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The Effect of Using E-Learning Assisted by Schoology toward Physics Learning Outcomes on Global Warming and Optical Material

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ABSTRACT

There is new hope for the problems that often occur in education in Indonesia, namely with the existence of alternative solutions to E - Learning assisted by schoology there are functions that are tailored to the needs, for the learning process. From these problems, researchers concluded that applying varied learning media such as teachers using schoology-assisted e-learning which is online-based. The application of schoology in the learning process can reduce these problems. As students often have difficulty understanding physics material that is abstract. With this schoology is a solution for teachers to communicate well between students to help get a role / part in the discussion and cooperation. Schoology is equipped with many media factors such as video, audio and images that can increase student interest. Schoology helps students to apply technology to learning. This study uses a type of quasi-experimental design, this study aims to directly test the effect of a variable and test the hypothesis of a causal relationship to determine the effect of teaching materials. The sampling technique used in this study is Purposive Sampling, which is based on consideration of the classes taught by the same teacher and classes that have an average daily test score in physics subjects that are almost the same value. For the results of this calculation, the coefficient of determination is 85.32%, which means that student achievement of cognitive abilities is seen from schoology-assisted e-learning teaching materials while 14.68% is due to other things.

Keywords: *Competence, E-Learning; Schoology*

I. INTRODUCTION

To help improve human life in upholding the progress of the nation by the Indonesian education system itself which has an important part. So that it is regulated in Law No. 20 of 2003 that carrying out abilities and building character is also one of the functions of national education, besides that students have potential that can be further developed so that they can form a person who is devoted and obedient to God, healthy, knowledgeable, innovative, independent, creative, democratic and responsible [1].

According to [2], the education sector is the main focus for the government in the demands of the industrial revolution 4.0 era. However, to get an intellectual society in the face of globalization makes an important priority in improving the quality and quality of education today [3]. The new policy implemented by the curriculum is an effort from the government in improving the quality of the quality of education.

Senior High School is one of the leading driving schools in West Sumatra. Almost all subjects have been integrated in Information and Communication Technology (ICT). For the implementation of learning with the maximum need to utilize the facilities available at school, the use of the internet can support learning using e-learning [4]. E-learning is currently starting to be widely used in the learning process, which is only used as sending and giving assignments and teaching materials. Students send assignments usually via E-mail which is the most frequently used account in contrast to the website which is only used in uploading materu files [5]. Students can submit assignments after that do not know the follow-up of their assignments teaching materials that have been provided on the website can also often only be downloaded. Communication between students

and teachers is also limited to learning activities in the classroom [6]. As a result, students often have difficulty getting the material that has been given by the teacher.

In the teaching and learning process of physics class XI, information is obtained that the internet facilities at school are quite adequate, but the learning process is less effective in utilizing the available internet facilities even though each student already has a laptop and smartphone [7]. The use of media in learning at this time often uses module media, books and sometimes uses Microsoft power point. In addition, it is very often found that teachers still convey material using only the lecture method. So it is necessary to vary E-Learning media learning by using schoology media, thus the role of learning media is expected to be more effective and interesting [8].

Based on initial observations of students conducted by researchers at the physics teacher Senior High School revealed that most students have a low level of physics knowledge ability due to one of them because of the lack of awareness of themselves of the importance of learning at school so that most students do not follow additional learning outside of school such as tutoring or study guidance, but at this time it is decreasing, it can be said that students' physics knowledge is relatively low compared to before [9]. Seen from the learning process where students prefer to be silent rather than ask questions about the material studied, in solving problems students find it difficult as a result of the decline in knowledge and motivation of students towards physics material.[10] This is a strong warning for teachers in carrying out the process of learning activities and reviving children's motivation in carrying out learning activities.

Researchers have conducted observations which obtained the results, namely there are 7 classes of XI science which each class has 36 students, researchers have collected the results of daily test scores from each class, namely class XI science 1 - XI science 7 on the material of gas kinetic theory and dynamic fluids which obtained that for class XI science1 on the material of gas kinetic theory many students have not completed with the lowest score of 20 as many as 1 person and for students who are complete only 0 people with the acquisition of the highest score of 70 so that the average is obtained 38.47. As for dynamic fluid material, most students also get low scores below the Minimum Completeness Criteria as many as 18 students with a score of 40 and an average of 70.13. In addition, in the science2 class, the average obtained on gas kinetic theory material is 39.79 for the number of students who completed 0 people with the highest score of 72.5 but for students who have not completed as many as 36 people with the lowest score of 22.5. However, overall students still do not achieve the expected results because the results of daily tests on the material of gas kinetic theory and dynamic fluid students tend to experience difficulties in the learning process which has an impact on learning outcomes that decrease and the scores obtained by students are still below the minimum completeness criteria.

