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The Effect of Inquiry Training Learning Method with the Help of Multimedia and Scientific Attitudes to The Students Science Ability

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Abstract: *The aim of this research is to analyze the ability of students science process which is taught by Inquiry Training Learning Method based on Multimedia which will be better than the student who is taught by using Direct Learning, and the ability of science process in the students group who have better science attitudes than the students group who have worse science attitudes, then whether it has interaction or not between Inquiry Training Learning Method based on multimedia and Direct Instruction Learning with the students scientific attitudes to the students science process ability. This research was conducted in State Senior High School 5 of Medan by using quasi experimental research method and it was sampled by using cluster random sampling in grade X MIA 10 as the control class and grade X MIA 11 as the experimental class. The Research instruments which was used in this research is the test result of learning in the form of description test to measure the ability of science process and the closed questionnaires to measure the students' scientific attitudes. From the research, it was gotten that the research result which was analyzed by using two paths ANNAVA test namely students science process ability which was taught by using Inquiry Training Learning method based on Multimedia is better than the students who was taught by using Direct Instruction and the ability of science process in the students group who have better science attitudes than the worse students attitudes, and also the interaction of Inquiry Training Learning Method based on Multimedia and Direct Instruction Learning Method with the students science attitudes to the ability of students science process.*

Keywords: *Inquiry Training Method based on Multimedia, Science Attitudes, The Ability of Science Process*

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I. Introduction

The learning paradigm shift from teacher-centered to student centered because learning is not pouring knowledge into the student's head but must be generated from the students' own thought process. This construction process can only be done if the students have an active role in the learning process. When construction is successful on students, then the concept to be taught will also be well controlled by the students. This construction process is a conscious process that a person undertakes to gain a whole new behavioral change, as a result of his own experience in interaction with his environment which is the definition of learning as in [1].

In addition to providing knowledge to students, physics subjects are intended as a vehicle to foster thinking skills that are useful for solving problems in everyday life. By developing process skills, students will be able to discover and develop their own facts and concepts as well as foster and develop attitudes and values demanded in [2].

But efforts to achieve the goal of science learning, especially physics still encountered obstacles. One of reason is the use of less precise learning models in the learning process. The weak process of physics learning can be seen from the results of preliminary studies that have been done. Based on student learning outcomes on physics subjects in class X MIA SMA Negeri 5 Medan TP. 2015/2016 only about 60% of total students of class X MIA SMA Negeri 5 Medan reached the minimum criteria of mastery.

In addition, observations which are made by researchers is to see the learning process that teachers do with the approach Teacher Learning Center. This is the process which then hinders students' science process skills. Like the research of science process skills ever studied by some previous researchers, among others as in [3] [4] [5].

To solve such learning problems, efforts need to be done, among others, in the form of improvement of learning strategy that is to change the learning model that can facilitate the communication between students and students and teachers, so as to develop students' science process skills. Because basically, students must have a curiosity which means students have a congenital scientific attitude, it's just not well directed. Therefore, an appropriate learning model is needed, which can motivate and facilitate students in the learning process. One of

the suitable learning model used in physics learning is Inquiry Training. The learning model of inquiry training or inquiry training has an advantage because students will conduct research on a repetitive basis and with ongoing guidance. As in [6], the inquiry training model is designed to bring students directly into the scientific process through exercises that can condense the scientific process into a short period of time. The goal is to help students develop the discipline and develop the intellectual skills necessary to ask questions and find answers based on their curiosity. Inquiry training model has been studied by several previous researchers, such as in [7], [8], and [9].

In addition to the less precise learning model used, the use of media is also still less done by teachers in learning so that students tend to get bored at the time of the learning process so that lessons tend to be ignored by students. Technological developments on media learning to develop multimedia that combines the words with images so that students are more interested to understand the subject matter that is delivered and make the learning activities become more interactive and innovative. The use of this multimedia has been studied by several previous researchers as in [10] and [11].

The student's disinterest is seen from the low student's scientific attitude. The low scientific attitude of the students is indicated by the rarity of students asking questions to the teacher and often the students commit the act of cheating during the exam. This low scientific attitude has had a huge impact on our current education. If noted, we often hear leakage of questions at the state exam (UN) is the biggest impact of low scientific attitudes that students have. Scientific attitudes are also interpreted as one's general assessment of an object that has a typical science or that is related to science, in addition attitude is a facilitator and product of the cognitive learning process as in [9]. Scientific attitudes in the learning process include curiosity, respect, critical thinking, discovery and creative thinking, open mindedness, diligence and environmentally sensitive. In fact, this scientific attitude has its own role in self-motivating students in implementing science learning. By having a scientific attitude, students will be encouraged to explore further to answer from students' curiosity.

