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DEVELOPMENT OF LEARNING MEDIA AS A SUPPORTER OF ONLINE LEARNING IN COMPUTER NETWORK COURSES

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ABSTRACT

The results of this study are as follows: (1) The validity of interactive learning media is declared valid in terms of content with a value of 0.85, (2) the practicality of interactive learning media is obtained from the teacher's response and student responses, from the student's response it is obtained an average of 87, 33 and the teacher's response was 93.57 with the practical category. (3) the effectiveness of interactive learning media obtained from student learning scores after using learning media obtained the number of students who passed were 26 students (86.7%) of 30 students and stated that the media was effective for improving student learning outcomes through the Gain score test with a value of 0 ,53 medium category.

***Keywords**: Interactive learning media, online learning*

INTRODUCTION

National education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble character, are knowledgeable, capable, creative, independent, and become democratic and responsible citizens in the context of educating the nation. Education as an indicator of the nation's progress is seen as very important in the development process. Therefore, there is a need for continuous and continuous improvement so that the quality of education is increasing.

Vocational High School (SMK) is an upper secondary level vocational education provided by the government in order to prepare a ready-made workforce. This is in accordance with the instructional objectives of vocational secondary education, namely that students are expected to become professionals who have adequate, productive, creative skills and are capable of entrepreneurship. Vocational High School graduates who have quality in their fields, require efforts to create competitive qualities, such as completing facilities and infrastructure, improving the quality of teaching staff, and improving the curriculum that emphasizes the development of aspects that lead to the improvement and development of life skills (Life Skills).) which is realized through the achievement of student competencies to be able to adapt and succeed in the future.

SMKS Harapan Utama is one of the formal education pathways for vocational secondary education which has the same goal as vocational high schools in general, namely to produce quality graduates who have special skills according to their field of expertise, are ready to work, and

continue their studies in accordance with their vocational field. The goals that have been formulated and planned by the school in achieving are influenced by several elements. One of these elements is the implementation of a good learning process in the classroom. Good learning can be implemented, one of which is the implementation of a learning process that applies a good and adaptive learning culture to the progress of science and technology (IPTEK).

21st century learning is no longer centered on teachers but student-centered learning, where students are required to be more active in seeking, understanding, and analyzing subject matter in a learning process. In addition, the learning process is carried out using computer-based or Information and Communication Technology (ICT)-based learning methods and media that are more interactive and interesting, no longer only using simple presentation learning media, especially for abstract learning materials (Devega, 2019). It is intended that students are more active in participating in the learning process and able to follow the progress of science and technology so that in the end students' learning outcomes increase and reach the minimum completeness criteria (KKM) that have been applied.

One of the subjects taught in Vocational High Schools (SMK) especially in the Department of Computer Network Engineering (TKJ) is computer assembly. Learning Computer assembly uses personal computer components as the main media to carry out the learning process. In computer assembly subjects, the material is generally theoretical and practical, the material studied in this subject invites students to recognize the components of computer equipment, understand the functions of components, and be able to apply them when assembling a computer. Students are expected to be able to find solutions if there are problems when assembling the computer.

For computer assembly learning materials usually use textbooks, job sheets, and power points and there is no interactive media available that makes it easier for students to repeat learning materials. Learning is still focused only on the teacher and the lack of activeness of students during the learning process, as well as the level of doubt of students to try the material provided by the teacher because the level of understanding is still low. This is evidenced by the results of the 2016/2017 odd semester midterm exam. Learning media that have been provided by schools and teachers have not been able to overcome the problems faced by students so that it is easy and fast to achieve the expected competencies. This results in learning activities to be less interesting and not optimal. The purpose of the learning process is focused on the level of ability of students, but in reality not all students understand in depth the substance of the material, how to link what is learned with its application in the industrial/work world and how to use the knowledge gained to support getting a job. Application of computer assembly learning. It cannot be done only once, but needs to be repeated by students so that the subject matter can be mastered.

