# THE EFFECT OF SCIENTIFIC INQUIRY LEARNING MODEL TO SCIENCE PROCESS SKILL ON DYNAMIC FLUID TOPIC OF GRADE XI SEMESTER II SMA DHARMA PANCASILA MEDAN A.Y 2016/2017

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## ABSTRACT

This research aims to analyze the effect of scientific inquiry learning model to science process skills on dynamic fluid topic grade XI semester II SMA Dharma Pancasila Medan academic year 2016/2017. The type of this research was quasi experiment, with experiment class used scientific inquiry learning and control class used conventional learning. The population was all of the classes XI. Sample was taken with random sampling technique. The instrument used to determine student's science process skills in dynamic fluid matter in form of experiment test with two observer and observation activity of student and the instrument had been validated and fulfilled to validator expert and reliability of test. Based on the data tabulation obtained the result of science proces skill of student pre-learning in experiment class 32.06 and 31.35 in control class and the result of science process skills post-learning in experiment class 78.13 and 50.91 in control class. Based on t testing, it can be conclude that science process skills of student using scientific inquiry learning model was better than conventional learning.

**Keyword:** Scientific inquiry learning model, science process skills

## PENDAHULUAN

Physics as the science subjects in learning should be able to invite learners to be active in the learning so that they get used and skilled perform the activity related to science or commonly called the science process skills. Skills used this process every scientist when doing science activities. Science process skills are the demands of a learning experience for the students because it involves cognitive skills, manual, and social. Learning that reflective activity which enables the learner to draw upon previous experience to understand and evaluate the present, so as to shape future action and formulate new knowledge (Abbott J, 1994).

Science content should be taught through participatory activities involving the students in classroom investigations. In performing these investigation and participating in activities, students necessarily use various skills that relate to the processes involved. These skills are typically referred to as process skills, and educators need to teach in manner that enables students to know how to use these skills (Brendzel, 2005).

Based on the above physics has an important role in the advancement of science and technology. Based on my observations in SMA Swasta Dharma Pancasila Medan through the interview to the physics teacher known that the interest students to study physics is

still low because these students do not understand the benefits of learning physics they learned. Students assume the physics lesson is a lesson that is only concerned with formulas and memorizing.

Based on the information of the teacher, The student rarely do the experiment in learning, so the student in SMA Dharma Pancasila Medan are thingking that physics only monotouns with formula and calculations. In fact the students really want to learning by experimenting and discussion groups. This is consistent with data on the results of the questionnaire that 83% of students want learning by experimenting. This has resulted in students' abilities such as observing, formulating hypotheses, using the tool, collecting data, making inferences and other activities to improve science process skills.

The researcher observed that the physics teacher, especially in class XI SMA generally apply lecturing method more than the other methods in learning activities, in the fact the method is not accordance with the purpose of learning. This is due to the teachers are not fully apply the appropriate methods for each materials. The teacher's role is more dominant, material presented by the teacher is more likely to lecturing method, students should take an active role in learning, like to experiment and create an interesting learning media for students that enables students to remember the lessons taught in the long-term memory and able to improve the science process skills possessed by students.

Scientific inquiry learning model is a powerful way of understanding science content. Students learn how to ask questions and use evidence to answer them. In the process of learning the strategies of scientific inquiry, students learn to conduct an investigation and collect evidence from a variety of sources, develop an explanation from the data, and communicate and defend their conclusion this model is one of model of teaching that very usefull in teaching and learning science in education, because this model is student centered learning. Based on all

this that scientific inquiry can increase the science process skills (Mahmed Ali, 2012).

Skills are defined as a set of broadly transferable abilities, appropriate to many science disciplines and reflective of the behavior of scientists. SAPA grouped process skills into two types-basic and integrated. The basic (simpler) process skills provide a foundation for learning the integrated (more complex) skills. (Padilla, 1990).

Scientific inquiry learning conducted by Lederman and Antink, A. (2013) in journal "Natural of science and scientific inquiry as context for the learning of science and achivement of scientific literacy" that conclude the scientific inquiry as a model of teaching to develop scientific knowledge and skills of students.

