Science Process Skills Improvement in Medan High School Students Through Inquiry Training Learning Model

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Abstract. This study aims to improve students’ science process skills that learned by inquiry training learning model. This study is quasi-experimental. The study population were students of class XI SMA Al Fityan Medan. Sample selection is done randomly to randomize the class. The instrument used is a sheet consisting of science process skills such as observation checklist sheet. The results of this study stated that students' science process skills can improve through the inquiry training learning model through its phases.

1. Introduction

Science process skills (SPS) is a physical and mental skills associated with basic skills are mastered, owned, and applied in scientific activity so that the scientists managed to find something new. By developing the skills of the future students will be able to discover and develop attitudes and values required (Semiawan, 2009). Rustaman (2003) stated that the SPS is a skill that involves intellectual or cognitive abilities, social and manual. Cognitive skills involved because by doing the science process skills of students using mind. Manual skills involved in science process skills as they involve the use of tools and materials, measurement, preparation, or assembly tools. Social skills are also involved in the recording process because the skills interact with each other in carrying out the teaching and learning activities, for example, discuss the results of observations. Process skills should be developed through direct experiences as a learning experience. Through direct experience, one can better appreciate the process or activity being performed. In the description above we can conclude science process skills are the ability to complex devices used by scientists to conduct scientific investigations into the series of the learning process. Science process skills are very important for every student as a provision to use scientific methods in developing science and is expected to gain new knowledge or develop the knowledge that has been held.

Initial studies in high school who were in Medan, the process of classroom teaching has not been able to develop science process skills (SPS) students. Its main activity is rarely done because the laboratory equipment is damaged and incomplete. So we need an improvement in the learning domain. A learning model that is believed to increase student SPS is a model of inquiry training (Joyce et. al., 2009). Model inquiry training aims to develop the intellectual skills of students through their curiosity in asking questions and finding answers.

Previous research stating that the inquiry model of training can improve learners SPS is Derlina and Nasution (2016) states that: (1) The science process skills of students that learned by inquiry learning model training using visual media that learned better than conventionally; (2) The science process skills of students who have high creativity better than students with low creativity; and (3)
there is interaction between inquiry learning model training and conventional learning with students' creativity in improving students' science process skills. Muliati, S. and Bukit, N. (2016) states that the inquiry training learning model better than conventional learning in enhancing students' science process skills. Siagian, HE et al. (2016) states that the inquiry training learning model using Macromedia Flash better than conventional learning in enhancing students' science process skills, science process skills on a group of students who have high creative thinking ability is better than a group of students with creative thinking ability is low, and there is interaction between inquiry training learning model using Macromedia Flash with the ability to think creatively to influence students' science process skills. Hutapea and Motlan (2012) states that: 1) the science process skills students are taught using a model of inquiry training better than science process skills of students using the model of direct instruction, 2) science process skills of students with critical thinking skills high is better than skill the process of science students with the ability to think critically low, and 3) there is an interaction between inquiry training learning model and the ability to think critically about the science process skills of students. Damanik, DP and Bukit, N. (2013) states that: (1) critical thinking skills of students that learned using the Training Inquiry learning model is better than the Direct instruction. (2) critical thinking skills in students of high scientific attitude better than the ability to think critically on a low scientific attitude. (3) There is no interaction between learning models and Direct Inquiry Training Introduction with a scientific attitude of students to improve students' critical thinking skills. Silitonga, P. et al. (2016) states that: 1) students that learned by the learning model inquiry training has science process skills are better than the students that learned with conventional learning models, 2) science process skills of students with high creativity better than students with creativity is low, 3) there is an interaction between the learning model training inquiry and creativity in influencing students' science process skills. Azizah and Parmin (2012), states that based questionnaire student attitudes toward the kind of action is chosen, that there is a 6 statement that is directly related to training inquiry more than 85% of students to be positive, which means helping students master the skills to do the research. Remziye, et al (2011) reported results showed that the use of inquiry teaching methods significantly improve the attitudes and skills of students' science process skills effect on students' science process, this is due to the learning process of inquiry some measures can foster the process skills.

2. Research Methods
The location of this research is at SMA Al Fityan Medan. The whole class XI SMA Al Fityan Terrain year 2019/2020 Study is a population in this study. cluster random sampling is a technique used in this study. The design of this research is Two group pretest-posttest design and methods used a quasi-experimental. The observation sheet is instrumental in this research. Data collected from the test scores of SPS. This data is collected in every learning process. Test data were analyzed using inferential statistics.

