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THE INFLUENCE OF INQUIRY TRAINING LEARNING MODEL TOWARD STUDENTS' ACHIEVEMENT ON THE TOPIC OF HEAT IN CLASS X SEMESTER II MAN KISARAN A.Y. 2013/2014

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ABSTRACT

The purpose of this research are to find out difference due to the influence of application of inquiry training learning model toward students' achievement on the topic of heat in class X MAN Kisaran. The study was quasi-experimental where population are all students in class X MAN Kisaran consisting of seven classes. Samples were taken 2 classes from 7 classes which determined by cluster random sampling technique, the class X-D as experiment class using inquiry training learning model and class X-F as control class using conventional learning. The instrument used in this study are test in the form of multiple choice with 20 questions that have been valid, the observation sheet of students' learning activities, the assessment sheet of students' skill and the assessment sheet of students' attitude. The results were an average value of students' achievement in experimental class is 77,12 and in control class is 69,39. The average percentage of students' activity in experimental class is 72.11 while in control class is 59.45. The average percentage of students' skill in experimental class is 70.80. The average percentage of students' attitude in experimental class is 62.33 while in control class is 55.60. Based on analysis results of t-test calculation, there are significant differences due to the influence of application of inquiry training learning model toward students' achievement on the topic of heat in class X MAN Kisaran A.Y. 2013/2014.

Keywords: *Influence, Inquiry Training, Students' Achievement, Activities*

INTRODUCTION

Education is the key to all of good progress and development, because of education human can realize all his potential, both personally and as a community. In order to realize the self-potential to become multi competences must pass through the education process that implemented in the learning process. "According to Law No. 20 in 2003 about National Education System states that education is effort to be conscious and planned to create a learning atmosphere and learning process so that students are actively developing their self-potential to have the spiritual strength, self-control, personality, intelligence, good character, and skills for themselves, community, nation, and the state" (Sagala, 2009: 3).

Thus the education is effort to be conscious that done by families, communities and governments through guidance activities, teaching, or practicing that takes place in and outside of school. It can be done in learning process with teachers who serve students in learning activities.

The learning process is characterized by an individual behavior changes that involved. On e effort that can be done to review the successful level of the learning process is to conduct an e valuation of learning. The indicators are used as a reference in determining the success of learni ng process in formal education is to get maximum students' achievement. But the fact shows th at it has not achieved well. One of the subjects that are often faced with this problem is physics.

Physics is the knowledge that uses scientific methods in the process. Thus, the process o f physics learning is not only understand the concepts, but also teach students how to think cons tructive through physics as science process skills, so that the students' comprehension of physic s to be whole, both as a process and as a product. In physics learning that must be considered i s how students gain knowledge (learning to know), concepts and theories through practical exp erience by carrying out observation or experiment (learning to do) directly so he roles as a scient ist.

It is known that between high school students has developed the impression that physic s is a difficult subject to understand and less attractive. One reason is the lack of interest and mo tivation to study physics well. In addition, the use of learning models tend to be monotonous and lack of student involvement in finding a concept, in the process of teaching and learning is more teacher centered. The teacher is more often using teaching style by presenting the material and completion problems with the formula. Students can only count but cannot understand the conc ept of real physics. This is consistent with observations from MAN Kisaran by giving questionnai res to 33 students, as much 53% stated physics is a difficult subject, less interesting and a lot of formulas. The fact, physics is an interesting knowledge because all phenomena that occur in nat ure related to physics and can be explained with a simple concept. The observation results expl ained that about 52% stated teachers tend to explain the material and work on the problems. Th e learning process can lead to be boredom so the role of student in the learning process is less active and more listening. Students are also still afraid asking the teacher if there is material that is not understood because they often get passively what the teacher have done.

