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The development of interactive learning media in computer and basic networks subject on computer and netwroks engineering of SMKN 2 Lubuk Basung

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Abstract- The purpose of this research is to develop interactive learning media on computer and basic networks subject that are valid, practical and effective. This reasearch is used the Four-D design model that is applied to develop and test the validity, practicality and effectiveness of interactive learning media in computer and basic networkinglearning. The research is used the Four-D model include defining, designing, developing, and distributing. The results of the validity test on interactive learning media are valid. Based on teachers and students responses about instructional media shows the results of interactive learning media are very practical and learning outcomes from students indicate the learning media has been effectively used for computer and basic networkinglearning. The analysis resultshows that interactive learning media is better in improving student learning processes.

Keywords: *Interactive learning media; Four-D; Computer and Basic Networking*

I. INTRODUCTION

Curriculum development in Indonesia has eleven changes in the curriculum, namely: Curriculum 1947, 1952, 1964, 1968, 1975, 1984, 1994, Competency Based Curriculum (CBC), Education Unit Level Curriculum (SBC), Curriculum 2013 and Curriculum 2013 revision. Curriculum 2013 is the development of curriculum and 2006 prepared in accordance with the objectives of Education and based on evaluation of the previous curriculum to meet the challenges of the future (GMBI, 2018) [1]. Vocational Secondary Education Curriculum Structure changes of subjects in vocational skills programs, including the Program of Computer Engineering and Informatics (Decree of the Director General of Primary and Secondary Education No. 130 / D / KEP / KR / 2017, 2017) [2]. Subjects' basic skills program which it is originally consisted of the Operating System.

Learning media is a communication channel tool, and the media comes from Latin which means the intermediary between the source of the message with the recipient of the message, this was stated by Heinich [3]. Furthermore, Gagne in Sadiman states that the media are various types of components in students' environment that can provide stimuli for learning [4]. Miarso reinforces Gagne's statement by stating that learning media are everything that is used to distibute messages and stimulate students' thoughts, feelings, concerns, and desires, so they can encourage a deliberate, purposeful, and controlledlearning process [5].

Learning methods that use media in learning determine the level of success in teaching and learning. The use of appropriate media will make students actively find teaching materials from various learning sources. [6]. According to Djamarah learning media play an important role in PBM (Teaching and Learning Process). The Submission of material can be helped by bringing up the media to be an intermediary. [7]. Technology provides so many changes into human life. Its direction and development has changed in how humans interact and carrying out their lives. One of the direction of technological development towards the ease of sharing information that is applied in the form of a world wide web base where every information can be disseminated and accessed by anyone, anywhere and anytime through the internet network.

Website means themedium for delivering information which is available in individually, in groups, or in organizations. [8]. One of the supporting media for learning is the Web-Based learning media. The characteristics of this interactive Web-based learning media have a very high degree of flexibility and portability, so students can access learning materials anytime and anywhere

Based on observations made at SMKN2 Basubuk on January 22, 2019 by conducting observations and interviews withteachers and students of Computer and Basic NetworksSubject (KJD)information is obtained, that in PBM at SMKN 2 LubukBasung, teachers only use LCD projectors and multimedia blackboards as a tool to convey learning material. Then, grade X of TKJ students'use the internet as one of the accesses in seeking knowledge or looking for material in their spare time. The availability of internet access at the school is sufficient in every corner and place at the school, as in the study rooms. But this is not give good impact on student learning outcomes. This marked when the initial data is collected on student learning outcomes; it is obtained information that is most of the student learning outcomes do not reach the KKM (Minimum Criteria of mastery learning) limit. The data of daily teast result of computer and basic networking subject on grade X of TKJ class only 39% achived the KKM and 61% of students are not reached the KKM that had been set at 75. This identifies het students' mastery on the basic competencies of the anatomy evaluate model. It is marked when the initial data of student learning outcomes is collected, most of the students learning outcomes do not reach the KKM limit.

Based on the fact, it is necessary to look for the other alternatives by making innovations and approaches in using the effective and adaptive learning media with the technological advances and able to support learning activities in delivery the material to students during the learning process in the class. One of them is a web-based interactive learning media. Thus, it is necessary to conduct research on the development of web-based interactive learning media by using subline text software on computer and basic network subjects' X class majoring in Computer Engineering and networking conducted at SMK Negeri 2 LubukBasung.

II. METHODS

This research is used research methodology development (Research and Development), with development model of the 4-D [9].

