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Development of based learning media with App Inventor

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Abstract: The research aims to develop an Android-based learning media. The stages of the research are analysis, implementation, and evaluation. The participants of the research were students at West Kalimantan Vocational High School. The research method used is Research and Development with the ADDIE approach. Data analysis used descriptive qualitative. The subjects in this study were students of class X AK 1 and X AK 2 at Vocational High School West Kalimantan, with a total of 56 students, for a small-scale trial taken 5 students from X AK 1 and 5 students from X AK 2. Research instrument was using a questionnaire with a scale. Research results based on research statements and the development of Android-based learning media with App Inventor on word processing software, it can be concluded that to make applications with App Inventor software it is not enough to just use a browser application. the development of learning media using the App Inventor media after validation with two media experts is very feasible to use and by using this application the teaching and learning process run very independently and make it easier for students to understand the learning material

Keywords: Software Development, Digital Learning Media, Android App, MIT App Inventor, Computational Thinking

INTRODUCTION

Education is a conscious and systematic effort, conducted by people who are given the responsibility to influence students to have traits and character following educational ideals. (Misbah, Gulikers, Dharma, & Mulder, 2019). Law number 20 of 2003 concerning the national education system explains that education is a conscious and planned effort to create an atmosphere and learning process so that students can actively developing his potential to have spiritual , religious, self-control, personality, intelligence, noble character, and skills that he needs , society, nation, and state.

The world of education is currently growing, various kinds of updates are conducted in order to improve the quality and quantity of education. Various breakthroughs in curriculum development, learning innovation, and the fulfilment of educational facilities and infrastructure are needed to improve the quality of education (Leo Agung, 2015; Myburgh, 2015). Schools are institutions in education that are formal, non-formal, and informal in nature, where the establishment is conducted by the state and the private sector with the aim of providing teaching, managing, and educate students through guidance provided by educators or teachers. The teacher is an educator who educates, teaches a science, guides, trains, gives assessments, evaluations and facilitates the process of shifting science from learning resources to students. In this case, the teacher is also obliged to provide learning media.

Learning media in general is a tool for the teaching and learning process (Setyadi et al., 2022; Taylor, King, & Nelson, 2012). Everything that could use to stimulate thoughts, feelings, attention and learning abilities or skills to encourage the learning process to occur. This limitation is quite broad and in-depth covering the notion of sources, environments, people, and methods that are used for learning purposes. Then the means of communication in print, view and hearing form, including hardware technology or software form (Sudarsana, Mulyaningsih, et al., 2019).

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The factor that supports the achievement of learning objectives is the selection of the right learning media and technology (Sudarsana, Nakayanti, et al., 2019; Sudarmo, Rasmita, & Satria, 2021). The right learning media is how to make the learning in accordance with the characteristics of students and learning materials for the achievement of learning objectives. Therefore, a teacher must be able to choose the right learning media to support the learning process being taught (E. Satria & Sari, 2018).

Based on pre-observations made by researchers, information was obtained that teachers had tried to use learning media by downloading animations or images from internet, but students only are limited to relying on the media and only opening at school time. Students don't reopen them outside of school hours on the grounds that not all students have laptops or computers at home. Therefore, to overcome these shortcomings, innovations really need to be created in the development of learning media. One of them is to create learning media *software* that can be run on mobile phones with the *Android* operating system (Arifin et al., 2021; Muhfiyanti, Mulyadi, & Aimah, 2021; Iskandar, Dwiyanto Tobi Sogen, Chin, Satria, & Dijaya, 2019) and using block based programming (Taufiq, Amalia, Parmin, & ..., 2016; Satria & Sopandi, 2022). This is in accordance with the results of systematic review analysis by (Rahmat, Syakhrani, & Satria, 2021) about teaching in digital age, virtual learning technology that have their effectiveness and innovative power to provide best practices to improve student learning or learning outcomes (Pranoto & Panggabean, 2019 ; Maruf, Nugroho, Kurniawan, Musiafa, & Satria, 2022) and the elite assessment conducted by (Goode et al., 2017) who concluded that technology can be implemented well on *smartphones* that have an operating system *android*.

