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Analysis of Science Process Skills Improved From Student Activities Through Inquiry Training Learning Model

Halimatus Sadyah Siregar[1], Satria Mihardi[2]
[12]Jurusan Fisika, FMIPA, Universitas Negeri medan
halimasiregar1405@gamil.com; mihardi@unimed.ac.id

ABSTRACT

Science skills are skills that students need when they are investigating. These skills are needed by students in the process of inquiry to solve problems from a natural phenomenon that is around them. general reality many of the skills of students who tend to be passive and low. The low scientific skills of students because the learning process does not involve practicum. Therefore, this study aims to find out. Improved science skills in terms of high school student activities through inquiry training learning models. This type of research is descriptive. The instrument of this study was the activity evaluation observation sheet. Each student observation sheet consists of five indicators. The indicator is confronting the problem, verifying data, experimenting, processing data and inquiry analysis. The results showed that skills based on assessment of activity indicators increased at each meeting.

Keywords: Inquiry training, Science Skill, Activities

INTRODUCTION

Education is demanded to prioritize meaningful learning processes. The meaningful learning process can also be interpreted as a process of interaction between students and teachers through learning resources that occur within the learning environment. (Ministry of National Education, 2013). The involvement of students in the learning process is very important especially to construct knowledge, investigate problems, process and find solutions to solve them (Permendiknas, 2006), one of which is learning science, especially in learning physics, students are required to be able to understand and have process skills in implementing it.

Science process skills are the ability of students to apply scientific methods in understanding, developing and discovering knowledge (Ratna Willis Dahar, 1985). Basically, science process skills are the skills and techniques used by scientists in a laboratory to obtain information through the activities they carry out. Science process skills are also called "lifelong learning skills" (Carin & Sun, 1989) SPS consists of certain skills, including observing, grouping / classifying, interpreting, predicting, formulating hypotheses, planning experiments, using tools and materials, applying concepts asking questions and communicating. Science process skills need to be developed in students because they have several important benefits in learning science. Dimyati and Mudjiono, (2002) explained that the benefits of science process skills are: first, students' knowledge can develop with a process skills approach. Second, learning through process skills will provide opportunities for students to work with science. Third, process skills can be used by students to learn processes and products of science. In addition, science process

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skills can develop the required value attitude, so students will be active in the learning process.

The activeness or activity of students in learning can change their personal experience with real experience and the addition of information during the learning activities. Activity is one of the important factors in the principle of learning, ideally learning activities are not only focused on efforts to gain knowledge but also how to use knowledge to deal with problem solving based on the field of study studied (Wena, 2011). From the viewpoint of modern psychology learning does not merely memorize facts but requires intellectual-emotional involvement through assimilation of knowledge, actions, and direct experience in order to improve skills and internalize values in the formation of attitudes (Sanjaya, 2010).

The preliminary survey results at the State High School in Medan were obtained information that the results of students' scientific skills were still low due to several factors, namely from the instructor, students, and facilities and infrastructure. Based on the observation sheet given by researchers to students, 42.5% (17 people) said physics lessons were difficult, 50% (20 people) said physics lessons were normal, and 7.5% (3 people) said physics lessons were boring.

The low learning activity of students is largely influenced by the learning approach used. To increase activities and science skills required learning strategies that use a variety of approaches. Research Cheng (2004) published in the Merlot Journal states that the chosen learning method will determine the learning outcomes achieved. The selection of learning strategies that are used entirely left to the teacher is adjusted to the conditions of the school learning process applied by the teacher tends to be less meaningful and monotonous because students only listen to the teacher's explanation and are not actively involved to explore knowledge and skills. Teacher-centered learning makes students tend to be passive, so difficult teachers condition learning that students should be more active, because students are only able to master limited material delivered by the teacher, practicum activities undertaken by students during learning are also not fully implemented optimally. Students often lack the ability to visualize and interpret abstract physical concepts in meaningful ways (Balta, 2015). Students need to be involved to be more active during the learning process, so that in overcoming problems, students must be trained to conduct experiments. The experiments were carried out in addition to aiming to train students in finding and understanding concepts, also aimed at forming skills in conducting active learning activities. The inquiry training model offers learning integrated with inquiry activities, scientific knowledge, openness, cooperative enthusiasm in developing various skills and applying it that allows students to gain a deeper understanding of the material being taught. Joyce & Weil (2009) inquiry training learning model tries to teach students about the process of researching and explaining foreign phenomena, this model tries to teach students several languages and scientific skills.

