THE COMPARATIVE ANALYSIS OF MOTIVATION AND STUDENTS' LEARNING OUTCOMES BY USING THE LEARNING MEDIA OF WEB E-LEARNING AND SCHOOLOGY IN VOCATIONAL HIGH SCHOOL

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ABSTRACT

Previous comparative studies of learning media have not explained the difference between the use of web e learning and schoology learning media. This study aims to: (1) find out the comparison of student learning outcomes between the use of learning media of web e-learning and schoology in Web Programming and Mobile Device subjects (WPMD), and (2) find out the increase in student completeness by using the learning media of web e-learning and schoology on WPMD subjects. The research method used is quantitative with quasi-experimental research involving two groups, namely the control and experimental groups. While the research design used was pre-test post-test control group design. The subjects of this study were students of class XII Software Engineering at SMK Negeri 1 Sukorejo. Data collection techniques carried out by providing research instruments and test instruments. While the data analysis technique uses normality test, homogeneity test, and independent samples t-test. The results of this study indicate that: (1) significant results of 0.000 are smaller than 0.05, which means that learning outcomes in WPMD subjects have significant differences between the control and experimental groups; (2) the results of the study note that the control group experienced an increase in completeness of 11.43% while the experimental group amounted to 94.12%. Increased completeness in the experimental group was higher when compared to the control group.

Keywords: Learning Outcomes, Learning Media, Web E-learning, Schoology

INTRODUCTION

The 21st Century skills that must be possessed by students and graduates of Vocational High Schools (SMK) include media literacy and information literacy. Media literacy is very important for students to be able to access, understand, and analyze media, and media messages used in learning. These skills include the ability to understand various media and the ways in which the media influence beliefs and behavior. Information literacy forms the basis for lifelong learning. This allows students to master content and expand their own learning independence investigations. Some online media used in learning such as schoology, e-learning, web-learning, moodle, and quipper.

In addition, Indonesia is now also entering the era of the industrial revolution 4.0. Wolter (in Hamirul, 2019) identified several challenges in the industrial revolution 4.0 including: (1) information technology security issues, (2) reliability and stability of production machinery, (3)

lack of adequate skills, (4) reluctance to change by stakeholders, and (5) loss of work due to change into automation. On the technical aspect, Hecklau et al (in Hamirul, 2019) specifically mentioned, virtual communication skills, media skills, communication skills, and networking capabilities. This is a challenge that must be better prepared through the education process.

The aim of vocational high school (SMK) is to prepare future generations who have high capability and competitiveness in facing the challenges of global job competition in the 21st century and the industrial revolution 4.0. To achieve this goal, the development of SMK's through the revitalization program as stated in the 2017-2019 Vocational Education Road Map is actualized in the revitalization implementation strategy including: (1) curriculum development and alignment, (2) standardization of main facilities and infrastructure, (3) fulfillment and improvement of teacher and tendency professionalism, (4) learning innovation, (5) expansion of cooperation with the business world and the industrial world, and (6) management and institutional arrangement (Kebudayaan, 2019). One strategy for implementing revitalization is learning innovation. Learning in the digital age now, requires teachers to innovate using information technology as part of the teacher's task to create an atmosphere of "learning fun and make students happy to learn". Therefore it is necessary to choose information and communication technology that can make the learning atmosphere fun and make students happy in learning.

Fun learning activities can be seen from the presence of students who are active in interacting with teachers, students with students, as well as students and teachers use through the media. In the implementation of the 2013 curriculum, learning activities are centered on students (student centered), while the teacher acts as a facilitator who facilitates students to be active in solving problems in learning. The implementation of the 2013 curriculum can also create a balance between cognitive development (soft skills) and physical skills (hard skills). Thus it is necessary to conduct research into the use of e-learning media to support learning activities in the 2013 curriculum.

