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The Influence of Assistance of Helped Guided Inquiry Methods Tutorial Video Practicum on the Process of Student Science Skills

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Abstract

Interesting learning methods and media can support the learning process being fun and improve students' skills. This study aims to determine the effect of guided inquiry methods assisted by video practicum tutorials on science process skills, cooperative skills and student responses. The study was conducted in Jepara Middle School 5 2018/2019 school year. The population of the study was 9th grade students. Determination of the sample with a cluster random sampling system so that two classes are obtained to be sampled. The experimental class received treatment using guided inquiry methods assisted by practical tutorial video and control classes using guided inquiry methods. Hypothesis testing using t-test. Based on the results of the analysis, it was found that: (1) There were differences results of significant scientific process skills between guided inquiry learning assisted by video practicum tutorials compared to guided inquiry learning; (2) The results of collaboration skills observation between guided inquiry learning assisted by practical video tutorials are better than guided inquiry learning; (3) Students show a very good respond (average score of all students 115). By using interesting and fun learning media, it can make students be motivated and interested in learning.

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INTRODUCTION

Learning becomes more meaningful when student study directly what they have learned. They touch, feel, measure, manipulate, draw, graph, record and find all the answers for themselves not just to answer questions in the textbooks (Ateş & Erylmaz, 2011: 2; Kurniawati et al., 2014: 37) This statement is in line with the thinking of Tissi et al. (2015: 112) and Erlina & Supriyono (2014: 132) that learning, especially science subjects, requires students to interact directly with learning resources. Students are not only given theoretical material in class, but also should be invited to do learning directly in the laboratory.

Rante et al. (2013: 204), Dowsbowska et al. (2013: 48), Kurniadi (2011: 18), Mursalin (2013: 1), and Wilujeng & Mulyaningsih (2013: 56) stated that the electrical material in junior high school is one of abstract concepts such as field, current and charge. So that in the curriculum content wants to be taught through practicum activities. Through practicum activities, students can improve their science process skills verbally and in writing so that students can become more active in learning (Ilmi et al., 2012: 45 and Rahmawati et al., 2014: 41). While one of the computer-based media that is suitable for electricity learning is the use of multimedia interactive learning with videos containing real people and equipment.

Since the 2006 curriculum applies, new subjects appear for junior high school students, namely integrated Science. With these changes, Science is taught more thoroughly and interrelated with each other. So that teachers who have a background in Biology Education must be able to explain about Physics material so that them. It is also one of the reasons why some teachers rarely do the Physics Science practicum in the science laboratory. Therefore, in practice, the Integrated Science learning still faces many obstacles and requires an interactive multimedia that can help teachers in delivering material in the laboratory.

Reagan (2012: 42) and Tissi et al. (2015: 123) states that multimedia which contains practical instructions and practical examples provides benefits for students to prepare, understand, and conduct experiments in the laboratory. Learning with interactive multimedia makes learning more fun, interesting, interactive and eliminate boredom so that learning goals can be achieved.

The progress of science and technology knowledge and the sophistication of information and communication technology are something that needs to be grateful for and utilized by our education today. The use of the web has increased rapidly in education and has become an important source of learning and teaching (Martindale et al., 2008: 101). By using interactive web usage and multimedia deployment that contains practicum video tutorials, it is expected to be easier.

Based on the background above, the objectives in this study are: (1) To find out the improvement of science process skills in science learning with guided inquiry methods assisted by practicum tutorial video compared to guided inquiry; (2) To find out the differences in students' cooperative skills with guided inquiry assisted by practical video tutorials compared to guided inquiry; (3) To find out students' responses during electrical circuit learning with guided inquiry assisted by practical video tutorials.

By using multimedia interactive learning is expected to give a real illustration of the electrical circuit practicum. So that students will be motivated and interested in participating in learning which is expected to improve students' science process skills.

