Learning Material in Multimedia Supporting Online Learning

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ABSTRACT:

Through the Ministry of Education and Culture, the Indonesian government has determined that the teaching and learning process must be online related to Covid 19, which has not shown a decline. Online learning is not a common form of learning for education in Indonesia. Determining this online method will affect student learning outcomes if it is not managed correctly. The learning method used so far is face-to-face learning in class or laboratory. They have conducted this research by processing non-parametric statistical data on subject learning outcomes using office software 2017-2020 at Ubaya Polytechnic Surabaya, East Java, Indonesia. Processed five hundred sixty-six data, carried out 444 learning outcomes data face-to-face in class, and carried out 122 learning outcomes data online. To determine the characteristics of the two types of data, the Mann-Whitney test was performed. The Asymptotic Significance value in the Mann-Whitney test is 0.402. This result is more significant than 0.05, so it can be concluded that there is no significant difference in the mean learning outcomes carried out face-to-face in the laboratory with those carried out online. The author modifies the learning process by providing learning material in multimedia form to each student. In this study, questionnaires were distributed to 103 participants, which were used to measure the relationship between learning media and online learning outcomes.

Introduction

At the beginning of the 2019/2020 semester, we were shocked by the news of the Corona Virus (Covid 19) outbreak, which is overgrowing and deadly. The spread of this virus has spread to all countries globally, and the impact of this virus outbreak has changed the entire order of human life. Until now, experts are still researching to find an effective vaccine to treat this disease. The World Health Organization (WHO) has determined that one way to prevent the spread of Covid 19 is to limit activities outside the home. Suppose we are forced to do activities outside the home. In that case, we must follow the established protocols, namely: wearing a mask, washing hands with soap (disinfectant) before and after activities, and maintaining a minimum distance of 1-2 meters for individuals.The Republic of Indonesia's Government responded to the WHO call by establishing various policies, such as Large-Scale Social Restrictions, implementation of work from home (WFH), and restrictions on working in the offices. This policy applies to all activities carried out by Indonesia's people, including all activities that provide educational activities. The Minister of Education and Culture of the Republic of Indonesia as the regulator for implementing educational activities, has determined that online teaching and learning activities during the Covid 19.The online teaching

and learning process has not been carried out for the Indonesian people because learning activities are generally carried out face-to-face in a classroom or laboratory. The application of learning online has a significant impact on educational providers, teachers, and students because learning is something new and suddenly applied. The choice of the most optimal online learning form so that the learning process during the Covid 19 pandemic continues. Changes in the way of online learning must ensure that every student can achieve maximum learning outcomes. Therefore, must well establish the synergy of the three parties**.** Educational institutions must provide reliable communication media and ensure the management of the learning system and process continues well. The teacher is obliged to prepare material and carry out the online learning process with the right method to take place efficiently and effectively. Efficient, which is precise or precise in achieving goals without wasting time, effort, and cost. Efficient, meaning that the activities carried out do not require a lot of money [1]. Students are obliged to follow and carry out the learning process in a disciplined manner.This study aims to measure whether teaching materials in the form of multimedia can increase the effectiveness and efficiency of online learning at the Ubaya Polytechnic and can achieve maximum learning outcomes. The method used to

measure the level of success achieved is to provide a set of questions in the form of a questionnaire and collect data on learning outcomes that have been obtained by students. All data obtained were then processed using descriptive statistics to get information that could be used to conclude this research.

Literature Review

The implementation of education in Indonesia has been regulated in various legal products, including Law Number 14 of 2005 concerning Teachers and Lecturers, Law Number 20 of 2003 concerning the National Education System, Regulation of the Minister of Research, Technology, and Higher Education number: 44 years 2015, 50 of 2018 and Regulation of the Minister of Education and Culture Number 3 of 2020 concerning National Higher Education Standards. Law number 20 of 2003 defines education as a conscious and planned effort to create an atmosphere of learning. Students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and the skills they need, society, and state [2].

Learning is a process of interaction between students and educators and learning resources in a learning environment. Through curricular activities, the learning process is required to use effective learning methods with subject characteristics to achieve specific abilities specified in these courses in a series of fulfilling graduate learning outcomes. The learning outcomes of a graduate must be useful in an optimum period. Educators evaluate student learning outcomes to monitor the process, progress, and improvement of student learning outcomes on an ongoing basis [20].