So far, learning activities at SMK Negeri 1 Sukorejo, Pasuruan District, especially the Software Engineering Skills Program (RPL) in Web Programming and Mobile Device (WPMD) subjects have been pursued in order to obtain good results and increase student learning motivation. The teacher presents the lesson briefly with the textbook package contained in the library, then is equipped with examples of program code in the textbook. As a result these students only see and hear. During learning activities, there is rarely one active student to ask the teacher about the material being taught. The activities of students who only imitate and type in the program code contained in the package book so that in reality students tend to only imitate without thinking creatively to develop the program code. This tendency has a weakness that is that learning activities will feel monotonous and not develop so that students cannot apply their knowledge with the program code that is demanded to be more up to date. The selection of WPMD subjects in this study is because in those subjects there are web program codes that are widely studied including html, css, js, and php files so students must master the material and practice it in order to think creatively.

Based on the results of interviews with the Headmaster of SMK Negeri 1 Sukorejo, information was obtained that in learning activities must collaborate between lecture, discussion, and practicum methods with the use of electronic learning media or known as e-learning to get satisfying results. The use of e-learning media is the use of technology in the era of the industrial revolution 4.0 in the field of education. By learning to use e-learning, students will be actively and independently involved to observe, identify and learn the main concepts in the subject of Web Programming and Mobile Devices.

A good e-learning media is expected to include visual aspects (visual aspects), auditive (hearing aspects), and motor (aspects of motion). The more senses students are involved in learning activities, the easier it is for students to learn and be more meaningful (Bobbi de Porter & Mike Hemaki in, 2002). Arsyad (2011) suggested that computer-assisted learning media is able to display well various simulations, visualizations, concepts and multimedia accessed by students in accordance with what is desired so that abstract visualizations can be displayed concretely and understood in depth. It aims to facilitate students in learning and instilling concepts. The more senses of students involved in learning activities, the easier the students are in learning and the more meaningful and more activein learning activities. Dedicated Web Programming and Mobile Device materials with a logical approach will be even more useful when using multimedia e-learning as a learning tool.

Various efforts to use *e-learning platforms* in learning cause confusion in choosing *e-learning* learning media that can have a positive influence on student learning outcomes. According to Rovai (in (Tigowati, Agus, et al., 2017)), students who use e-learning are intrinsically more motivated than students in traditional classes. According to Smaldino et al (Yana, 2018) that the purpose of the use of instructional media is "communication and learning", in order to present a lively and meaningful learning process. According to (Tigowati, Efendi, et al., 2017), e-learning platform is an application that can be connected between teachers and students in an online learning room. E-learning is used to overcome the limitations of learning between teachers and students, namely the limitations of time and space. Learning activities can run anytime and anywhere regardless of space and time.

Therefore, there is a need for a study of e-learning platforms and comparative studies between platforms. According to Rubin et al (2010), with the e-learning platform, teachers can communicate and store course information, such as syllabus, assignment instructions, and teaching materials. Teachers can use e-learning platforms to provide comments and feedback to students which are two very important features of the online learning process (Cavanaugh et al, 2005; Hashey & Stahl, 2014; Liu & Cavanaugh, 2011; Lochner et al, 2015; in Derek Schalager, 2016). The learning media of web e-learning and schoology have similarities in terms of features, namely, the features of files, links, quizzes, gradebook, discussion forums and assignments. On the other hand, there are differences in features, namely in schoology there are attendance, analytic features, and there are many resources that are not available in the web e-learning. Whereas on the web e-learning, there is a simulator for coding a program that initially normally uses sublime or notepad ++ , but with this web e-learning students can use directly to encode, edit, save, and collect programs with html, css file extensions, js, and php.

