

Development of Android-Based Digital Drawing Learning Media Using Online Applications

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Abstract

The existence of COVID-19 has caused many problems in various fields, one of which is the world of education. Students are required to study remotely so that there is a need for innovation in learning media so that learning materials can still be accepted by students. The purpose of this research is to create digital image learning media as a support for illustration courses in animation study programs where digital drawing skills are needed. The learning media is packaged in an Android-based application to make it easier for students to access because Android is currently often used by students. The method used in building this application is the waterfall method. As for the software needed to build this application, it uses Google sites technology, appsgyser for navigation and content and Adobe Photopea for design. The result of this research is the creation of digital image learning media applications as a support for illustration courses that can be accessed easily by students. At this stage of testing this application using the black box method to test the program's functionality and also conduct a feasibility test. For the test results, all features can function properly and for the feasibility value, it gets a score of 87% or falls into the very feasible category.

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INTRODUCTION

The COVID-19 pandemic has brought many changes to various aspects, one of which is in the world of education. The learning process that previously took place face-to-face, is now forced to learn with a distance learning system. The policies taken by many countries, including Indonesia, have forced educational institutions to present new alternatives in the learning process (Andri, 2020). This distance education system takes place by utilizing electronic devices, namely laptops or personal computers or also many of them use Android. Learning is currently expected to be carried out without limitations of space and time to support distance learning by utilizing information technology (Putri, 2020)

The purpose of the learning process is a learning process where there is a transfer of knowledge which basically aims to change the behavior of students for the better. Changes in student behavior are influenced by environmental conditions which are the task of educators to create conditions that change student behavior for the better (Mulyasa, 2008).

Digital drawing is a basic competency that must be mastered by students majoring in animation because it will be used in courses such as illustration, 2d animation, character design, 2d animation production and other subjects. So it can be said that this competency is the most basic competency and must be mastered by students majoring in animation. Many factors affect the success of a learning process including the learning resources used including the form of modules, work widths, books and various other media, one of which is electronic media, namely Android-based.

Media is an intermediary that is expected to make educators clearer and understand the material taught by educators. An important factor to achieve learning objectives is learning media (Chusni, 2017). The criteria for a good learning media are those that can increase students' learning motivation as well as those that are creative and innovative (Listiaji, 2015).

The source of this material is also expected to be easily accessible by students anywhere and in an unlimited time. Although the absorption of material is influenced by different students because of many factors including, learning styles, learning opportunities, the ability of each individual and other factors.

Mobile learning is a learning media that provides educational content to support learning materials with wireless devices (Cabanban, C. L. G, 2013). Android is currently a living habit that cannot be separated from various groups and ages in society (Ningsih, 2019). One of the efforts to improve the quality of education is by utilizing science and technology which is currently growing rapidly. One of these uses is the use of Android smartphones for learning media. The number of android users in Indonesia is 83.5 million and it is estimated that in 2019 there will be 92 million android smartphone users in Indonesia (Ramaita, 2019). One of the reasons for the use of android media for learning is because android has been used by students in everyday life so that it is closer to students. Multimedia is a collection of various media in the form of information containing elements of text, graphics, audio, video, animation, links and so on. The use of multimedia technology in Android smartphones in a learning media strongly supports the delivery of more interesting material, which is easily accessible by students wherever and whenever (Munir, 2012). The advantages of Android-based learning media that can be considered are that they are flexible and can be accessed anywhere and anytime (Calimag, 2014). The learning process by utilizing technology can integrate independent learning according to the student's schedule (Adriana, 2015). By utilizing technology, it can make it easier for students to understand the material in a fun and faster way (Thitiporn Sittichailapa, 2015). Mobile learning media cannot replace traditional classes but as material support for the learning process (Sarrab et al., 2012).