METHODS

The type of research used is quasi-experimental research (Quasi Experiment) with the Pre-test-Post-test Control Group Design technique using two classes. The first class is an experimental class and the second class is the control class. To obtain data in both classes, the initial test (pre-test) and final test (post-test) were given. The difference between the two classes is the treatment in the learning process, where the experimental learning class with guided inquiry is assisted by practical video tutorials while the control group with guided inquiry.

The population in this study were all grade IX students of 5th Junior High School Jepara in 2018 to 2019 school year. The population was homogeneous so the class to be used as research class are determined randomly (cluster random sampling).

There is one independent variable and three dependent variables in this study. As an independent variable is learning science with guided inquiry assisted by video tutorials. The dependent variable is student science process skills, student collaboration skills and student responses.

Science process skills are assessed through a description test. The trial of the evaluation sheet of the science process skills test was conducted on the 9th grade students of 5th Junior High School in 2017 to 2018 as many as 20 students who had obtained electrical circuit material. This trial was conducted to obtain data on items that have been tested for validity and reliability. Final stage of the analysis was conducted after the post-test. The difference in the results of the post-test with the pre-test was carried out an comparative test using SPSS 24. The final test of efficacy of the science process using normalized test (N-Gain).

Students' collaboration skills are seen from the attitude observation data of cooperation in two meetings. Observational data on cooperative skills were analyzed quantitatively descriptive which aimed to find out the students' cooperative skills during the learning process.

Data analysis techniques for student response questionnaires using a Likert scale. The questionnaire's maximum score is 130, the questionnaire minimum score is 26, the assessment category is 5, and the value range is 20.

RESULTS AND DISCUSSION

The teaching media used in the form of video tutorials are packaged in the form of physics websites that contain several menus such as: tutorial videos, material, daily events and quizzes. Media validation was carried out by two experts, the first was a media expert, the other was the expert in the field of natural sciences. The website used as a learning media can accessed at www.kitadanfisika.com . Website screenshot can be seen in Figure 1 and a screenshot of the tutorial video in Figure 2.

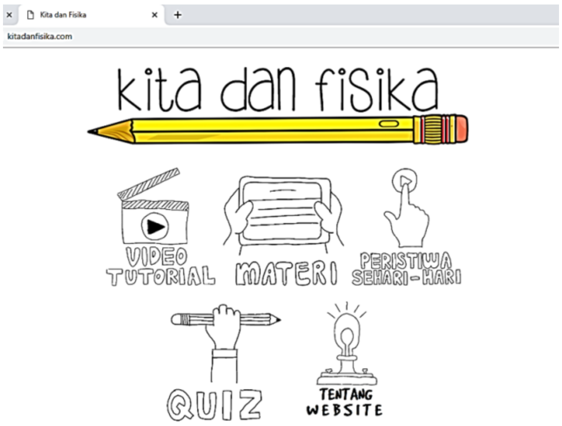

Figure 1. Screenshot of Website Home

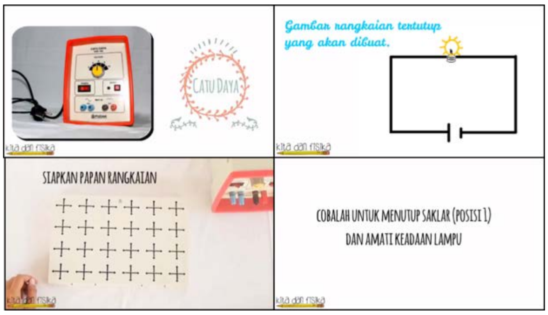

Figure 2. Screenshot of Practicum Tutorial Videos

The science process skills that are tested are tailored to the science process skills that are developed when carrying out the learning and planned in the learning method. The aspects of the science process skills developed at the time of learning only cover four aspects of process skills including: interpreting, communicating, applying concepts, and planning research. The reason for choosing aspects of science process skills only covers the four aspects above because the four aspects are in accordance with the concept being taught.