The inquiry training model has five learning stages: (1) exposes the problem; (2) formulating a hypothesis; (3) collecting experimental data; (4) process and formulate data; (5) analyzing the research process. The inquiry training learning model emphasizes the critical thinking process and analysis to find the

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answers to problems by themselves (Sirait, 2012). This is proven by research by Ningsih & Siregar (2016) that the inquiry training model is a learning model for developing students' scientific knowledge, skills, activities and attitudes. According to Khalid & Azzem (2012) states the inquiry training learning model provided by teachers can help student learning activities where students are active, skilled at formulating and testing their ideas, drawing conclusions, and conveying their knowledge. Some of the results of research on the success of improving students 'science process skills were also carried out by Abdul & Aisyah (2016), suggesting that the development of students' science process skills using practicum-based learning is better than using conventional learning. Elisa (2018), said there is a relationship between student learning activities and science process skills, where this model is better than conventional learning.

METHODS

This type of research is a descriptive study that aims to find out the improvement of science skills in terms of student activities through inquiry training learning models. The instrument used in this study was an observation sheet for the assessment of science process skills activity activities consisting of five indicators at each meeting given to 36 students. Stages of conducting research: (1) exposes the problem; (2) collecting verification data; (3) collecting experimental data; (4) process data-formulate an explanation; and (5) inquiry analysis. Analysis of student data on each observation sheet uses the average value and scoring indicators for each meeting.

RESULT & DISCUSSION

The data obtained in the results of this study are the data of science process skill activities of high school students using inquiry training learning models on each observation sheet at each meeting. There are five assessment indicators for SPS activity. The recapitulation of the results of the activity assessment is shown in table 1.

Table 1. Recapitulation of Average SPS Activity Assessment Results

Average Value Acquisition	Oriented Problem	Verification	Experiment	Processing data	Inquiry analysis
	64.42	66.35	74.38	62.34	62.65

SPS Activities in Table 1. shows that on the observation sheet each meeting per student activity indicator obtained an average value of 64.42 on the indicator confronting the problem, an average value of 66.35 on the data verification indicator, an average value of 74.38 on the Experiment indicator, 62.34 on the data processing indicator, and an average value of 62.65 on the inquiry analysis indicator Of the five indicators, the lowest value is found in processing the data and the highest value is on the experimental indicator. Then analyze the data from the observation sheet the average value of SPS activity of students on each indicator, as Table 2.

In the assessment contained in Table 2. Shows that the acquisition of value presents a problem at meeting I of 48.14 and the value of working together at 45.37, this is because students are not accustomed to learning how learning confronts the

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problem then verifies the problem, experiment / practical , processing data, and how to analyze inquiry in the classroom. However, at the next meeting students began to get used to it. Thus, the learning process is more interesting and students are active in class.

Table 2. Analysis of Student Activity Evaluation

Rated aspect	Meeting I	Meeting II	Meeting III
Oriented Problems	48.14	61.80	83.33
Verification	45.37	67.59	86.11
Experiment	60.18	71.29	91.67
Processing data	53.70	60.18	73.14
Inquiry analysis	51.85	63.89	72.22