Research with a title related to this research is a research conducted by Muhammad Ryza Awwali in 2015 entitled Learning Media of Graphic Design at SMA 1 Kudus Based on Interactive Multimedia. Where in this study produces applications to introduce the basics of graphic design to students and can increase student interest in studying graphic design.

Research was also conducted by Ali Shofi and Andi Mariono in 2018 about the introduction of adobe photoshop tools for basic graphic design subjects for class x multimedia at SMK Negeri 1 Kalitengah Lamongan with the aim of creating applications for learning the introduction of adobe photoshop tools and menus. The result of this research is that the application can be applied to graphic design learning for students.

Based on previous research, seen from the aspect of the software used, it still uses Photoshop which incidentally is paid, besides that there is no focus on digital drawing materials so that a solution is needed for learning digital drawing materials using applications that are easy to use, free of charge, easily accessible and with features that are almost the same as Photoshop. currently often used for applications to produce digital images.

The purpose of this research is to create a learning application with the topic of digital drawing using photopea software as an alternative to photoshop which is packaged in an android-based application. The benefits of this research are that students can more easily access the material and are more enthusiastic in learning digital image material using Photopea.

METHODS

In developing this android-based digital drawing learning application, several stages must be carried out. There are many methods used in the development of learning applications, but in this study the system development method is used, namely the waterfall. According to Ian Sommerville (2011:30) this method is the oldest system development. In the testing phase, the black box method is used to test the functioning of several menus and features in this application.

The stages of the waterfall method consist of several stages including needs analysis, namely analyzing problems and efforts to solve these problems. The next stage is the system design, namely designing the program flow, navigation flow, program prototype and so on. At this stage there is also a need for hardware specifications needed both to build and also to run the program results. The next stage is writing program code or called implementation. This process is based on the results of the program design and then a program is made to match the expected function. The next stage after coding is the program testing stage, which is testing the functions of all menus and features so that they can function as planned. The final stage is implementation and maintenance where applications that have been built can be used as needed as solutions to existing problems. In addition, it needs to be maintained so that the sustainability of the program can continue to be used and utilized.

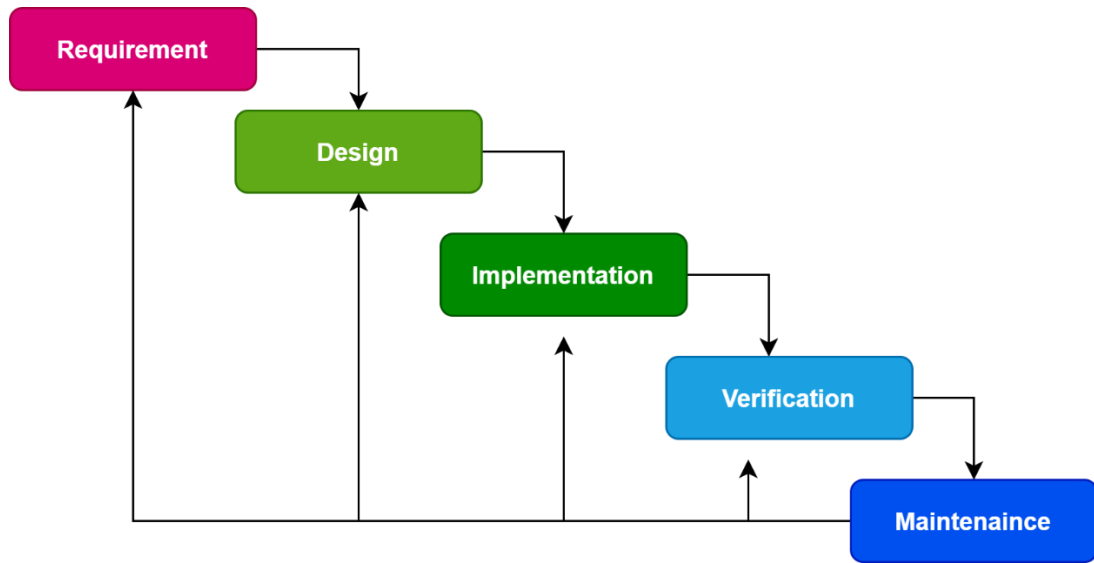


Figure 1. Waterfall Model Diagram

DISCUSSION

3.1 Needs Analysis

3.1.1 User Needs Analysis

In making Android-Based Digital Image Learning Media Using this Online Application, the first thing to do is analyze user needs so that this application is able to answer existing needs.

