Letters in Information Technology Education (LITE)
Vol 6, No 2, 2023, pp. 76 – 80
e-ISSN: 2654-5667

Enhancing Interest in Network Installation with Android-Based Learning for Vocational IT Students

Muhammad Shalahuddin Amrullah [1*], Wahyu Sakti Gunawan Irianto [2]
Department of Electrical Engineering and Informatics, Faculty of Engineering, Universitas Negeri Malang, 65114, Indonesia
[1] muhammad.shalahuddin.2005334@students.um.ac.id; [2] wahyu.sakti.ft@um.ac.id
* corresponding author

Article Info

Article history:
Received: May 8, 2024
Revised: Jun 14, 2024
Accepted: Jun 25, 2024

Keyword:
Android
Mobile learning
Learning interest
Computer and network
Vocational education

ABSTRACT

This research aims to develop an Android-based learning media called JaringanPedia to stimulate an increase in students' interest in learning about Network Device Installation and Configuration at the Vocational High School level. This media was developed using the ADDIE model, which consists of analysis, design, development, implementation, and evaluation stages. The results of the media feasibility analysis show a positive outcome, with a validation value of 92.11% from media experts and 86.46% from material experts. The media was also tested on students, with a validity score of 85.94% for small-scale testing and 86.15% for large-scale testing, both categorized as "very valid." Furthermore, this research found an increase in students' interest in learning after using the media, with an increase of 4.69% for small-scale testing and 6.46% for large-scale testing. The JaringanPedia media is expected to become a learning media that can stimulate students' interest in learning about computer network installation and configuration.

I. INTRODUCTION

One of the learning achievements of Computer and Network Engineering students is the installation and configuration of network devices. However, students' interest in this material is relatively low due to monotonous teaching and a lack of innovative learning media. Observations at State Vocational High School 2 Singosari show that students have difficulty remembering the material and prefer to chat with friends rather than actively participate in learning. Therefore, creative teachers must be able to create an effective learning atmosphere. [1].

To achieve this goal, one effort that can be made is to develop interactive learning media that can be used in teaching and learning activities. [2]. The lack of use of learning media in teaching and learning activities makes educators more often use lecturing methods that are less interactive, resulting in students being less involved. Therefore, educators need to use learning media to increase students' interest in learning. [3].

In developing learning media, educators must consider students' learning preferences. Students prefer to learn using media that has text, images, or videos, which can increase their enthusiasm for learning. [4]. Furthermore, the development of learning media must also consider its implementation method, such as using smartphones to access learning media, which can facilitate the effective delivery of messages in learning. [5].

The learning model used in the learning media also affects its effectiveness. [6]. Learning media implementing the Problem-Based Learning model can increase students' interest in learning. [7], [8]. Therefore, it can be concluded that learning media with text, image, and video content that can be accessed through smartphones and implementing the Problem-Based Learning model can stimulate an increase in students' interest in learning during the teaching and learning process.

Based on this, this research aims to develop an Android-based learning media to increase students' interest in learning about network device installation and configuration at the Vocational High School level. The researcher developed a learning media platform that can be accessed through Android

devices and requires internet connectivity. This learning media was developed using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. This model was chosen because it is generic, considers cognitive, affective, and psychomotor development, and is interactive.

II. METHODS

This study employs the Research and Development (R&D) method with the ADDIE development model, which consists of five phases: Analysis, Design, Development, Implementation, and Evaluation. This study aims to develop an Android-based learning media that can stimulate an increase in learning interest in network device installation and configuration among Computer and Network Engineering (CNE) students at the Vocational High School (VHS) level. To achieve this goal, this study was conducted in several stages: needs analysis, competency analysis, design, development, implementation, and evaluation. In the data collection process, the research instrument used was a questionnaire distributed to media experts, subject matter experts, and students. This questionnaire utilizes a 4-point Likert scale. [9], which is used to clarify the definition of good or bad statements, as follows:

TABLE I. LIKERT SCALE

Value	Description
4	Very Suitable / Very Easy / Very Agree / Very Good / Very Positive / Very Accurate / Very Attractive
3	Suitable / Easy / Agree / Good / Positive / Accurate / Attractive
2	Less Suitable / Less Easy / Less Agree / Less Good / Less Positive / Less Accurate / Less Attractive
1	Not Suitable / Not Easy / Not Agree / Not Good / Not Positive / Not Accurate / Not Attractive

