

THE EFFECT OF USING E-WORKSHEETS INTEGRATED PHYSICS LEARNING VIDEOS ON SCIENCE PROCESS SKILL

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ABSTRACT

This research was motivated by the low Science Process Skill of students, the cause of the low science process skills of students because the learning materials used by teachers in schools were less effective and quite difficult to understand. This study aims to see the effect of using integrated electronic video worksheets on physics learning on Science Process Skill in class XI fluid materials at Senior High School. The subjects of this study were all learners of class XI Natural Science Mathematics at Senior High School. The sample was taken out using a purposive cluster sampling technique, selecting class XI Natural Science Mathematics 1 as the experimental class and XI Natural Science Mathematics 2 as the control class. The study instrument was a written test including 30. The data research technique used in the hypothesis test is the t-test. The results showed that the average science process skills of students in the experimental class were taller than those in the control class. The results of assumption testing using the t-test, received t count of 4.393 and t_{table} with a significance level of 0.05 with a table value of 1.668. So, it can be deduced that there is an influence of the use of video-integrated electronic worksheets on science process skills in fluid material for class XI Senior High School.

Keywords : Science Process Skills, Electronic Worksheet, Fluid



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I. INTRODUCTION

The expansion of the 21st-century world is observed by the use of data and transmission technology in all aspects of life [1], including education. 21st-century education demands students' readiness to face the ever-evolving era [2] and requires proficiency in mastering technology, and high-order thinking skills [3], as well as all the skills needed in the global era. All of these skills are needed to survive and win the match in the 21st-century industrial era [4].

Education is very important to measure the improvement of a nation. Quality schooling will make rate Human Resources (HR). The quality of schooling in this technical era is measured by the achievement of 21st-century skills including essential thinking skills, innovative thinking, communication, collaboration, and ICT literacy [5]. In realizing this achievement, it is necessary to have an appropriate curriculum.

21st century education must have a great focus on conscious behavior and sustainable way that makes the world a better place [6]. According to the 2013 curriculum, the 4C skills and ICT literacy can be achieved with a scientific orientation and student-centered [7]. One of the learning activities that can provide direct experience to students is practicum activities.

Process skills are a learning approach that emphasizes students through learning processes, activities, and creativity in acquiring knowledge, skills, values, and scientific attitudes and applying them in everyday life [8]. Science process skills are significant to hone because they can make students participate actively, make long-term knowledge, form good practices as a scientist in cracking issues and preparing experimentations, and create students' understanding of how to apply science rather than simply learning concepts and laws. Then the tools

are important in generating and using scientific information to conduct scientific investigations and solve problems. Therefore, the result of Process Skills for effective science learning is very significant [9].

A good education model to enhance students' science process skills is the discovery learning model [10]. The discovery learning model is an education model that enables students to ask inquiries and pull findings from useful public principles [11]. In using the discovery learning model the teacher acts as a focus by feeding possibilities for students to understand vigorously [12], the teacher must be capable to drive and directing student education actions according to education purposes [13]. The discovery learning model has stages that must be taken, namely, providing stimulation, identifying issues, gathering data, processing data, verifying, and pulling findings [14]. To be able to use the steps of discovery learning to the fullest, appropriate teaching materials are needed, to enhance students' science process skills [15]. Discovery learning is noticed as a good way of knowing for several explanations, the main one being that the learner's active employment with the field will result in a better-structured knowledge ground for the learner reached to better classic techniques of learning [16].

Teaching materials can help teachers and students in the education process so that education is better useful and efficient, especially for students who have difficulty understanding learning [17]. Varieties of instructional materials based on education consist of; (1) teaching materials created directly by the teacher for learning such as handouts -, textbooks, student worksheets, and modules; (2) instruction materials that are not designed but can be used in understanding such as newspapers, films or advertisings [18]. One of the appropriate teaching materials to help improve students' science process skills is student worksheets [19]. Worksheets is a guide or guide containing steps to complete tasks that can help students gain experience and skills directly so that students do not only gain knowledge conveyed by the teacher [20]. Worksheets is divided into two, namely printed worksheets and electronic worksheets.

Electronic worksheets integrated with learning videos are student worksheets in digital form in which there is a summary of the material, questions, questions, and instructions for carrying out tasks taken out by students in the interactive multimedia education process [21]. The work is carried out by students in groups and individually (home assignments) which are interrelated with videos containing natural phenomena in everyday life so that learning material becomes easy to understand.

Founded on the effects of a consultation with one of the teachers, the learning materials used by teachers at Senior High School have printed worksheets made by the teacher himself and YouTube videos as support. The use of print worksheets in learning does not attract students' attention [22], because most in worksheets are available words that have enough long formulas [23]. The use of worksheets and videos from YouTube alone has not been able to make students understand learning because of, a lack of explanation of material, examples of problems, and application of concepts in life, which could make a student more understand and comprehend with draft [24].