II. Method

This research was conducted at X class MIA-10 and X MIA-11 SMA Negeri 5 Medan, Jalan Pelajar No.17 Medan on March 23 - April 8, 2017. The population in this study is all students of class X even semester TP. 2016/2017 in SMA Negeri 5 Medan consisting of 11 MIA classes. Sampling is done by cluster random sampling which take two classes that is one class of control taught by Direct Instruction learning model that is class X MIA-10 and one class of experiment which will be taught by Inquiry Training model of multimedia assisted that is class X MIA-11. This type of research includes quasi experimental research that aims to determine the presence or absence of a result of something imposed on the subject students i.e. students. The research design is 2x2 ANAVA. The instrument used in this research is a test that is the students' scientific attitude measurement (closed questionnaire) and the test of learning result (essay test question) to know the ability of students based on science process skill.

III. Result

The results of descriptive analysis of research variables on the ability of the science process of learning model inquiry training (experiments) by using multimedia and the ability to process science model direct instruction (control) with above average scientific attitudes and below average can be seen in the table 1.

Table 1. Descriptive Analysis Results

	N	Minimum	Maximum	Mean	Std. Deviation
A1	40	50.00	91.00	74.4500	9.11451
A2	40	56.00	93.00	71.2500	8.44515
B1	40	40.00	73.00	59.4750	7.31345
B2	40	45.00	74.00	56.9250	6.69247
A1B1	26	74.00	91.00	79.9231	5.07482
A1B2	14	50.00	70.00	63.7857	5.56332
A2B1	23	68.00	93.00	77.0435	5.62040
A2B2	17	56.00	70.00	63.1176	3.93514
Valid N (Listwise)	14				

Table 1 shows that the eight research parameters have mean values above the minimum so it can be concluded that generally the scores of students' science process skills both inquiry training (experimental) and direct instruction (control) models in general is good enough to be above average. The analytical testing requirements for the analysis of variance for each group of data have been met, i.e. the data of each group is normally distributed, has a homogeneous variance and from a randomly determined sample. Thus, the hypothesis test with two-lane analysis of variance from the ability of the process of science can be done. The results of data analysis with two-lane analysis of variance from Prosses Capability of Science can be shown in Table 2.

Table 2. Summary of Combined Variance Analysis Results

Variance Source	JK	df	KT	F	$F_{table0.05}$	$F_{table0.01}$
Model	3954.12	1	3954.12	149.39		
Attitude	214.513	1	214.5125	8.10		
Group	4275.4614	3	1425.153804	53.84	2.49	3.58
Interaction	106.829	1	106.8289121	4.04		
(Error)	1905.76	72	26.46889532			
Total	6181.22	78	79.24643429			

To know the interaction between students' scientific attitude and the learning model in influencing the ability of the science process is done further test by using Tuckey test. Summary of Tuckey test results can be seen in Table 3.

Table 3. Summary of Tuckey Test Calculation Results

Ratio	Mean Difference	Standard error	T_{count}	$T_{table\ (0.05)}$	Conclusion
A1B1 : A2B1	15.55	1.3144	11.8300		Different
A1B1: A1B2	2.86	0.5637	5.0735		Different
A1B1 : A2B2	16.65	1.3601	12.2413	1.99	Different
A2B1 : A1B2	12.69	1.1874	10.6869		Different
A2B1 : A2B2	1.10	0.3496	3.1464		Different
A2B2 : A1B2	13.79	1.2378	11.1405		Different

IV. Discussion

The calculation result in table 4:15 shows the value of Fcount of 149.39 while the value of Ftable = 2.49 (for the 0.05 level) and 3.45 (for 0.01 level) so that Fcount (149.39)> Ftable (2.49) at 0.05 significance level. This means Ho is rejected and Ha accepted.The research hypothesis stating the ability of the students 'science process by using the Inquiry Training model is better than the ability of the students' science process by using the accurate Direct Instruction model. This happens because of various things that can be explained as follows. First, learning by using Inquiry Training model gives opportunity to students to be able to express their thoughts and feelings to their peers so that the ability of students' Science Process can increase. In learning by using Direct Instruction learning model children play more solitary (own solitary) and here is rarely communication between children, although communication is relatively small. This is in line with Vigotsky's opinion in Schickedanz with the theory of constructivism that explains that the development of speech is formed from interaction with others and by interacting the child's knowledge, values and attitudes will develop. Children have a limited development of cognition at certain ages, but through social interaction, the child will experience improvement in thinking ability. The students' Science Process Capabilities will also improve if supported by a rich environment of language learning. Second, learning by using Inquiry Training model gives big enough challenge to the children to do learning activity according to their ability by able to play other person on their experience. This is in accordance with biological studies as in [3] which say there are differences in physics learning outcomes between students using multimedia-based learning models compared with students using Inquiry Training model. Likewise, with the results as in [6] who said that the science process skills of students who are taught with Inquiry Training model of learning is better than students taught by conventional learning.