The following is the research instrument grid for subject matter experts. [10] As described below:

TABLE II. SUBJECT MATTER EXPERT INSTRUMENT

Variable		Indicator
Material Quality	a.	The suitability of material content
	b.	The relevance of the material to learning objectives
	c.	The accuracy of material with Learning Achievement Elements
	d.	The validity of material
	e.	The completeness of material
	f.	The consistency in material presentation
	g.	The depth of material
Material Benefits	h.	The ability of material to increase student learning interest
	i.	Facilitating teachers in delivering material

The following is the research instrument grid for media experts as described below:

TABLE III. MEDIA EXPERT INSTRUMENT

Variable		Indicator
Functionality	a.	Adequate features
	b.	Ease of navigation
Availability	c.	Speed of media access
	d.	Smoothness of media access
Interactivity	e.	Clearness of user instructions
	f.	Suitability of content
User Friendliness	g.	User-friendly
	h.	Ease of using the media
	i.	Ease of learning the media
Interface Display	j.	Attractive interface
	k.	Layout

The following is the research instrument grid for users as described below:

TABLE IV. USER INSTRUMENT

Variable		Indicator
Usability Testing	a.	Useful
	b.	Ease of Use
	c.	Ease of Learning
	d.	Satisfaction

The following is the research instrument grid for learning interests. [11]:

TABLE V. LEARNING INTEREST INSTRUMENT

Variable		Indicator
Student Interest	a.	Students' interest in the topic or activity
	b.	Students follow the learning process accordingly
Involvement in learning activities	c.	Students are active in following the learning process
	d.	The level of student initiative in seeking additional information
Attention to material	e.	Students often ask relevant questions
	f.	Students are active in giving responses

After product development, the testing phase was conducted to determine the feasibility and improvement of student learning interest after trying the product. The testing phase was divided into several stages: ongoing evaluation, alpha testing, beta testing, and final testing. In the final testing, the product was tested by eight students from grade 11 of SMK (Vocational High School) majoring in TKJ (Computer and Network Engineering) for small-scale testing and 30 students for large-scale testing. The selection of grade 11 students was based on their familiarity with the learning materials of media education. The test results will be used to conclude the developed product.

The questionnaire results will be analyzed by media experts, subject matter experts, and students to determine the level of feasibility of the developed learning media. Data analysis will use validation equations, and the results will be matched with the criteria for the validation category level as follows:

The following is the formula and criteria for validation as described below [12]:

$$V = \frac{TSe}{TSh} \times 100\%$$

Information:
V = Validation percentage
TSe = Total empirical score (total score achieved)
TSh = Total maximum score (expected total score)

TABLE IIII. VALIDATION CRITERIA

Percentage (%)	Validation Level	Description
85,01% - 100,00%	Very valid	It can be used without revision
70,01% - 85,00%	Fairly valid	Requires minor revision
50,01% - 70,00%	Not valid	It cannot be used
00,00% - 50,00%	Very not valid	Prohibited from use

The following are the formula and criteria for learning interest. [13]:

$$P = \frac{F}{n} \times 100\%$$

Information:
P = Percentage of Learning Interest
F = Total score of respondents
n = Total maximum score of all respondents

TABLE IVII. LEARNING INTEREST CRITERIA

Percentage (%)	Description
76% - 100%	Very High
56% - 75%	High
40% - 55%	Low
0% - 39%	Very Low

If the learning media obtains a valid validation level (85.01% - 100.00%), it can be considered as one of the suitable alternatives for use in teaching and learning activities. After being declared feasible, the product will be tested to determine the increase in student learning interest. Data analysis will use the learning interest equation, and the results will match the learning interest criteria.

III. RESULTS AND DISCUSSION

A. Results of Learning Media Development

The innovative Android application, JaringanPedia, was designed as a learning tool to stimulate an increase in student learning interest in the subject of concentration and configuration of network device elements. This application has menus that make it easy for users to access learning content, such as the Material, Practice Questions, Guide, and Information menus. Illustrative images and videos accompany the material in the application to attract students' attention. Users can test their understanding by completing practice questions and viewing the results, thus helping teachers and students evaluate learning progress.

