

Mobile Application Design for Learning Digital Engineering Based on Figma and Android Studio

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ABSTRACT

The purpose of this research is to create and implement effective learning media to facilitate lecturers and students in conducting learning at the Electrical Engineering Study Program, Faculty of Engineering, University of Muhammadiyah Sumatera Barat, namely designing "Teknik Digital App" learning applications by designing using use case diagrams, making the system in accordance with the design that has been made and implement the system that has been created and perform testing on the system. In collecting data, researchers used the method of observation, interviews and literature study. Meanwhile, in developing the system, researchers use the type of Research and Development (R&D) research referring to the waterfall model. Applications made using Android Studio, Figma and Adobe Illustrator CS3. The application that has been made is tested using the black box testing method. This research produces a "Teknik Digital App" learning application that helps parties in carrying out the learning process during lectures and also helps students to make it easier to learn basic digital engineering materials anywhere and anytime.

Keyword : *Mobile application, digital technique, android studio, figma, waterfall.*

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1. INTRODUCTION

Nowadays, many students or college students use *Android*-based *smartphones* both in the home environment and in the campus environment as we currently encounter many anywhere and anytime, because *Android* is currently a necessity in studying and mobilizing other information. However, learning is very minimal, especially regarding the application of learning digital engineering courses for students, because digital engineering subjects or courses are very important in the learning process, especially for the Electrical Engineering study program. To generate motivation for learning interest in digital engineering courses for daily use, it is necessary to develop a learning method that attracts students wherever and whenever they are without having to carry books anymore, because we can see that nowadays students' motivation to learn is not given much attention.

At present educators must continue to follow the development of technology that is so rapid able to use it more effectively and produce interesting lesson ideas so that the atmosphere learning so not boring. Media type selection Inappropriately it can cause various effects in the learning process.

According to Buyens (in Harumy and Amrul, 2018:54) mobile application comes from the word application and mobile. The meaning of application is application, proposal or use. According to terminology application is a ready-to-use program that built to do a function for users or another application that can use by intended target. While mobile has a meaning as movement from one place to another place. One of application used in programming to make application is android studio. Android studio is IDE (Integrated Development Environment) the development If android application and open source or free. The launching of the Android Studio on Mei 16th 2013 at Google I/O conference event for android application development. Juansyah.

The Faculty of Engineering, Muhammadiyah University of West Sumatra is one of the faculties at the Muhammadiyah University of West Sumatra which is on Jl. By pass AurKuning, No. 9, KM. 1 Bukittinggi City where the Faculty has 3 study programs, 32 permanent lecturers and approximately 1,006 students. The learning system at the Faculty of Engineering, Muhammadiyah University, West

Sumatra, still uses a manual system in which the lecturer conveys to the students and then the students listen, but this is really very inefficient in the learning process. Because we can see the current technological developments, it is necessary to develop to increase and raise the enthusiasm of student's learning in the learning process.

Almost all students at the Faculty of Engineering, Muhammadiyah University, West Sumatra have *smartphones*, where students are allowed to bring and use their *smartphones* in the campus environment. So that this supports the application of applications that will be carried out on the campus. Related to the use of this application in its application, the researcher submits a *figma*-based and *android*-based Digital Engineering learning *mobile applicationstudio* to the lecturer in charge of the course. Then the researcher guides or provides direction on how to use the *figma* and *android* based digital engineering learning *mobile application* in this *studio*, after the lecturer knows how to use this application, the lecturer teaches students how to use an *Android*-based digital engineering learning *mobile application*. this *studio* at the time of learning digital engineering.

Based on the above background, an effective and efficient learning system is needed to build student interest in learning. Therefore, the author is interested in raising the title of the research "Design of a *Mobile Application* for Learning Digital Engineering Based on *Figma* and *Android Studio*."

2. RESEARCH METHOD

Research development or *Research and Development (R&D)* is currently one type of research that is being developed. Development research is a type of research that can connect or break the gap between basic research and applied research. The definition of application research or *Research and Development (R&D)* is often defined as a process or steps for developing a new product or improving an existing product. The resulting product can be in the form of software, or hardware such as books, modules, packages, learning programs or learning tools. The product built in this research is a *figma*-based and *android*-based digital engineering learning *mobile applicationstudio* at the Faculty of Engineering, Muhammadiyah University, West Sumatra.

The system development method used in this research is the *Waterfall* model, which is a sequential and systematic product development model. This model is the most widely used model in *SoftwareEngineering (SE)*, this model is called *Waterfall* because the stages that are passed must wait for the completion of the previous stages and run in an orderly manner.