Efforts to improve learning outcomes have been carried out by using e-learning learning media ((Goh et al., 2017); (Ulva et al., 2017); (Tambunan et al., 2018); (Yustinaningrum, 2018); (Suryati et al., 2019); (Affandi et al., 2020); (Arota & Mas'ud, 2021); (Azis et al., 2019); (Kartikawati et al., 2021)). Goh et al (2017) explained that in their research there was an increase in learning outcomes and satisfaction in using e-learning. In addition to the use of e-learning media, the use of schoology can also develop a learning community for students and provide a more interesting experience. Gwee and Damodaran in (Resty et al., 2019). (Irawan et al., 2017) asserted that the provision of material carried out online aims to improve learning outcomes and practicum potential by using schoology learning media. Schoology can also improve communication between teachers and students in being responsible for their learning outcomes. Manning et al in (Resty et al., 2019). Several previous studies have used schoology learning media in learning activities. ((Tigowati, Efendi, et al., 2017); (Widodo, 2018); (Purba et al., 2017); (Subiyantoro & Ismail, 2017); (Ismarjiati et al., 2019); (Akhmalia et al., 2018); (Huurun'ien et

al., 2017); (Kustandi, 2017); (Yana, 2018); (Rayadi & Wijanti, 2020); (Sitinjak, 2020); (Muhtia et al., 2018); (Monalisa et al., 2019); (Sulaiman & Wibawa, 2018); (Gaiz & Mosaway, 2018); (Wirganata et al., 2018); (Resty et al., 2019); (Warsito et al., 2019); (Sriyanto & Kaniadewi, 2019); and (Suryati et al., 2019)).
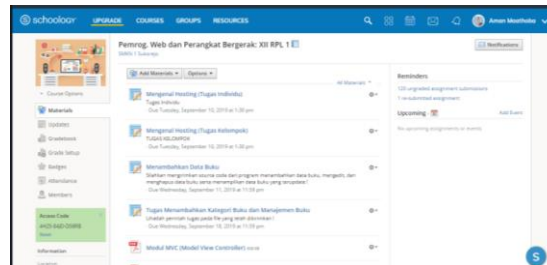

Figure 1. Learning media of schoology

Figure 2. The learning media of web e-learning

Based on the background of these problems, it is necessary to have learning innovations using e-learning media, so that learning becomes fun. So that the learning outcomes of WPMD subjects increase learning innovation is needed using e-learning media. Thus it is necessary to find the answer about The Comparative Analysis of Student Learning Outcomes by Using the Learning Media of Web E-learning and Schoology in Vocational High Schools.

METHOD

The research method used is quantitative with quasi-experimental research involving two groups, namely the control group and the experimental group. While the research design used was pre-test post-test control group design. The subjects of this study were students of class XII RPL in the 2019/2020 school year at SMK Negeri 1 Sukorejo, with a sample of class XII RPL 1 totaling 35 students and XII RPL 2 totaling 34 students.

Table 1. The Subjects of This Study

Class	Sum of Research Subjects
XII RPL 1	35
XII RPL 2	34
Total	**69**

Data collection techniques carried out by providing research instruments and test instruments. The test instrument was prepared in relevance to the topic studied and applied before and after treatment was given. The research instrument was used to determine student's learning motivation in the form of questionnaires and the test instrument was used to measure the student's competency abilities and find out the student's learning outcomes. While the data analysis technique uses normality test, homogeneity test, and independent samples t-test. All data were analyzed using SPSS version 20 software. If the condition sig. (2-tailed) > 0.05 then Ho is

accepted and H1 is rejected. Whereas if the condition sig. (2-tailed) < 0.05 then Ho is rejected and H1 is accepted. The hypothesis proposed is as follows:

H_0 : There is no comparison of student learning outcomes using schoology learning media (control classes) and using web e-learning learning media in Web Programming and Mobile Devices subjects.

H_1 : There is a comparison of student learning outcomes using schoology learning media (control classes) and using web e-learning learning media on Web Programming and Mobile Devices subjects.

RESULTS AND DISCUSSION
Results

In this study the normality test was carried out after the pre-test and post-test of the research subjects which were conducted and calculated using Kolmogorov-Smirnov with the level of sig. 0.05. The count results of the pre-test and post-test normality tests on research subjects are listed in Table 2.