Table 1. User Requirements List

List of needs
The application can display the main menu
The application can display a list of materials
Applications can display digital drawing written materials
Application can display digital drawing video materials
Application can display developer information

3.1.2 Software Requirements Analysis

The applications used in building this learning media are by using online-based applications, namely google sites and appsgeyser. The google sites are integrated with gmail, google drive, google spreadsheets and several other google products. The advantage of using this online-based application is that there is no need to install software builder applications such as android studio and others which are of course very heavy, and also require complex programming. In addition, in making designs using an online-based application, namely Photopea which is also an online-based application with an interface that is almost the same as Photoshop so that it can meet design needs in building interface designs including icon icons and so on as needed.

3.2 Software Design

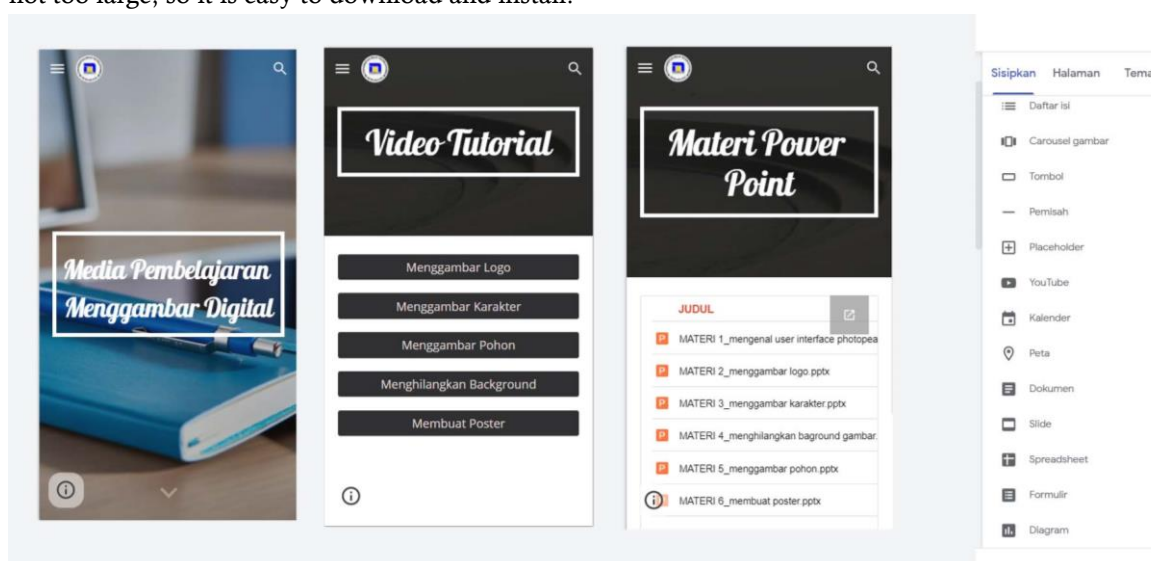
After finishing determining the software needed to build this Android-based digital drawing learning media, the next step is to design the application, then design the application according to the concept and needs. In this digital drawing learning media, several components are needed including :

Table 2. User Requirement Component List

Component Name	Component Type	Description
Main Menu Button	Button	Button Access main menu
Button Drawing Logo	Button	Button Access Logo Material
Button Drawing Tree	Button	Button Access Tree Material
Button Drawing Character	Button	Button Access Character Material
Button Create Poster	Button	Button Access Poster Material
Material Video Player	Youtube Player	Playing Material Videos
Developer Info Button	Button	Accessing the Developer Info Menu
List View List of Written Materials	List View	Displaying List of Written Materials
PowerPoint Material Viewer	Power Point Viewer	Showing Power Point Material

After all the data needed for the components needed, the next step is the interface design process. For learning video materials, first made using Camtasia software, containing material on digital drawing steps according to the theme or topic raised, such as drawing logos, trees, characters and video tutorials for making posters.