Based on that statement, the author interested in applying scientific inquiry learning model to improve student's science process skill, especially in dynamic fluid. Thus study is formulated there1 is effect of Sciencetific inquiry learning model to science process skills on dynamic fluid topic.

## RESEARCH METHOD

This research was conducted at SMA Swasta Dharma Pancasila Medan. Population in this research is all student at class X SMA swasta Dharma Pancasila academic year 2016/2017 that consist of 5 classes. The sample that would be taken is choosen by using Random sampling, where each population class with the same opportunity to became a sample.

The research involved two classes, namely the experimental class and control class, where the class was given a different treatment. Experimental class taught using learning model scientific inquiry learning model while the control class is taught by using conventional learning model.

To determine student science process skills obtained with the two treatments each class is taught by the same material with different teaching that the experimental class taught by learning scientific inquiry and control

classes taught by conventional teaching. The design of the research in table 1.

**Tabel 1.** The Design of Research

| Class | Pre-learning | Treatment | Post-learning |
|---|---|---|---|
| Experiment | $X_{1E}$ | T | $X_{2E}$ |
| Control | $X_{1C}$ | O | $X_{2E}$ |

Explanation :

$X_{1E}$ = Pre-learning in experiment class
$X_{1C}$ = Pre-learning in control class
$X_{2E}$ = Post-learning in experiment class
$X_{2C}$ = Post-learning in control class
T = Treatment with scientific inquiry learning model
O = Conventional learning model.

The selection of data is carried out to observe whether the samples come from normal distribution population or not. The test used is Lilliefors test and homogeneity test, to know the homogenity of both samples. The test criteria are received Ho: the data come from a homogeneous population if $F_{count} < F_{table}$ , where the F table obtained from the distribution list F with a = 0.05. Here a is a real level for testing.

Hypothesis test use t- test for pre learning testing criteria are : accept $H_o$ if $-t_{1-\frac{1}{2}\alpha} < t < t_{1-\frac{1}{2}\alpha}$ where $t_{1-\frac{1}{2}\alpha}$ get from t distribution list, for t another Ho rejected. And t-test for post learning The criteria of test : accept Ho if $-t_{(1-\alpha)} < t < t_{(1-\alpha)}$ where $t_{(1-\alpha)}$ obtained from the distribution list t dk = $n_1 + n_2 -$ 2 dan $\alpha = 0,05$. For the other t value Ho rejected and Ha accepted that there is influence student Scinece process skills by using model Scientific Inquiry Learning Model.

## RESEARCH RESULT AND DISCUSSION
### Ressearch result

The result of this research is to know student's science process skills using scientific inquiry learning model and using conventional learning.

Based on the research data, the pre-learning average value is 32.06 in experiment class and standard deviation is 5.04 and the pre-

learning average value is 31.35 in control class and standard deviation is 5.85.

To observe the result of science process skills in pre learning detail of two classes can be seen in the figure 1.
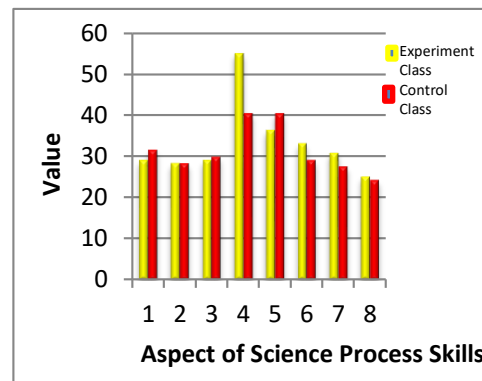


**Figure 1.** Aspect of Science Process Skills

Explanation figure 1 is about aspect science process skills is (1) observation Skill, (2) ask skill, (3) identify problem skill, (4) use tools and materials skill, (5) do experiment skill, (6) communicate skill, (7) apply concept skill, (8) take a conclusion skill.