Table 2. The results of the normality test Pre-test and Post-test Using Kolmogorov-Smirnov

Instrument	Group	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
PRETEST	Control	0.141	35	0.078
	Experiment	0.139	34	0.093
POSTTEST	Control	0.121	35	0.200[*]
	Experiment	0.138	34	0.098

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

In the table above it can be seen that using the Kolmogorov Smirnov test on the Pre-test instrument in the control group has a significance level of 0.078 and the Pre-test instrument in the experimental group has a significance level of 0.093. Whereas the Post-test instrument in the control group had a significance level of 0.200 and the Post-test instrument in the experimental group had a significance level of 0.098. This shows that the level of significance in the Pre-test instrument in the control group > 0.05 or 0.078 > 0.05 and the level of significance in the Pre-test instrument in the experimental group > 0.05 or 0.093 > 0.05 which means the instrument research sample Pre-test tests in the control and experimental groups are normally distributed. While the level of significance in the Post-test instrument in the control group > 0.05 or 0.200 > 0.05 and the level of significance in the Post-test instrument in the experimental group > 0.05 or 0.098 > 0.05 which means the sample of the post-test instrument Tests in the control and experimental groups are normally distributed. So it can be concluded that the normality test results from the pre-test test instruments in the control group and the experimental group and the post-test test instruments in the control group and the experimental group, the study sample was normally distributed.

a. Homogeneity Testing

In this research, homogeneity test is used to find out whether some variants in the population are the same or not. Homogeneity test is done after the pre-test and post-test data from the study sample is obtained. The results of the homogeneity calculation pre-test and post-test can be seen in Table 3.

Table 3. Summary of Variance Homogeneity Tests

Instrument	Levene Statistic	df1	df2	Sig.
PRETEST	0.100	1	67	0.753

| POSTTEST | 0.105 | 1 | 67 | 0.747 |

Based on the results of the above table it can be seen that the value of sig. pre-test's instrument as big as 0.753 and post-test's instrument as big as 0.747. The results of this calculation show the value of sig. pre-test's instrument > 0.05 or 0.753 > 0.05 which means it has the same variant and sig. post-test's instrument > 0.05 or 0.747 > 0.05 which means it has the same variant. So that can be concluded that the scores obtained from the results of tests on the current charging the pre-test and post-test have the same variant.

Hypothesis testing used independent t-test or subject t-test. This t-test was conducted to determine whether there are differences in the two samples. This formula can be used if the data are normally distributed with a homogeneous population. T-test was carried out on the pre-test and post-test data both in the experimental group and the control group on each subject matter. The results of the t-test calculation of the control group and the experimental group using SPSS software version 20. A summary of the average results of learning outcomes between the control group and the experimental group is listed in Table 4.

Table 4. Average Learning Outcomes in the Control and Experiment Groups

	Group	N	Mean
POSTTEST	Control	35	73,9143
	Experiment	34	85,5294

While the summary of the calculation of the independent sample t-test score between the control group (using schoology learning media) and the experimental group (using learning media of web e-learning) are listed in Table 5.

Table 5. Comparison of Independent Sample t-test Test Scores in WPMD Subjects

Category		t	df	sig. (2-tailed)
Learning Outcomes	Equal variances assumed	-10.616	67	0,000
	Equal variances not assumed	-10,622	66,997	0,000

From the management of the data obtained significance results on learning outcomes of 0,000 less than 0.05 (significance level of 5%) or 0,000 < 0.05 which means that H_0 is rejected and H_1 is accepted. This shows that the learning outcomes of WPMD subjects have a significant difference between the control group using schoology learning media and the experimental group using learning media of web e-learning.

b. Descriptive Analysis

To find out student learning outcomes before and after treatment, students are given a test. The results of the tests given by students aim to find out how far students absorb the knowledge delivered. The following are the initial abilities and learning outcomes of students on WPMD subjects listed in Table 6.

