiment class and control class is experiment class bigger than control class. The results of the t test one tail showed that there were significant differences due to the effect of cooperative learning model type group investigation on student learning outcomes.

INTRODUCTION

Education is a very important thing for human life. Through education, man will grow and develop as a whole person. Education is expected to meme gang important role on the progress of a country and nation. If the higher level of public education in a country, the higher the level of public prosperity in the country. In addition, education can also be interpreted as a conscious and planned effort to create an atmosphere of learning and learning process so that learners are actively developing their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed self and community.

Physical one science subjects are abstract. Therefore learners should begin to develop imagination in order to understand the fundamental concepts in physics to improve maximum learning outcomes. The minimum value that students have to get to get a good learning result is 70. With such a value, a teacher's strategy is needed on how to teach physics that is abstract.The process of physics learning is still focused on the teacher as an informer who play a dominant role in every learning process. In the learning process learners need to be encouraged to not just see and hear it, but also do something to really understand the concept and can apply it in everyday life.

In innovative learning, the method used is no longer a lecture method but a flexible and dynamic model that is student-centered so that it can meet the needs of students as a whole. Here the author offers a cooperative learning model, this learning comes from the concept

that it will be easier to find and understand difficult concepts when discussing with friends. One model that can be used is a cooperative learning model type GI.

Cooperative learning model is a model of learning in which students learn with a group and they work together. According to Slavin the cooperative learning model is where students learn and work in small groups consisting of 4-6 people with heterogeneous structures. This learning arises from the concept that students will find it easier to find and understand difficult concepts if they discuss with their friends. Students will routinely work in ok groups to help each other solve complex problems (Trianto, 2009).

GI is a learning model emphasizing student choice and control rather than applying classroom teaching techniques. In addition it also combines the principles of democratic learning in which students are actively involved in learning activities including students having the freedom to choose the material to be studied according to the topic being discussed.

Most students haveproblems in physics lesson especially on circular motion. In this material students will be easier to understand if done with cooperation in observation to obtain data analyzed to support the learning objectives to be achieved. Students often experience difficulties in learning this material, especially in understanding concepts. Students are only able to solve problems that have been taught or discussed by the teacher and still have difficulties in working on modified questions (Ningsih,2017).

GI model can improve metacognitive skills and conceptual understanding. Research results by Akcay and Doymus (2012). Siddiqui (2013) also states that GI improves the level of learning (investigation, participation, interaction, critical thinking, logical thinking, problem solving, decision making, communication skills). Problem formulation in this research is how the difference learning outcomes using cooperative learning type group investigation with conventional learning in subject matter circular motion?

Research Objective ini this research is to know thedifference between cooperative learning model type Group Investigation with conventional learning to student learning outcomes.

Reseacrh benefit in this reseach is, for school: Can give good contribution in order improve the learning process by facilitating learning and professionalism of teachers, for teachers: As consideration in choose the model of learning, for students: Students more motivated for learn physics, because concept abstract physics biased more real through the learning model cooperative type Group Investigation. So, learning process be more interesting and more attractive for improve understanding students, for Researcher: As picture for apply more learning models effective and can made reference.

As an action, then learning is only experienced by the students themselves. Students are the determinants of the occurrence or not of the learning process. Skinner believes that a behavior. At the time person learn, then the response becomes better. Conversely, if he does not learn then the response decreases (Sagala, 2013).

Based on the above definition of experts can be concluded that a is said to learn when a person is experiencing a process directed at the goal to be achieved to gain knowledge through experience gained from interaction to the environment so that the changes in behavior, attitude and skills.

This needs to be done, because with clear criteria can be determined what should be done by students in learning content or learning materials (Sanjaya, 2006).

Learning outcomes that should be achieved by students closely related to the formulation of instructional goals planned by previous teachers. According to Nana Sudjana (2009) states that learning outcomes are the abilities that students have after he received his learning experience .Horwardkingsley divides three kinds of learning outcomes, namely (a) Skills and habits, (b) Knowledge and understanding, and (c) Attitudes and aspirations.

Learning models can be defined as conceptual frameworks that depict systematic procedures in organizing learning experiences to achieve learning objectives (Suprijono, 2010).

Cooperative learning model is characterized by a cooperative structure of tasks, goals, and rewards. Students in cooperative learning situations are encouraged or required to work on the same tasks together, and they must coordinate their efforts to complete the task. The lessons with the cooperative model can be marked by the following features:

- Students work in teams to achieve learning goals.
- The team consists of students with low, moderate and high achievers.
- Where possible, the teams consist of a mixture of race, culture, and gender.
- The reward system is both group and individual oriented.