The next step is to upload the video on the YouTube channel so that later it can be called or inserted into the learning media application that was created. The placement of videos on this youtube channel has advantages, including the Android application that is installed, the file size is not too large, so it is easy to download and install.

**Figure 2.** Application Design

3.3 Coding

After making the design on each page according to the needs, the next step is to code according to the function. The functions needed include linking between pages, importing youtube videos, importing power point files and so on.

In using Google Sites, there are many conveniences including to create navigation links between pages, we only need to enter the link feature and then enter the URL link of the page that is the destination. Likewise with entering video content, just click the youtube menu then enter the desired youtube video link. Especially for new gmail to insert youtube videos, you are required to create a youtube channel first. To save a power point file, the first step is to upload the file on google drive, one account with gmail that is used on the google sites that are being used. The next step is to

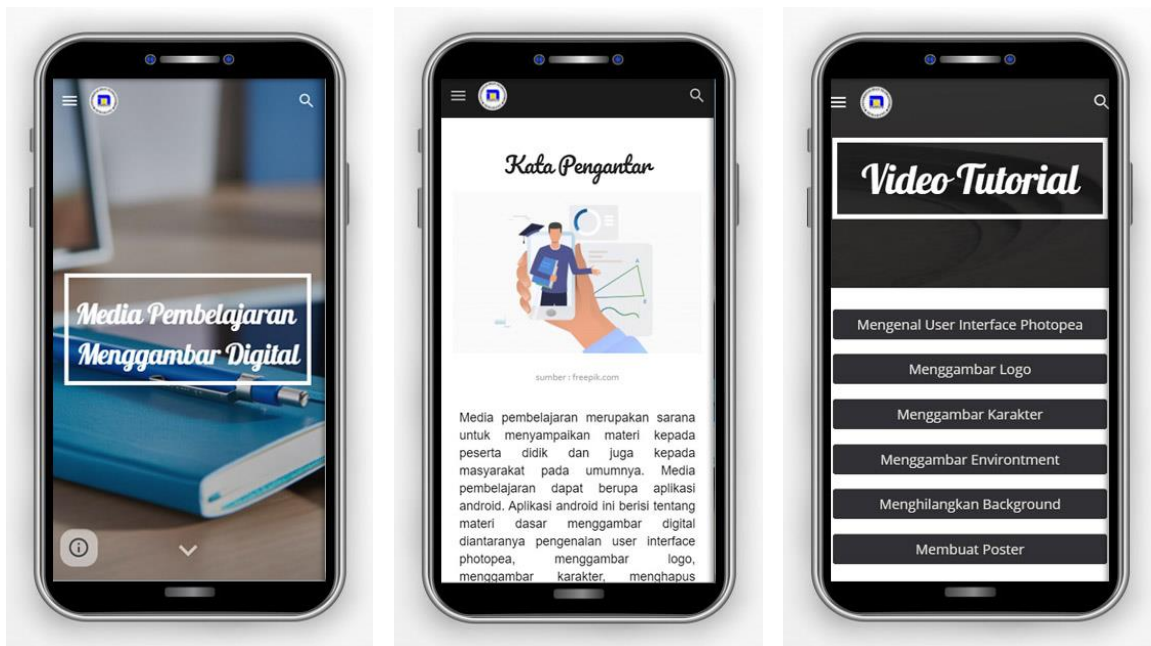
import the file into a folder into the workspace so that it becomes a list of the contents of the power point file which when clicked will display the power point material. For development in Google sites, it also supports the embed function so that it can be developed into more complex functions whose kdoe can be embedded in the embed feature.

