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The Effect of Inquiry Training on Learning Model Using Macromedia Flash and Creativity on Student's Science Process Skills

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Abstract
This research aimed to determine whether students on science process skills that were learned by inquiry training model using macromedia flash will be better than conventional learning, to know whether the science process skills of students who have creativity above average was better than students who have creativity below the average, to find whether there was an interaction between instructional inquiry training model used macromedia flash with creativity on students process science skill. This research was quasi experiment research with two group pretest-posttest design. The research population was the whole of the XIth grade of SMA Negeri 4 Medan, 2nd semester of 2016/2017 academic year. The sample of research were taken by cluster random class, consist of 80 students. Class XI-1 was experiment class, consists of 40 students learned by inquiry training on learning model used macromedia flash. Class XI-2 was control class, consists of 40 students taught conventional learning. The instruments consists of two types namely: essay test science process skill consists of 10 questions and essay test of creativity consists of 5 questions. The analyzing of data used Anava two ways. The results showed: the first hypothesis that the significant on learning model is 0,035 because (sig)<0,05 so H_0 rejected, it meant that the science process skill of student taught by inquiry training on learning model used macromedia flash was better than conventional learning, the second hypothesis showed the singnificant of creativity is 0,147 because (sig)>0,05 , H_0 accepted, it meant the science process skills of students who have creativity above average was not better than students who have below average creativity and the third hypothesis showed that the siginficant is 0,252 because (sig)>0,05 so H_0 accepted that there is no interaction between inquiry training model using macromedia flash and conventional learning with creativity in an effort to improve students' science process skills.
Keywords: Inquiry training model, Conventional, Creativity, Science process skills.

1. Introduction

Education is one effort to educate the life of the nation and is a key to achieve the goals of a nation. Education is believed to be able to encourage maximizing student's potential as a reliable resource candidate in order to be critical, logical, and innovative in dealing with and solving every problem faced. Education requires continuous improvement. Education emphasizes the mastery of material and mastery of skills are balanced. The world of education has a goal to be achieved in the learning process. Education is not only emphasized on the mastery of the material, but also emphasized on the mastery of skills. (Silitonga, P., dkk: 2016)

Physics learning process should be emphasized in learning process and student centered learning is not a number of information that must be memorized by students, so that students can gain the learning experience. Therefore, the learning process should be more emphasized on the importance of meaningful learning (Meaningfull Learning) (Dahar, R. W. 2011:112). In order to achieve that goal, the teacher's role as a teacher is very important. Teachers should be able to present the material well and students are involved in the learning process. The choice of learning model should be adjusted with the material to be discussed because each material in the subject of physics is different, it is meant that the students are directly involved in the learning process so that students are able to remember the material based on the experience. Physical subjects are generally known as "dreaded" subjects and are not liked by students. This tendency usually begins with their learning experience, where they find the fact that the subject of physics is a 'serious' and serious lesson that is not far from the problem of concept, conceptual understanding, solving complicated problems through a mathematical approach (Purwanto, A. 2012:133).

Based on the results of interview with a teacher who taught physics in SMA Negeri 4 Medan in 2016, he said that the average score of physics exam is only about 60, whereas the minimum completeness criteria in the school is 75. Based on the questionnaire given to some students showed that about 20 students rarely ask the questions when studied on class, 6 students responded teachers doing question and answered about the material will be learned, 5 student's gave exampling of physics in their daily life, based on some the problems that exist in the questionnaire given to the student constraints were found in the learning process. First, the studied of physics contains many abstract principles, concepts, and theories difficult to understand by students. Second, the students are less optimal and less active when following the learning, so that the students' learning outcomes are

less good which resulted in the students only memorize the material only. Third, the creative thinking ability of students is less developed, because the selection of learning model is not in accordance with the learning materials, from some of these constraints resulted in many students who get cognitive learning outcomes less than the limit of mastery and the ability to think less creative. The fact that found in the field is the learning process is still centered on the teacher, the teacher is still rarely use the media, so for students physics learning is often boring and learning is often ignored by students and students are often sleepy when the learning process takes place, because the learning that took place in school is still very theoretical and teachers are less likely to apply the learning model developed by education specialists.

Selection of the right learning model can improve students' science process skills for the better. Based on these objectives can be understood that through physics learning is expected that students not only master the knowledge alone but become individuals who have the skills and abilities found in everyday life.

