

Effect Model Inquiry Training on Student's Science Process Skill

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Abstract

The aims of this study to analyze the science process skills that students are taught by inquiry training model better than students who use conventional learning. The research method is a quasi-experimental design with non-equivalent pretest-posttest Groups Experimental Design. Experimental class with inquiry learning model training and control class with direct learning model of instruction. The instrument used was a test of skill for science process skills. Data was analyzed using one way ANOVA. The results showed that science process skills that students are taught by inquiry training model better than students who use conventional learning. Inquiry learning in the classroom with Inquiry Training which requires the active involvement of the students can improve learning achievement and attitudes of children to lessons, especially the ability of understanding and communication students. Learning process with Inquiry Training Model able to create the basics of scientific thinking on students, so in this learning process students are learning themselves, develop creativity in solving problems and improving science process skills. Students actually placed as the subject of learning, the role of teachers in teaching with inquiry training is as mentors and facilitators.

Keywords: inquiry training, science process skills

INTRODUCTION

Education has a very important role in generating fully human resources both as individuals and as a society. In order to improve education in Indonesia learning activities at school is an activity that should be improved so as to achieve the goal of changing behaviors, knowledge, and skills in self-learners. Educators have an important role to improve the quality of the learning process of students. In conducting the study, teacher educators as well as mastering the material, of course, need to understand the model and choose the right model to deliver the subject matter and how the characteristics of learners who receive the subject matter. Heywood, D. & Parker, J. (2010) said the failure of educators to give lessons not only because of lack of mastering the material, but because of the use of learning and teaching methods are not appropriate. Therefore, one of the efforts that must be made to improve the student learning outcomes is through the use of learning and teaching methods appropriate to the subject matter being taught, so students can learn with a nice atmosphere.

In educational experiences, pedagogical elements also help the learners avoid developing superstitious behavior, such as believing they are influencing something by a particular action when they are really not (Aldrich, C., 2005). Educating is helping learners with full awareness, both with the tools or not, in their obligations to develop and grow yourself to improve as well their role as individuals, members of the community, and the people of God. Pidarta, M. (2007) is an effort to educate creates a situation in which students can learn and want to push yourself to develop your talents, and personal potential more optimally in a positive direction.

Teachers do not engage students so that students are less active. Learning often takes place in one direction and centered on teachers without involving students. Due to lack of active participation of students, the students feel less involved in education, not creative, and do not have the skills. Teachers also tend to teach students to memorize theories, laws, postulates, and formulas that accentuate the shape of the concept of mathematical equations that must be applied. As a result, students have difficulty in solving problems related to physics skills to the students was low. (Rauf, R. A. A., Rasul, M. S., Mansor, A. N., Othman, Z. & Lyndon, N., 2013) revealed science process skills need to be realized by teachers that it is important in the learning of science and it serve as a scaffold to other cognitive skills such as logical thinking, reasoning and problem solving skills.

Science process skills of students is low in the learning process of learning physics applied due to still use the lecture method is varied with informed discussion, in addition to the low level of ability of teachers are able to raise the motivation for the students to follow the learning process. Teachers lacking guide students to be able to formulate and discuss a question that could encourage the emergence of students' curiosity. Teachers tend to not provide encouragement that the students are able to think critically in porses learning, so that students do not have good science process skills. Science process skills of the students is very important because these skills make students able to work and ready to face all problems, especially problems in physics. Learning science brings a change in character and give the opportunity for more creative thinking and imagination of the students were able to compile (Kumari, U. N. & Rao, D. B. 2008).

Karamustafaoğlu, S. (2011) state that Science process skills are crucial for meaningful learning; Because the learning continues throughout life, and individuals need to find, interpret, and judge evidences under different conditions they encounter. Learning physics experiments using a modest course regardless of the performance of each student carefully to make the most students tend to play alone and less followed the experiment well, so there are still students are not monitored and inactive. Exclusion from the majority of students in learning makes students less in developing science process skills. It will be increasingly difficult for students when they are required to develop science process skills of students while they do not get used to train the skill to experiment or inquiry. Kazempour, E. (2013) stated will be a balance between content and education process if: the priority between content and education process is kept, both of them can be taught in the class even briefly. Based on consideration of these issues, efforts to improve the physical science process skills is by means creating a learning effective, efficient, and creative. Heywood, D. & Parker, J.(2010) stated the teacher not only requires the ability of science but also the ability to carry out the development of appropriate learning to support learning.