In the world of education, the application of online learning methods is not new, but this method has not been widely applied in our country's education process. With the restrictions on face-to-face activities set by the government to reduce the spread of Covid 19, online learning methods have become a method that can be applied, especially with the support of very rapid development. Information and communication technology.Distance education is one of the educational methods [3]. Telecommunication technology is a medium for distance education dialogue [4]). Learning materials and distance learning assignments are conducted via the internet (Dictionary from cambridge.org).

Distance education has made a big difference for education providers, students, and educators Cleveland-Innes & Garrison, (2010). Gagne and Briggs [6] state that learning media is a tool for conveying teaching materials' content. One of the learning media is multimedia, a learning material containing various combinations of forms (Vaughan, 2004 [7]). Every student has a learning style in carrying out the learning process [8]. Learning style is a combination of how it absorbs, organizes, and processes information [9]. Can use knowledge of this learning style. To help maximize the learning process [8]. Every student has a visual, auditory, and kinesthetic learning style (DePorter et al., 2000); at least every student has one learning style (Bendler and Grinder (1981) [10]).

Learning in the form of practice aims to train and train students to apply knowledge [11]. This form of practical learning can be done independently and practically [12]. The video included in this multimedia learning media is a form of guidance from educators towards the material described. Simultaneously, the assignment given is in the form of exercises to improve students' ability to transfer their knowledge.

Methods

The research conducted was classroom action research aimed at solving problems experienced by students in taking online learning. The difficulties encountered are communication problems due to unstable network connections and frequent power outages. Action research is any systematic inquiry conducted by teacher researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how their particular school operates, how they teach, and how well their students learn [13].

The research object carried out is the subject the author teaches, namely the use of software for offices. To support this study, sampling as participants used a convenience sampling method [14]. The data that has been collected in this research is processed using SPSS (Statistical Product and Solution Services) software in describing data, testing hypotheses, and looking for correlations or relationships between one or more variables [15].

Methodology

Communication factors that can affect the learning process are educators, students, pathways, and learning media [16]. In the online learning process, students are the main determining factor in the learning process. In this research, finding the best solution for students who have difficulty online learning will be known. Learning difficulties that occur due to students are caused by poor network connections and frequent power outages, which hinder students' and educators' communication process. The solution offered is to create multimedia-based learning media as a solution to these difficulties. The methodology chosen to examine the activities undertaken is Classroom Action Research [17]. There were 122 students as participants in this study. All students are participants in the use of software for offices.

The initial stage is carried out before determining the form of learning media to be made, then first studying students' learning styles. The way this is done is by giving several questions to students [8]. The results of data processing from the answers given, then we can find out that a student has a Visual or Auditory, or Kinesthetic style and can also combine the three learning styles. The calculated data is processed using descriptive statistics to determine the percentage of each learning style. This information is the basis for learning materials made in multimedia format, which contains theoretical explanations of the studied material. It is accompanied by examples of questions (kinesthetic) and is equipped with videos discussing each process carried out to solve the problems (auditory and visual).

Several pieces of software are used in making learning materials in multimedia form. Microsoft Word 2016 software is used to create manuscripts of the material discussed and then saved in .pdf format, and then The Movavi Screen Recorder 11 software is used to make learning videos. Foxit PhantomPDF software is used to combine the two files (learning materials and videos) to equip the resulting learning material with video (multimedia).

Before the learning process is carried out, each student is given the learning material that has been made. So that in the online learning process, using teleconferences only conducts questions and answers about learning material that students have not understood. Students do more learning activities and complete tasks and questions contained in learning media independently [12].

Before carrying out the middle semester exam, each participant was given a questionnaire about the response to the online learning process that had been carried out. The questionnaire given is in the form of questions to measure whether the learning material provided in multimedia supports student learning and how students respond to the learning material. The list of questions given is:

a. whether the learning material help to understand the subject being studied.
b. b. whether the video in the learning material help understands the subject being studied.
c. Whether the examples in the learning material help to understanding the subject being studied.

The answers to the questions above are given using a Likert scale: Not Helpful at all (1), Not Very Helpful (2), Helpful (3), Somewhat Helpful (4), and Very Helpful (5).

a. whether the learning material has been used for learning
b. Whether the sample questions in the learning material have been resolved.
c. Whether the questions in the learning material have been resolved

The answers to the questions above are given using a Likert scale: Never (1), Rarely (2), Sometimes (3), Usually (4), and Very Time (5).