According to the results of interviews with physics teachers Senior High School and class XI students found several obstacles that are often experienced in learning physics. The obstacles that often occur in physics learning include: students often complain of boredom with the media learning activities applied by the teacher, students want teachers to use more varied learning media, students by applying learning media is very influential on student motivation and results, a total of approximately 50 students out of 72 students still get scores below Minimum Completeness Criteria which is 75.00 and students can not interact directly with the learning media.

E-Learning assisted by schoology is an alternative solution to many educational problems in Indonesia, so this can be adjusted by teachers. E-Learning can be an innovation that has a big influence on changes in learning activities, such as student learning activities that are more varied not only listening but doing other attitudes such as observing, doing etc. [11].

From these problems, researchers suggest using learning media that has been varied, namely teachers using e-learning assisted by schoology in helping effective teaching and learning activities on schoology such as online-based learning activities. Therefore, it no longer needs to be monotonous in the room, and the time needed does not have to be during class hours at school so that it makes it easier for students to be active and focus on learning [12]. The objectives to be achieved in this study are: to determine the significant effect on student physics learning outcomes on the material of optical devices and global warming in class XI science 2 high school by applying E-Learning learning media assisted by Schoology.

II. METHOD

states that the type of quasi-experimental design is close to a real experiment, the goal is to be able to see directly the effect of a variable by other variables and to see the hypothesis of a causal relationship [13]. This quasi-experimental design uses the posttest only control group design type, this study has two selected classes [14]. The first class did not get treatment while the class that was given treatment by applying learning using schoology in the learning process was called the experimental class and the class that was taught by not applying the schoology learning media method or learning was done conventionally which was said to be the control class [15].

There are three important parts in the procedure: preparation, implementation, and completion [16]. (1) Preparation Stage (a) Determining the place and schedule of research at Senior High School (b) Preparing letters for research (c) Determining the population and sample of the research (d) Determining the control and experimental classes (e) Providing learning tools made according to the annual program and semester program such as lesson plans (RPP) for experimental and control classes, e-learning media assisted by schoology is in the experimental class and materials can be used at school in the control class. (f) Make a lattice of pretest and posttest test questions, answer keys to pretest and posttest test questions and scoring guidelines for pretest and posttest test questions. (g) Prepare research instruments for assessment including final test questions for knowledge aspect assessment, attitude assessment instruments and assessment rubrics, and attitude assessment instruments [17]. (2) Implementation Stage. Learning activities by both sample classes according to the 2013 curriculum [18]. The treatment obtained by the experimental class of the control class is: introduction, core activities which include phase 1 providing orientation about the problem by students then phase 2 managing students so that they can learn phase 3 helping individuals and groups phase 4 presenting actions that have been carried out during teaching and learning phase 5 checking and investigating problem solving activities, finally closing [14]. (3) Completion Stage (a) Making posttest experiments in both sample classes (b) Checking the results of the activities to get the reliability, difficulty index, and differentiation on the questions (c) Carrying out the posttest for the sample class, the test is carried out in order to obtain good knowledge results. Distribution of posttest scores for both sample classes (d) Accumulation of students' attitude assessment based on questionnaires (e) Collecting data on student assessment of rubric scoring (f) analyzing the knowledge and attitude of students through statistical tests (g) Compile a research report (h) Requesting a letter from the school because the research had been completed [19].

III. RESULTS AND DISCUSSION

A. Result

Researchers obtained values in the form of competence of students in class XI Senior High School on knowledge and attitude skills for both sample classes. Student data for cognitive abilities were obtained based on posttest research activities. Affective ability is obtained when learning activities with observation sheets. The results of the achievement of physics subject skills on student competencies are described.

Value analysis is determined by first, the normality test of the final test to determine whether the data is normal [20]. Second, the homogeneous test aims to determine whether the sample is homogeneous [21]. Third, hypothesis testing to see if there is a significant effect of schoology-assisted e-learning on students' physics learning achievement on the material of optical devices and global warming. Each data analysis will be explained below [22].