LITERATURE REVIEW

Teachers are expected to make students understand the material presented. This thing can occur if it is supported by an effective learning process and media. Therefore, teachers who are experts in their fields are needed and do not forget the information that will be conveyed. When in the learning process, the teacher explains the material by giving examples, and sometimes there are some things that are missed in the delivery. If this happens, the teacher must repeat explaining the material in the teaching and learning process. To overcome these problems, students can be presented with learning media or multimedia in the form of images, clear text, sound, video and a good sequence of work steps, in order to obtain a goal of good learning (Adriyanto, Santosa, Syarief, & Irfansyah, 2021; Chowdhury, Obeidy, & ..., 2013; Suryanda, Ernawati, & Maulana, 2016; Saddhono, Satria, Erwinsyah, & Abdullah, 2019). Based on unstructured interviews conducted with digital simulation teachers at West Kalimantan Vocational High School, there are still many students who do not focus on studying because they are too busy with Smartphones. which is used for social media and gaming. Most students already have a smartphone with the Android operating system, but it has not been utilized optimally as a tool for effective learning. In addition, one of the learning processes conducted at this school is the subject of Digital Simulation. Interviews are very necessary, based on the results of interviews conducted on the Word Processing Software material, it was revealed that the problem that occurred was that there were still many students' scores. under the Minimum Completion Criteria of 70.

In the use of media used in schools only in the form of book packages, learning modules (print and files). Though, most of the students have mobile phones with android operating system. Referring to the problems that the researchers have described above, the need for appropriate learning media used in teaching activities in schools. The use of smartphones by students that are less than optimal in learning activities is also one of the things that needs to be considered. By using android-based learning media, it is hoped that it will be able to provide solutions for schools to improve student learning outcomes and student learning motivation. Based on the background of the problem that has been raised, research aim is to develop an Android-based learning media and the research question is How to make learning media using MIT App Inventor on the Soft Word Processing device material?

METHOD

The research method used is ADDIE Research and Development, which stands for Analysis, Design, Development, Implementation, and Evaluation. The research steps (Figure 1) for the development of ADDIE canbe seen in the following picture (Sugiyono, 2010; Ummah, 2017).

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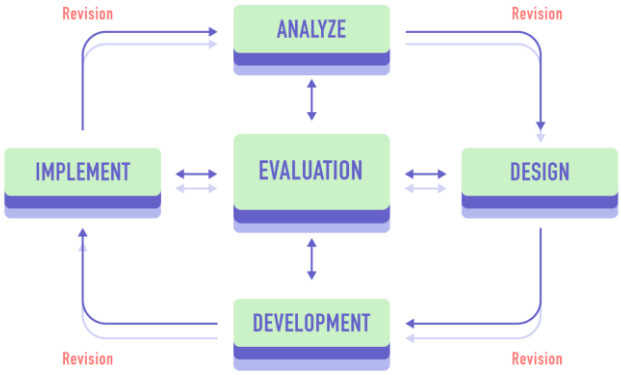

Figure 1: Development Steps

Analysis is related to analysis activities or identifying what are the problems found in a certain environment so that ideas or ideas arise in determining the product to be developed. The objectives of the analysis step are (1) Identifying learning problems, (2) Formulating learning objectives, (3) Identifying the character of learners, (4) Identifying sources needed, (5) Determining the right learning strategy, and (6) Developing a learning management plan, you are analyzed to determine user needs supported by media specifications / characteristics learning.

Design is the stage to design a product according to needs or analysis that has been done before. In the design stage, the steps taken are to compile a list of tasks such as storyboards, compile learning objectives, develop learning strategies, and design interfaces. Examples of this design stage are array diagrams, learning complementary devices, and other design designs. Development is an activity of making and testing products. The steps taken in this development stage are: (1) Produce content, (2) Choose or develop supporting media, (3) Develop guidelines for student or teacher, (4) Revise, and (5) Conduct a trial run. Implementation aims to prepare a learning environment that involves students. At this stage the product is ready to be applied to students. At this stage it is necessary to prepare the product and market it to the target learner. Finally, Evaluation is an activity to evaluate and assess every step that has been taken to achieve a product that meets the specifications that Set. The goal is to measure the quality of the products that have been developed.