The participants' answers to the questionnaire given were then processed using statistics [18]. The final results of students in the learning process carried out online can be compared with the final results of the face-to-face learning process in a computer laboratory. The data used are 2017 odd semester to odd semester 2020. From odd semester 2017 to even semester 2019, there are 444 final results data for students who carry out face-to-face learning in a computer laboratory. From even semester 2019 to odd semester 2020, there are 122 pieces—last result data of students doing online education. Used the IBM SPSS version 21 software to help analyze data. The first step is to study the two groups of data using the Kolmogorov-Smirnov normality test to know the research data distribution. The two data groups will then be analysed using parametric analysis with an independent sample t-test or non-parametric analysis using the Mann-Whitney test based on the test results.

Data Analysis

Used descriptive statistics to analyze the data used in classroom action research. The data used is the final value data of the learning process, carried out face-to-face in a computer laboratory, and the last score data is done online. Besides, it also uses data from questionnaires given to students who carry out the learning process online. In analyzing information statistically, the first thing to do is test the normality of the data using the Kolmogorov-Smirnov test. These data will determine the next statistical test, whether parametric or non-parametric statistical tests carry it out.

The final score used as the basis for research analysis is extensive group data, so the Mann-Whitney test is used to determine the characteristics of the two data groups. The second data used for calculation is the questionnaire result data from online learning participants. The questions given were divided into two groups: a statement about learning material in the multimedia form given to students and a statement about the student's attitude towards the learning material. The statistical test used in the two group's ideas was to determine the questionnaire's reliability based on Cronbach's Alpha value. Furthermore, to determine the relationship between the two groups of a statement from the questionnaire, it can be analyzed from the linearity results using the ANOVA results.

Results

A set of questions in the book Quantum learning [9] is given to students who take online learning. The results of data processing on the answers to these questions are calculated and processed with descriptive statistics. The results are shown in Table 1.

Table 1. Learning styles of students who take online learning

Learning Styles of Student	%
Auditory	40.21%
Auditory Kinesthetic	13.40%
Kinesthetic	15.46%
Visual	11.34%
Auditory-Visual	9.28%
Auditory Kinesthetic Visual	7.22%
Kinesthetic Visual	3.09%

The final grades of students who are carrying out face-to-face in a computer laboratory from 2017 to 2019 and online learning from 2019 to 2020 are used to determine the two types of learning forms' characteristics. In deciding the statistical test to be used, one must first test the normality's owned data with the Kolmogorov-Smirnov test. The results of the normality test are shown in Table 2.

Table 2. The Kolmogorov-Smirnov test results of the final value of face-to-face learning in the laboratory and done online

Tests of Normality

	lecturing type	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Score student	face to face in the laboratory	.101	44	.000	.942	44	.000
	online	.111	122	.001	.963	122	.002

a. Lilliefors Significance Correction

The significance value of the Kolmogorov-Smirnov test for face-to-face learning = 0.000 0.05 (reference value). These results indicate that the data are not normally distributed, as well as for online learning, the significance value = 0.001 0.05 (reference value) is also not normally distributed. We can see non-parametric test results using the Mann-Whitney test for the two data groups in Table 3.

Table 3. The Mann-Whitney Test calculation of the final value of face-to-face learning in the laboratory and online.

Test Statistics

	score student
Mann-Whitney U	25746.500
Wilcoxon W	33249.500
Z	-.837
Asymp. Sig. (2-tailed)	.402

a. Grouping Variable: lecturing type

Significant Asymptotic Value or p-value is 0.402 > 0.05 (reference value). If the p-value > the

critical limit of 0.05, then there is no significant difference between the two groups of face-to-face learning in the computer laboratory and online (Ho is accepted).

The questionnaire given is in the form of questions to measure whether the learning material provided in multimedia supports student learning and how students respond to the learning material. Reliability measurement of the questionnaire given to students obtained a Cronbach's Alpha value of 0.930 > 0.6. Statistically, the questionnaire instrument used was reliable (table 4).

Table 4. Reliability questionnaire used to obtain research data
Case Processing Summary

		N	%
Cases	Valid	103	100.0
	Excluded[a]	0	.0
	Total	103	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.930	6

In classroom action research, questionnaire data from participants are used to measure the treatment results that have been given—used ANOVA test questionnaire data and final student results to determine the impact of the treatment carried out. Tables 5 show the results of the ANOVA test. Linearity between the learning materials created and students who were given the material can be measured using ANOVA. Table 5 shows the significance value of linearity = 0.000 < 0.05 (reference value). These results illustrate that the learning material in multimedia provided to students has a linear relationship with students' attitudes towards learning material.