1) Normality Test of Knowledge Competency

Table 25. Normality Test Results

Class	A	N	L_0	Lt	Distribution
Experiment	0,05	36	0,12	0,147	Normal
control	0,05	36	0,13	0,15	Normal

It can be seen that the cognitive ability of the sample is normally distributed, for L0 < Lt at the real level of 0.05, [23] namely the experimental class (0.12 < 0.147) and the control class (0.13 < 0.15).

2) Homogeneity test of knowledge competence

Table 26. Homogeneity Test Results

Class	N	S^2	F_h	F_t	Description
Experiment	36	238,72	1,11	1,75	Homogen
control	36	264,06	1,11	1,75	Homogen

From Table 26, it is obtained for the value of the homogeneity test carried out on the posttest sample, Fhitung < Ftabel with a real level of α = 0.05. This means that the sample data has a homogeneous variance. After the data is known to be normally distributed and homogeneous, then conduct hypothesis testing [24].

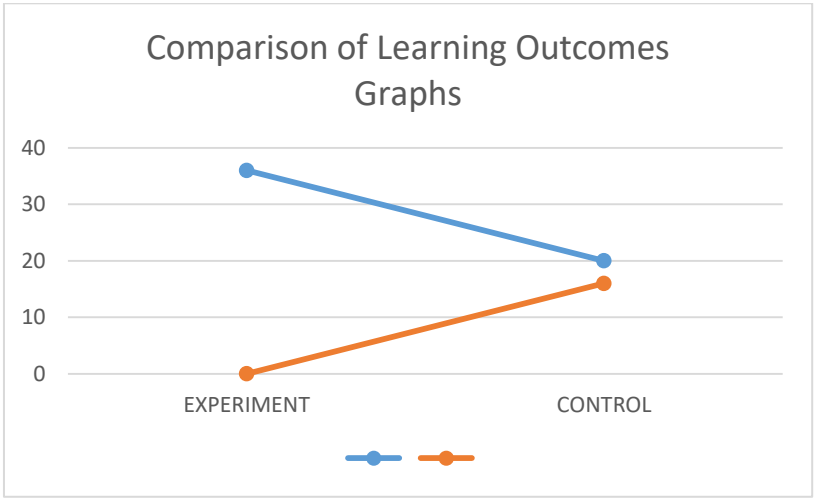
3) Hypothesis Test of Knowledge Competency

Table 27. Hypothesis Results

Class	N	$\bar{x}$	S^2	t_h	t_t
Experiment	36	88,05	238,72	4,45	2,00
Control	36	7,14	264,06	4,45	2,00

Table 27 shows that th is located in the H0 rejection area. For the test criteria accept H0 if -tt < th < tt [25]. the statistical test results obtained the price of th = 4.45 which is greater than tt = 2.00 and is outside the H0 acceptance area. This means that there is a difference in the average learning outcomes of knowledge competencies in the sample. So the working hypothesis (H1) states "There is an effect of using e-learning assisted by schoology on physics learning outcomes of students of Senior High School on the material of optical devices and global warming" is accepted.

The average achievement of attitude competence can be seen in the figure



4) Regression and Correlation Test

Regression and correlation tests were conducted after it was proven that there was a significant difference between the two sample classes in the cognitive domain. The relationship between schoology-assisted e-learning and students' knowledge competency is linear regression, with the regression equation as follows:

$$\hat{Y} = a + bX = 15{,}8699 + 0{,}358\ X$$

To see the relationship between schoology-assisted e-learning and student learning outcomes, the significance test and regression linearity test must be done first.

Based on the analysis, $F_h = \frac{S^2_{reg}}{S^2_{sisa}}$ = 35,426 is greater than , F_{tabel} which is 4,17, indicating that the regression is meaningful. After that, the linearity test was carried out. The analysis comes from $F_h = \frac{S^2_{TC}}{S^2_G}$ = - 1,83054 worth less than Ftable which is 2,23 means the regression results of cognitive abilities linear [26]. So that analysis can be carried out to see the relationship between teaching materials and knowledge competencies. The value of r_h = 0.0296918 is not less than the rtable, namely 0.329, which means that there is a relationship between teaching materials and student achievement of knowledge competence.

The effect on teaching materials is student achievement seen the coefficient of determination. The coefficient of determination is 85.32%, which means that 85.32% of student achievement in knowledge competency is influenced by e-learning assisted by schoology teaching materials while 14.68% is influenced by other things.