One of the learning models that can improve students' science process skill is the inquiry training model. The inquiry training model begins by presenting puzzle-filled events to students. Students who face the situation will be motivated to find answers to the problems that are still the puzzle. Teachers may use this opportunity to teach assessment procedures in accordance with the steps of the inquiry training model. The inquiry teaching model is a student-centered teaching. In this case students become actively learning. The main goal of the inquiry model is to develop intellectual skills, think critically and be able to solve problems scientifically (Dimyati dan Mudjiono. 2013:173).

According to Joyce., dkk (2009:201), an 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.

Macromedia flash is a vector based application program professional authoring tool professional that is used to create a very interesting bitmap animation to create logos, cinema, performances, interactive menus and web application creation. The latest version of Macromedia flash offers capabilities far beyond the scope of the current tool. Using flash, people can create web applications with all the same power and advantages of traditional server technology. Recent applications have demonstrated the potential for flash to outperform the power of traditional software applications. Utilizing this web application helps users better understand large amounts of data, providing easily accessible information, graphical visual representation.

Sinaga, K., dkk (2015) said that the influence of learning inquiry training model using macromedia flash on student learning result gives significant value, so as to produce better form of learning model. This is because what is the problem in the model, in learning, can be visualized by using Macromedia flash.

Research result of Siagian, H. E., dkk (2016), shows that there are significant differences in science process skills between students who are taught by inquiry training model using macromedia flash and conventional learning model. In addition to learning inquiry training model using macromedia flash, creativity also affects the skills of the science process. Supriadi, Dedi. (1994:20), also suggests that creativity is the ability of a person to give birth to something new, both in the form of ideas and real work that is relatively different from what already exists.

The students' science process skill is an approach that gives students the opportunity to discover facts, build concepts, through activities or experiences like scientists. Furthermore Rustaman, A. (2005:86), says that process skills need to be developed through direct experiences as learning experiences. Through direct experience one can better appreciate the process or activities that are being done. Based on the above, it can be concluded that students' science process skills are complex capability devices that can be used by scientists in conducting scientific inquiry into the learning process. Skills in the science of students are very important for every student as a preparation for scientific investigation.

2. Method

This research had done in SMA Negeri 4 Medan which is located at Jl. Glass No. 12, Sei Putih Tengah, Medan Petisah, Medan City, North Sumatera, 20118. Population in this research whole of students the grade XI th SMA Negeri 4 Medan, on semester of 2016/2017 academic year. The sample of this research is taken 2 (two) class. Sampling is done by cluster random sampling. After the selected random sampling experimental class taught by inquiry training on model learning consits 40 students of grade XI MIA-1. For control class taught by conventional learning consits 40 students of grade XI MIA-2.

This research is a type of quasi experiment research, which is a research that aims to know the effect of "something" that is imposed on the "subject" ie students (Arikunto, S. 2010: 159). The study involved two different sample classes treated. In experimental class with inquiry training model using macromedia flash while control class with conventional learning.

The variables in this study consisted of three variables: independent variable, moderator variable and dependent variable. The independent variable is inquiry training on learning model using macromedia flash. The

moderator variable is creativity, and the dependent variable is the students' science process skill on dynamic fluid material. The study involved two different sample classes treated. the experiment class were treated with inquiry training model while the control class was learned by conventional learning. The research is Two Group Pretest Posttest design.

3. Result

From the pretest and posttes data processing for each class, the average and standard deviation in Table 1 is obtained.

Table 1. Pretest and posttes data

Class	N	Mean	Std. Dev
Pretes Control	40	62.75	6.00
Pretes Experiment	40	62.65	6.03
Posttes Control	40	73.75	6.57
Posttes Experiment	40	77.30	6.48

Based on table 1, After data obtained prerequisite test data analysis that used test of normality and homogeneity.

Table 2. The Normality test

Class	Kolmogorov-Smirnov		
	Statistic	df	sig.
Pretes Control	0.16	40	0.12
Pretes Experiment	0.13	40	0.07
Posttes Control	0.12	40	0.19
Posttes Experiment	0.12	40	0.17

Based on the normality test results in Table 2, the significance value in the sig column. data of pretest value and posttes of science process skill obtained by significance value greater than 0.05, hence can be said pretest and posttes data of control class and experiment class is normal distribution. Furthermore, homogeneity test is done.