Based on the above, there are other things that are needed to make the students be more active, namely science process skills. Siddiqui, M. H. (2013) stated Inquiry Traringing model to

teach learners a process how to investigate and explain unusual phenomena. Upadhyaya, A. K. & Upadhyaya, A. K., (2015) revealed Inquiry Training Model is more effective than the Traditional Teaching Method in developing the Scientific Aptitude for the students of High & Low Intelligence. Base on this research Inquiry Training model can improve the science process skills of students in the class.

METHOD

This research will be conducted in Class XI SMK in Medan. The research method is a quasi-experimental design with non-equivalent pretest-posttest Groups Experimental Design. Experimental class with inquiry learning model training and control class with direct learning model of instruction, such as research design in Table 1.

Tabel 1. Research Design

Sample	Pre-Test	Treatment	Post-Test
Experiment Class	P ₁	X ₁	P ₂
Control Class	P ₁	X ₂	P ₂

From McMillan Schumacher, 2001.

- P₁ = Pre-Test
- P₂ = Post-Test
- X₁ = treatment by *inquiry training model*
- X₂ = treatment by *conventional model*

The data obtained in this study is data on science process skills on the topic of electric current measured by testing the science process skills of each student. Data collector taken with the observation sheet and test data analysis one way Anova F test.

RESULTS

Inquiry training has five phases. The first phase is the student's confrontation with the puzzling situation. Phases two and three are the data-gathering operations of verification and experimentation. In these two phases, students ask a series of questions to which the teacher replies yes or no and they conduct a series of experiments on the environment of the problem situation. In the fourth phase, students organize the information they obtained during the data gathering and try to explain the discrepancy. Finally, in phase five, students analyze the problem-solving strategies they used during the inquiry (Joyce, B & Weil, M. 2003).

Inquiry learning model application in the experimental class began to form a group of students into four groups with each group consisting of 7 students. Then the teacher gave a demonstration which makes students confused and interested about the dynamic electrical material. It aims to develop students' critical thinking skills by asking students about the fishing demonstrations by the teacher. A series of questions posed by students can only be addressed teachers with yes or no answer. By the questions they submit, then instructed to perform lab to test the hypothesis that they have made to develop students' science process skills.

Experiments conducted by the student aims to train students' science process skills. Students do experiments by following a student worksheet that has been given. After data collection and processing is completed, students are asked to verify the results of their experiments and make

a conclusion on each experiment they do. After each group presents the results of their discussion, the researchers then gave explanations and draw conclusions.

Test results of one-way ANOVA science process skills gained from the study are shown in Table 2.

Tabel 2.Result of One way ANOVA students' science process skills ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1275,586	1	1275,586	19,598	,000
Within Groups	3644,828	56	65,086		
Total	4920,414	57			

Based on the table 2 can be seen there is an increase of skill the process of science the student with use the inquiry training model on class experiment there has been increasing in science process skills than student use a conventional learning model.

In the calculation results obtained output SPSS 22.0 statistical test result data science process skills of students using the inquiry training model and science process skills using conventional learning. To model gained significant learning of $0.000 < 0.005$, it can be said that the test results reject H_0 or accept H_a in alpha level of 0.05. It can be concluded that the science process skills of students by inquiry training learning model is higher than on conventional learning. In other words, science process skills of students by inquiry training learning model is better than conventional learning.

DISCUSSION

From the tabel 2 was shown the differences of science process skills by inquiry training learning model is higher than on conventional learning. Consistent with previous research, Pandey, A., Nanda, G. K. & Ranjan, V. (2011) revealed teaching of physical science through Inquiry Training Model is more effective than the teaching through the Conventional Method and Vaishnav, R.S. (2013) revealed a statistical significant effect of Inquiry Training Model over traditional teaching method on academic achievement of students. Akpullukcu, S. & Gunay, F. Yasemin. (2011) revealed the learning environment in which inquiry-based learning methods are applied in science and technology courses is an effective way of raising the academic success.

Schlenker (Joyce, B & Weil, M. 2003) said that the practice of research will improve understanding of science, productivity in creative thinking, and skills in obtaining and analyzing information. Then the students' science process skills can be improved with the Inquiry Training model.

Inquiry learning in the classroom with Inquiry Training which requires the active involvement of the students can improve learning achievement and attitudes of children to lessons, especially the ability of understanding and communication students. Learning process with Inquiry Training Model able to create the basics of scientific thinking on students, so in this

learning process students are learning themselves, develop creativity in solving problems and improving science process skills. Students actually placed as the subject of learning, the role of teachers in teaching with inquiry training is as mentors and facilitators. Based on the research results and the discussion can be concluded student's science process skills using inquiry learning model training is better than conventional learning model. It proved by results of testing that given to the students in inquiry training model are better than students in conventional learning model.

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