B. Analysis of Validation Data from Media Experts and Subject Matter Experts

The initial prototype will be submitted to experts for validation. The validation process will be done by lecturers from the Department of Electrical Engineering, University of Malang, and vocational teachers of Computer and Network Engineering at SMK Negeri 2 Singosari. Furthermore, subject matter experts will also validate the developed product.

The results of the media expert validation show that the JaringanPedia application has performed well in terms of functionality, availability, interactivity, user-friendliness, and interface.

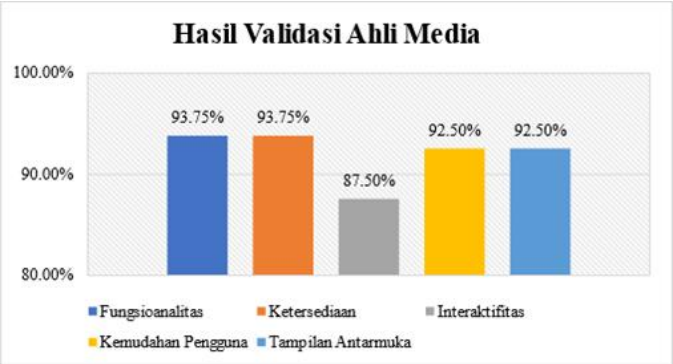

Fig. 1. Graph of Media Expert Validation Results

The average value obtained is 92.11%, which indicates that this learning media is very valid and can be used directly without needing revision. The media experts also provided comments and suggestions for improvement, such as replacing the material button with the material title, adding the name of the supervising lecturer, and changing the practice question mechanism. Thus, the JaringanPedia application can become a learning media that can stimulate an increase in learning interest and be attractive to students and teachers in the context of vocational concentration subjects.

The subject matter expert validation results show that the JaringanPedia application has good values in terms of material quality and benefits.

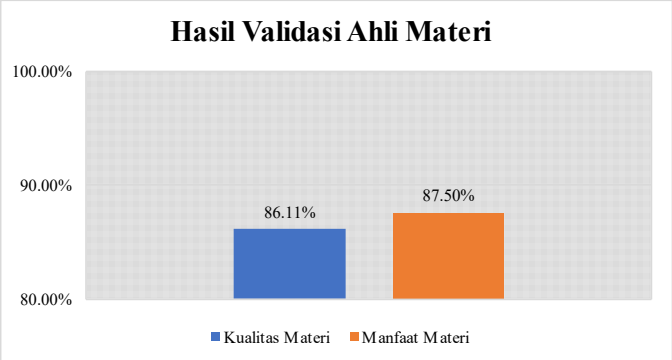

Fig. 2. Graph of Subject Matter Expert Validation Results

The subject matter expert validation results show that the JaringanPedia application has good material quality, with a value of 86.11%. The material in this application is aligned with the learning objectives, is complete, and is equipped with images, videos, and quizzes to support the learning process. Additionally, this media also has the potential to increase student learning interest, introduce basic concepts of Network Device Installation and Configuration, and facilitate teachers in delivering material. Therefore, the JaringanPedia application can be used without needing revision, with some suggestions for improvement, such as adding real-case examples, developing computer network installation material, and changing the practice question mechanism.

C. Analysis of Small-Scale Trial Validation Data

This trial involved eight students from Class XI TKJ 1 of SMK Negeri 2 Singosari who were randomly selected. The user

validation results show that the JaringanPedia application has met the validation criteria with a percentage of 85.94%. Based on the data analysis, this application meets the requirements of being functional, ease of use, ease of learning, and satisfaction. Therefore, the JaringanPedia application can be considered valid and used without revision.

D. Analysis of Large-Scale Trial Validation Data

This trial involved 30 students from Class XI TKJ 1 of SMK Negeri 2 Singosari who were randomly selected. The user validation results show that 86.15% of students agree that this application is handy and easy to use, meeting the aspects of Useful, Ease of Use, Ease of Learning, and Satisfaction. Based on the results of the analysis, this application can be categorized as very valid and can be used without revision.