Table 5. The Linearity of Learning Media Functions and Students' Responses Using Teaching Media ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Responses to Learning media (total number) * Learning media function (total number)	Between Groups	(Combined)	316.924	7	45.275	24.671	.000
		Linearity	303.453	1	303.453	165.357	.000
		Deviation from Linearity	13.471	6	2.245	1.223	.301
	Within Groups		174.338	95	1.835		
	Total		491.262	102			

Discussions

Table 1 shows the diversity of learning styles that students have, namely: auditory learning styles, namely teaching techniques dominated by acoustic elements, kinesthetic is a learning style dominated by motor activities, and visual learning styles are learning styles that are dominated by the sense of sight. When carrying out the learning process, it is expected to be able to activate all the senses possessed by students so that the process of understanding the learning material is maximized to achieve better learning outcomes [9]. The form of learning material that meets these three criteria

is learning material in multimedia [7]. Software that can create learning materials in multimedia form is Foxit PhantomPDF version 10 [19]. This software provides facilities for adding video and sound into a pdf format file. The learning material that has been made is given to each student to be used as learning material.

The research conducted is a classroom action research aiming to help the limitations of students doing online learning. The study showed on making learning materials that can be used independently by students so that the rules of

face-to-face learning because online learning can still achieve good learning outcomes.

To determine the actions taken that impact the learning process, the first component that can be used as a measuring tool is to compare the learning outcomes obtained by face-to-face learning in a computer laboratory with learning outcomes obtained from online learning. Table 2 displays the Kolmogorov-Smirnov test results on the final score data for each form of learning that is carried out. The significance value of face-to-face learning in the laboratory and online < 0.05 (reference value) means that the two final value data are not normally distributed. For further statistical tests, non-parametric tests are used. This data also provides information that students' average final score is not at the average value of the normal distribution. The intermediate final score of these two forms of learning is the same, namely 66, and the score is above the standard passing grade of 56.

The Mann-Whitney statistical test can be used to determine whether or not there is a difference between the two learning method variables.

Can view the quality of learning from the final score obtained by students. Table 3 displays the Mann-Whiney test results, the value of Asymptotic Significance or p-value of 0.402> 0.05 (reference value). This data provides information that there is no significant difference between the two methods of learning carried out, namely face-to-face in a computer laboratory and those conducted online. This data also supports the previous information that the average final score for the two learning forms is the same, namely 66.

The second component that can be done to test classroom actions carried out classroom research is a survey in the form of a questionnaire to students as participants. Gave six questions to evaluate the learning material created for evaluating actions through online learning. The six questions are:

a. whether the learning material help to understand the subject being studied.
b. Whether the video in the learning material help understands the subject being studied.
c. Whether the examples in the learning material help to understanding the subject being studied.
d. whether the learning material has been used for learning

e. Whether the sample questions in the learning material have been resolved.
f. Whether the questions in the learning material have been resolved.

The questions given to the participants have been tested for reliability. Table 4 shows the tests' results, and the Cronbach Alpha value is 0.930 > 0.6 (reference value). These results indicate that the questionnaire given is reliable.

Questions a, b, c relate to the learning material made, while questions d, e, and f relate to the participants' attitudes towards the given learning media. Table 5 is an ANOVA table with a significance value of linearity = 0.000 <0.05 (reference value). This data provides information that questions about the learning media used and questions about student attitudes towards learning media are linear.

Conclusion

The description previously described illustrates the limitations of two-way communication between students and educators in the online learning process by providing learning material in multimedia form. The learning materials provided encourage students to carry out the learning process independently so that the available communication channels are only used for the question and answer process and discuss learning material that has not been understood. Students' average online learning outcomes are not much different from face-to-face education in a computer laboratory with this form of learning.

Limitations and Future Studies

Factors that support the online learning process are not only multimedia learning materials. Another supporting factor in learning is communication with students and educators. Can view further research from the use of communication technology that is easy to operate by students and educators and is cheap to use (not large requires internet quota). Besides, the means of communication used must be stable and can be used when students ask for explanations from educators or fellow students.

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