Table 6. Value of initial abilities and student learning outcomes in WPMD subjects

	Kontrol		Eksperimen	
Completeness	Pre Test	Post Test	Pre Test	Post Test
Not Complete	100,00 %	88,57%	97,06 %	2,94 %

Complete	0,00%	11,43%	2,94%	97,06 %

With a minimum completeness value set by schools of 80, learning outcomes in WPMD subjects can be known for their completeness percentage. From the data shown in Table 6 it can be seen that when the pre-test the control group had completeness by 0.00% then after conducting learning activities using schoology learning media, mastery learning outcomes increased by 11.43%. Increased completeness using schoology learning media by (11.43% - 0.00%) = 11.43%. While the value of completeness of the pre-test learning outcomes in the experimental group was 2.94% then after learning activities using learning media of web e-learning, mastery learning outcomes increased by 97.06%. Increased completeness by using learning media of web e-learning (97.06% - 2.94%) = 94.12%. This increase is said to be quite large when compared with an increase in learning outcomes in the control group or by using schoology learning media.

Discussion

Interactive learning media is a learning media that includes features of pictures, videos, messages (chat), animations, and online exams as well as features in task collection. In other words, interactive learning media is a medium that can interact with students so students get a complete set of information from the presentation of information that has been sent by the teacher. If students are interested in learning the material presented can affect better learning outcomes.

Previous comparative studies of learning media have not explained the difference between the use of web e learning and schoology learning media. The results of the study note that there are differences between the control group and the experimental group. The control group uses learning media of schoology while the experimental group uses the learning media of web e-learning. From the analysis of the data that has been done can be obtained significance or sig. results (2-tailed) of 0,000 less than 0.05 (significance level of 5%). Thus, it shows that the learning outcomes in WPMD subjects there are significant differences between the control group using learning media of schoology and the experimental group using the learning media of web e-learning. While the results of the study note that in the WPMD subjects the control group (using schoology learning media) experienced an increase in completeness by 11.43%. While the increase in the experimental group (using learning media of web e-learning) was 94.12%. The increase in completeness of students with minimum completeness criteria (KKM) of 80 in the experimental group was included in the higher category when compared to the increase in completeness in the control group. From the increase in completeness that has been calculated it can be said that the use learning media of web e-learning can improve student learning outcomes so that students can absorb the knowledge delivered and have an effect on the mastery of learning outcomes.

The use of appropriate learning media can motivate students to be enthusiastic in learning. In addition, the right learning media can also increase students' interest and attention to the information conveyed in learning activities. This statement is in line with the research conducted by (Yana & Adam, 2019) which proved that there is a difference in the average student learning outcomes using different LMS platforms with a Sig value of 0.033, this value is smaller than 0.05 (significance value of 5 %) in the ANOVA table and it can be interpreted that H_0 is also rejected. However, this research results that web e-learning learning media is better than schoology for several reasons, including: students are more interested in delivering information and there are also features in making, collecting, and checking coding with html, css, js, and php file extensions. Whereas learning media of schoology may only be used for interaction with students and there are no features such as the developed learning media of web e-learning. However, all of that

cannot be separated from the teacher's role because the most optimal form of teacher explanation carried out during online learning regarding practicum procedures is the use of module books or practice guides accompanied by detailed explanations and practicum learning videos (Siddiq et al., 2021).
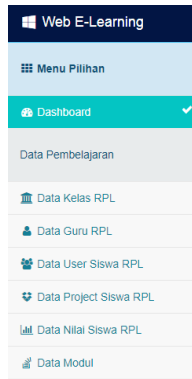

Figure 3. Menu facilities available on the web e-learning

Figure 4. Features of sending assignments to teachers contained on the web e-learning
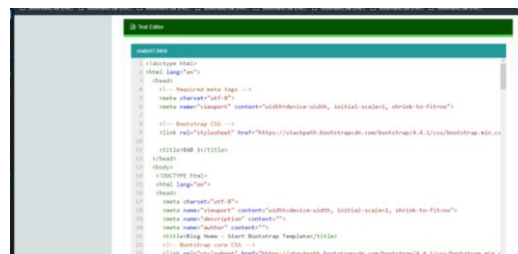

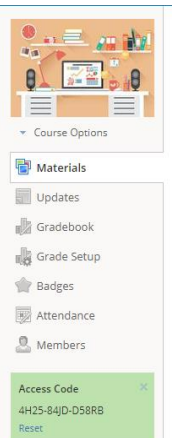Figure 5. Web coding simulator features found on web e-learning