The interview result with a teacher at MAN Kisaran stated that the usual method are a le cturing and catechizing method. In presenting the material, teacher explained material in front of class and gave a summary of material by writing it on the board, students listened and recorded the important things from the material being taught. The students' achievement was also low, 50 % of students who could pass the minimum standards of completeness, that was 74 so it must be remedial so that all students could pass on the material being studied. The interview results o btained that laboratory facilities and infrastructure in MAN Kisaran was quite complete but not us ed well because lack of time so that students were very rare doing the experiment directly in the laboratory.

Based on the explanation of problems above, one way that can be done to improve the learning process is to implement inquiry training learning model. According to Joyce, et al., (2009 : 201) stated that the inquiry training learning model is designed to help students directly into the scientific process through exercises that can solidify the scientific process in a short period of time. The goal is to help students for developing the intellectual discipline and skills that necessary to ask questions and find the solution based on his curiosity.

Inquiry training learning model expected students to take an active role asking why something happened then find out and collecting and processing data logically until the next is developing intellectual strategy that can be used to find solution for the question why something happened. Inquiry training started by presenting problems that require students' answers. The students who deal with the situation would be motivated to find the solution of the problem. Teachers could use this opportunity to create the interesting and funny learning process by being welcome and friendly to students so that they did not have fear to speak. Through this learning process, students were facilitated to think and ask questions. In inquiry training, the teachers' task was facilitate the students to examine, not doing research for students. If the teacher was asked questions which could not be answered with words "yes" or "no", then the teacher should ask students to recast the question so that students could continue their efforts to collect data and connect it to the problem. Therefore it will be good communication between teacher and students in the teaching and learning process.

One of the concept that require the involvement of students in various activities and make students more active is the concept of heat. The concept of heat requires explanation and thought through reasoning. With the reasoning, students could solve problems and apply it in daily life.

From the research result from Harahap (2012) with the title "The Effect of Inquiry Training Learning Model Towards Students' Achievement on the Subject Temperature and Measurement in Class VII Semester 1 MTsN 2 Medan AY 2012/2013", obtained the average value of pretest is 34.87, after conducted the treatment by inquiry training learning model then the students' achievement has increased with the average value is 70.37.

Based on the description above, the writer interests in conducting research with the title "The Influence of Inquiry Training Learning Model Towards Students' Achievement on the Topic of Heat in Class X Semester II MAN Kisaran A.Y. 2013/2014".

METHODOLOGY

The research was conducted in MAN Kisaran with population of all class X consisting of several even classes. The sampling technique was done by cluster random sampling. The class was ta

ken from population as many of two classes, namely class X-D by using inquiry training learning model and X-F using conventional learning. This design of study was quasi-experimental with two group pretest-posttest two design as shown in Table 1.

Table 1. Research design of *Two Group Pretest–Posttest Type*

Class	Treatment	
	<i>Pretest</i>	<i>Posttest</i>
Experiment	X ₁	X ₂
Control	X ₁	X ₂

Note: X₁=Conducted Pretest, X₂=Conducted Posttest, =Treatment by inquiry training learning model, = Treatment by conventional learning

The collecting data tools in this study was a multiple-choice test to determine the students' achievement for cognitive and observation sheets to determine the activity, attitudes and skills of students.

The hypotheses test that used was t-test by comparing the average scores achieved from experiment class and the control class. The data obtained are tabulated then calculated the average. Before analyzing data, it must first be determined score from each group of samples then data processing performed by the following steps:

- a) Calculate the average score and deviation
- b) Normality test
- c) Homogeneity test
- d) Similarity test for pretest average score.

The t-test was used to determine the similarity of initial knowledge from students in both groups of samples. The hypothesis tested in the form of :

H₀ : $\mu_1 = \mu_2$: experiment and control class had the same initial knowledge.