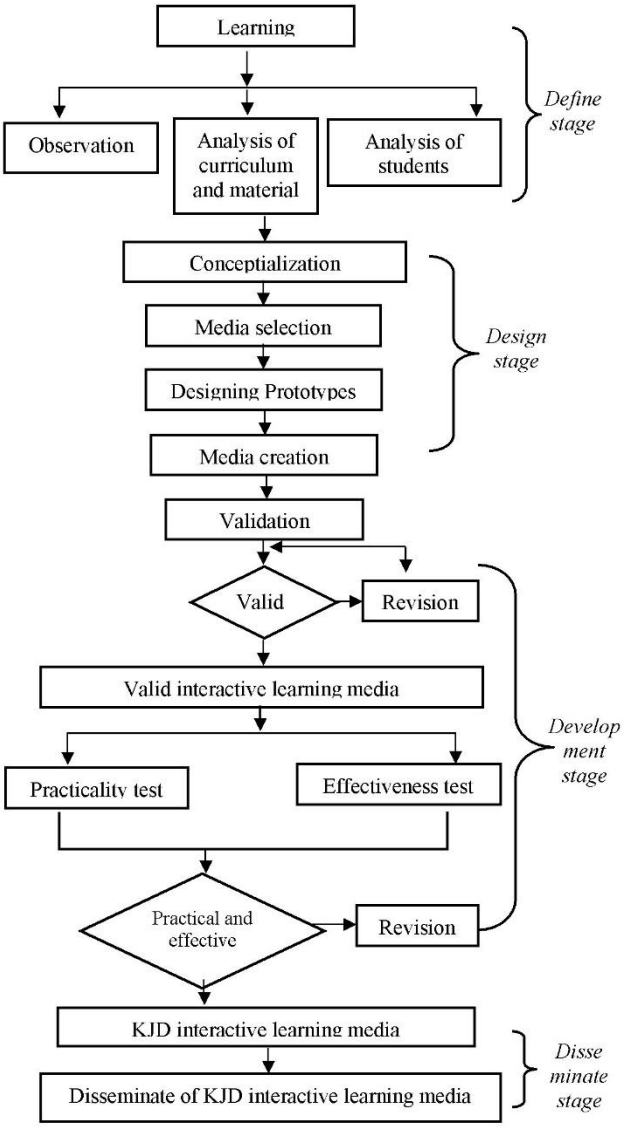

Figure 1. Research development procedures

The research instrument that is developed to collect the data in this study isobservation, questionnaires, and test questions. The Data analysis is obtained from validation by experts, practicality by teachers and students, as well as student learning outcomes data obtained from product trials. The data analysis technique is used descriptive method. The instruments is used to collect data in this study are instruments of validity, practicality and effectiveness.

The validity instrument is divided into 2 instruments; the material validity instrument which contains the assessment and response to the material in basic competence that consist the suitability of the material on interactive media with a computer and basic network syllabus of the grade X class. Media validity which contains responses and assessments about the suitability of the media developed against the criteria and principles of learning media.

This instrument is in the form of a questionnaire or validation sheet that is used to obtain the data about the validity of the learning media developed. The questionnaire was submitted to the material expert, and the media expert after it was designed. The validation data is processed to become a reference for determining the validity of the developed interactive learning media.

The questionnaire consisted of statements to determine the validity of the media and provided alternative answers to these statements. Media validity was analyzed using descriptive statistics and carried out by following the following steps:

a. *Answer score with the following criteria:*
   1 = No
   2 = Yes
b. *Determine the total score obtained by adding up the scores obtained from many indicators*
c. *The maximum score for each item of validity is 1*
d. *Analyze the valuator's decision by using Cohen's Kappa inter-rater valuation analysis using the SPSS 20 application*. With the criteria if the significance value less than 0.05 (P <0.05) the media is considered valid and if the significance value greater than 0.05 (P> 0, 05) media is considered invalid.

Practicality instrument is an instrument which is used in the form of a questionnaire, to obtain data about the practicality of learning media developed. The questionnaire was handed over to the teacher and students. Practicality questionnaire contains responses and assessments about the practicality of the use of interactive learning media that were developed primarily in explaining its function as a learning medium used in a learning process. The practicality of the media is analyzed by using descriptive statistics and carriedout by following a few steps below [10]:

a. Answer score with the following criteria:
   1. = Strongly Disagree
   2. = Disagree
   3. = Doubtful
   4. = Agree
   5. = Strongly Agree
b. Determine the average score obtained by adding up the scores obtained from many indicators

The maximum score on each item for practicality is 5.

a. *Grading practicality with the formula:*
   Point of Practicality in

$$\% = \frac{\text{Total of Practically Point}}{\text{Maximum of Practicality}} \text{ X } 100\ \%$$

b. *Provide an assessment of the practicality of this interactive multimedia with the criteria presented in the table.*

Table 1. Classification of learning media practicality

No	Achievement Level (%)	Classification
1	81-100	Very Practical
2	61-80	Practical
3	41-60	Pretty Practical
4	21-40	Less Practical
5	0-20	Not Practical

Effectiveness of the instruments are used to obtain the data about the level of effectiveness of the learning media developed, which are valid and reliable learning outcomes tests. The effectiveness of the instrument consists of two test questions that are the pretest and posttest instruments, this is because the used of product trial design is the One Group Pretest-Posttest design. The learning achievement test is used to obtain the data needed to determine the effectiveness of interactive learning media. Effectiveness analysis is done by looking at classical completeness and paired data t test analysis for the results of the pretest and posttest.