Final test of the science process using the normalized t-test (N-Gain) to analyze the pre-test and post-test score (Hake, 1998: 65).

$$\langle g \rangle = \frac{\text{posttest score} - \text{pretest score}}{\text{maximal score} - \text{pretest score}}$$

With the N-Gain level criteria:
$\langle g \rangle < 0{,}3$ = low
$0{,}7 > \langle g \rangle \geq 0{,}3$ = medium
$\langle g \rangle \geq 0{,}7$ = high

The data obtained from the pre-test and post-test scores of the process skills can be seen in Table 1.

Table 1. Acquisition of Pre-Test Values and Post-Test Science Process Skills

Class	Average of Pre-Test Score	Average or Post -Test Score	N-Gain
Experiment	44,66	73,78	0,53
Control	46,06	62,77	0,31

Before testing the average difference between the experimental class and the control class, the normality test and homogeneity test were first carried out. The results of the normality test are shown in Table 2.

Table 2. Test the Normality of Science Process Skills

Class	Statistics	Df	Sig.
Experiment	0.152	32	0,058
Control	0.148	32	0.072

Based on data in Table 2 experimental class normality test results and grade control sig. greater than 0,05, so it can be concluded that the sample data taken is normally distributed.

From the results of the homogeneity test on the pre-test value and the post-test value of the control class and experimental class the science process skills obtained a value of 0,610 greater than 0,05, so it can be concluded that the sample data taken is homogeneous.

Furthermore, the data value of the pre-test and post-test science process skills is analyzed by paired sample t-test the average difference in learning outcomes of pre-test and post-test. Then independent sample t-test to determine the difference in the average learning outcomes of the experimental group and the control class. Allegations of an increase in science process skills are as follows: Ho is no difference in science process skills for students between before and after learning, and H1 is there are differences in science process skills among students between before and after learning. The assessment criteria are set as follows: Ho rejected if the Sig. (2-tailed) less than 0,05 and Ho accepted if the value of Sig. (2-tailed) more than 0.05.

Based on the results of the paired sample t-test the value of Sig. (2-tailed) pair 1 or pair 2 of 0,000 less than 0,05 . From these data it can be concluded that there is an average difference between the pre-test and post-test values in the experimental class and the control class. Whereas based on independent test sample t-test obtained the value of Sig. (2-tailed) of 0,11 less than 0.05. So it can be concluded that there are significant differences in science process skills before and after the implementation of learning between the experimental class and the control class.

Science process skills are a skill so students are accustomed to finding problems, finding information about the problem, making hypotheses and then drawing conclusions. To measure science process skills students use evaluation (tests). Rustaman (1992) said that process skills can be measured in various ways, including practical tests, written tests, and oral tests. Process skills can also be evaluated part by part according to the type of process skills, can also involve all process skills in an integrated manner.

Students' science process skills are assessed from written test answers. From the analysis of aspects of the science process skills, it was found that the most aspects of the science process skills developed in this learning model were planning experiments and communicating. This is in line with the research of Kholifudin (2012: 148), Getty (2009) and Laubach et al. (2010) by conducting experiments students can learn physics well and have a long-term impact on mastering physics concepts because students gain hands-on experience.

The results of the study stated that the hypothesis was accepted that there were differences in the results of the scientific process skills test between the experimental group and the control group. This means that the higher the involvement of students in practicum activities, the higher the achievement of understanding and science process skills. This statement was also stated by Widayanto (2009: 5) in his research. In addition to using guided inquiry methods, the experimental group also uses the help of tutorial videos that are packaged in web form in every experiment that students do. In line with Jaya's thoughts (2012: 84) learning with the web makes learning more interesting because it contains images, and graphics with clear colors, as well as videos that encourage students to learn physics to be more fun and independent.

Collaborative skills a student obtained under observation sheets observations during the learning process. Collaborative skills observed included five indicators, namely giving opinions in group discussions, accepting the opinions of other friends, helping friends who experienced difficulties, dividing assignments and carrying out tasks in groups well and completing group assignments on time. The results of observation of the students' skills in the control class and the experimental class are categorized as Figure 3 and Figure 4.