Cooperative learning models are developed to achieve at least three important objectives of academic achievement, tolerance and acceptance of religious diversity, and the development of social skills (Arends, 2009).

This model is highly versatile and comprehensive; it blends the goals of academic inquiry social integration, and social-process learning. It can be used in all subject areas, with all age levels, when the teacher desires to emphasize the formulation and problem-solving aspects of knowledge rather than the intake of pre organized, predetermined information.

RESEARCH METHODOLOGY

This study includes quasi-experimental research, which is a study that aims to determine the effect student learning outcomes in the subject matter of Circular Motion with the cooperative learning model type Group Investigation.

Data obtained on student learning outcomes using the cooperative learning model Group Investigation type for the experimental class and the control class using conventional learning in the material of Circular Motion.

The population in this study were all class X SMA Negeri 18 Medan which consisted of 6 classes. The research sample consisted of two classes, namely class X MIA 3 as the experimental class, and class X MIA 6 as the control class.

This study involved two classes namely the experimental class and the control class which were given different treatments, cooperative learning models investigation group type in the experimental class, while in the control class using conventional learning. The design of this study can be seen in Table 1:

Tabel 1 *Two Group Pretest – Posttest Design*

Class	Pre-test	Treatment	Post test
Experiment	T	X_1	T
Control	T	X_2	T

Description :

T = Instrument test

X_1 = Cooperative learning model with Group Investigation type

X_2 = Learning using conventional learning

The instrument carried out with this study was used to obtain data on student learning outcomes before and after learning using a learning model type investigation group with a conventional model in the form of a multiple choice test of 20 questions consisting of 5 options.

RESULT AND DISCUSSION

Result

The results of the pretest of experimental class and control class in the material Circular Motion in the form of frequency distribution are listed in Table 2.

Table 2. Data on Value Pretest Experiment and Control Class

Value	Experiment Class Frequency	Control Class Frequency
20-26	6	5
27-32	2	2
33-38	4	3
39-44	1	12
45-50	19	12

51-56	3	0	
57-62	0	1	
Amount	1430	1395	
Average	40.85	39.86	
Standar Deviasi	9.35	7.72	
Varian	87.42	59.60	

Standar Deviasi	10.01	Standar Deviasi	10,79
Varian	100.20	Varian	116.42

To see in detail the results of the experimental class posttest and control class posttest can be seen in Figure 2.

To see in detail the results of the experimental class pretest and control class can be seen in Figure 1:

Figure 1. Diagram data Pretest Control and Experiment Class

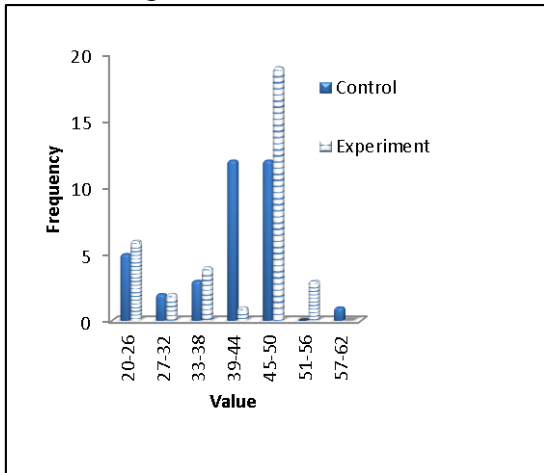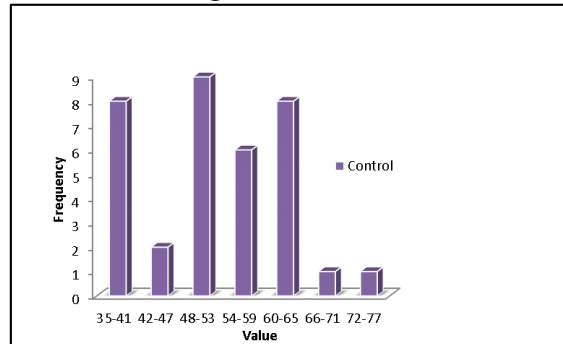**Figure 2 .**Diagram data Posttest Control Class

After giving the pretest, different classes are applied in both classes. The experimental class applied the Group investigation cooperative learning model while the control class applied a conventional learning model. At the end of the study the two classes were given posttest to see the learning outcomes obtained by students. The posttest results of the two classes are shown in Table 3.