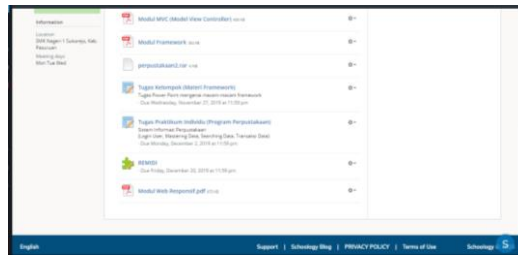Figure 6. Menu facilities available at schoology

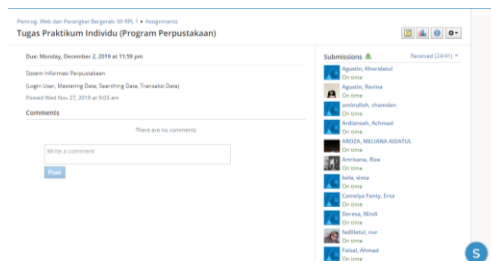Figure 7. Feature delivery of material to students contained in schoology

Figure 8. Features of sending assignments to teachers found in schoology

The results of this study are in line with (Tigowati, Agus, et al., 2017) which states that, the results of the study found differences in the use of schoology and edmodo – based e-learning on cognitive learning outcomes in Digital Simulation subjects. Learning media schoology has benefits for students, namely: making students more enthusiastic, not bored, appreciate more attention to the lesson, easy to do the task, more active in learning, have a target value, more earnestly in doing the task, more motivated in learning, on time in gathering tasks, more independent in learning and more understanding in lessons. In addition, learning media of web e-learning that have been developed also have benefits for students, namely: making students more challenged in learning, always having ideas in completing, more careful in coding, easy to do or send assignments, creative thinking, think innovative, be right in gathering tasks, and fast in coding. The results of this study are also supported by (Rofiqoh et al., 2020) namely there are differences in learning outcomes and learning motivation between the use of the blended learning model, namely think pair share assisted by Google Classroom compared to traditional learning models in productive subjects for class XII TKJ SMK Mabdaul Ma'arif Jember. On the other hand, the results of research conducted by (Yana & Adam, 2019) are that there are differences in the average student learning outcomes using different LMS platforms and it can be concluded from the results that the calculated F (3,585) is greater than the F table (3,150) and the Sig 0.033 is less than 0.050.

From the conclusions that have been given, it can be suggested for SMKN 1 Sukorejo to consider the application of learning using the learning media of web e-learning and schoology especially on vocational school schedules with the use of technology for adaptive and normative subjects. The web e-learning platform can be recommended if the instructor requires e-learning to conduct an assessment in making projects especially RPL expertise programs, while schoology can be recommended as e-learning if the learning needs for resource sharing, task collection, and discussion or collaboration of learning activities between participants students and teachers.

CONCLUSION

Based on the results of research and discussion, this study can be concluded as follows: (1) The results of the t-test calculation of the control group and the experimental group using SPSS

version 20 software obtained data analysis that has been carried out, namely the significance result of 0,000 is smaller than 0, 05 (significance level of 5%). Thus, it shows that the learning outcomes in WPMD subjects there are significant differences between the control group using learning media of schoology and the experimental group using web e-learning learning media. (2) Comparison of student learning outcomes using learning media of schoology (control group) learning media of web e-learning (experimental group) in class XII RPL students of SMK Negeri 1 Sukorejo on Web Programming and Mobile Devices subjects shows that there are differences between the control group and experimental group. Student learning outcomes in the experimental group had a higher percentage value than the control group. From the results of the study note that in the WPMD subjects the control group experienced an increase in completeness by 11.43%. While the increase in the experimental group was 94.12%. The increase in completeness of students by using learning media of web e-learning (the experimental group) was higher when compared to the increase in completeness in the learning group using learning media of schoology (control group).

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