APPLICATION OF THE MULTIMEDIA DEVELOPMENT LIFE CYCLE METHOD FOR THE DEVELOPMENT OF ANDROID-BASED E-LEARNING AS AN ALTERNATIVE LEARNING MEDIA DURING THE COVID-19 PANDEMIC

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	Abstract
Article Info Received : 29/09/2022 Revised; 26/10/2022 Accepted : 28/10/2022	The rapid spread of Corona Virus Disease-2019 (COVID-19) has forced various countries in the world to start implementing lockdowns to break the chain of virus spread. The United Nations Educational, Scientific and Cultural Organization (UNESCO) on its website stated that the COVID-19 pandemic threatens 577 million students in the world. The Indonesian government implements social distancing to prevent the spread, by organizing Distance Learning (PJJ) and advising students to learn from their respective homes which are conveyed through the Circular of the Ministry of Education and Culture Directorate of Higher Education No. 1 of 2020 regarding the prevention of the spread of COVID-19 in the world of education. The COVID-19 pandemic, which continues today, has resulted in students still having to study from home. An alternative that can be used to keep learning going is online learning. PJJ with E-Learning media is an alternative solution for learning media during the COVID-19 pandemic. The purpose of this study is to develop an Android-based learning media E-Learning as a learning solution during the COVID-19 pandemic, and by using the Multimedia Development Life Cycle (MDLC) approach. The research method referred to in this study is to adopt the MDLC approach, there are 6 stages of research, namely: Concept, Design, Material Collecting, Assembly, Testing, and Distribution. The results of this study help schools, teachers, and students with learning solutions during the COVID-19 pandemic.

Keywords: E-Learning, Learning Media, Multimedia Development Life Cycle

1.   INTRODUCTION

The rapid spread of Corona Virus Disease-2019 (COVID-19) has prompted countries across the globe to impose lockdowns in an effort to break the chain of virus transmission [1]. Indonesia, an archipelagic nation with a big population and various characteristics, has loosened its grip on the Indonesian government. The government established Large-Scale Social Restrictions (PSBB) as a precaution [2]. This social constraint has a substantial effect on the field of education. On its website, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) states that 577 million schoolchildren around the world are threatened by the COVID-19 epidemic.

In an effort to limit the spread of COVID-19, the World Health Organization (WHO) suggests temporarily suspending crowd-generating activities [3]. In response, the Indonesian government implemented social distancing to prevent the spread by implementing Distance Learning (PJJ) and advising students to study from their respective homes, as stated in Circular of the Ministry of Education and Culture (Kemendikbud) Directorate of Higher Education No. 1 of 2020 regarding the prevention of the spread of COVID-19 in the world of Education [4].

The COVID-19 pandemic, which is still present today, has forced children to continue doing their homework at home. Online learning is a possible substitute for continuing education. An internet network with connectivity, accessibility, flexibility, and the capacity to set up a variety of learning activities is needed for online learning [5]. The delivery of knowledge can be altered and replaced through the use of the internet and multimedia technology [6].

E-Learning is a phrase that refers to a variety of technologies used to support learning initiatives via the Internet [7]. The benefits of E-Learning for educational units during the PJJ process include: having a centralized database of teachers and students; it being easier to administer class and learning; it being easier to monitor the activities of teachers and students; and it being more cost-effective [8]. During the COVID-19 epidemic, PJJ with E-Learning media provides an alternative solution for learning media [9]. E-Learning is a remedy to school closures in this instance as a preventative step against the spread of COVID-19 [10].

This study aims to develop an Android-based learning media E-Learning as a learning solution during the COVID-19 pandemic, using the Multimedia Development Life Cycle (MDLC) to produce applications that meet user needs so that they can be accepted to support the implementation of the teaching and learning process and increase students' absorption of the taught material.

2. METHOD

The research technique is a standard procedure for conducting research in order to fulfill the study goals. This study utilizes the MDLC methodology for its research. The MDLC approach is suitable for creating and building a media application that combines picture, sound, video, animation, and other forms of media [11]. Concept, Design, Material Collection, Assembly, Testing, and Distribution are the six phases of the Luther-Sutopo version of the MDLC process.
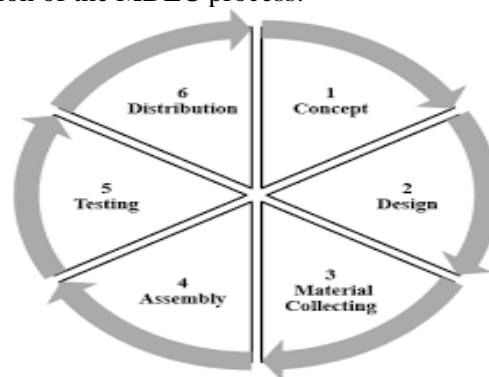

Figure 1. MDLC Stages

The application of the MDLC method produces interactive learning multimedia that can generate motivation and stimulation of student learning activities, help students improve their understanding of

learning materials, and foster learning creativity, thereby contributing to the enhancement of learning quality [12].

3. RESULTS AND DISSCUSSION
3.1. Concept

At this stage, analyze the needs of the target user of the application that is designed and also analyze the needs of the system, namely by interviewing and observing directly teaching and learning activities. Based on the results of interviews with 5 teachers and 20 students and direct observations of teaching and learning activities during the COVID-19 pandemic, it was concluded that schools, teachers and students experienced problems in the PJJ process due to the absence of an E-Learning system that assisted the process.