Physics teacher at Senior High School stated that many students had not been able to express their ideas or opinions in learning while in class and at school. laboratory. At the time of learning in class, students can be seen during discussions and questions and answers. When carrying out discussions, students have not been able to express their own opinions to solve a problem properly. When students can give their opinion, the explanation is also not deep and still general. At the time of debriefing, students have not been able to describe their ideas properly, and logically and relate everyday problems in context.

Founded on the students' Science Process Skill effects, the answer sheet for each question was carried out by analyzing ten indicators of science process skills. The results of the analysis for each indicator of science process skills are added up, then averaged, and the result is 56.84. This indicates that students' science process skills are always down.

The reason for the lower students' science process skills is that the learning materials used by teachers in schools are less effective and quite difficult to understand so they have not been capable to hone students' science process skills [25]. Therefore, students feel bored, so they are less active in learning [26]. In learning physics, teachers must consider teaching materials that are effective and efficient for use in enhancing students' science process skills.

From this explanation, the solution provided by the researcher is to improve the learning approach by using worksheets teaching materials integrated with context-based physics learning videos in academies so that students more easily comprehend the material properly and use it in daily life. This is done so that the education process is more effective, interesting, and not boring, students can be more active in learning, so tools are needed such as learning teaching materials that can improve students' science process skills.

Padang State University's Faculty Of Mathematics Natural Sciences physics research team, chaired by Dr. Desnita, M.Si has developed an electronic worksheets integrated with context-based learning videos in 2020. The physics learning worksheets and videos have gone through validity and practicality tests. So that it is just to be used as a medium for learning physics in high school. In each video, there is a recording of events related to static fluid material. In the video, students are taught material with a contextual approach.

After searching, it turns out that there has been no investigation on the effect of using integrated electronic worksheets on context-based physics learning videos to enhance students' science process skills in physics subjects. Therefore it is essential to investigate to examine the impact of using integrated electronic learning video worksheets developed by the Physics Research Team at the Faculty of Mathematics and Natural Sciences, Padang State University on students' science process skills. Founded on the background that has been presented, the researcher plans to conduct a study entitled "The Effect of Using Integrated Electronic Worksheets Physics Learning Videos on Science Process Skills in Class XI Fluid Material at Senior High School".

II. METHOD

This investigation was performed at Senior High School, with class XI Mathematics Natural Sciences 1 as the experimental class and class XI Mathematics Natural Sciences 2 as the control class. The method of this study can be noticed in table 1.

Table 1. *Posttest Research Design- Only Control Design*

Group	Treatment	Posttest
Experiment	X_1	O_2
Control	X_2	O_4

(Source: Sugiyono[27])

Information :

O_2 : Final test (*Posttest*) experimental group after being given treatment.

O_4 : Test final (*Posttest*) control group which not given treatment.

X_1 : The treatment given to the experimental group is by using of Electronic Worksheet-integrated learning videos .

X_2 : Treatment is given in group control that is with using Worksheet from the teacher with videos from YouTube .

The type of data used in this study is quantitative data. The data described in this research are the learners' science process skill scores in terms of the final research test which is assessed according to the science process skill indicators in the experimental class and the control class. The research data were obtained from tests conducted at the end of the study using noted examination techniques in the structure of multiple-choice questions. This written test has been tried out and data analysis obtained 30 questions that were used to be given to the two sample classes. The two sample classes have also been given a question grid. The source of the data in this analysis was students from class XI at Senior High School, which consisted of two classes.

In this study 3 variables have stood determined, namely, the autonomous variable or autonomous variable and the conditional variable. The data in this analysis are separated into two, namely direct data and secondary data. Preliminary data is received from databases that now supply data to information collectors, while secondary data are from databases that do not now provide data to information collectors, for instance through different individuals. or via document. The instrument employed in this investigation is a science process skills test that has been tested for validity and reliability. This study used three data research methods, namely the normality test, homogeneity test, and hypothesis testing. Aspects of science process skills in this study consisted of aspects of observance, category, interpretation, prediction, requesting questions, formulating hypotheses, conducting experiments, using tools/materials, applying ideas, and speaking.