The analysis is used an analysis of the differences in learning outcomes before and after treatment using the t-test formula paired sample (related samples). Sugiyono (2008: 23) argues that to compare the state of research objects before and after treatment can be tested with the following paired t-test formula [11].

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

t = t poin calculated
$\bar{X}_1$ = *pretest* average poin
$\bar{X}_2$ = *posttest* average poin
S_1 = *pretest*standard deviation
S_2 = *posttest*standard deviation
n_1 = *pretest*number of subjects
n_2 = *posttest*number of subjects
r = correlation between two samples

In this research the paired sample of t-test analysis was conducted using the SPSS 20. The decision criteria if the significance value ≤ 0.05 then there were significant differences in student learning outcomes between before and after the implementation of the learning process using interactive learning media, so that interactive learning media is effective. In the other hand, if the significance value> 0.05 then there is no significant difference in student learning outcomes between before and after the implementation of the learning process using interactive learning media.

III. RESULTS AND DISCUSSION

A. Defining stage

The research began with data collection before making instructional media; definition stage. This Define Phase aims to bring up and determine the basic problems faced in learning, by using this analysis will be obtained of facts, overlays and alternative solutions to the basic problems. This stage is done as a basis for developing interactive learning media on computer subjects and basic networks, so it can be used to facilitate students independently. This stage is a needs analysis where there are three activities carried out; observation, curriculum analysis, and student analysis. The results of the three analyzes will be used as guidelines for researchers in developing interactive learning media on subjects.

B. Designing stage

After conducting the analysis at the defining stage, proceed with the initial product design stage or prototype of the interactive learning media, then making it based on the initial product or prototype that was created. This research is resulted a product in the form of Interactive Learning Media using sub-text software on computer subjects and the basic network of X class majoring in Computer and networking Engineering conducted at SMK Negeri 2 LubukBasung that is suitable for use as learning media.

C. Disseminate stage

The disseminatestageis aimed to produce interactive learning media that are valid, practical, and effective. The intended developmentstage includes:

1. The validation stage of learning media

The purpose of validation by experts is to obtain the input, criticism, and suggestions for improvement for the perfection of the developed media. Validation test data were obtained through a validation instrument which was filled by several validators who were learning media experts. The validatorsconsist of 4 people; two people for media validator and two people for material validators. Media expert validation is focused on the appearance or presentation seen from the perspective of the media. Validation by media experts is aimed to make interactive learning media products developed into quality products in terms of programming, display, and fulfillment of learning media functions. Material validation is focused on the suitability of the interactive learning media produced with the syllabus and curriculum in force.

The data from the validator was obtained from a questionnaire that had been given an evaluation by two validators. Based on the results of the analysis it can be seen that for media validation, two validators are at a high level (K = 0.64). Based on these data it can also be seen that both validators declare valid. Material validation, two validators are at a very high level (K = 0.68) based on these data it can also be seen that both validators declare valid. Based on the results of the analysis of the two aspects of validity, it can be concluded that the interactive learning media developed is valid based on the media and material.

2. Practicality of interactive learning media

The practicality data of interactive learning media is taken through tests conducted at SMK Negeri 2 LubukBasung which are intended to see the feasibility of learning by using thie interactive learning media to check the practicality of interactive learning media that have been valid are used in the learning process by teachers and students. At the end of the lesson, the teachers and students prepare a practical questionnaire from the interactive learning media that has been used.

The results of practicality analysis based on the results of questionnaire of the teacherS found that interactive learning media is very practical (86.46%) used by teachers on computer subjects and basic networks. Meanwhile, based on the results of students question, it is known that interactive learning media is very practical (84.50%) used by students.

3. The Effectiveness of interactive learning media

The effectiveness of interactive learning media of students learning outcomes is looked at classical completeness and the difference between pretest and posttest results. Students learning outcomes is obtained from student test results between student slearning outcomes before and after the use of learning media in the learning process. Student s learning outcomes is obtained from 32 students subjected to trials. Based on the data obtained, it can be seen that student learning outcomes after the use of interactive learning media have been completed classically (completeness = 86.44%). Based on the results of the analysis of differences in the pretest and posttest, it can be seen that there are significant differences in student learning outcomes between before and after the use of interactive learning media.

D. Disseminate stage

The disseminate or disseminate stage is carried out by using of the application of this interactive learning media in the teaching and learning process on computer and basic networks subjects that are distribute to other classes.

VI. CONCLUSION

Based on the research results on the development of interactive learning media that has been done, there following conlusion are obtained:

1. The results of the development of the research are products in the form of interactive learning media on computer and basic networks subjects.
2. The research development is produced a valid, practical and effectiveinteractive learning media on computer and networkingsubjects.
3. The results of the validity test conducted done by validator shows that this interactive learning media has been declared valid. The results of practicality tests conducted by teachers and students are declared practical. Then, effectiveness tests conducted on students are also declared effective, which can be seen from the improvement in student learning outcomes.

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