E. Increase in Learning Interest in Network Device Installation and Configuration Elements after Using Android-Based Learning Media

Student learning interest was tested using two different methods, and participants were tested in small-scale and large-scale trials. This instrument uses two key elements: before and after using the Android-based learning media, JaringanPedia.

The test results show an increase in the percentage of student learning interest in both small-scale and large-scale trials. In the small-scale trial, the percentage of student learning interest before using the Android-based learning media was 77.73% and increased to 82.42% after using the media, with an increase of 4.69%. Meanwhile, in the large-scale trial, the percentage of student learning interest before using the Android-based learning media was 80.00% and increased to 86.46% after using the media, with an increase of 6.46%.

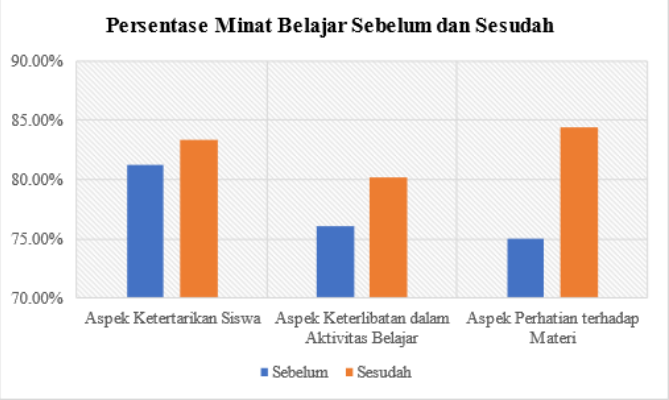

Fig. 3. Graph of Learning Interest Percentage Before and After (Small-Scale Trial)

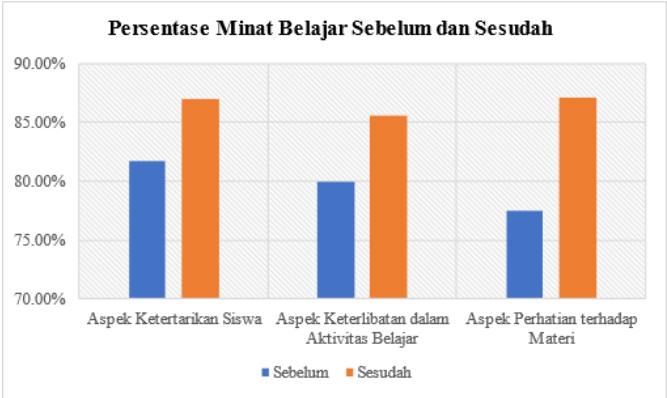

Fig. 4. Graph of Learning Interest Percentage Before and After (Large-Scale Trial)

This learning media has been proven to stimulate increased student learning interest, particularly regarding attention to material. The trial results show an increase of 9.38% and 9.58% in small-scale and large-scale trials, respectively. This increase is due to the student's need for a deeper understanding of the material being taught, so they have a great enthusiasm for learning it. This finding is supported by previous research, which states that using appropriate learning technology can increase students' learning interests. [14], [15], [16], which will then increase students' competency achievements [17].

The trial data shows that an increase follows the increase in attention to material in student interest and involvement in learning activities. However, the increase is insignificant, ranging from 2.08% to 5.56%. This is due to the limitations of the media and environmental distractions that hinder student interest and involvement. Previous research has shown that the learning environment and technology have the potential to cause distraction in students' learning process. [18], [19].

IV. CONCLUSION

Based on the research and development conducted, several important points can be drawn from the findings, namely: (1) the development of a learning media application called JaringanPedia for the concentration subject of Computer and Network Engineering (MPKK) program in Class XI at SMK Negeri 2 Singosari, which is designed to assist students in learning the elements of Network Device Installation and Configuration. (2) The media's feasibility has been evaluated through expert validation, small-scale testing, and large-scale testing, and the results show that it is highly valid and can be used without revision. (3) Furthermore, the analysis of student learning interest data reveals a significant increase in learning interest after using JaringanPedia, with a notable improvement in students' attention to the material, (4) which is triggered by the material presented, being the initial elements of Network Device Installation and Configuration that spark students' enthusiasm to learn. (5) However, there is no significant increase in student engagement and participation in learning activities due to the limitations of the learning media in facilitating the direct application of learned materials, despite students' interest in applying what they have learned.

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