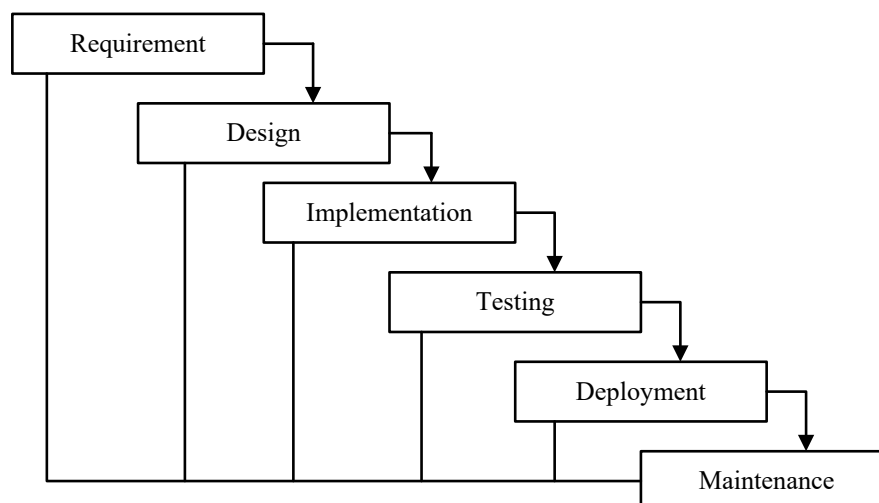


Fig 1. The waterfall method.

3. RESULTS AND DISCUSSION

The results of the research on the *Figma*- Based Digital Engineering Learning *Mobile Application* and *Android Studio* in the Electrical Engineering Study Program, Muhammadiyah University of West Sumatra are as follows.

A. App Logo

Logo design begins with designing a logo *symbol* or icon because the logo used is a *combination logo type*, which is a combination of *word mark* and *pictorial mark*, the use of that type of logo so that the Digital Engineering application *brand* can be more easily remembered and recognized by users.



Fig 2. Digital Engineering Application Logo

Logo icon designed and adapted using *Adobe Illustrator software*. The Digital Engineering logo is in the form of a *route printed circuit board (PCB)* which means that the Digital Engineering application represents dynamic applications and connectivity in accordance with technological developments. The route also symbolizes electronic and digital systems that integrate each component into a single unit.

B. Splash and Onboarding Screen

In the *splash screen* and *onboarding screen*, the component displayed is the Digital Engineering Application logo. The *splash screen* is created by displaying the Digital Engineering application logo which will move and move automatically to the instructions page according to the set time. Meanwhile, the *onboarding screen* displays 3 welcome screens that display application descriptions and illustrations of the main components of the application, namely materials, calculations and Digital Engineering exercises.

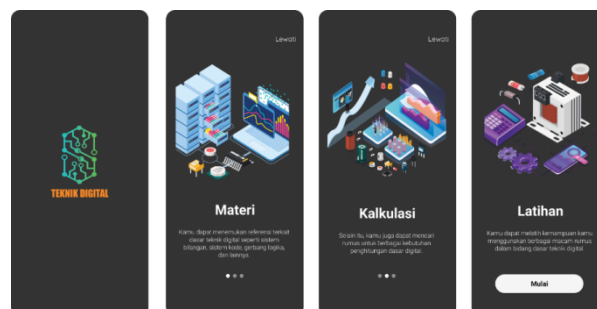


Fig 3. Splash and Onboarding Screen

C. Home Screen

Home page display is a page that has 5 buttons, text, images and logos. The button that appears on this page serves to move to the next page. Like the material button functions to move to the material page, the calculation button functions to move to the calculation page, the exercise button functions to move to the training page and the *about button* functions to move to the *about page* and the *exit button* to exit the application.



Fig 4. Home Screen

D. Material Screen

The material page display is the display that appears when pressing the material button on the *home* menu page. On this page there are several learning materials such as digital systems, number systems, ASCII tables, logic gates, boolean algebra, karnaugh maps, number conversions, combinational circuits, etc. The material detail page view is the view that appears when clicking one of the buttons on the material page. On this page there is a brief and structured explanation of the material.

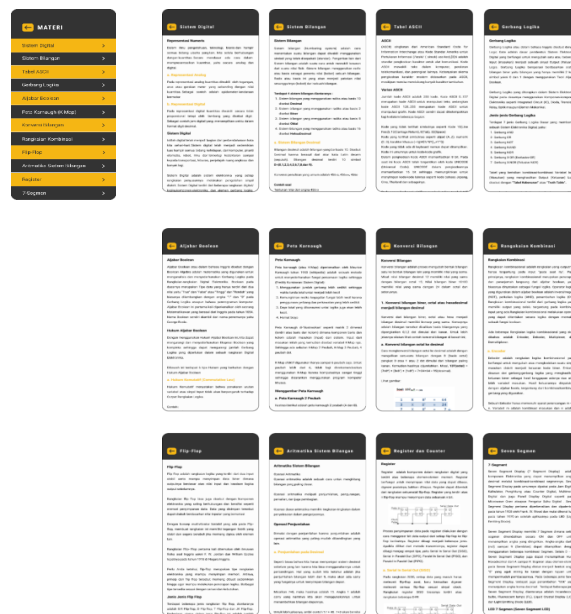


Fig 5. Display of the material page

E. Calculation Screen

The calculation page display is the display that appears when pressing the calculation button on the *home* menu page. On the calculation page display, it will display 2 menu buttons to select the conversion calculation required by the user, namely byte conversion and number system conversion.