Table 3. Data on Value Posttest Experiment and Control Class

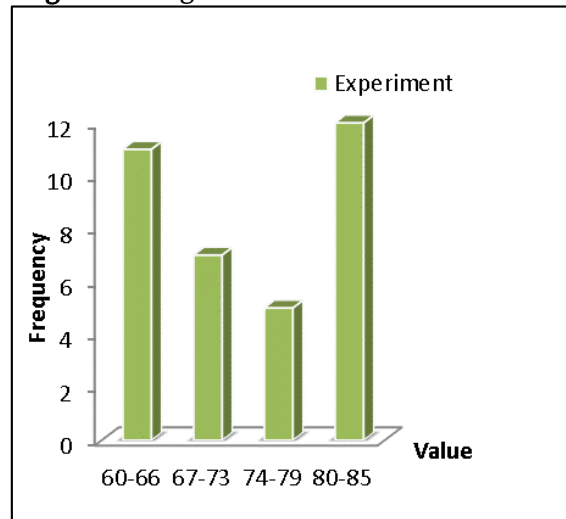| Control Class		Experiment Class	
Value	Frequency	Value	Frequency
35-41	8	60-66	11
42-47	2	67-73	7
48-53	9	74-79	5
54-59	6	80-85	12
60-65	8		
66-71	1		
72-77	1		
Amount	1820	Amount	2555
Average	52.00	Average	73.00

Figure 3. Diagram data Posttest Experiment Clas

Then, obtaining the results of the pretest and posttest data of students from the experimental class and the control class, the data analysis was tested in the form of a normality test and a pretest homogeneity test. Data analysis is done by testing the normality of the data by Lilliefors test and homogeneity test by testing the similarity of variance.

Based on Table 4 it can be seen that $L_{count} < L_{tabel}$, then the pretest and posttest data of the two groups of samples were normally distributed.

Table 4. Normality Test

Nb.	Data	L_{count}	L_{table}
1.	Pretest experiment class	0,1268	0,1496
2.	Pretest control class	0,1206	
3.	Posttest experiment class	0,1335	0.1496
4.	Posttest control class	0.1222	

Based on Table 5, the value of $F_{count} < F_{table}$ which means that the sample used in this study is declared homogeneous or can represent the entire population.

Table 5. Homogeneity Test

Nb.	Data	Varian	F_{count}	F_{table}
1.	Pretest experiment class	87.42	1.467	1,824
2.	Pretest control Class	59.60		
3.	Posttest experiment class	116.42	1,162	1,824
4.	Posttest control Class	100.20		

From tables 4 and 5 above it can be concluded that the research data is normally distributed and homogeneous, then it meets the requirements hypothesis testing.

After the normality test and homogeneity test, the t-test hypothesis of the two parties was carried out to determine the initial ability of students in the two sample groups. From this test it can be concluded that the initial ability of the two samples is the same.

The results of the t test two tail hypothesis test can be seen in Table 6:

Tabel 6. Test t Pretest Data

Data	Average	t_{count}	t_{table}
Pretest experiment class	40.85	0,52	1,997
Pretest control class	39.46		

And hypothesis testing of one party to find out the differences in student learning outcomes due to being treated by cooperative learning type investigation group.

The difference in learning outcomes can be known by posttest t test one tail hypothesis test results can be seen in Table 7:

Table 7. Test t Posttest Data

Data	Average	t_{count}	t_{table}
Posttest experiment class	73.00	9.2	1,67
Posttest control class	52.00		

Discussion

The study began by giving a pretest to both samples with a number of 20 items in the form of multiple choice questions in the experimental class and the control class. The pretest results in the experimental class obtained an average value of 40.85 and the average value in the control class 39.86. The results of the normality test for both classes showed that the pretest value was normally distributed where $L_{count} < L_{table}$ and derived from a homogeneous population $F_{count} < F_{table}$ (1,467 < 1,824). The results of the t two tail test at a significant level $\alpha = 0.05$ obtained $t_{count} < t_{table}$ (0.52 < 1.997) which means that the experimental class and the control class have the same initial ability.

After that, the two classes were given different treatments, namely in the experimental class applied the investigation group type cooperative learning model, while in the control class conventional learning models were applied. After being treated in both classes were given posttest to see whether there were differences in student learning

outcomes due to different learning treatments. The posttest results in the experimental class obtained an average value of 73.00 and the control class obtained an average value of 52.00. The results of the normality test for both classes show that the posttest value is normally distributed where $L_{count} < L_{table}$ and comes from a homogeneous population where $F_{count} < F_{table}$ (1.162 < 1.824). The results of the t ine tail test at a significant level of $\alpha = 0.05$ were obtained $t_{count} > t_{table}$ (9.2 > 1.67) this states that there is a significant difference due to the treatment of group investigation type cooperative learning towards student learning outcomes.