Figure 3 shows the category of student cooperation skills during two observations. The first meeting of the class control skills was 19 good enough students, and 13 good students. In the observation of the second day of the class, the control skills of the 7 students were good enough, 24 students were good, and 1 student was very good. Whereas in the experimental class, cooperative skills during the first observation were 27 good students and 5 very good students. In the observation of both experimental class cooperation skills 20 good students and 12 excellent students.

Student cooperative skills are obtained based on observations during two meetings. In this study students were assessed on their cooperative skills based on the assessment grids contained in the observation sheet. The cooperative skills observed included 5 indicators, namely giving opinions, accepting the opinions of other friends, helping friends who experienced difficulties, dividing tasks and carrying out tasks in groups well and completing group assignments on time.

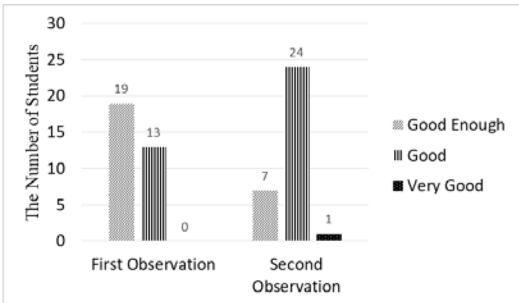

Figure 3. Observation Comparison Result of Control Class Cooperative Skills

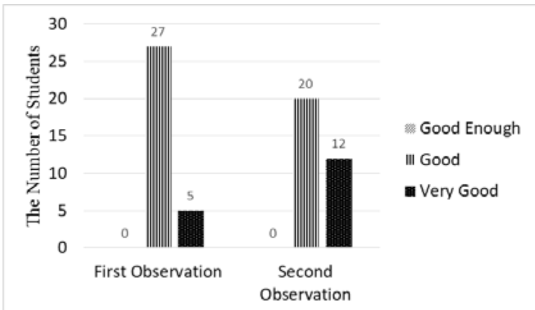

Figure 4. Observation Comparison Result of Experiment Class Cooperative Skills

Based on the results of the study, it was found that the average students' cooperative skills in each meeting had increased. Students' cooperative skills in this study are categorized into five levels, namely not good, not good, good enough, good, and very good. Based on the results of the first observation of cooperative skills in the control class many students whose cooperative skills were still in a pretty good category while in the experimental class there were many students in good category and some students in the very good category.

In the second observation all classes increased in terms of their cooperative skills, but in the control class there were still some students in the category of good enough while in the experimental class there were many students in the very good category. These results indicate that the students' cooperative skills in the experimental class are better than the control class. The results are also the same as those expressed by Nurnawati et al. (2012: 7).

Improved collaboration skills are due to the help of video tutorials that help students to be more independent and collaborate with their friends to do practical work. Whereas if the control class they ask the teacher more often than discussing it first with their group friends.

An student response pattern is given to the experimental group students after receiving an electrical circuit learning. Student response results have met the target of the research indicator which is in the very good category. The high response in the experimental class was obtained because during learning in the laboratory learning media were given which helped students to assemble their own tools so that students did not feel discouraged in doing the lab work.

Student responses in electrical circuit learning from the experimental class showed a very good criterion response, which can be seen from the achievement of the average score of students' responses to learning by 115. This is due to various varied and innovative learning activities such as internet access, practicum and group discussions which make students not bored and happy in receiving learning. Students' positive responses were also discussed by Rante et al. (2013: 207) and Yulianti et al. (2012: 133) in his research using audio-video based multimedia. In addition, it is reinforced by web - assisted learning that causes practicum in the laboratory to become more meaningful for students.

The student's response to learning is one of the supporting motivations of students in following the learning process. Especially in science subjects where the learning context is difficult for students to understand, without students' responses, learning will be difficult to achieve goals.Although in this study students' learning responses did not significantly affect learning outcomes.

CONCLUSION

Based on the results of research and discussion, the authors can conclude that there is adifference in the results of significant scientific process skills between guided inquiry learning assisted by video tutorials compared to guided inquiry learning. The results of observation of cooperative skills between guided inquiry learning assisted by practical video tutorials are better than guided inquiry learning. The student showed a response with criteria very well.

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