Jurnal Ilmiah Mandala Education (JIME)
Vol 10 No. 1 Januari 2024
p-ISSN : 2442-9511, e-2656-5862
DOI: *10.58258/jime.v9i1.6652/http://ejournal.mandalanursa.org/index.php/JIME*

Development of Multimedia-Based Mobile Learning in Class X SMKN Informatics Subjects

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Article Info
Article history:
Accepted: 17 January 2024
Publish: 27 January 2024

Keywords:
Pengembangan
Mobile Learning
Multimedia
Informatika
SMK

Abstract
This research discusses the development of multimedia-based mobile learning in class X informatics subjects of SMKN. The purpose of the research is to develop a mobile learning product based on multimedia in class X informatics subjects at SMKN. This research method is development research (R&D) with a 4D development model. The population *in this study was all grade X students at SMKN 1 West Pasaman. The sample of this study* amounted *to 25 respondents taken from one class X at SMKN. The data collection tool used a questionnaire with a total of 19 question items. The data analysis technique used is descriptive quacitivative, using Likert scale. The results of research on learning media development by media validators 1 and 2 were obtained " **4.95**" with the category "**Very Valid**". For material validators on the feasibility aspects of content, presentation, and evaluation, "**4.10**" was obtained* with *the category "**Valid**". The results of the practicality test to students on multimedia, it was concluded that the assessment carried out by students obtained results of "**4.53**" with the category "**Very Practical**"*

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Diterima: 17 Januari 2024
Terbit: 27 Januari 2024

Abstrak
Penelitian ini membahas tentang pengembangan *mobile learning* berbasis multimedia pada mata pelajaran informatika kelas X SMKN. Tujuan dari penelitian adalah mengembangkan sebuah produk *mobile learning* berbasis multimedia pada mata pelajaran informatika kelas X di SMKN**.** Metode penelitian ini penelitian pengembangan (R&D) dengan model pengembangan 4D. Populasi dalam penelitian ini adalah seluruh siswa kelas X di SMKN 1 Pasaman Barat. Sampel penelitian ini berjumlah 25 responden yang diambil dari satu kelas X di SMKN. Alat pengumpulan data menggunakan angket dengan jumlah 19 item pertanyaan. Teknik analisis data yang digunakan adalah kuatitatif deskriptif, menggunakan skala likert. Hasil penelitian pengembangan media pembelajaran oleh validator media 1 dan 2 diperoleh " 4,95" dengan kategori **"Sangat Valid"**. Untuk validator materi pada aspek kelayakan isi, penyajian, dan evaluasi diperoleh "**4,10**" dengan kategori **"Valid"** . Hasil uji praktikalitas kepada peserta didik terhadap multimedia, disimpulkan bahwa penilaian yang dilakukan oleh peserta didik diperoleh hasil **4,53** dengan kategori **" Sangat Praktis".**

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1. INTRODUCTION

Learning is the process of student interaction with educators and learning resources in a learning environment. Learning is assistance provided by educators so that the process of acquiring science and knowledge, mastering skills, and formation can occur

Learning is a set of actions designed to support students' learning process, taking into account external events that play a role in the series of internal events that take place within students (Winkel in Sutikno, 2013: 31). Learning that takes place at school is related to the learning media used. Hendri Nofri (2017: 121-128) explains that the involvement of learning media in the learning process is expected to influence learning outcomes, the more concrete the learning is taught and felt by students, the more effective learning will be.

According to Eldarni (2001: 4) media is anything that can be used to channel messages from the sender to the recipient so that it can stimulate students' thoughts, feelings, attention and interests in such a way that the learning process occurs. Learning media plays a very important role in the learning process, because with learning media it can facilitate the delivery of information, make the

information to be conveyed clearer and easier for students to understand, and the learning process can be carried out effectively and meaningfully.

Learning media is an integral part of the entire learning process. Learning media lays concrete foundations for thinking, this implies that learning media is a component that does not stand alone but is interconnected with other components in order to create the expected learning situation.

The use of learning media refers to how students are able to understand the learning provided easily and increase their curiosity about the content contained in the learning media. Learning media, especially digital, consists of several types, such as Virtual Reality (VR), Game Based Learning, and one of them is mobile learning.

Mobile learning is one alternative for developing learning media. Mobile learning has advantages in its application such as flexibility in time and location which allows students to learn anytime and anywhere, efficiency in creation and distribution which also makes it easier for application designers to disseminate the application, as well as customization of content which is an important point of mobile learning in accordance with material delivered by educators. Of these advantages, mobile learning also has weaknesses in its use, including misuse of gadgets in mobile learning applications, the emergence of distractions which allow students to multitask or not focus on the mobile learning media taught by educators.