3.4 System Implementation

The next step is to make sure that all the required content has been entered into the application and all functions have successfully run according to plan, the next step is to turn the application into an android application with an .apk extension.

Basically google sites is a web-based application that has the advantage of being very responsive on various platforms such as laptops or PCs, tablets, smartphones and so on. This Google Sites will adjust the appearance according to the platform where this application is run. In this application, the first step is published in the form of a website address, then the website address is converted to an android application with an .apk extension by utilizing appsgeyser technology. Google Sites adalah produk dari google untuk membantun websites sehingga dapat digunakan oleh pengajar untuk pembelajaran secara daring (Jubaidah, 2020).

The advantage of appsgeyser.com is that there is no need to install heavy application files to create android applications, because it is based online. In addition, you can still custom icons, are free even though there are paid services, you can add an exit button from the application and so on. The results from the conversion of google sites to android through appsgeyser can then be downloaded and can also be shared to several other applications such as whatsapp and other social media, so that it can be easily distributed to students or students. The results of the implementation of the Android-based digital drawing learning media application are as follows.



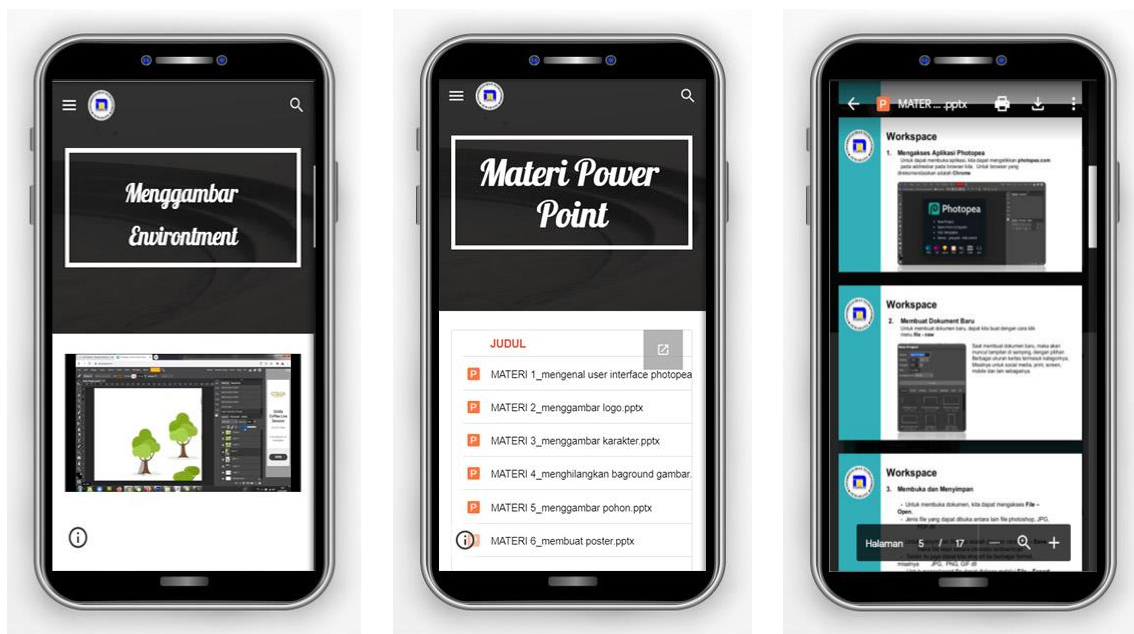


Figure 4. Application Implementation

3.5 Testing

a. Functionality Testing

Each software has different errors (Akiladevi, Vidhupriya, & Sudha, 2018). The function of this test is to find errors in the software so as not to cause losses, so as to minimize losses arising from software errors (Sethi, 2017). After the Android-based digital drawing learning media application has been implemented and successfully installed on Android, the next step is the testing process. At this testing stage, the black box testing method is used, namely testing the functioning of each component or feature contained in the application. With this method, it can be seen that the functionality of a software can run with the desired needs (Mustaqbal, 2015). The list of tested components and the test results are described in the following table.