The participants in this study were students of class X AK 1 and X AK 2 at SMKN 2 West Kalimantan totaling 56 students, for a small-scale trial taken 5 students from X AK 1 and 5 students from X AK 2. This media was used in Simulation subjects. Digital. The research instrument used was a questionnaire with a scale of 4. The criteria for the questionnaire were as follows (Arikunto, 1996) Table 1.

Table 1: Scale Category

Score	Criterion
4	Excellent
3	Good
2	Enough
1	Not Good Enough

The collected data is processed by summing up, compared with the expected amount and promiscuous percentage (Arikunto, 1996: 244) as Table 2, or it can be written with the following formula:

Eligibility Percentage (%) = $\rho = \frac{x}{xi} x100\%$

Information:
P: percentage
X: respondent's answer in one item
Xi: ideal value in one item
100%: constant

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Table 2: Percentage Scale

Persentage Achievements	Interpretation
76 – 100%	Proper
56 – 75%	Decent Enough
40 – 55%	Less viable
0 – 39%	Not worth it

RESULT

Analysis

Analysis is related to analysis activities or identifying what are the problems found in a certain environment so that ideas or ideas arise in determining the product to be developed. The objectives of the analysis step are (1) Identifying learning problems of digital simulation subjects of word processing software materials, (2) Formulating learning objectives on the device material word processing software, (3) Identifying the character of learners, (4) Identifying sources needed, (5) Determining appropriate learning strategies, and (6) Developing management plans learning. The following are the results of the analysis determined based on data from the results of unstructured observations and interviews listed in Table 3.

Table 3: Table of Observations and Interviews

No.	Observations and Interviews	Information
1.	Observed subjects	Digital Simulation
2.	Learning Process	Explaining, discussion, Presentation, assignment
3.	Availability of books or learning resources	Reference books should be to libraries and other sources come from the internet
4.	Quality of learning media	It is still limited to power point slides whose use is still rare. In addition, the media used has not varied
5.	Student conditions	Difficulty understanding the material and the teacher having to explain repeatedly, difficulty finding reference sources
6.	Teacher constraints in teaching	Students lack motivation to learn because the lessons are considered difficult, students do not pay attention and do not seriously study, students are busy with their respective cell phones to socialize media and play games
7.	Technology that students have as a source of independent learning	Some students have laptops, but more students have Android smartphones that haven't utilized to the maximum
8.	Required media	Auxiliary media that can attract students' interest and attention, there can be material, videos to clarify the material, and exercises to add insight into learning skills Media that can also be used for studying at home (takeout)

The results of the observations and interviews are then analyzed to determine user needs supported by the specifications / characteristics of learning media. It is listed in Table 4.

Table 4: Results of User Needs Analysis

Requirements	Analysis Results
Target users	Students of grades AK 1 and AK 2 at West Kalimantan Vocational High School
Types of learning media	Learning media is in the form of an application that can be installed on an Android smartphone so that it can be used for self-study.

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Required features

1) Displaying Word Processing Software Materials,
2) Software Tutorial Videos Available Word Processor,
3) There are Multiple Choice Question Exercises
4) The app's how-to feature.
5) There is an app developer Profile page.

4.2. Design

Design is the second stage in the development of learning media. The result of the design stage is a flowchart that describes the order and structure of the learning media, a storyboard that includes a template design plan, and an interface design. The flowchart that has made then used as a learning medium which can be described Figure 2 as follows:

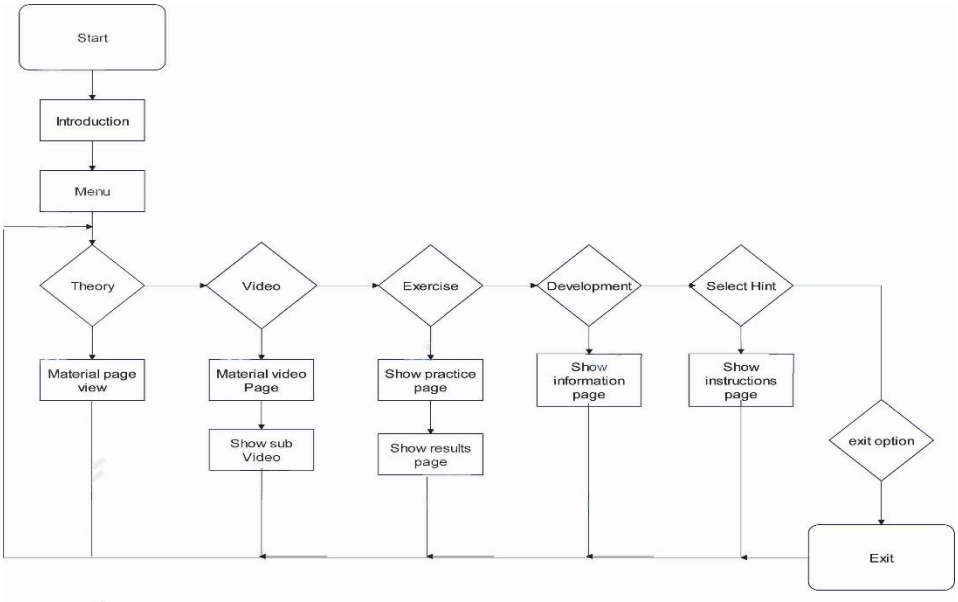

Figure 2: Flowchart

Flowchart describes the visualization of the sequence of content contained in the application. At the beginning of the opening of the application, users will enter the intro page containing a true image of the material and the researcher university logo. Then the user will be directed to enter the main menu safe thing, where there are various kinds of menu buttons to go to certain pages. These pages include material pages, video pages, question practice pages, profile pages, and help pages. The material page contains the material for which he is a word processing software material. A video page that contains a sub-video of Word Processing software. The practice menu page contains questions about the material on the material page the number of questions is 20 and the questions are randomized if there is a repeat of the practice questions. The developer page is the content of the developer's biodata. The how-to page is a guide for media user applications.

Development

Development is the stage of product development and testing, where the results of the analytics and design are developed into finished products. The following is the stage of product development, designed which has been made using Photoshop CS5 software, then poured into product development in the form of an application using the Website app in venter, The existence file of the inventor app is (. aia) and its existence plugin (. aix). The content existence plugin contains some command code in the Java programming language (.java) that will convert into an existence plugin file (. aix), this is useful for an extension. The following are the results of product development and programming (Figure 3 and 4):

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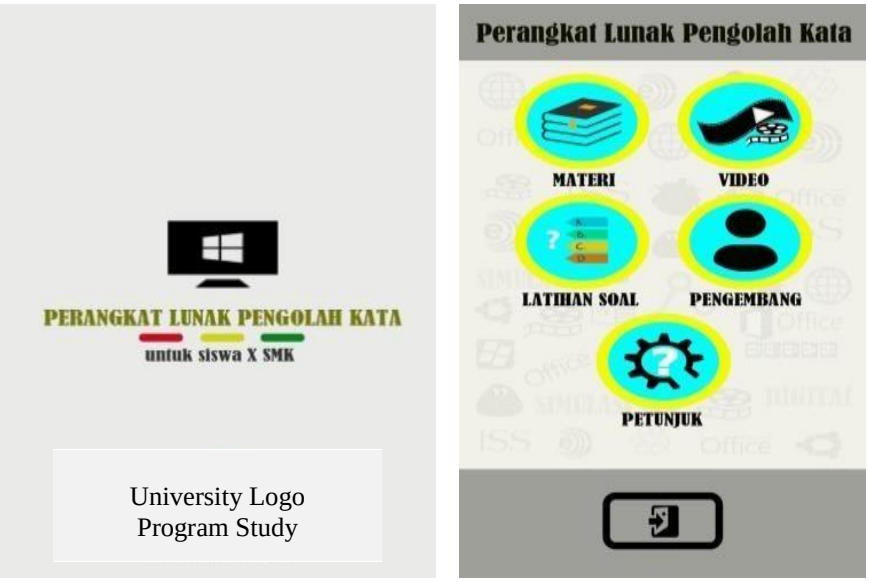