III. RESULTS AND DISCUSSION

After being given treatment, students' scientific processing abilities increased in each indicator as shown in the following figure:

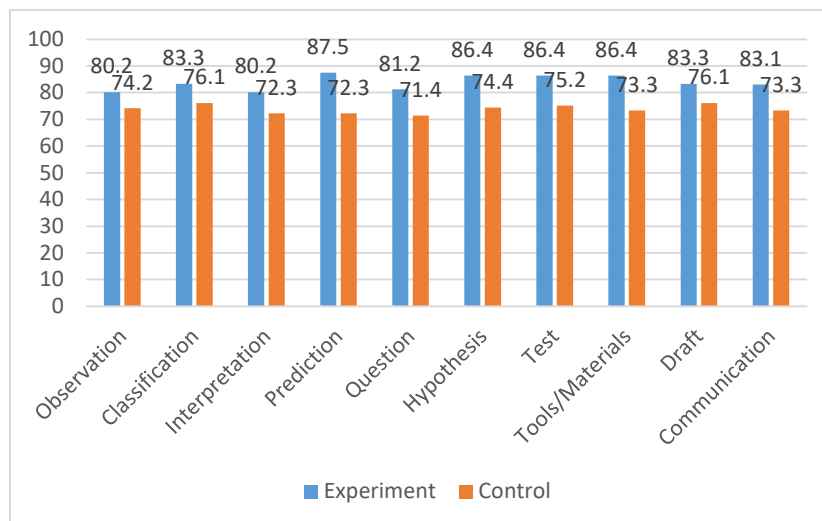


Figure 2. Final Score of Students' Science Process Skills

Founded on the effects of the analysis of research data received from the effects of the analysis of tests carried out at the end of the study. The observed aspect is science process skills. From the information that has been obtained, the importance of science process skills is obtained as a whole and is also by following the indicators of science process skills. The value of science process skills in general for the experimental class is greater than that of the control class.

The examination outcomes showed that the science process skills of the experimental class students using electronic worksheets integrated with physics learning videos were taller than the control class using worksheets from subject teachers and video media from Youtube as support for fluid material. This is because electronic worksheets integrated with physics learning videos contain events that are closely related to everyday life, while worksheets from subject teachers and YouTube videos as supports contain explanations of material to increase student understanding.

The role of electronic worksheets integrated with physics learning videos on students' process skills can be noticed when the implementation of knowledge takes place when knowing is shown several events that are closely related to everyday life about fluids then students are asked to put forward ideas, ideas or questions related to the events that are broadcast and students able to find solutions to their questions so that students more easily solve a problem related to fluids.

Electronic worksheets integrated with physics learning videos can clarify the material in lessons and make learning more alive. This is supported by learning videos with a context approach meaning that the videos produced are not only in the form of spectacles but direct students to analyze cases in an elaborative manner from the events encountered with the theory being studied. Integrated electronic Worksheet means that it is made to strengthen physics learning videos in class [28].

The use of electronic worksheets integrated with physics learning videos is strengthened by using the Discovery Learning model. In this learning model, students are given a stimulus first while students are required to master and find these problems. The use of this model also helps improve science process skills, because with this model students can provide solutions to a problem.

If we pay attention to it in better point, then in each component of science process skills each score is received for per indicator. In the experimental class, out of 10 indicators of science process skills, all achievement components > 80 with very good categories, with their respective scores, namely: Observation 80.2, Classification 83.3, Interpretation 80.2, Prediction 87.5, Propose Questions 81.2, Formulating Hypotheses 86.4, Conducting Experiments 86.4, Using Tools/Materials 86.4, Applying Concepts 83.3, and Communicating 81.2.

Whereas in the control class, out of 10 indicators of science process skills, all achievement components were >70 in good categories, with their respective scores, namely: Observation 74.2, Classification 76.1, Interpretation 72.3, Prediction 72.3, Propose Questions 71.4, Formulating Hypotheses 74.2, Conducting Experiments 75.2, Using Tools/Materials 73.3, Applying Concepts 76.1, and Communicating 73.3.

Furthermore, each aspect was tested for significance using the t-test with a level of 5%, this was done to see the effect of the integrated electronic Worksheet video context-based learning, which was seen from each aspect of science process skills which totaled 10 aspects as explained in on.

The observation aspect, after the t-test was carried out on this aspect, the outcomes received were t count 1.412 and t table 1.668 the results showed that the t table was greater than the t count, so there was no effect from the integrated electronic Worksheet context-based learning videos on the observation aspect, this could happen because the experience of students in carrying out experiments or the lack of information obtained by students and other possibilities that make the observation aspect insignificant.

Aspects of classification, after the t-test was carried out on this aspect the outcomes received were a t count of 1.753 and a t table of 1.668 the results showed that the t count was more significant than the t table, so there was an influence from integrated electronic Worksheet video context-based learning on the classification aspect and it can be concluded that the classification aspect significantly tested and can be honed using electronic worksheets integrated with context-based learning videos.

Interpretation aspect, after the t-test lived carried out on this aspect the outcomes received were t count 1.303 and t table 1.668 the results showed that the t count was greater than the t table so there was an influence from the integrated electronic Worksheet context-based learning video on the interpretation aspect and it can be concluded that the interpretation aspect was tested significantly and can be honed using electronic worksheets integrated with context-based learning videos.

