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EFFECT OF COOPERATIVE LEARNING MODEL TYPE NUMBERED HEADS TOGETHER (NHT) ASSISTED ANIMATION MEDIA OF STUDENT LEARNING OUTCOMES

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ABSTRACT

The purpose of this research are to find out the increased activity and the difference due to the effect of application of cooperative type NHT model assisted animation media to students learning outcomes. The study was quasi-experimental with the entire population of tenth grade students of SMA Negeri 6 Medan consisting of six classes. Samples were taken 2 classes are determined by cluster random sampling technique. The instrument used in this study are test of learning outcomes in the form of multiple choice with option 5 of 20 questions, the student learning activities observation sheet, the student attitude observation sheet and the student skill observation sheet. The average value of student learning outcomes treated with cooperative type NHT model assisted animation media is 76,06 and with conventional learning is 69,1. The increased activity learning during follow the learning with cooperative type NHT model assisted animation media with activity N-Gain percentage include to medium criteria and by using conventional learning with activity N-Gain percentage include to low criteria. Based on the results of the calculation of t test analysis there are significant differences due to the effect of application of cooperative type NHT model assisted animation media to students learning outcomes.

Key Words : Cooperative type NHT model, learning outcomes.

INTRODUCTION

Schools as the formal education system is composed of several elements, including elements teacher educators and students as learners as running with certain norms in the form of curriculum. As a manager in the teaching-learning process in the classroom, the teacher must be able to design a class to form learning communities (learning community). Design classes supported by the selection of models, methods and appropriate learning media can create the conditions for a class so that students will be more motivated to learn. The new paradigm requires teachers to develop learning patterns that stimulate student thinking by finding and constructing learning experience. The attitude of curiosity, as part of a scientific attitude, indispensable in studying physics.

Physics deals with how to find out about nature systematically so that physics is not just a concept, but also a process of discovery. Therefore, physics lesson is directed at the

discovery process and commit themselves so as to help the students to a deeper understanding. In the process of the invention and do yourself, the involvement of skills indispensable aspect (Azizahwati, et al., 2010) [2].

Teaching physics will be more abstract, if only communicated through verbal language. The presence of media in teaching and learning physics have enough sense to make the student experience becomes more concrete and the message actually reaches the target. Use of teaching aids greatly assist the process of teaching and learning activities in the classroom, especially the improvement of student learning outcomes (Setianigrum and Sunarti, 2013)[5].

fact shows that there is still a lot of attention from various parties arising on student achievement, especially in the field of study Natural Sciences, especially physics where the learning outcomes achieved by students in the subjects of physics is still very low. This is supported by the results of a preliminary study conducted in SMAN 6 Medan class X through questionnaires given to students, data showed that of the 37 students, 43% said that physics is difficult because more dominant teacher explained using the formula, 45% said that physics it is less attractive because of the teachers who rarely use the media, 12% said that it was normal physics because students do not gain experience learning when teachers teach, whereas for physics teaching and learning activities, 56% want to learn while discussing and 44% want the lab and demonstration.

Based on the interview to one of the teachers of physics at SMAN 6 Medan, found that test scores of students in physics is lower compared with other subjects. This is supported by the results of studying physics students in two consecutive years, which is the result of learning physics class X on T.P. 2011/2012 average of 56 and the results of class X students studying physics at T.P. 2012/2013 62, whereas the minimum completeness criteria (KKM) to be achieved is 75, so it can be concluded that student learning outcomes are not achieving the expected criteria.

The low yield of this study, because teachers tend to still use conventional learning more dominated by the teacher (teacher-centered learning), yet provide an opportunity for students to develop independently. Thus, in the process of learning, the students very rarely interact with teachers who lead students still passive learning activities, whereas the development of the curriculum requires learning paradigm changes, one of which is teacher-centered learning switch on students (student centered learning). The method used by teachers also varied, which is often used is the dominant discourse method. Teachers rarely used method of presentation that can train the ability to think are expressed through the ability to communicate with students and experimental methods that can practice the skills of students to conduct experiments. Use of media used by teachers is rarely more dominant and whiteboard

markers, whereas learning media can clarify the students an overview of the material to be learned. This needs to get the attention of a teacher with reforming the teaching and learning process.

Addressing the lack of physics learning outcomes, the need for efforts made by the teacher, one alternative solution that is taken is to implement cooperative learning model NHT (Numbered Heads Together) which is a learning model developed by Spencer Kagan. This model provides the opportunity for students to give each other ideas and consider the most appropriate answer. This model also encourages students to improve their spirit of cooperation. This model can be used in all subjects and for all age levels of students (Ibrahim, et al., 2000; Isjoni, 2012; Lie, 2004).[4],[5],[6]

Selection of cooperative learning model NHT, the expected learning that takes place can be more meaningful and give a strong impression to the students. The implementation of cooperative learning model NHT uses experimental methods that can involve the students to conduct experiments in the lab activities that can develop ideas through collaboration and foster interest and the interest of students in learning which is expected to improve the skills of students.