Smaldino (2008), (Novita, & Harahap, 2020) argues that, "Learning media is a message-carrying technology that can be used for learning purposes; learning media is a physical means to deliver subject matter; Learning media is a means of communication in print and visual form, including hardware technology. Interactive learning media is very necessary during the computer assembly learning process because not all of this subject matter can be understood by just reading but requires media in displaying something animated and illustrated that is difficult for students to understand. And the use of media makes it easier for students to learn individually or in groups by repeating learning. Therefore, with the existence of interactive learning media, it is hoped that students can understand learning so that it is easier to understand concepts.

Based on this fact, it is necessary to look for other alternatives by innovating and approaching the use of effective, and adaptive learning media with technological advances and being able to support learning activities for delivering material to students during the learning process in class.

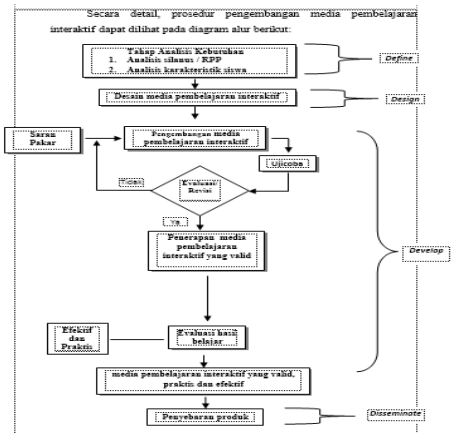
Thus the learning process can be active, innovative, creative, effective, and fun which in the end, increases student learning outcomes. One approach that is able to realize the learning situation is a learning approach using interactive media based on Information and Communications Technology (ICT).

METHOD

A. Types of Research and Research Design

This research is research and development (Research and Development), it can be seen based on the formulation of the problem that was revealed earlier. In this development research, the product that has been advertised is in the form of learning media using Lectora Inspire software. According to Sugiyono (2008), "development research is research that is used to produce certain products and test the effectiveness of these products".

The development model used is the 4D (Four-D) development model. Riyanda (2019), (Adzan, et, al, 2021) stated that the development process consists of 4 stages including: Define, Define, Design, Develop and Disseminate. This development model was chosen because this model has a systematic procedure, in accordance with the problems underlying this research. With the needs analysis, looking at the characteristics of students, and with the condition of the existing school facilities, the researchers hope that with this model, valid, practical, and effective learning media can be developed.



B. Development Procedure

1. Define Stage

This research intends to develop a pre-existing learning media. This media was developed because the previous media only used conventional media, students were not required to be directly involved in the learning process, in other words learning was still focused on the teacher. In the subject of computer assembly to examine more deeply about the personal computer itself and how to properly assemble a computer, so the author wants to develop media that has been used in learning computer assembly in the hope that after students use the media that the author has developed students can practice and analyze problems that happened.

2. Design Stage

The selection of interactive multimedia is done because it is relevant to the characteristics of the computer assembly material. In addition, interactive learning media are also selected according to the needs analysis and analysis of student characteristics. The

research instrument consisted of 1) a validation sheet for developing interactive learning media, 2) a practical sheet for developing interactive learning media, 3) an analysis sheet for student learning outcomes.

3. Development Stage

At this stage, the following steps are carried out:

a. Designing Prototypes

Make an initial design (propotype) of Interactive learning media whose content is adjusted to the applicable syllabus and lesson plans.

b. Validation Stage

The validation process is accompanied by discussions or direct interviews with experts regarding improvements that must be made by means of designing interactive learning media for computer assembly subjects which are consulted first to experts or experts and supervisors, then the design is assessed by competent people (validators) who have understood the principles of media development.

c. Practical Stage

Interactive Learning Media is said to have high practicality if it is practical, easy to administer. In the sense that it is easy to use, easy to check and complete with clear instructions. At this stage the data collection was carried out using a practical questionnaire by teachers and students. The media practicality questionnaire by the teacher contains the ease of using the media, the time used, easy to interpret, and the equivalence of the media.

d. Effectiveness Stage

This stage is carried out to assess whether the developed media can be used as expected to improve the quality and student learning outcomes. The instrument used to collect data on the effectiveness of the media is a test.