Table 3. The Homogenity test

Result		Levene Statistic	sig.
Pretes	Based on	0.00	0.96
Posttes	Mean	0.12	0.73

Based on the result of variance homogeneity test by using Levene test in Table. 3. sig value > 0.05, it can be concluded that the control and experiment class students come from populations having the same variant, or both classes are homogeneous. Based on the prerequisite test results obtained that the science process skills are normal and homogeneous distribution, then tested the hypothesis with the test of General Linear Model Univariate Anova 2 × 2. Hypothesis test results for students' science process skills.

Hypothesis testing

The results of hypothesis testing for students' science process skills.

Table 4. The test of Two ways Anova

Source	Mean Square	F	Sig.
Model	192.699	4.61	0.04
Creativity	89.61	2.15	0.15
Model*Creativity	55.64	1.33	0.25

3. Discussion

The skills of students' science processes learned by inquiry training on learning model using macromedia flash

The result of variance analysis test in Table. 4. obtained value of Model $F_{count} = 4.61$ and learning model significance of 0.04, F table = 3.24. Because the value of $F_{count} > F_{table}$ and sig value. 0.04< 0.05 so that the results of hypothesis testing reject H_0 or accept H_a in the level of alpha 5% its meant the science process skills of students who are taught by inquiry training model using macromedia flash is better than conventional learning. The skills of the science process in these two groups of students can be shown in the comparison diagram of the results of the students' science process skills on the pretes and posttes in Figure. 1.

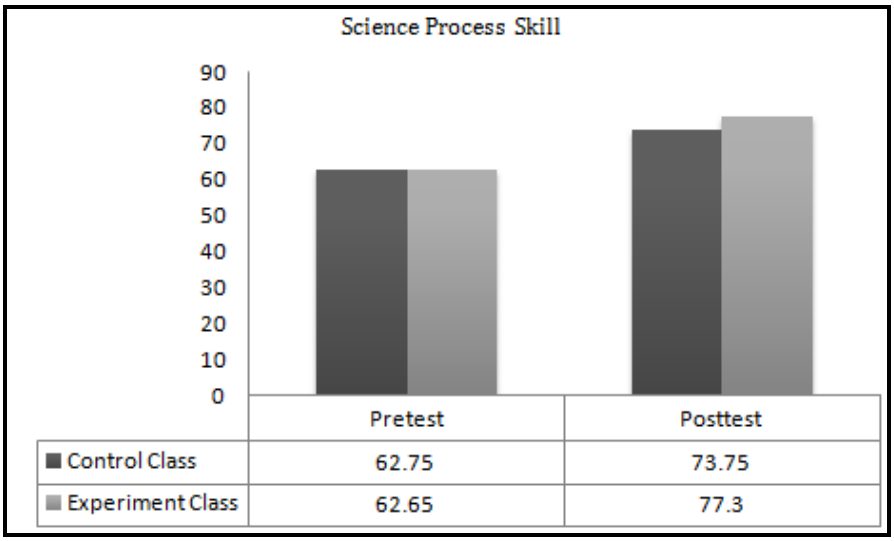

Figure 1 The Value Score of Student Science Process Skills in Control Class and Experiment Class

Figure 1 shows the average posttes of students' science process skills in the experiment class taught by inquiry training model using macromedia flash that is 77.30 is higher than the average posttes of science process skills of control class students taught by conventional learning that is 73.75 . These results prove that the inquiry training model using macromedia flash provides better results in improving students' science process skills.

The results of this study are supported by research that has been done by some previous research. (Abdi, A, 2014) in his research said that the academic ability of science students who are taught by inquiry learning is higher than the academic ability of science students who are taught with inquiry learning is higher than the academic ability of science students who are taught with traditional learning.

When viewed from the results obtained, it appears that the activity of students in the experimental class led to the results of the science process skills increased after treatment was given. The role of teachers in learning as a mentor and students find their own concepts or facts that will be learned so that students creativity appears. The discovery process itself will be more useful for students so that the knowledge they have is difficult to forget with the creativity they have.

