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The Effectiveness of Learning Media as a Supporter of Online Learning in Computer Networking Courses

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INTISARI

Kurangnya inovasi dalam pemanfaatan media pembelajaran pada masa pandemic covid-19, mengakibatkan mahasiswa kurang termotivasi dan memiliki semangat belajar yang rendah dalam proses pembelajaran jaringan komputer. Untuk mengatasi masalah tersebut, salah satu alternatifnya adalah dengan mengembangkan media pembelajaran pada era pandemic. Tujuan dari penelitian ini adalah melihat keefektifan dari media pembelajaran yang dikembangkan sebagai pendukung pembelajaran daring pada matakuliah jaringan komputer. Metode penelitian dari pengembangan media pembelajaran yang digunakan Reseach and Development (R&D) dengan menggunakan pendekatan model Instractional Development Institute (IDI). Model pendekatan IDI meliputi tiga tahapan yaitu define, develop, dan evaluate. Uji keefektifitasan dilakukan pada tahapan evaluate dengan melakukan perlakuan kelas control dan kelas eksperimen kepada mahasiswa yang mengambil matakuliah jaringan komputer mengunakan instrumen soal. Hasil dari penelitian ini yaitu mendapatkan hasil keefektifan media pembelajaran yang dikembangkan dan dapat meningkatkan hasil belajar mahasiswa dengan niali postest rata-rata 84,78%. Dengan dilakukanya penelitian ini diharapkan mahasiswa dapat termotivasi dan memiliki semangat belajar pada era pandemic covid-19.

Kata kunci: *Efektifitas Media Pembelajaran, IDI, Jaringan Komputer.*

ABSTRACT

With the issuance of a study from home policy by the government during the COVID-19 pandemic, the learning process is carried out online. this makes lecturers innovate in using learning media in the learning process. The lack of use of learning media during the COVID-19 pandemic resulted in students being less motivated and having low learning enthusiasm in the computer network learning process. To overcome this problem, one alternative is to develop learning media in the pandemic era. The purpose of this study is to test the effectiveness of the media developed to support the online learning process. The research method of developing learning media used is Research and Development (R&D) using the Instructional Development Institute (IDI) model approach. The IDI approach model includes three stages, namely define, develop, and evaluate. The effectiveness test is carried out at the evaluation stage by treating the control class and the experimental class to students who take computer networking courses using question instruments. The results of this study are the effectiveness of the developed media and can improve student learning outcomes with an average post-test value of 84.78%. By doing this research, it is hoped that students can be motivated and have a passion for learning in the era of the COVID-19 pandemic.

Keywords: *Effectiveness of learning media, IDI, Computer Network*

INTRODUCTION

The development of information technology makes the higher education system flexible without being limited by space and time. Information is not only limited to face-to-face meetings in class, but students can obtain information by accessing information from home and can interact at any time [1],[2]. In the era of the industrial revolution 4.0, the Minister of Research, Technology and Higher Education encouraged universities (PT) to develop online learning, especially with the regulations issued by the government related to the learning process carried out from home during the pandemic, making universities also have to innovate in applying and utilizing technology to support the online learning process [3][4]. Therefore, universities and lecturers are required to innovate and be more creative in creating alternative learning media related to the effective and efficient use and utilization of technology in online learning [5]. By studying at home, the biggest difficulty faced by lecturers is when implementing the home study method. Therefore, all means must be done so that there is a significant increase even though learning is carried out online [6].

One of the alternative learning resources that can be created by lecturers is by utilizing learning media. However, based on existing facts, learning media have not been fully used by lecturers as an alternative source of learning, the first reason being using media is troublesome, secondly the media is sophisticated and expensive, the three lecturers are not skilled at using media, the four media are entertainment, while learning is serious. the fifth is not available on campus, the sixth is the habit of enjoying lectures or talking, the seventh is the lack of appreciation from superiors [7][8].

In the learning process carried out in computer network courses, they still use simple PowerPoint learning media which are only in the form of slides, so that students do not understand in depth the material given by the lecturer. This causes students to be less interested in listening to or reading the presentation of material from the lecturer during the learning process [9][10]. Then the lecturers and students also have problems when presenting the material given by the lecturer, including the short time, the network is not optimal and the internet quota is limited during the presentation of the conference. Therefore, learning media is needed that can really be understood and absorbed by students [11][12][3].