Based on the scientific attitude test on the ability of the science process, the calculation result shows the value of Fcount of 8.10 while the value of Ftable = 2.49 (for the 0.05 level) and 3.45 (for 0.01 level) so that Fcount (8.10)> Ftabel (2.49) at the 0.05 significance level. This means Ho is rejected and Ha accepted. Thus, the research hypothesis that states the ability of science process students who have above average scientific attitudes better than students who have a scientific attitude below the average tested truth. In other words, if students basically have above average scientific attitudes if taught with Inquiry Training model and Direct Instruction learning model will produce good science process capability. According to Barnes's definition of scientific attitudes in [10] are attitudes that have been attached to the general person of science which is a tendency, readiness and willingness of a person in responding based on scientific ethics. The scientific attitude indicators are able to dominate all the actions and responses of the students in the lesson. In addition, students' scientific attitudes will have a positive impact on their preferences. Reference [5] said that there is influence of scientific attitude toward cognitive and affective achievement and according to research result as in [13] which said that students' science process skill in group of students who have above average scientific attitude is better than groups of students who have below average scientific attitudes.

And lastly, based on test results presented in Table 4:15 for the interaction between Inquiry Training model and Direct Instruction learning model with a scientific attitude toward the students' science process ability. The calculation result shows Fcount of 4.04 while Ftable = 2.49 (for 0.05) and 3.45 (for 0.01 level) so

that Fcount (4.04)> Ftable (2.49) at significance level is 0.05. This means Ho is rejected and Ha accepted. Thus the research hypothesis states that there is an interaction effect between instruction model inquiry training and direct instruction with students' scientific attitude above average and below average to the ability of science process students are tested correctness. Students who have below average scientific attitudes have low self-esteem, difficulties in expression. The concept of self is centered in the experience of each individual and always everywhere in all aspects of behavior, acting to mediate both as a stimulus and response. Secondly, students who have above average Scientific attitudes like the challenge so that in the role playing activity that have been designed to make him the spirit to do so will even be able to improvise with the tools and materials that exist because there is a belief about himself, for students who have a scientific attitude below the average less able to improvise because generally only accept what is given by the teacher and lack of self believe. Self-concept is the image of a person about himself which is a combination of beliefs about himself, physical, psychological, social, emotional, and achievement. Third, students who have above average scientific attitude will be better if given more opportunities to play a macro role and for students who have below average scientific attitudes better to be given more opportunities to play a micro role because in the macro role play more challenges than in playing a micro role so that children perform activities based on their own desires and wishes, teachers only facilitate it. Generally, the child will be happy if he plays in accordance with the desires and needs so that when the child is playing with based on feelings of love and pleasure then that's the best for children so that it can stimulate the ability of higher level of Science Process. Self-concept relates to one's self-acceptance and self-esteem, as well as the feeling of being able to possess. Furthermore, students who have below average scientific attitudes need to continue to be motivated by teachers so that the more have a good self-confidence because the concept of self can actually change to a better direction when the child gets support from the surrounding environment so that dare to do and declare something that ultimately the ability of the Science Process will also be more improved. This is in accordance with the research in [14] who said that the students' scientific attitude more influence on the experimental class is the class that is taught by Inquiry Training model than the conventional class. Furthermore, compared to conventional class, the learning outcomes in the Inquiry Training class are higher than the conventional class. Likewise, with the results of research of [4] which says that there is an interaction between models of learning Inquiry Training based on collaborative and direct learning model with a scientific attitude to the students' science process.

V. Conclusion

Based on the results of the analysis and discussion, it can be concluded that the ability of science group process students who are taught with the instruction model Inquiry Training assisted multimedia better than the ability of the process of science students Direct Instruction learning model, and the ability of science process students who have above average scientific attitudes better than students who have below average scientific attitudes, and there is an interaction of Inquiry Training learning model and Direct Instruction learning model with scientific attitude toward students' science process ability. In this study, the ability of students is dominant at science process in the instructional model Inquiry Training assisted multimedia on students who have above average scientific attitudes.

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