The science process skills of students who have creativity above average and below average

The result of variance analysis test on the Table. 4. Obtained the value of Creativity $F_{count} = 2.15$ and significance of the learning model of 0.15, $F_{table} = 3.24$. Because the value of $F_{count} < F_{table}$ and sig value. $0.18 > 0.05$ so that the results of hypothesis testing reject H_a or accept H_0 in the level of alpha 5% it meant the science process skills of students in groups who have above average creativity is not better than students in groups who have below average creativity

In learning physics can assist students in acquiring knowledge, skills and attitudes. The results obtained in this study indicate that students' science process skills in the group of students who have above average creativity better than the group of students who have below average creativity. This is seen from the value the average score of science process skill on creativity below average for both grades 74.16 and the average score of scienceprocess skills for creativity above average of 76.76. The scienceprocess skills of students who have above average creativity are better than students who have below average creativity. This is an illustration that students have different creativity values, but that is what causes students to succeed in working on science process skill matters.

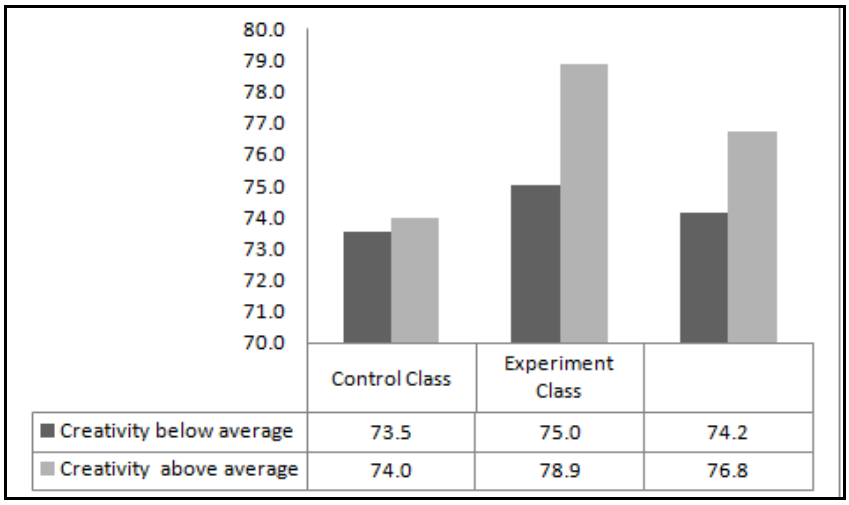

Figure 2. The diagram of Average Scores of Student Science Processes in Control class and Experiment Class Based on Creativity Level

This is also in line with research by Siagian, H. E., et al (2016) that students with high levels of creative thinking acquire high science skills while students with low levels of creative thinking gain high science skills. In other words, students who have high or low creative thinking skills taught with inquiry training model using macromedia flash give better result to their science process skill. This is because students with high creative thinking ability in learning inquiry training become more open and active in observation and discussion activities and show higher enthusiasm compared with students who have low creative thinking ability, and ultimately impact on the improvement of science process skills. The science-process skills of students who have above average creativity are better than students who have below average creativity. This is an illustration that students have different levels of ability, but that is what causes students to be successful in working on science process skills.

The interaction between instructional inquiry training model using macromedia flash and conventional learning with creativity to students' science process skill.

The result of variance analysis test in Table. 4. Obtained the value of Model*Creativity $F_{count} = 1.33$ and the significance of the learning model of 0.25 $F_{table} = 3.24$, because the value of $F_{count} < F_{table}$ and sig value. 0.25> 0.05 so that the results of hypothesis testing reject H_a or accept H_0 in the level of alpha 5% it meant there is no significant interaction between inquiry training model with conventional methods with the level of creativity to students' science process skills.

According to research conducted by Hutapea, F., et al (2014) showed that the interaction between instruction model inquiry training and critical thinking ability influence each other in improving students' science process skill which means that inquiry training model has an optimal effect to improve science process skill if applied to students with high critical thinking skills, in conventional learning using direct instruction, critical thinking skills have no effect on students' science skill. This shows that there is a significant difference between the interaction of high critical thinking ability in the experimental class which is taught by the inquiry training model with high critical thinking ability in the control class which is taught by the conventional model that direct instruction has a significance value of 0.00. Similarly, the interaction between low critical thinking skills in the experimental class taught by the inquiry training model with low critical thinking skills in the control class taught by the conventional model has a significance value of 0.00. It can also be seen the average difference between experimental class with high critical thinking ability and control class with high critical thinking ability has an average difference of 22.89. Experimental class with low critical thinking and control class with low critical thinking ability with an average difference of 15.0. From these results it can be seen that there is a significant difference in the average difference in the skills of the students between groups. This suggests that it can lead to an interaction between the model used and the ability to think critically of students' science process skills. This research is in line with Susanti, A. (2014) there is influence of high and low category critical thinking skill to cognitive learning outcomes, but there is no influence on learning result of affective and psychomotor aspects.