Cooperative learning model NHT applied supported by a media that can help the process of delivering the material. One appropriate media used in assisting the process of delivering a material is learning media animation with Macromedia Flash. Instructional media animation with Macromedia Flash is a computer-assisted media that presents information in the form of a living document, can be viewed on screen and when projected onto the screen can be heard voices and seen pictures.

Cooperative learning model NHT already been investigated by several researchers before them, Setianingrum (2013)[7] and Hakim (2012)[3] were then obtained results of cooperative learning NHT good enough. After analyzing the obtained t test was no difference between the results of student learning using cooperative learning model NHT.

Based on the description set forth above, then the objectives to be achieved in this study are: to know the results of student learning, knowing the increase in student activities and know the difference due to the influence of cooperative learning model NHT assisted animation media on student learning outcomes.

METHODOLOGY

This research was conducted at SMAN 6 field with the entire population of students of class X SMA 6 field consisting of six classes. The sampling technique was conducted by means of random sampling technique class (cluster random sampling). Class samples taken from a

population of two classes of grade X-6 by using cooperative learning model NHT media-assisted animation and class X-4 using conventional learning. This type of research is this quasi-experimental design with pretest-posttest two group design as shown in Table 1.

Table 1. Two types Research Design Group Pretest–Posttest*)

Class	Pretest	Treatment	Postest
Eksperimen	Y_1	X_1	Y_2
Kontrol	Y_1	X_2	Y_2

)X1 = Learning using cooperative learning model NHT media-assisted animation, X2 = Learning using conventional learning, Y1 = pretest is given in the experimental classes and control classes before treatment, Y2 = Postes given after treatment in experimental classes and control classes.

Means of collecting data in this study is a multiple-choice test to determine student learning outcomes in the cognitive and observation sheets to determine the activity, attitudes and skills of students.

Test the hypothesis that used to using the t test to compare the average scores achieved learning outcomes both experimental class and control class. The data obtained are tabulated then searched the average. Before analyzing the data, it must first be determined score of each group of samples and data processing performed by the following steps:

a) Calculate the average value and standard deviation

b) Test for normality

c) Test of homogeneity

d) Test for equality average pretest

e) Testing hypotheses (Sudjana, 2005)[9]

RESULTS AND DISCUSSION

Results. The study begins by providing a pretest to determine learning outcomes in the cognitive (knowledge). Cognitive respect to intellectual learning outcomes which consists of six aspects, namely remember, understand, apply, analyze, evaluate and create (Anderson and Krathwohl, 2001)[1]. The results of the experiment class pretest obtain an average value of 26.67 and the average value of the control class is 23.33. After obtaining data from the pretest students of experimental class and control class, then do the test data analysis using the average similarity test pretest in which condition the data to be normally distributed and homogeneous. The results of tests of normality, homogeneity and similarity average pretest shown in Table 2.

Based on Table 2 data pretest both normal classes, homogeneous and there is no significant difference, then in second grade sample is given a different treatment, the experimental class was given treatment by applying cooperative learning model NHT media-

assisted animation while the control class is given the treatment by applying conventional learning.

Table 2. Normality, homogeneity and similarity average pretest.

Class	Average	Lcount	Ltable	Fcount	Ftable	Tcount	ttable
Eksperimen	26,7	0,146	0,15	1,52	1,81	1,74	1,99
Kontrol	23,33	0,108					
Kesimpulan		Normal Homogen		Kemampuan awal siswa sama			

After being given a different treatment, both classes are given post-test to see any difference due to the application of different learning models. The average yield grade posttest experimental obtain an average value of 76.06, while the average value posttest control group was 69.1. Results of tests of normality, homogeneity and hypothesis is shown in Table 3.

Table 3. Results of normality test, homogeneity and Hypothesis Students

Class	Average	Lcount	Ltable	Fcount	Ftable	Tcount	ttable
Eksperimen	76,06	0,129 0,15	1,08	1,8	3,0	1,7	
Kontrol	69,1	0,139					
Kesimpulan		Normal Homogen		Ada perbedaan yang signifikan			

Based on Table 3 the second post-test data is normal classes, homogeneous and tcount> ttable is 3.02> 1.67, so it can be concluded that there is a significant difference due to the effect of the application of cooperative learning model NHT assisted animation media on student learning outcomes.