Table 3. Application Component Test Results and Results

Tested components	Test result	Conclusion
Menu Button Menu List	Successfully Displays Menu List	Be accepted
Video Material Button	Successfully Showing Video Material	Be accepted
Button Material Power Point	Successfully Displaying PPT Material	Be accepted
Button Introduction to Photopea User Interface	Successfully Displaying Photopea User Interface Introduction Material	Be accepted
Button Drawing Logo	Successfully Displaying Logo Drawing Material	Be accepted
Button Drawing Environment	Successfully Displaying Environment Drawing Material	Be accepted
Button Drawing Character	Successfully Displaying Character Drawing Material	Be accepted
Button Create Poster	Successfully Displaying Poster Making Material	Be accepted
Material Video Player	Successfully Display Video Material, and get full screen	Be accepted
List View PPT Material List	Successfully Displaying PPT Material List	Be accepted

PowerPoint Material Viewer	Successfully Displaying Power Point Material	Be accepted
Developer Info Button	Successfully Display Developer Info Info	Be accepted

b. Feasibility Test Stage

After the application has been tested using the black box testing method and produces all the buttons and features running properly, the next step is to carry out the feasibility testing process. This feasibility testing process is carried out by asking students majoring in animation to install this android-based digital drawing learning media application on the android smartphone of each student as many as 10 students, by providing several question points related to the feasibility value of this application. To produce quality applications, a feasibility test is needed to get a feasibility value which is the most important thing in building software applications (R. Setiawan, 2019). The results of the feasibility assessment using the google form and the results are described in the following table.

Table 4. Application Feasibility Test Results

No.	Question	Number of Respondents to Answers					Score	PI (%)
		STS(1)	TS(2)	N(3)	S(4)	SS(5)		
1	Applications can be an attraction			2	5	3	41	82
2	students in learning			1	6	3	42	84
3	The application display is quite easy cukup			1	3	6	45	90
4	to understand				4	6	46	92
PI Average								87

After the application is tested for feasibility, it is completed at the data collection stage, then the next stage is to calculate the score of the assessment results. In calculating the results of the feasibility test above or the Percentage of Interpretation (PI), the following formula is used.

$$PI = \frac{S \times 100\%}{S_{Max}}$$

With the following information :

The highest score (SMax) = 5 x n = 5n (SS).....(1)

Lowest Value (SMin) = 1 x n = 1n (STS) (2)

n value = total respondents Total Value (S) = $\sum (A \times B)$ (3)

Where, A = Number of respondents who chose the answer, B = Answer Value

Table 5. Presentation Assessment Interpretation

Percentage	Criteria Value
84% < Skor ≤ 100%	Very Feasible
68% < Skor ≤ 84%	Feasible
52% < Skor ≤ 68%	Ordinary
36% < Skor ≤ 52%	Not Feasible
≤ 36%	Very Inappropriate

Based on the results of the feasibility test for this android-based learning application, it gets a score of 87, so if you look at the interpretation table of the value above, the application is included in

the very feasible category, but it must be developed in the future to be better and with more complete features according to development needs which will come.

CONCLUSION

This Android-based Digital Drawing Learning Media application is needed as a support for learning, especially during the COVID-19 pandemic as it is today. In this study, to build this application it does not require complex programming knowledge and also with online-based applications so that it can be applied to be able to develop learning media applications on other subjects. The results of this study produce application products that are acceptable from the functionality test results and the feasibility value is very feasible.

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