During the learning process in the experimental class using the same learning students have understood each of the predetermined learning models, namely cooperative investigation group type, making it easier for researchers who act as teachers to implement it. Starting from the selection of topics, groups, to solve the problems that exist in the student worksheet. Students look much more active when compared to previous meetings. This is evident when the researcher explains the subject matter and conducts question and answer, several questions from the researcher and students can be responded to by other students, this shows that the learning atmosphere is interactive. In groups, students are more orderly and directly involve themselves investigating the problems listed in the Student Worksheet. Discussion activities to solve problems have been dominated by students. So that researchers are easier to explain the material, because the situation is conducive. In the presentation phase students read the results of the discussion. Each student with a sense of initiative and enthusiasm volunteered to represent his group to come to the front of the class to present the final report of their results and dare to present their results. After the researcher sees the results of the student's answers, then the researcher reviews the students 'answers which aim to broaden the students' understanding. At the end of learning the researcher motivates to review the material discussed at the meeting that day to more easily understand the upcoming material.

In the control class using conventional learning where the teacher acts as a full information center so that students are more passive, the teacher continuously delivers learning material by recording on the board and giving examples of questions then giving practice questions to students. This is what makes students feel bored in learning and there is a one-way learning activities that can result in the learning outcomes of the control class less than optimal.

Although cooperative learning model group investigation type can make student learning outcomes better than conventional learning, but there are several obstacles in conducting research including the difficulty of controlling students while doing practicum activities because it is limited to the equipment to do lab work so that group division is too many of its members, and also at the beginning of the meeting students are not accustomed to participating in learning activities so that at the first meeting the expectations contained in this learning model have not been achieved as a whole.

The results of this study are in line with previous studies such as those examined by Untoro, (2016) with the results of the average score of the pretest of both classes before being given treatment, namely in the control class 59.33 and the experimental class 59.90. Different treatments were given in both classes, in the experimental class using Cooperative Learning Type Group Investigation Model and in the control class using Conventional learning models. The average posttest value obtained in the control class is 69.57. In the experimental class, the average posttest value is 81.32. It can be concluded that the learning outcomes of students using cooperative learning models of type Group Investigation have a positive effect on improving student learning outcomes.

Based on the research of Harahap and Derlina (2017) the results of the study state that the average posttest of experimental and dick class is 74.7 and 63.53 there are differences in the results of student physics learning with Group Investigation type cooperative learning

model with the Know-Want-Learn method KWL) is better than using conventional models. In this case, it can be seen the influence of the Cooperative Group type of Investigation model with the Know-Want-Learn (KWL) method on student learning outcomes.

Based on Genç's research (2016) shows that student learning outcomes using cooperative learning models are 85.07 (student achievement) compared to using conventional learning models is 75.14. From the results obtained, the cooperative learning model is better than the conventional learning model.

According to the research of Irwan and Ningrum (2016) states that the cooperative learning model of the Group Investigation type has a positive influence on student learning outcomes in crafts and entrepreneurship. According to Wahyuni, Fihrin and Muslimin stated that the cooperative learning model of the Group Investigation type was effective against the results of physics learning in students. This is based on the value of the posttest experimental class and control class are 11.50 and 9.08 respectively.

From the result of the author's research and the results of previous researchers it can be stated that the cooperative learning model type group investigation an improve student learning outcomes, motivate student, interact with student, and ative student in learning. And this will make it easier for teacher o review and evaluate studen progress in the learning process. So from this research can be concluded that there is effect of cooperative learning model type group investigation toward student learning outcomes on circular motion at X SMA Negeri 18 Medan A.Y 2018/2019.

CONCLUSION & SUGGESTION

Conclusion

Based on the results of data analysis conducted in this study, it was concluded that the learning outcomes of students applying cooperative learning models investigation group type had an average value of 73.00 and learning outcomes of students applying conventional learning had an average value of 52.00. This can be interpreted the learning outcomes of students who apply the group investigation cooperative learning model is higher (better) than the learning outcomes of students who apply conventional learning.

Suggestion

Based on the results of the research and the conclusions stated, for the follow-up of this research, the researcher has suggestions for the nature of the learning of the next researcher so that they can control students in forming groups, and explain the stages in learning, and the researchers are expected to prepare tools and materials more practicum so that the practicum can run effectively.

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