Assessment attitude should be an integral part of learning and should appear hasi in the process of learning achieved by students who assessed outcomes. In this study, the aspects in the assessment of attitudes is a character (logical, critical, thorough, honest, polite behavior, and have a curiosity) and social skills (cooperation, expression and respond to the opinions of others). Results of the assessment grade students attitudes and classroom experiments can control shown in Table 4.

Table 4. Assessment of Student Attitudes in the meeting I, II and III

No	Class	%pert I	%Pert II	%Pert III
1	Kelas experiment	54	62,5	69
2	kelas kontrol	43	51	56

Based on Table 4 it can be seen that the development of the attitudes of students in the experimental class for receiving learning using cooperative learning model NHT assisted animation media is better than the development of the students in the class attitude control.

Assessment skills appear in the form of skills (skills) and the ability to act individually. In this study, the aspects in the assessment of skills is preparing tools and materials, assembling experiment, experiment, experiment to observe, perform calculations in the experiment and conclude the trial. The results of the experiment class students' skill development and control classes can be shown in Table 5.

Table 5. Assessment of Student Skills in the meeting I, II and III

No	Class	%pert I	%Pert II	%Pert III
1	Kelas experiment	55	60	66
2	kelas kontrol	49	52	59

Based on Table 5 it can be seen that the development of the skills of the students in the experimental class for receiving learning using cooperative learning model NHT assisted animation media is higher than the development of the skills of the students in the control class for receiving study using conventional learning.

Increased activity of the average of the percentage of students increased activity between the experimental classes and control classes are very different. In this study, an increase that occurred before and after the learning calculated by the formula N-gain. In the experimental class that uses cooperative learning model NHT media-assisted animation with the percentage of N-gain value activities that are included in the criteria being and the control class by applying conventional learning acquired percentage of N-gain activities that are included in the low criteria. Increased activity in the experimental classes and control classes can be seen in Figure 1.
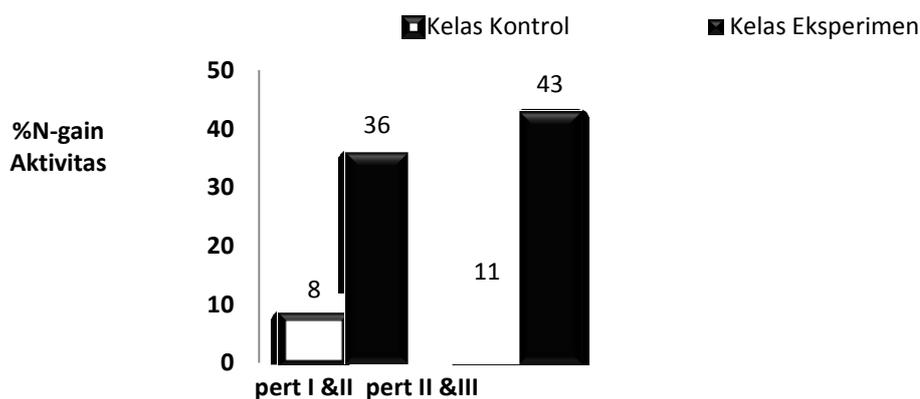
Figure 1. Increased Activity in Experimental Class and Class Controls

Based on Figure 1 it can be seen that an increase in activity at each meeting in the experimental classes and control classes with an average improvement of student learning activities in experimental class is higher than the control class.

DISCUSSION

The results showed that the learning outcomes of physics by using cooperative learning model NHT media-assisted animation is better than conventional learning. This is evidenced by the acquisition value of the average posttest experimental graders at 76.06, while the average posttest control class 69.1.

Physics learning outcomes using cooperative learning model NHT media-assisted animation better than conventional learning is based on many things: NHT cooperative learning model that can help direct students to construct knowledge through every activity that has been designed in co-operative phase of NHT. The phases are numbering, asking questions, thinking together and giving answers (Siswanto and Rechana, 2011)[8]. Activities at each phase of this is what makes the students become more active in learning. In the phase of questioning for example, at this phase the teacher gives LKS (Student Worksheet) that will experimenting by students. Students are required to work on worksheets that will experimenting are excited to try out the experiment in worksheets that encourage students to think and generate new knowledge.

Based on the data acquisition activities increase students average percentage score increased activity between the experimental classes and control classes are very different. This is because the experimental class using the experimental method that can make the knowledge constructed by the students themselves can actively through the process of personal and social. Increased activity is highest in the aspect of discussions. It can also be seen from the interdependence among students in a given task. Because it is on the principle of learning is done, then with an increase in the activity of students expected learning outcomes of students also increased. Percentage of average score of attitude between the experimental and control classes classes are very different. Aspects of attitude assessment is highest in the aspects of cooperation because in essence this model encourages students to improve their spirit of cooperation. The average percentage score of skills between the experimental and control classes classes are very different. This is because in the experimental classes that implement cooperative learning model NHT using experimental methods in order to develop ideas through discussion and cooperation and foster interest and the interest of students in the study which is expected to improve the skills of the students.