There are several researchers who have conducted research on the use and utilization of mobile devices in learning, namely Musahrain. et al, (2017) who discuss the application of Mobile Learning as a medium for learning, Ibrahim, Nurwahyuningsih. et al, (2017) who discussed the development of Android-based Mobile Learning learning media in science subjects for junior high school students, Rahmawati, Erni, (2017) who found that m-learning significantly supports students' independence and learning outcomes in geography subjects, Hapidz, Radif, (2019) which discusses the design and creation of mobile learning media on the subject of air conditioning systems and installations.

Based on the results of observations from pre-research conducted by researchers in the July – December 2021 semester period at SMKN 1 Pasaman, this school has not yet used mobile learning assisted by the Articulate Storyline application as learning multimedia. Therefore, the implementation of the development of Articulate Storyline is still not optimal due to limitations in terms of devices, networks and time owned by educators, coupled with the large number of senior educators who certainly have difficulty integrating technology into the learning process, so that Articulate learning multimedia The storylines developed are still less attractive and many educators have switched to conventional learning media and only use Microsoft PowerPoint as a learning medium. This is also reinforced by the high level of smartphone usage and internet access by students, so that the development of mobile learning is very suitable to be developed, especially in Informatics subjects.

Informatics is a local content subject in schools and must be understood by students because this Informatics subject is a subject that forms, fosters students' creativity and personality so that they are not confused about technology. It is actually written in Minister of Education and Culture Regulation No. 36/2018, there is an amended article, namely Article 10A: Implementation of Informatics learning as an elective subject will be implemented starting in the 2019/2020 academic year according to school readiness. Returning ICT to a subject is part of the Ministry of Education and Culture's strategic steps in facing the challenges of the industrial revolution 4.0. Informatics subjects are a science that students in primary and secondary education must master. The concept of Informatics subjects is different from ICT education, although there are several things that have been adapted. Informatics subjects not only study various computer software, but also problem solving and critical thinking. Students are required to think computationally by studying various scientific disciplines.

Therefore, it is necessary to use learning multimedia that is appropriate and effective when delivering Microsoft PowerPoint subject matter to students regardless of the basic understanding

taught at school. So Articulate Storyline 3 can be used as an alternative choice because it is easy to use and can be accessed using a computer/laptop or smartphone, both online and offline.

This research aims to develop multimedia devices of *mobile learning* which is in sync with the suitability of the media used and the material to be achieved in the Informatics subject for class X SMKN. Based on the previous explanation, the researcher intends to conduct research with the title "Development of Multimedia-Based Mobile Learning in Class X SMKN Informatics Subjects".

2. RESEARCH METHOD

This research uses the Research & Development (R&D) type of research. The following research refers to research that produces, develops, or creates a product or service. The following are the reasons why this development research was carried out:

a. To assess the suitability of a product that has been produced.
b. It is assumed that the resulting mobile learning multimedia development will produce media that is able to meet students' learning needs, because this development will go through various development stages, including expert testing as a program validation stage.
c. This development methodology is very suitable for the field of educational technology, namely the development area.

The development of M-learning based on multimedia learning uses a 4D development model, which is carried out in 4 stages, namely definition, design, development and dissemination. The results of the development of M-learning learning media based on Articulate Storyline 3.

The result of this research and development is a mobile learning application of multimedia-based in the class X Informatics subject at SMKN which is suitable for use. The results were obtained through the following 4D research procedure.

a. Define stage, this stage aims to bring out the basic needs and problems faced in the Informatics learning process so that a learning media needs to be developed. There are three steps that must be taken in this definition stage, namely curriculum analysis, student analysis, concept analysis. Curriculum analysis aims to determine the provisions for implementing learning based on indicators that students must achieve. In this study, researchers used the class X Informatics subject at SMK 1 West Pasaman, on Hardware, Software, Operating Systems and Networks. Next, the student analysis aims to determine student characteristics, skills, needs and conditions of the school where the researcher will conduct research later. For the research location, researchers conducted research at SMKN 1 Pasaman Barat. The school already has adequate facilities to conduct research, and the characteristics of the students are in accordance with the media that researchers have developed. Then, concept analysis, this analysis aims to determine the initial concept or design used to create appropriate multimedia. The multimedia concept that the researchers created, namely presenting images, text, video and sound, to make it easier for students to learn, both independently and in groups.
b. Design stage, this stage is also the stage in designing instruments that are useful in measuring the feasibility of the multimedia being developed. Sketches of problems and needs need to be followed up with creative ideas about multimedia. These sketches are expressed in the form of flowcharts and storyboards as well as compiling research instruments. Apart from that, the choice of format is also designed to be as attractive as possible to make it easier for researchers to carry out research.
c. Development Stage At this stage, the results of the product design at the design stage are then developed to produce a real product and then its validity is tested before being implemented. Development is carried out based on the design that has been created as well as the validation stage. The following are the stages carried out:

1) Developing and implementing the design, this stage involves collecting various initial materials, content material, and some programming. This product framework design will later be implemented into an initial interactive multimedia product.
2) Validation, to test the validity of interactive multimedia developed to obtain suggestions and product improvements before the product is tested in learning. The product was validated by two media experts and one material expert.
3) Revision is an improvement to the product in accordance with suggestions and input from validators.

d. Disseminate Stage (Dissemination). The final stage carried out in developing Android-based m-learning learning media is distributing the product. At this stage, researchers carry out a distribution process tailored to research needs. An Android-based m-learning learning media product that has been created in the form of m-learning called "KeTik" (Informatics Class) with the link https://bit.ly/KeTik can be applied to other classes, because this media is packaged in a link that can be accessed offline by students and teachers via laptop or smartphone.

The data collection technique that researchers used in this research was a questionnaire in the form of a 1-5 Likert scale questionnaire. This questionnaire will later be used for development of multimedia-based mobile learning in class X informatics subjects at SMKN". The data collection tool used in this research was a statement questionnaire sheet totaling 19 questions whose validity had been tested and given to students.

The data analysis technique used in this method is descriptive quantitative. The term statistics means quantitative data, statistics is data in the form of numbers that can provide an overview of certain circumstances and events (Solikhah, 2017). This research uses a Likert scale, with a scale of 1 to 5 to validate the material and media. Then use a scale of 1 to 4 to test practicality. The aim is to compare and find out the levels obtained so that conclusions can be drawn. The formula I use was proposed by (Jasmalinda, 2021)

Percentage Formula

$$\bar{x} = \frac{\sum x}{n}$$

Information :

$\bar{X}$	=	Average Score
$\sum X$	=	Total value/score
n	=	Number of respondents

3. RESEARCH RESULTS AND DISCUSSION

3.1.Research result

Multimedia is used in class X Informatics learning and is supported by text, audio, image and video content that is tailored to the learning objectives and attracts students' attention. This allows students to be directly involved in learning activities. To produce valid and practical multimedia, researchers conducted validity tests on media and material validators as well as questionnaire sheets for students using a Likert scale. After giving an assessment, the validator provides suggestions for improvements which become guidelines for improving multimedia.

a. Learning Media Validation Results

Table 1. Media Validation Results 1 (Validator 1)

Rated aspect	Average
Media Suitability	4.75
Media Use	5.0
Media Presentation	5.0
Design and Layout	5.0
Amount	**4.95**

In the media validation test on the first validator, media suitability, media use, media presentation, design and layout, the results were included in the "Very Valid" category.

Table 2. Media Validation Results 2 (Validator 2)

Rated aspect	Average
Media Suitability	4.75
Media Use	5.0
Media Presentation	5.0
Design and Layout	5.0
Amount	**4.95**

In the media validation test on the second validator, media suitability, media use, media presentation, design and layout, the results were included in the "Very Valid" category.

b. Learning Material Validation Results

Table 3. Material Validation Results

Rated aspect	Average
Content Eligibility	4.28
Presentation	4
Evaluation	4
Amount	**4.10**

Based on the results of validation tests by material validators for aspects of suitability of content, presentation and evaluation, the results are included in the "Very Valid" category.

c. Practicality Test Results

Table 4. Recapitulation of Product Trial Results Data

Assessment Aspects	Average
Appearance	4.52
Ease of Use	4.42
Presentation of Material	4.59
Usefulness	4.57
Average	**4.53**

The results of the media practicality test were assessed by 25 class Students expressed that they were helped by the multimedia that the researchers developed.

4. CONCLUSION

Based on the results of research and development of multimedia in learning using and also with several other supporting applications, it can be concluded as follows:

a. The process of developing interactive multimedia in Informatics learning went well and was in line with the researchers' expectations.
b. The results of the material and media validation test show that multimedia using mobile learning in informatics subjects, by media validators 1 and 2 obtained "4.95" in the "Very Valid" category. For material validators in the aspects of appropriateness of content, presentation and evaluation, it was obtained "4.10" in the "Valid" category.
c. The results of the practicality test concluded that the assessment carried out by the students obtained a result of 4.53 in the "Very Practical" category.

5. ACKNOWLEDGMENTS

Acknowledgments are intended for research publications with research schemes for final thesis assignments. Therefore, the author would like to thank all colleagues who have helped in writing this.

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