Educators have challenges in dealing with online learning, one of which educators must be able to quickly master how to use and apply learning media capable of supporting learning objectives [13][14]. Not only that, an educator is also expected to be able to innovate and be creative in the learning process so that learning objectives are achieved optimally [15][16]. Effective learning is learning that is able to support the achievement of instructional objectives of learning and can support the learning process by having adequate facilities and infrastructure, so that students get an attractive learning experience and foster student activity in the learning process [17][18][19].

METHOD

This research uses the Research and Development (R&D) development method. Research and Development is a process or steps to develop a new product or improve an existing product, which can be accounted for. In this study developing a learning media product using the Instructional Development Institute (IDI) approach model. The principle of this IDI model approach has three stages, namely determination, development, and evaluation. The initial stage in this model is determining, in this determination identifying the problems that occur, then conducting curriculum analysis, and also analyzing the characteristics of students, as well as analyzing learning materials and concepts. The second stage, is the development stage, which is carried out in developing a prototype of the product and validating the product. The third stage is the last stage of this model, namely the assessment stage. At this assessment stage, the effectiveness of the learning media that has been developed is tested [20]. To obtain the data needed in this study used data collection techniques in the form of a questionnaire. Questionnaire is a data collection technique that contains a list of questions or statements given to other people who are willing to respond according to their wishes. The data analysis technique used in this research is descriptive analysis. Meanwhile, the tolls used for data analysis use SPSS.

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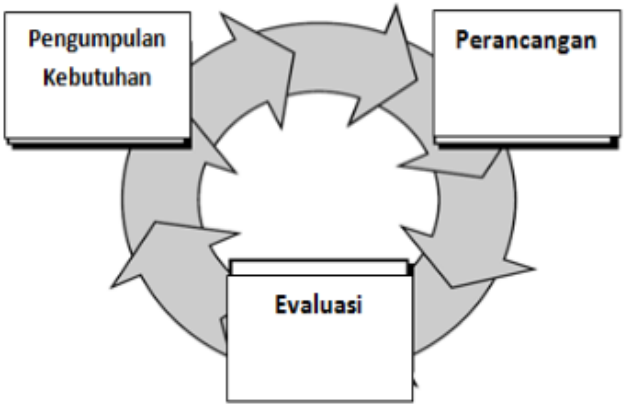

Figure 1. Prototype Model Design

At the determination stage, determine and define the needs of the learning requirements which consist of analyzing student characteristics, analyzing drafting concepts and identifying the main concepts of learning.

At the design stage, design a prototype interface design from the developed learning media and perform expert validation.

At the evaluation stage, activities are focused on evaluating whether the initial design (prototype) can be used as expected and is effective as a media to support student online learning. the effectiveness test of learning media was tested on the treated class and the untreated class. The control class was not given media for independent study, while the experimental class was given media for independent study. The effectiveness of learning media can be seen by comparing the post-test learning outcomes in each class. Comparison of learning outcomes in the control and experimental classes was analyzed using the t test.

2.1 Validity

In a question, it is said to be valid if the question can measure what is being measured. Testing the validity of the test instrument is done by comparing the instrument with the material that has been taught. Technically, this is done by making an instrument grid as a guide in selecting test items. Meanwhile, to determine whether or not the question is used, it is analyzed by looking for the level of difficulty and reliability, as well as the power of difference.

2.2 Question difficulty index

The problem difficulty index is a number that shows the difficulty and ease of a question [21]. To determine the level of difficulty of the problem, the equation is used.

$$P = B/Js$$

Description:
P = difficulty index
B = Number of correct answers
Js = Jumlah yang mengikuti tes

Table 1. Classification of Problem Difficulty Levels

No	Difficulty Index	Classification
1	0,00 ≤P ≤0,30	Hard
2	0,30 ≤P ≤0,70	Currently
3	P > 0,70	Easy

RESULTS AND DISCUSSION

To support the learning process carried out online by lecturers, it is necessary to develop learning media, so that the learning process can run optimally in the pandemic era.

In the first stage of research and information gathering, this is the initial stage in developing learning media. At this stage of needs analysis, several analyzes were carried out including determining the RPS, analysis, concept analysis, and student characteristics.

In this second stage, the researcher designs learning media as a learning support from computer network courses through designing and testing valid learning media that have been developed.

Figure 2. Learning Media Display

In the third, the researchers tested the effectiveness of the developed learning media. Before the test was given to the sample class, a trial was first conducted to determine the the validity of the questions, the reliability of the questions, the level of difficulty of the questions and the power of discrimination.