Table 2 Product Trial Design

Pretest	Treatment	*Posttest*
O_1	X	O_2

Source: Sugiyono (2009)

4. Stage of Dissemination (Disseminate)

The dissemination stage will be carried out by means of media socialization through distribution in limited quantities to teachers and students. This distribution is intended to obtain responses, feedback on the media that has been developed.

C. Data Analysis Techniques

1. Analysis of the Validity of Interactive Learning Media

Content and media validation analysis is based on the results of the validator's assessment. The data obtained through a questionnaire, were analyzed using descriptive statistics. The steps to perform the analysis are:

a. Determine the average score obtained by adding up the values obtained from many indicators.

b. Aiken's V statistic is formulated as

$V = \sum s / [\, n\,(c - 1\,]$ (1)

Description :
s = r – lo
lo = Low validity score (in this case = 1)
c = The highest value of the validity assessment (in this case = 4)
r = Number given by an evaluator

The results of Aiken's calculations range from 0 to 1 and the number 0.6 can be interpreted as having a fairly high coefficient, so the V value of 0.6 and above is declared in the valid category.

2. Analysis of the Practicality of Interactive Learning Media Questionnaire

Questionnaire Analysis of the Practicality of Interactive Learning Media

The results of the research through a questionnaire on the media from teachers and students. The assessment will obtain responses or opinions from lecturers and students to determine the practicality of learning media

a. Determine the average score obtained by adding up the values obtained from many indicators.
b. The value of practicality with the formula:

$NA = . \frac{S}{M}\ x\ 100\%$ (2)

Description:
NA = Final Score
S = Score obtained
SM = Maximum Score

3. Analysis of the Effectiveness of Interactive Learning Media

Effectiveness analysis is used to measure the level of student learning completeness obtained from student learning outcomes using test instruments.

a. Effectiveness Test
1) Gain Score Test

After doing research and doing calculations to see the increase in student learning outcomes using the gain score formula. The developed interactive learning media can be said to be effective if the gain score is > 0.30 or at least in the moderate category.

2) T test

Sudjana, (2006). suggests that to compare the state of the object of research before and after treatment can be tested with the following t-test formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{{S_1}^2}{n_1} + \frac{{S_2}^2}{n_2} - 2r\left(\frac{S_1}{\sqrt{n_1}}\right)\left(\frac{S_2}{\sqrt{n_2}}\right)}}$$ (3)

Description :
t = Value t count
= average posttest score
= average pretest score
= Posttest standard deviation
= standard deviation of pretest

= many pretest subjects
= many posttest subjects
= correlation between two samples

RESULTS AND DISCUSSION

This section presents all the data collected from each stage of learning media development.

1. Define Stage (Determination)

a. Curriculum Analysis

This curriculum analysis refers to the syllabus and lesson plans for mathematics. The material/subject developed in interactive learning media is a topic in the syllabus of the computer network course.

b. Analysis of Student Characteristics

Based on the analysis of these students, it is taken into consideration in the development of interactive learning media on basic competencies, namely interactive learning media that have been developed in accordance with the conditions and characteristics of students, with the existence of interactive learning media, it is hoped that students can more easily understand computer network courses.

2. Design Stage

The results of the analysis from the definition stage are used for the next stage, namely the design stage. The details of the design stage are as follows:

a. Media Selection
b. Designing Prototypes
c. Media Creation

3. Development Stage (Development)

When the design stage is complete, the next stage is the development stage. This development stage aims to produce valid, practical and effective interactive learning media. This development stage consists of media and material validation assessments by validators and practicality assessments by teachers and students. And at the end, a test is conducted to determine the level of effectiveness of the developed interactive learning media.

Table 3 Assessment of Learning Media Validators

No	Validator	Aiken's V	Description
1	Validator 1	0,867	Valid
2	Validator 2	0,833	Valid
Total		0,85	Valid

Based on the results of the media validation analysis, the value of Aiken's V learning media in the computer network course is 0.85, so it can be concluded that the learning media in the computer network course is valid and the media can be used.