3. RESULTS AND DISCUSSION
Science process skills (SPS) value of each indicator is as follows:

| SPS Indicators | value pretest | value posttest | Enhancement |
|----------------|---------------|----------------|-------------|
| Observation    | 43.33         | 51.11          | 8           |
| Classification | 57.78         | 73.33          | 16          |
| Predicting     | 51.11         | 71.11          | 20          |
| Measure        | 53.33         | 76.67          | 23          |
| communicate    | 56.67         | 78.89          | 22          |
| Conclude       | 44.44         | 55.56          | 11          |
Table 1 shows that the enhancement The highest is the indicator measure that is equal to 23 and enhancement is the lowest on indicators of observation, which is equal to 8.

Graph increase in each SPS indicator control experimental class as follows:

![Graph showing increase in each SPS indicator](image)

Figure 1. Increased Each SPS indicator

The learning process is currently conducted research before, many students do not pay attention to the teacher's explanation. Many students talk with friends, conducting themselves incompatible with lessons delivered to teachers. Even students who read books that are not the subjects being studied. Teachers only use methods lectures, discussions, and exercises. Teachers lacking using a variety of methods. Teachers rarely do lab work, because the tools that exist in the laboratory are not complete and many were damaged.

When applying the model training inquiry for the first time, researchers have a lot of obstacles. The obstacles facing researchers, among others: students do not understand the phases of the inquiry model of training, it took a long time to explain the rules in the learning process and the time was not as planned.

The learning process by applying inquiry training learning model is done with syntax is as follows: Phase 1 presents a problem, in this phase, the teacher presents a problem and explain the procedure of inquiry. The problem presented is a problem puzzle that encourages students to find out for yourself. The problem as opposed to the previous student understanding. Phase 2 collect and verify the data, in this phase, the students collect information and data on the issue, students are expected to find the nature of the object and find the cause of a problem. teachers do question and answer to the students to verify the data. The teacher directs students to find information about the concepts that they experience by asking questions that can only be answered with “yes” or “no”. Phase 3 experiments, In this phase, students conduct experiments or lab, collect data to find answers to the problems previously encountered. Phase 4 organizing data, formulate and explain, in this phase, the students were asked to present the results of the lab they get to the other students. Teachers only pay attention to the students in linking the data so that it can be explained. Phase 5 analyzes the proceedings, in this phase the students are asked to analyze the inquiry process, discussing, reviewing the questions of effective and less effective, appropriate information and are not in accordance with the hypothesis, analyze the weaknesses of the experiments and to compare the results of experiments with another group of experimental results.

Students' science process skills can be improved through the phases of inquiry training learning models for students are directed to work with the scientific method, making observations, formulating hypotheses, take measurements and draw conclusions. Hypotheses obtained from the questions that the students ask the teacher. In the formulation of hypotheses, students can associate the detection of new knowledge through a process of assimilation and accommodation with the knowledge that he already has, so that the students themselves who construct knowledge to form formulation of a concept in itself.
The experiential learning phase can collect data to test the hypothesis that the charge is done through experimentation. At this stage of the experiment the students trained in performing activities in the form of a discussion process skills, inquiry, observation, investigating the facts, examine the phenomenon of physics, the phenomenon or problem to make general conclusions. According to Muliati, S., and Bukit, N. (2016) states that the inquiry training learning model better than conventional learning in enhancing students' science process skills.

Learning physics assists students in acquiring the knowledge, skills, and attitudes. Kurniati (2001) revealed that the Science Process Skills approach is an approach that allows the students to find the facts, build concepts, through activities or experiences as scientists are. According to Dahar (1996), Science Process Skills (SPS) is the student's ability to apply scientific methods to understand, develop and discover science. According to Joyce (2009) says that the Inquiry Training will enhance the understanding of science, productivity in logical thinking, and skills in obtaining and analyzing information.

Figure 1 shows that the increase in the value of the SPS through the model of training is a very significant inquiry. This is because the inquiry model of training effect on the SPS students through each of the phases of learning. In the first phase, the teacher presents a problem often encountered by the material taught. In this phase, students are required to understand the problems being experienced and understand the work steps in the laboratory to solve problems as a group. In the second phase, teachers guided students to gather information from experiments on worksheets. In this phase, students are required to cooperate in conducting all these activities, resulting from these activities will make a special experience on the student. In the third phase, teachers guide students to experiment, organize the data and observe the change and lead students to want to ask. In this phase, students are required to understand the questions that are appropriate to experiment properly. In the fourth phase, teachers guide students to the arrangement of the data, explanations and make conclusions. In the fifth phase or the last phase, the students led teachers to analyze the processes of inquiry that has been done. Each phase through which students can improve their science process skills by trial experience gone through. This is in line with the statement Remziye, et al (2011) that the results showed that the use of inquiry teaching methods significantly improve the attitude and science process skills of students affect the students' science process skills.

4. Conclusion

Based on the above, it can be concluded that the science process skills that students can improve the inquiry training learning model through its phases.

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