State is in line with the results of studies using cooperatiif learning model type NHT, Hakim (2012) in SMP Negeri 10 Medan in the subject matter Quantities and Units obtained an average value of 45 experimental class pretest and posttest average value of 76 while the control class average values obtained by 39 students pretest and posttest average value of 64, after t test analysis obtained difference between the results of student learning using

cooperative learning model NHT. Students during the learning activities using cooperative learning model NHT in the subject matter Quantities and Units of class VII SMP Negeri 10 Medan obtained an average score of student activity reached 71.56 with active category.

Based on this study, the use of cooperative learning model NHT assisted animation media can improve learning outcomes and student activity, but in learning there are still obstacles faced is when work takes place there are groups of students who are less active look at the students are required to discuss the experiment , there are some students who choose to sit quietly and wait for the results obtained by the help of his friends rather than join to obtain such data, it is because habits of students who are not accustomed to cooperate in the study. This model would be better if the students are actively involved during the process of learning through group work, then you should need to add some observers so that learning is more directed and supervised the data collection. Researchers also have difficulty in allocating time when students submit the results of the discussion so that not all groups can present the results of the discussion, this model would be better if researchers consider sharing time every phase efficiently, then you should researchers must take the time to think phases together, as in this stage is often excessive use of time for all the students want to display the results of the discussion to provide the best results report.

Based on the results of research and testing of hypotheses can be seen that the average student learning outcomes in experimental class is higher than the average of learning outcomes in the control class, meaning physics learning outcomes using the cooperative model NHT media-assisted animation is better than conventional learning, so that it can be concluded that there are significant differences in learning outcomes due to the influence of cooperative learning model type NHT assisted animation media on Dynamic Electricity material in the second half of class X SMA 6 Medan T.P. 2013/2014.

CONCLUSION AND RECOMMENDATION

Based on research data obtained and the data analysis and hypothesis testing, it can be concluded that: (1) Increased student learning activities during the learning by using cooperative learning model NHT higher assisted animation media dibaningkan to increase students' learning activities during the learning by using conventional learning. (2) There is a significant difference due to the effect of the application of cooperative learning model NHT media-assisted animation on learning outcomes of students in the subject matter in class X Dynamic Electricity second half of SMA 6 Medan T.P. 2013/2014.

Based on the results and conclusions in this study, the researchers have some advice, namely: (1) For the next researcher, during the learning process should add some observers to

help that student learning is more focused and the observer is able to observe the students and assess students in collecting Data for the assessment sheet attitudes, skills and observation. (2) For the next researcher, during the learning process should be more concerned with the efficiency of time in each phase contained at this stage of cooperative learning model NHT

REFERENCES

Anderson, L. W., dan Krathwohl, D. R., (2001), A Taxonomy for Learning, Teaching and Assesing; A revision of Bloom's Taxonomy of Education Objectives, New York, Addison Wesley Lonman Inc.

Azizahwati, Puteri, L. E., dan Sudrajad, H., (2010), "Keterampilan Psikomotor Fisika Siswa Melalui Model Pembelajaran Kooperatif Tipe Number Head Together", Jurnal Geliga Sains, Vol.04, No. 01, Hal. 12-17.

Hakim, A., dan Rambe, D., (2012), "Perbedaan Hasil Belajar Fisika dengan Menggunakan Model Pembelajaran Kooperatif Tipe NHT dan Model Konvensional pada Materi Pokok Besaran dan Satuan", Jurnal Pendidikan Fisika, Vol.01, No. 02, Hal. 7-12.

Ibrahim, M., Rachmadiarti, F., dan Ismono, (2000), Pembelajaran Kooperatif, University Press UNESA, Surabaya.

Isjoni, (2012), Cooperative Learning, Alfabeta, Bandung.

Lie, A., (2004), Cooperative Learning, Mempraktikkan Cooperative Learning di Ruang-Ruang Kelas, Grasindo, Jakarta.

Setianigrum, R. P., dan Sunarti. T., (2013), "Penerapan Model Pembelajaran Kooperatif Tipe NHT dengan Media Physicround pada Materi Cahaya", Jurnal Inovasi Pendidikan Fisika, Vol. 02, No. 02, Hal. 87-91.

Siswanto, J., dan Rechana, S., (2011), "Pengaruh Model Pembelajaran Kooperatif Tipe NHT (Numbered Heads Together) Menggunakan Peta Konsep dan Peta Pikiran terhadap Penalaran Formal Siswa", JP2F, Vol. 02, No.02, Hal. 178-188.

Sudjana, (2005), Metode Statistika, Penerbit Tarsito, Bandung