At this stage, a field test was conducted to determine the level of practicality of the interactive learning media that had been developed. The practicality test data was obtained from filling out the interactive media practicality questionnaire.

a. Teacher's Response to the Practicality of Interactive Learning Media

The following is the practicality assessment data by the teacher in the table 4

Table 4. Table of Practicality Assessment by Teachers

No	Responden	Presentase %	Description
1	Validator 1	94,29 %	Very Practical
2	Validator 2	92,86 %	Very Practical
Total		93,57 %	Very Practical

Based on the results of the analysis of the practicality assessment data by the teacher on learning media in the computer network course, it is 93.57% which if interpreted with the level of practicality, the practicality level of interactive learning media in the computer network course is at a very practical level.

b. Student Response to the Practicality of Interactive Learning Media

Based on the results of the analysis of practicality data through student responses, the practical value of interactive learning media in computer networking courses is 87.33% which when interpreted with the level of practicality, the practicality level of interactive learning media in computer network courses is at a very practical level.

The effectiveness of using interactive learning media in computer assembly subjects is reviewed in two ways, namely by looking at the classical KKM achievement and by calculating pretest and posttest data using gain score analysis.

Table 5. Results of Effectiveness Analysis Based on KKM

NO	Jumlah Siswa	Nilai Maksimum	Nilai Minimun	Rentang Nilai			
				< 75 (Tidak Tuntas)	%	≥ 75 (Tuntas)	%
1	30	92	64	4	13,3	26	86,7

Source: Processed primary data

The results of the analysis using SPSS from the pretest data are presented in table 6.

Table 6. Results of Pretest Data Analyst

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	30	44	80	61.73	10.167
Valid N (listwise)	30				

The results of the analysis using SPSS from the pretest data are presented in table 7.

Table 7 Results of Posttest Data Analyst

	N	Minimum	Maximum	Mean	Std. Deviation
Postes	30	64	92	81.87	6.101
Valid N (listwise)	30				

4. Gain Score Test Results

The gain score test is used to see the increase in student learning outcomes from the pretest and posttest scores. The following are the results of the gain score test.

Table 8. Gain Score Test Results

Responden	Pretest		Posttest		gain score	Kategori
	Benar	Nilai	Benar	Nilai		
Jumlah		1852	Jumlah	2456		
Rata-rata		62		82	0,53	sedang

Source: Processed primary data

5. t test results

The calculation of the tcount value is carried out using SPSS version 16. The results of the analysis for tcount can be seen in the table below.

Table 9. t test results

	Levene's Test for Equality of		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence	
								Lower	Upper
nilai	10.674	.002	9.300	58	.000	20.133	2.165	15.800	24.467
			9.300	47.488	.000	20.133	2.165	15.779	24.487

Based on the results of data analysis using SPSS 16, it can be seen that the t arithmetic value is 9.300 > t table 1.697 and the significance value is 0.00 which is smaller than 0.05, it can be concluded that there is a significant difference between the pretest and posttest. Posttest learning outcomes are better than pretest learning outcomes, this can be seen through the average posttest results which are greater than the pretest. Thus, it can be concluded that interactive learning media is effectively used in computer assembly subjects for class X TKJ SMK.

CONCLUSION

Based on the results of the research on the development of learning media that has been carried out, the following conclusions are obtained: The results of the study are interactive learning media on computer network subjects with the process of developing interactive learning media referring to the 4-D development model, namely Define, Design Develop, and Dessiminate. In this development research, it produces an interactive learning media that is valid, practical and effective, in the subject of Computer Assembly class X TKJ Department, this is proven because this interactive learning media has undergone validity, practicality and effectiveness trials carried out on validators, teacher and student. This interactive learning media developed is based on competency standards, and basic competencies from computer networking subjects

The results showed that the validity of interactive learning media was declared valid in terms of content with a value of 0.85, the practicality of interactive learning media was obtained from teacher responses and student responses, from student responses obtained an average of 87.33 and teacher responses were 93.57 with practical category. The effectiveness of Interactive learning media is obtained from student learning scores after using learning media obtained the number of students who pass is 26 students (86.7%) of 30 students and states that the media is effective to improve student learning outcomes through the Gain score test with a value of 0.53 categories currently.

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