The result of interaction between the model of learning and the level of logical thinking ability in an effort to improve the skill of science process presented in figure 3.

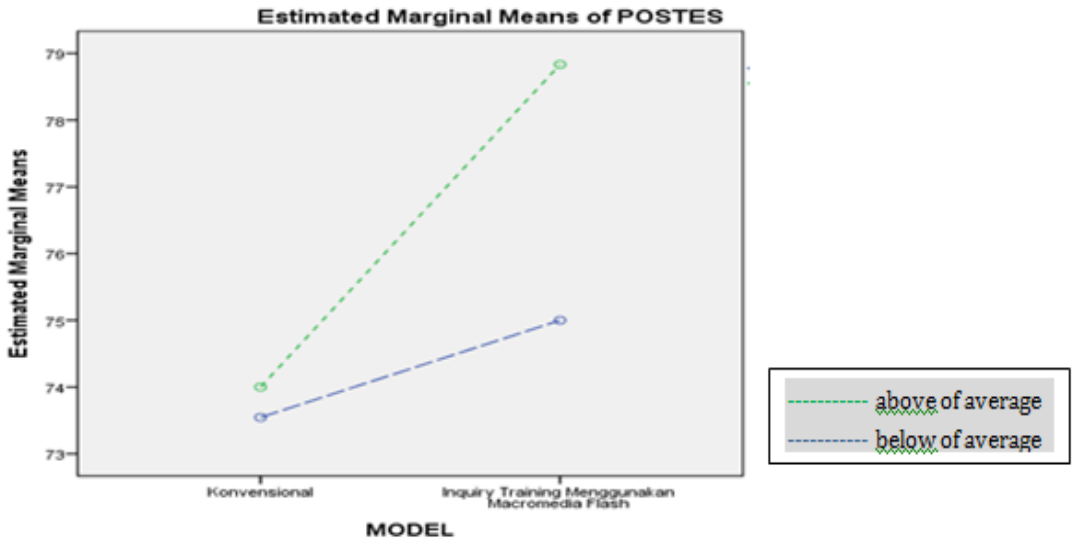

Figure 3 Interaction between learning inquiry training model using macromedia flash and conventional learning with creativity to science process skill

By the figure 3. It can be seen that if both lines are extended then at a point there will be an intersection. Students who have below average creativity with groups of students who have below average creativity, if taught with inquiry training model using macromedia flash as well as conventional learning will gain the value of low science process skills. Unlike students who have above average creativity, if taught with inquiry training model using macromedia flash and conventional learning will show the results of higher science process skills than the classes taught by conventional learning.

Inquiry training model is better applied to students who have above average creativity. The existence of interaction between instructional model inquiry training using macromedia flash and creativity above average to the students 'science process skill is caused in the implementation of learning, students' science process skill progressively grow by the creativity of students who grow when the student's curiosity is raised in the implementation of inquiry training model.

4. Conclusion

Based on the results of research and discussion it can be concluded:

1. Skills of students' science processes taught by inquiry training model using macromedia flah with an average of 77.30 is better than conventional learning with an average of 73.75.
2. Science process skills students who have above average creativity with an average score of 76.76 is better than students who have below average creativity with an average rating of 74.157.
3. There is an interaction between learning inquiry training model using macromedia flah and conventional learning with creativity in improving students' science process skills.

5. Suggestion

1. To the researcher / prospective researcher who is interested to do a similar research, in order to conduct further research on the inquiry training model with the moderator variable and the dependent variable that is different from the previous one.
2. Viewed from the average students 'science process skills achieved by students taught through an inquiry training model is much higher than that of students taught through conventional learning shows that this learning model more effectively improves students' science process skills than conventionally, the educators are advised to be able to make this learning as a consideration to be used as one of the alternative models in physics learning.
3. Educators should choose the learning model in accordance with the subject matter for the purpose of learning can be achieved.
4. In applying the model of learning inquiry training using macromedia flash should be considered the creativity of students, because the inquiry training model in demand demand that students are more active so that the creativity of students appear.
5. Expected to the next researcher to pay attention to the use of time so that the implementation of this learning model can run optimally and also pay attention to the instrument in accordance with the material.

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