Based on the acquisition of SPS student activity in figure 2. Shows a diagram of the acquisition of the average value of student activity in each meeting for each indicator. The results of the acquisition of the average value of scientific attitudes obtained from the results of the process of students pay attention to the teacher's explanation of delivering teaching materials, when the teacher describes the experimental procedure before carrying out the practicum, students carry out the practicum, when delivering the results of the practicum through presentations through the question and answer process. At the first meeting students were still not active in the learning process with the inquiry model, so the score obtained was 48.18 in the indicator confronting the problem was in the unfavorable category, 45.37 in the verification indicator was in the unfavorable category, 60.18 in the experimental indicators. in the good enough category, 53.7 in the data processing indicator is in the good enough category, and 51.85 in the inquiry analysis indicator is in the good enough category. At the second meeting students began to be interested in participating in the learning process so as to obtain a score of 61.8 in the problem-facing indicator, 67.59 in the data verification indicator, 71.29 in the experimental indicator, 60.18 in the data processing indicator and 63.89 in the inquiry analysis indicator , each indicator is in good category. at the third meeting students are accustomed to learning by practicum, presentation and question and answer in class, so that the score obtained on the observation sheet of the third meeting has increased on each indicator. Obtained a score of 83.33 on the indicator confronting the problem based on the excellent category where students are getting used to formulating and writing hypotheses based on the problems faced in the student worksheet. a score of 86.11 on the data verification indicator is in the very good category seen from students who have begun to understand collecting data by giving questions to the teacher as information material for conducting practical work on student worksheets. a score of 91.67 on the experimental indicators is in the very good category in terms of students already starting to understand the experimental procedures and collecting data on student worksheets. score 73.14 in the data processing indicator and 72.22 in the inquiry analysis indicator obtained an increase but still in the active category. Because students still need direction from the teacher The following are the SPS assessment criteria for the activity observation sheet instrument.

Indicators of student SPS activity scores increase at each meeting. This is in line with research. According to Ariani et.al., (2015) states that SPS is accustomed to

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be trained continuously in learning activities, then SPS will be formed and developed in students. then continued by Damopoli, Hasan & Kandowangko (2015), that science process skills are needed when a student is conducting an experiment in a practicum. By applying the inquiry training learning model, students can work together with other students to be able to conduct an investigation. SPS students become better when taught using inquiry-based learning. The science process skills of each indicator are in different categories ranging from sufficient to very good categories. In line with Demirbas & Tanrivendi's (2012) research, on the level of science process skills of students at seven different universities, the results show that students have different levels of process skills. Siddiqui (2013) in the journal "Inquiry Training Model of Teaching: A Search of Learning" states that the inquiry model can make students active and autonomous, develop logical thinking, develop tolerance for ambiguity and perseverance, promote inquiry strategies, values and attitudes that are needed to ask questions, think, improve process skills such as observing, collecting and organizing data. In addition, according to Germally, Buchmann, Hallar & Armstrong, (2009) stated that the inquiry training learning model is a learning model that is designed as a learning activity based on student activity, students 'science process skills and improving students' research abilities. Erqul, Caklis Ozalitek, Gocmancelebi & sanli (2011) stated that the use of inquiry based teaching models is good so that it can improve science process skills and student attitudes.

According to Sirait, Bukit & Sirait (2016), said that through experimental activities students can try various ways to complete the experiments carried out so that they can develop their thinking skills by exposing students to scientific activities (experiments). Students are trained to be skilled in obtaining and processing information through thinking activities by following scientific procedures (methods), such as skilled in observing, measuring, classifying, drawing conclusions and communicating the findings. Ningsih and Siregar (2016) stated that the science process skills of students in the experimental class with inquiry training models were better than the science process skills in the control class with conventional learning. According to Aminah and Derlina (2015) in their research also stated the science process skills of students who are taught with Inquiry Training learning models are better than students who are taught with conventional learning. Cahyani & Hendriani (2017), said that inquiry learning encourages many students to carry out various scientific inquiry activities. Furthermore, the results of Siregar & Ritonga's research (2017) state that the application of contextual approaches used in learning can improve student learning activities and outcomes. Zarisa & Saminan (2017), that the average score of creativity obtained by students at each meeting increases and is included in a good category.

Thus, the inquiry training learning model is expected to be able to make the learning process active and attract students 'interests, so that student activities can improve students' science process skills. Increasing the indicator score makes the SPS activity of students better at each meeting. So the inquiry tarining model is proven to be able to improve SPS of students in the class.

CONCLUSION

Student activities can improve students' science process skills by using the inquiry training learning model. science process skills activities consisting of five indicators,

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namely confronting problems, verifying data, experimenting, processing data, and inquiry analysis have an average acquisition of 66.29 including the active category.

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