H₁ : $\mu_1 \neq \mu_2$: experiment and control class had the different initial knowledge.

e) Hypothesis test

The t-test was also used to know the difference from a treatment namely inquiry training learning model towards the students' achievement. The hypothesis that tested was :

Ho : =

H1 : >

Note :

=: there is no difference of students' achievement as the influence of inquiry training learning model

>: there is any difference of students' achievement as the influence of inquiry training learning model

RESULTS AND DISCUSSION

Results. The research was started by giving pretest to determine the students' achievement for cognitive (knowledge). Cognitive was related to intellectual learning outcomes which consists of six aspects, namely remembering, understanding, applying, analyzing, evaluating and creating. The results of pretest in experiment class obtained the average value was 39,39 and in control class was 38,79. After obtaining data from the pretest of experimental and control class, then done the analysis data using the similarity average test of pretest with condition the data has to be normally distributed and homogeneous. The result of normality, homogeneity and similarity average test was shown in Table 2.

Table 2. The result of normality, homogeneity and similarity average test from pretest.

Class	Average	L _{count}	L _{table}	F _{count}	F _{table}	t _{count}	t _{tab}
Experiment	39,39	0,110	0,15	1,474	1,81	0,25	1,99
Control	38,79	0,117					
Conclusion	Normal	Homogeneous	Same initial knowledge				

Based on table 2, the pretest from two classes was normal, homogeneous and there is no significant difference, then both classes were given different treatment, the experimental class was using inquiry training learning model while the control class was using conventional learning. After conducted the different treatment, both classes were given post-test to know any difference due to the application of different learning models. The average posttest score of experiment class was 77,12 while the control class was 69.39. The result of normality, homogeneity and hypothesis of students as shown in Table 3.

Based on table 3 obtained that the post-test data from both classes was normal, homogeneous and the value of $t_{count} > t_{table}$ was $3,65 > 1,67$, so it can be concluded that there was any difference due to the influence of inquiry training learning model towards students' achievement.

Student learning activities in experiment class was higher than in control class. At the first meeting, the average of experimental class was 68,89. At the second meeting occurred an improvement to 72,3. At the third meeting, it increased again become by 75.14. This was because th

e students already understand the steps that instructed by researcher and students were increasingly interested by experiment, they did not just know the theory from a book or from researchers' explanation but they could prove it directly in practice. While in control class, the activity average of first meeting was 51,30, the second meeting was 60,40, the third meeting was 66,67. There were a few of active students in control class and many students were passive too. From the observations obtained the activity average of experiment class from first meeting to third meeting was 72,11 (active category) and for control class was 59,45 (quite active category).

The skill assessment of students in experiment class has increased in every meeting. At the first meeting, it was 67,33, the second meeting 70,46 and the third meeting 74,61. The average percentage of skills assessment in experiment class with using inquiry training learning model was 70,80 which is included as good category.

Table 3. The result of normality, homogeneity and hypothesis of students

Kelas	Rata-rata	L _{hitung}	L _{tabel}	F _{hit}	F _{tab}	t _{hit}	t _{tab}
Eksperimen	77,12	0,140	0,15	1,47	1,81	3,65	1,67
Kontrol	69,39	0,136					
Kesimpulan			Normal	Homogen		Ada perbedaan yang signifikan	

The attitude assessment of students in experiment class was also higher than in control class. The average percentage of attitude assessment in experiment class using inquiry training learning model was 62,33 which is included in good category, while in control using conventional learning was 55.60 which is included as quite good category.

Discussion. The result showed that the students' achievement using inquiry training learning model was better than conventional learning. This is evidenced by the average of posttest in experiment class was 77,12 while in control class was 69,39.

The improvement of students' achievement in experiment class using inquiry training learning model was better than conventional learning model. It was based on many things such as this inquiry training model emphasized students to engage in full to find the materials by connecting it to real life situations so that encourage students to be able to remember and apply them in daily life. In the process of inquiry learning, students were not just passive receiving lessons from teacher but they were also active in finding the topic itself because with this model, the knowledge and skills acquired by students from the results of their finding. Student skills in learning by using inquiry training learning model taught students to learn verify, collect data experimentation, and manage then find answers of problems when students worked together with the group by

proposing a hypothesis and when students asked the teacher and when the student was proposing their opinions and what the students thinking then proved it by collecting data when the experiment done. This was supported by the opinion of Joice, et al., (2009: 214), which stated that the inquiry training learning model format offers an active and autonomous learning, especially when students formulated questions and tested the ideas. In the third phase of inquiry training learning model was "collecting data experimentation" that used experimental tools so that students are motivated to perform experiments and arouse their curiosity in finding solutions of problems.