3.1 Testing Question Validity

Testing the validity of the test instrument was carried out by testing questions on computer network course students (outside the sample) with the assumption that they were both carried out in computer network courses. After testing the validity of the item items from the 30 questions given to the students, there were 25 valid questions and 5 invalid questions, meaning that the invalid questions were discarded.

3.2 Test the reliability of the questions

Test reliability is a measure of whether the test can be trusted. The results of the calculation of the reliability of the questions are known that all the questions are reliable.

Table 2. Reliability test

Reliability Statistics

Cronbach's Alpha	N of Items
.887	25

The results of reliability using IBM's SPSS obtained a value of 0.887. These results are compared with r table. The test is declared reliable if r calculation results > r table. According to the r table, for N=30 and a significant level of 5%, the value of r is 0.361. Then we get r count > r table = 0.887> 0.361. From the results of the analysis and based on the interpretation of the value of r, it can be seen that the test has a high level of test reliability, namely 0.887.

3.3 Difficulty Index Test

The difficulty index of the questions made is to see whether the questions that have been made are in the difficult, medium or easy categories. Of all the questions that have been tested, then an analysis is carried out and the results are that 1 question is classified as moderate criteria, 1 question is classified as difficult and 28 questions are classified as easy criteria.

3.4 Differential Power Test

From all the questions that have been tested, a question analysis was carried out and it was found that 2 questions were in the good category, 11 questions were in the sufficient category, and 17 questions were in the bad category.

3.5 Student Learning Outcomes

Student learning outcomes (posttest) of control class students (classes do not use learning media) of 20 students of class 5f obtained results for posttest 77.15 and experimental class (using learning media) of 19 students of class 5c obtained results for posttest 84.78.

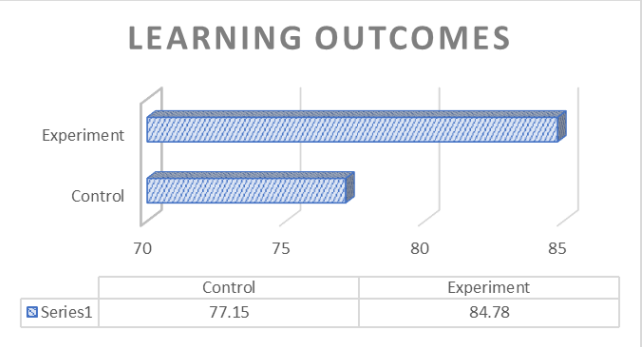

Figure 3. Learning Outcomes

Furthermore, to determine the significance of the difference in learning outcomes of the two classes, a t-test was carried out as follows:

1. Normality Test

From the results of the normality test that has been carried out with SPSS, the following values are found:

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	kelas	Statistic	df	Sig.	Statistic	df	Sig.
hasil	kontrol	.162	20	.177	.948	20	.333
	ekperimen	.159	19	.200*	.934	19	.202

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

a. Lilliefors Significance Correction

Figure 4. Normality Control and Experiment Class

From Figure 4 obtained a significant value based on Kolmogorov for the control class of 0.177 and for the experimental class of 0.200, so it can be said that the data is normally distributed because > 0.05.

2. Homogeneity Test

The results of the homogeneity test on the learning outcomes of the control and experimental classes are as follows:

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Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
hasil	Based on Mean	1.416	1	37	.242
	Based on Median	1.521	1	37	.225
	Based on Median and with adjusted df	1.521	1	26.708	.228
	Based on trimmed mean	1.401	1	37	.244

Figure 5. Homogeneity Test Results

From Figure 5. it can be seen that the significant value is 0.242 > 0.05 so that it can be said between the control and experimental classes in the homogeneous category.

3. T-test

Based on the post-test normality and homogeneity testing, it is said that the two classes are normally distributed in homogeneous variants, so that the test for the difference between the two class averages is as follows:

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	hasil - kelas	79.38462	5.41254	.86670	77.63007	81.13916	91.594	38	.000

Figure 6. T-Test Results

From Figure 6. the significant value is 0.000 > 0.05 so it can be said as having a significant difference between the two classes

CONCLUSION

Learning media developed as a means of supporting online learning can be said to be effective seen from the learning outcomes of students who take the test before using learning media and after using computer network learning media which shows an increase in student learning outcomes. So, it can be concluded that the learning media developed as a supporting medium for learning during the COVID-19 pandemic can be said to be effective in improving student learning outcomes.

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