Figure 3: Start page interface and Main Page Interface

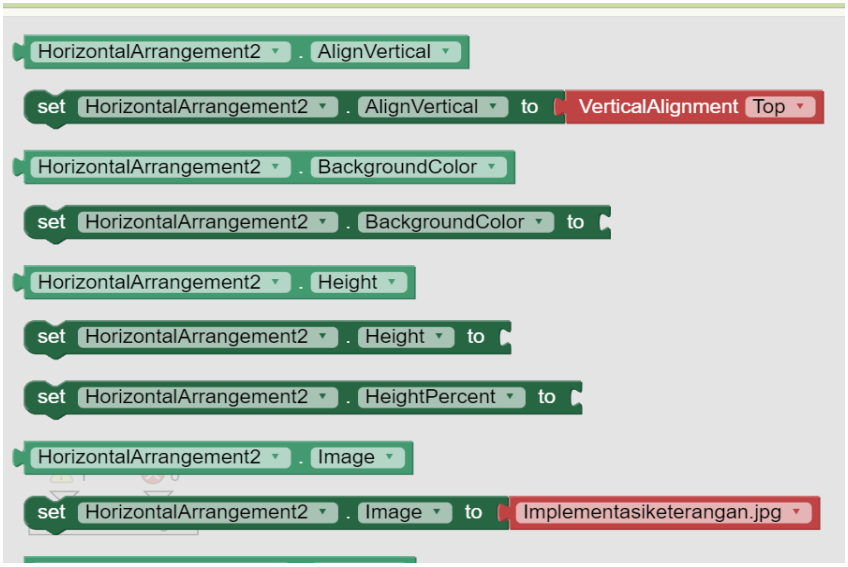

Figure 4: Block Based Programming Display in App Inventor

Assessment of media experts and material experts the results of the learning media design are validated by 2 (two) media experts and 1 (one) material expert. Based on the results of media validation and material obtained that the learning media is designed in the category "Feasible". The design of the learning media is carried out improvements in accordance with the suggestions and comments of media and material experts. After improvements were made, the learning media was tested on 10 students. Based on the trial, the results were obtained that the learning media was in the "Feasible" category, so that the learning media could proceed to the implementation stage.

Implementation

Android-based learning media that has gone through a process of expert validation and small group testing is revised until the product has been completed, which is then implemented to students. Android-based learning media in the form of an application, which is shared with students via Bluetooth to share this application from one smartphone to other smartphones so that they can be installed and used on each student's smartphone.

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Evaluation

Evaluation is the process of knowing or determining the value for a thing as a certain reference in a particular goal. In education evaluation as a measurement process in achieving educational goals. Most of the evaluations carried out are formative evaluation. This evaluation is carried out at each of the stages. The purpose of this evaluation is to improve the product created before the final product is applied. One of the evaluation stages is to improve the learning media resulting from the development stage, namely after testing by media experts, material experts, and by small groups, on This stage is carried out revision of Android-based learning media in accordance with the suggestions obtained to produce a good final product.

Respondents "Agree" that the word processing software learning media that was successfully developed in this development is an application that supports both classroom learning and independent learning, by utilizing android-based smartphone and has been tested to be compatible on various versions of Android.

DISCUSSIONS

The development of learning media based on Android uses the RnD (Research and Development) method by adapting the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). Analysis is the first stage in development in the form of user needs analysis, analysis of content, and hardware and software analysis. The second stage is Design which is the design stage. The results of this stage are flowcharts, storyboard designs, and interface designs from learning media. Development is the development stage according to the design that has been made by utilizing the website https://appinventor.mit.edu/explore/ At this stage testing is carried out by media experts, materials, and evaluation by small groups to determine product quality. In the implementation stage, the finished product is tested on users who are class students X AK 1 and X AK 2 West Kalimantan Vocational High School. Evaluation stage is an evaluation carried out at each of the previously mentioned stages and an evaluation to calculate feasibility. The result of the development of this learning media is an Android-based application with *.apk format. The development of learning media using the App Inventor media was very feasible to use and by using this application on teaching and learning and the learning process run very independently and make it easier for students to understand the learning material, this result also supported by another researcher.

CONCLUSION

Based on media research and development statements Android-based learning with App Inventor on word processing software, the conclusion is that to make an application with an App Inventor software, it is not enough just to use a browser application. The development of learning media using the App Inventor media after validation with two media experts is very feasible to use and by using this application the teaching and learning process will run very independently and make it easier for students to understand the learning material.

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