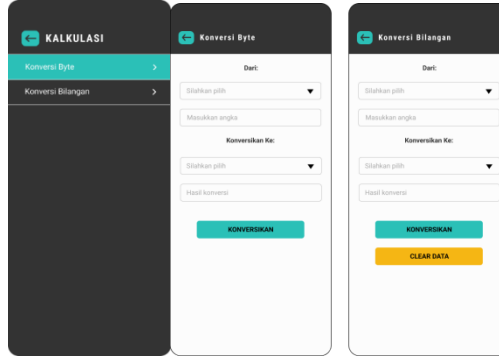


Fig 6. Display the calculation page

F. Exercise Screen

The exercise page display is the display that appears when pressing the exercise button on the *home* menu page. This page will display 10 menu buttons to select the exercises that the user wants, namely digital system exercises, number systems, ASCII tables, logic gates, number conversions, combinational circuits, flip-flops, number system arithmetic, registers and seven segments. After doing the exercises, the user can see the scores obtained.

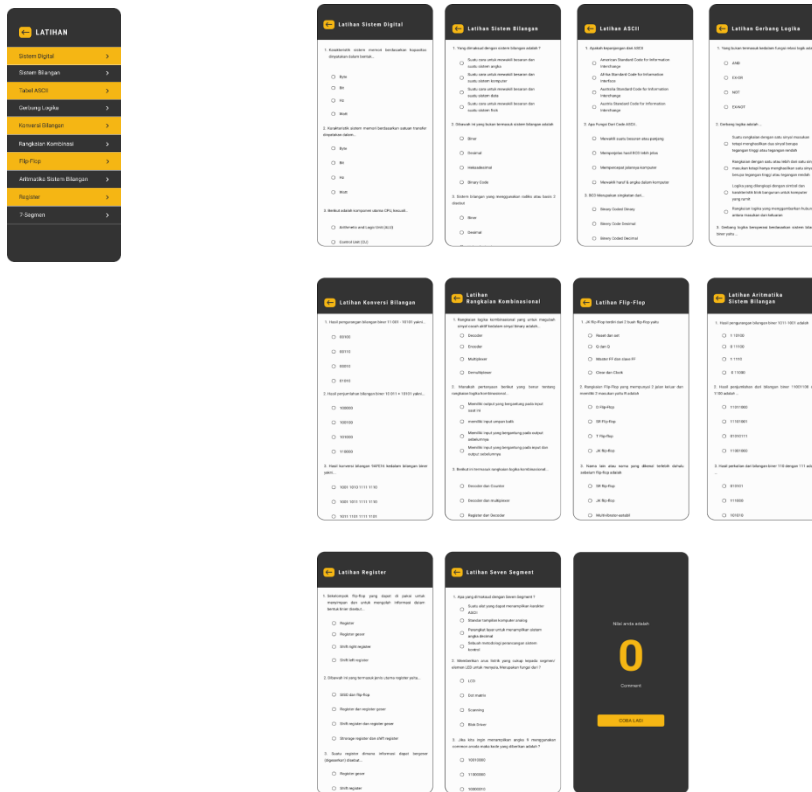


Fig 7. Exercise page display

G. About Page View

The about page display is the display that appears when the *about* button on the menu page is clicked. This page contains text and images. This page contains information about the application, developer details and social media which can be directly forwarded to the *website page* (ee.umsb.ac.id/), *Facebook* ([web.facebook.com/Fakultas Teknik UM Sumbar](https://web.facebook.com/Fakultas_Teknik_UM_Sumbar)) and *Instagram* ([fakultasteknikumsumbar/](https://www.instagram.com/fakultasteknikumsumbar/)).

Fig 8. Display *about* page

Testing is needed as one of the stages of implementation to test the minimum level of error and the accuracy of the designed software. Tests are carried out using the *black box testing method* with the following test results.

Table 1. Digital Engineering application testing

Test components	Expected realization	Showing results	Note.
Material Button	To show another page	The system displays the material page	Succeed
Calculation Button	To show another page	The system displays the calculation page	Succeed
Practice Button	To show another page	The system displays the exercise page	Succeed
<i>About</i> button	To show another page	The system displays the <i>about. page</i>	Succeed
<i>Exit</i> button	To exit the app	The system automatically exits the application	Succeed

4. CONCLUSION

Mobile application is made using *java programming* which is already available in the *android studio application*. This application can run on *android version 5.0 (lollipop)* and higher versions, while versions below the *lollipop version* cannot run the Digital Engineering application. This Digital Engineering learning mobile application consists of several menus, namely menus such as the home menu, the material menu, the calculation menu, the Exercise and score menu and the about menu. Within each of these menus there are several pages that contain details of Digital Techniques. Android Studio as an android application maker application, Figma as a design application UI/UX design and Adobe Illustrator CS3 as an image editing application and product logo maker.

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