The beginning of this stage, researcher gave explanation to students the goals to be achieved and motivated them to be more active in learning. It would be difficult for students to carry out a task well if they did not know clearly about what and why to do an activity or if the success criterion has not been disclosed. At the time of presenting the material, researcher gave the questions and students interested to seek the answers for knowing the basic knowledge and students ask some questions for collecting data and can only be answered by researcher with the word yes or no, then researchers lead students to do the group consisting of 5 – 6 people and the total of group was 6 groups. Then the researcher was distributed the worksheets and a set of experimental tools to each group so that the students were very enthusiastic to do the experiment. First, researcher explained the experiment before students perform these activities so they were more understand to do the worksheets and also supervised them then the students were processing and summarizing the results of the experiment then presented it. At this time, the students are required to be able to work together and provide suggestions to other students so that they who are less competence to be more motivated to learn the material.

This is similar to students' learning activities that improvement of it in experiment class was higher than in control class. This was because the activity process in experiment class was many variation than in the control class so it was more interesting and memorable for students to learn.

The skill assessment of students in experiment class has increased in every meeting. It happened because in experiment class which implemented the inquiry training learning The attitude assessment between experiment and control class was very different.

The highest aspects of attitude assessment was cooperation because in essence this model encourages students to improve their spirit of cooperation.

model using experiment methods in order to develop the ideas through discussion and cooperation and foster the students' interest in learning which is expected to improve the students' skill.

It was similar to the results of previous studies quoted in national journal where Ratni Sirait and Sahyar (2013) stated that the students' achievement of experiment class was higher than

control class, then Dede Parsaoran Damanik and Nurdin Hill (2013) stated that the students' achievement of experiment class using inquiry training could improve the critical thinking skill and scientific attitude of students.

Based on this study, the use of inquiry training learning model could improve students' achievement activity, but in learning there was still obstacles when group work was going on, there were less active students in looking hypothesize, at the time of collecting data verification and experimentation, there are some students who choose to sit quietly and wait for the results that obtained by his friends rather than join to obtain such data. It happened because the habits of students who are not accustomed to cooperate in learning. This model would be better if the students are actively involved during the process of learning through group work, then it should need to add some observers so that learning was more directed and being supervised the data collection and experimental verification. The researcher also have difficult in allocating time when students submitted the results of discussion so that not of all groups could present the results of their discussion. This model would be better if researcher consider sharing time every phase efficiently, then the researcher should have to pay attention to the time on stage "process, formulate the explanation", because at this stage almost of all students wanted to display the results of their discussions to provide suggestions for students in the other groups.

Therefore, based on the research result and hypothesis testing could be concluded that there was any significant difference of students' achievement as the influence of inquiry training learning model on the topic of heat in class X semester II MAN Kisaran AY 2013/2014.

CONCLUSION AND RECOMMENDATION

Based on the research results that obtained and data analysis and hypothesis testing, then it can be concluded as follows: (1) The students' achievement using inquiry training learning model on the topic of heat in class X semester II MAN Kisaran A.Y 2013/2014 was 77,12; (2) The students' achievement using conventional learning on the topic of heat in class X semester II MAN Kisaran A.Y 2013/2014 was 69,39; (3) The students' learning activities using inquiry training learning model was 72,11 as active criteria; (4) The students' learning activities using conventional learning was 59,45 as quite active criteria; (5) There is difference due to the influence of inquiry training learning model on the topic of heat in class X semester II MAN Kisaran A.Y 2013/2014.

Based on the results and recommendation in this study, so the researcher has some recommendations as follows: (1) At the time of learning process should collaborate by some observers to help students learning more focused and able to supervise and observe students in colle

cting data verification and experimentation. (2) During the learning process should be more concerned for the efficiency of time in each stage of inquiry training learning model.

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