B. Discussion

Based on student learning outcomes for knowledge and attitude competencies, it can be seen that the effect of using schoology-assisted e-learning teaching materials on physics learning outcomes of Senior high school students on the material of optical devices and global warming. This can be seen from the comparison of the average value of knowledge competency and attitude competency in the experimental class is better than the control class. In the knowledge competency, for the experimental class, the class average value was 88.05 while for the control class, the class average value was 71.4. This is in line with [27] which states that the level of understanding of students in the control class is lower than the level of understanding of students in the experimental class. To see the significance of the treatment effect, from the results of data analysis, the tcount value is outside the H0 acceptance area, so H0 is rejected and Hi is accepted. This means that the average learning outcomes of the two classes are significantly different and indicate a significant effect of using schoology-assisted e-learning teaching materials on student knowledge competency learning outcomes.

The knowledge competency obtained in the experimental class has shown a good effect of the PBL (Problem Based Learning) learning model even though not all students have obtained scores above the minimum completion criteria. Learning outcomes in the knowledge competency of the experimental class have a higher average value than the control class. This is reinforced by [28] stating that with problem-based learning that is oriented towards a problem so that participants become more active. In general, the experimental class students' scores were better than the control class students' scores.

This data shows that there is a significant difference between the experimental class and the control class, because Fh < Ft the relationship between the variables is linear. Furthermore, through the correlation test obtained rcount = 0.9236918, the correlation coefficient obtained is 0.853206, thus the correlation coefficient obtained means that the correlation between the use of e-learning teaching materials assisted by schoology on the physics learning outcomes of Senior high school students on the material of optical devices and global warming of 0.853206 is significant. In addition, from the calculations carried out, the coefficient of determination is 85.32% of the effect of the use of schoology-assisted e-learning teaching materials on the physics learning outcomes of students of Senior high school on the material of optical devices and global warming in the knowledge aspect of 85.32% and the remaining 14.68% is determined by other variables. In addition to the use of schoology there are several other factors that affect the improvement of student competence, other factors are student environmental factors such as parents, friends and school or home environment.

Based on observations during the study, it can be seen that students in the experimental class learning by using schoology-assisted e-learning teaching materials using the PBL (Problem Based Learning) model have better learning motivation, are more active in the learning process and behave better because the integrated problem orientation in teaching materials makes students understand and explore the problem better than students in the control class. Students feel meaningful learning every meeting with the reflection of each problem at the end of the learning process which is integrated into teaching materials in accordance with the material being studied and in accordance with what happens in everyday life. This can be seen from the enthusiasm of students when listening to the conclusion of the learning process at each meeting and its relation to daily life.

Students are asked to discuss the material before learning in the discussion feature and students can download files of teaching materials for optical devices and global warming and solve questions on the quiz feature under the guidance of the teacher, so that learning is no longer teacher center but student center. The application of e-learning teaching materials assisted by schoology using the PBL (Problem Based Learning) model can make learning more active and students are more motivated to learn students not only to quietly listen to the teacher, but students connect, organize, rethink, explore, and explore information, and can expand the material that has been learned through group discussions, besides that students must also be able to communicate to express their ideas or opinions in solving group discussion problems. The existence of high enthusiasm and motivation that arises in oneself, students can increase their activities in learning so that student learning outcomes will increase.

Based on the description above, it can be revealed that the use of e-learning teaching materials assisted by schoology using the PBL (Problem Based Learning) learning model has a significant effect on student competence for knowledge competence and attitude competence in accordance with the opinion of [29] that the form of learning that integrates the learning process from traditional learning and a combination of various other learning models, one of which is problem-based learning. This is evidenced by higher scores at the end of the

study in the experimental class. This means that the application of schoology-assisted e-learning to learning outcomes and can improve student competence for knowledge competence and attitude competence.

IV. CONCLUSION

After conducting research on the effect of the use of schoology-assisted e-learning teaching materials on the physics learning outcomes of students of Senior High School on the material of optical devices and global warming, conclusions can be drawn.The amount of influence given by the use of teaching materials e-learninig assisted schoology on physics learning outcomes Senior High School on the material of optical devices and global warming amounted to 85.32% and the remaining 14.68% caused by other factors. The use of teaching materials based on problem orientation through the PBL (Problem Based Learning) learning model in class XI science Senior high school has a significant effect at the real level of 0.05 on the physics competence of students in class XI science Senior high school on knowledge competence and attitude competence characterized by increased learning outcomes and positive attitudes of students.

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