After both of class give the treatment then both of class are given post-learning and the result are the post-learning average value is 78.13 in experiment class and standard deviation is 7.78. while in the control class is got the postest average value is 35.28 in experiment class and standard deviation is 7.36.

To observe the result of science process skills in post learning detail of two classes can be seen in the following figure 2:
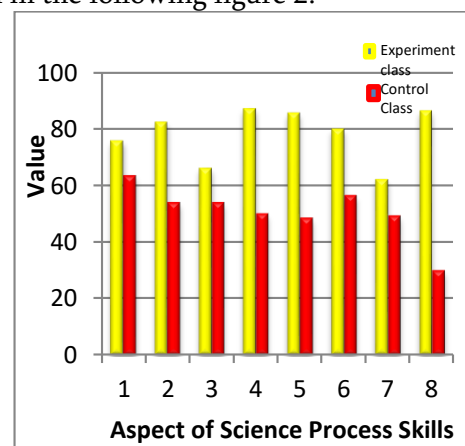


**Figure 2.** Aspect of Science Process Skills

From figure 2, scince process skills tough by scientific inquiry learning model was higher

than science process skill tough by conventional learning.

## Discussion

The use of Scientific Inquiry learning model during the learning process certainly has a good impact or influence on the students' science process skill, because in every phase or phase of scientific inquiry learning can foster and develop science process skill, that is observation skill, question skill, tool and skill skill Materials, experimental skills, communication skills, linking skills to concepts and concluding skills. While in conventional learning rarely illustrated these skills, because usually learning only using lecturing methods and assignments to do the actual questions of physics learning not only requires students to understand the formulas but also must be fostered their science process skills so that learning is more meaningful for the students themselves.

According to Joyce and weil (1980), scientific inquiry learning models are designed to bring students directly in the scientific process through exercises that can condense the scientific process in a short period of time. The goal is to help students to develop the discipline and develop the intellectual skills necessary to ask questions and to answer them based on the wishes.

According to Tay (2005) process skills help us obtained answers in science by developing an understanding of science concepts. They can also be applied to other fields of inquiry.

The result of this research is in line with previous research which is investigated by Mulia Ramadhani (2016), with the result of research indicate that there is influence of scientific inquiry learning model to the students' science process skill, learning activity and student attitude.

This research is also in line with journal of education and practice by sahyar and Febrina (2017) also said science process skills of students using scientific inquiry learning model was better than using conventional learning.

In another research Physics teaching method with scientific inquiry model by Ashiq Hussain and Azem (2011) in University of Education Pakistan that say there is the significant effect of learning tough by scientific inquiry learning model on science process skill's student, that concluded the scientific inquiry learning model better than traditional learning to develop science process skills.

Scientific inquiry learning model can give positive impact to students, this learning model can provide opportunity for students to be more active in the learning process, through the application of scientific inquiry learning model.

Students get involved in the problem, find the principles and answers by experiment. Although the application of scientific inquiry learning model has made the students' science process skill better and can increase the students activity, but during the learning there are still obstacles faced, that is the existence of students who do not play a role in activities resulting in the commotion in each group. In addition, researchers also in implementing all the syntax when the implementation of the learning process is still less effective due to not maximal in managing the time. From the constraints faced by researchers, it is expected to further researchers to make learning more interesting and researchers also pay more attention to and guide students during experiment.

## CONCLUSION AND SUGGESTION
### Conclusion

Based on the research result data it can conclude that:

Student's science process skill in experiment class that tough by sciencetific inquiry learning model is greater and better than student's science Process skills in control class tough by conventiona learning.

### Suggestion

Based on the results and conclusions in this study, the researchers have some suggestions, namely:

Frirstly to the next researcher should make better planning on group organizing,

preferably the number of students in each group of 3-4 people just to be all active in doing experiments. Secondly to the researchers further suggested to be more master in managing the stages of scientific inquiry learning model because some stages can take up more time targeted. And last for future researchers should pay attention to the availability of tools and materials to be used when experiment.

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