Predictive aspect, after the t-test lived carried out on this aspect, the outcomes received were t count 3.217 and t table 1.668 the results showed that the t count was more significant than the t table so there was an influence from the integrated electronic Worksheet context-based learning video on the predictive aspect and it can be concluded that the predictive aspect was tested significantly and can be honed using electronic worksheets integrated with context-based learning videos.

Regarding the aspect of asking questions, after the t-test lived carried out on this aspect, the outcomes received were a t count of 1.806 and a t table of 1.668 the results showed that the t count was more significant than the t table so there was an influence from the integrated electronic Worksheet video context-based learning on the aspect of asking questions and it can be concluded that the aspect of asking questions Questions are tested significantly and can be honed using electronic worksheets integrated with context-based learning videos.

Aspects of formulating hypotheses, after the t-test was carried out on this aspect the outcomes received were a t count of 2.414 and a t table of 1.668 the results showed that the t count was more significant than the t table so there was influence from the integrated electronic Worksheet video context-based learning on the aspect of formulating hypotheses and it can be concluded that the aspect of formulating the hypothesis is tested significantly and can be honed using electronic worksheets integrated with context-based learning videos. Worksheets are very good for training science process skills student. Students' science process skills will increase high if student involvement in practicum and Other scientific activities are also increasing. other than that approach process skills that constitute learning research can increase the potential of students in scientific process and scientific attitude [29].

The aspect of experimenting, after the t-test was carried out on this aspect, the outcomes received were a t count of 2.054 and a t table of 1.668 the results showed that the t count was more significant than the t table so there was an influence from the integrated electronic Worksheet video context-based learning on the aspect of experimenting and it can be concluded that the aspect of experimenting has been tested significantly and can be honed using electronic worksheets integrated with context-based learning videos. Discovery learning uses three main properties: 1) explore and solve problems to create, integrate and generalize knowledge; 2) activities interest-based where students determine the phase and frequency; and 3) activities that encourage the integration of new knowledge into in the prior knowledge base. Discovery learning can be facilitated through various strategies in the classroom. Use discovery method means that the teacher tries to improve the quality of student activity in the learning process [30].

Aspects of using tools/materials, after the t-test was taken out on this aspect the outcomes received were a t count of 2.870 and a t table of 1.668 the results showed that the t count was more significant than the t table so there was an influence from the integrated electronic worksheets video context-based learning on aspects of using tools/materials and can it was concluded that the aspect of using tools/materials were tested to be significant and could be honed using electronic worksheets integrated with context-based learning videos.

Aspects of applying the concept, after the t-test, is carried out on this aspect, the effects of t count are obtained at 1.347 and t table 1.668 the results show that the t table is greater than the t count, so there is no influence from electronic worksheets integrated with context-based learning videos on aspects of applying concepts, this can happen because of students' experience in conducting experiments or lack of information obtained by students and other possibilities that make the aspect of applying the concept insignificant.

Aspects of communication, after the t-test was carried out on this aspect, the results of the t count were obtained at 1.526 and t table 1.668 the results show that the t table is greater than the t count, so there is no influence from the electronic Worksheet integrated video context-based learning on the communication aspect, this can happen because of the experience of students in conducting experiments or lack of information obtained by students and others so on the possibility that makes the aspect of communicating I become insignificant.

In line with previous research, a good learning model can improve students' science process skills in learning, especially learning physics, learning video integrated worksheets with discovery learning models are more effective and efficient so that they can improve students' science process skills compared to conventional worksheets. There are several benefits of using discovery learning, namely first, the knowledge obtained is easier to remember or lasts a long time in students' memories. Both can improve students' reasoning and ability to think freely. Third, improve students' problem-solving skills, and students are more active and independent in digging and searching for information, so they don't only receive information from the teacher.

Founded on the outcomes of the investigation, integrated electronic learning video worksheets can improve students' process skills, it lives obtained from the outcomes of the study that the worth of science process skills in the experimental class is more elevated than that of the control class. This is also reinforced by the hypothesis in the shape of a t-test with a grade of 5% obtained $t_{count} = 4.397$ and $t_{table} = 1.668$ meaning that the weight of t count is in the H_0 rejection area so that H_1 is accepted at a significant level of 0.05. Thus it indicates that there is an effect of using integrated electronic worksheets on physics learning videos on students' processing skills in fluid material for class XI Senior High School.

IV. CONCLUSION

Founded on the data and debate that includes lived submitted, there is a positive impact of the usage of integrated electronic learning video worksheets on students' science process skills in class XI fluid material at Senior High School. It is hoped that further researchers will examine different materials with a wider scope.

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