3.2. Design

At the stage of design, create specifications for the program's architecture, style, appearance, and material requirements or materials.
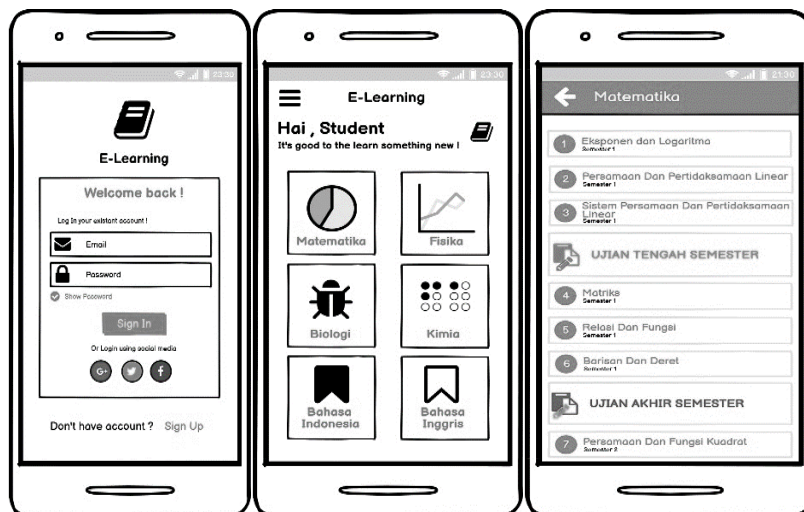

Figure 2. E-Learning Application Display Design

The following are the tools and materials used:

Table 1. Tools and Materials

No	Tool and Material	Version	Description
1	Mockup Balsamiq	3	Software utilized for designing or prototyping user interface displays
2	Android Studio Arctic Fox	2020.3.1	Integrated Development Environment (IDE) for Android operating system
3	Java	15.0.1	The programming language used to construct the software's back-end components.

4	Adobe Animate	19.2.1	Software used to create mobile content using illustration and animation tools.

3.3. Material Collecting

At this stage, collect the materials that will be used. Then the materials that have been collected will be continued in the next stage, namely assembly.

3.4. Assembly

At this stage, all objects or multimedia materials are created. Application development is based on the design stage.
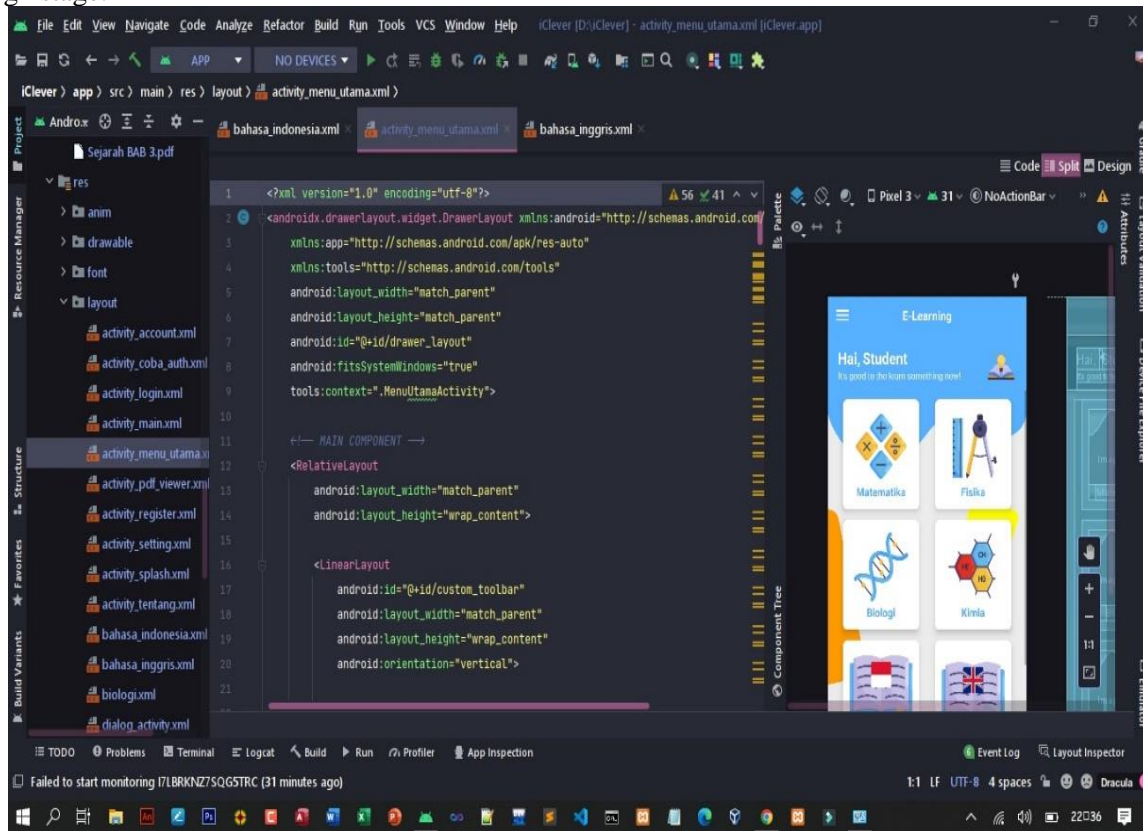

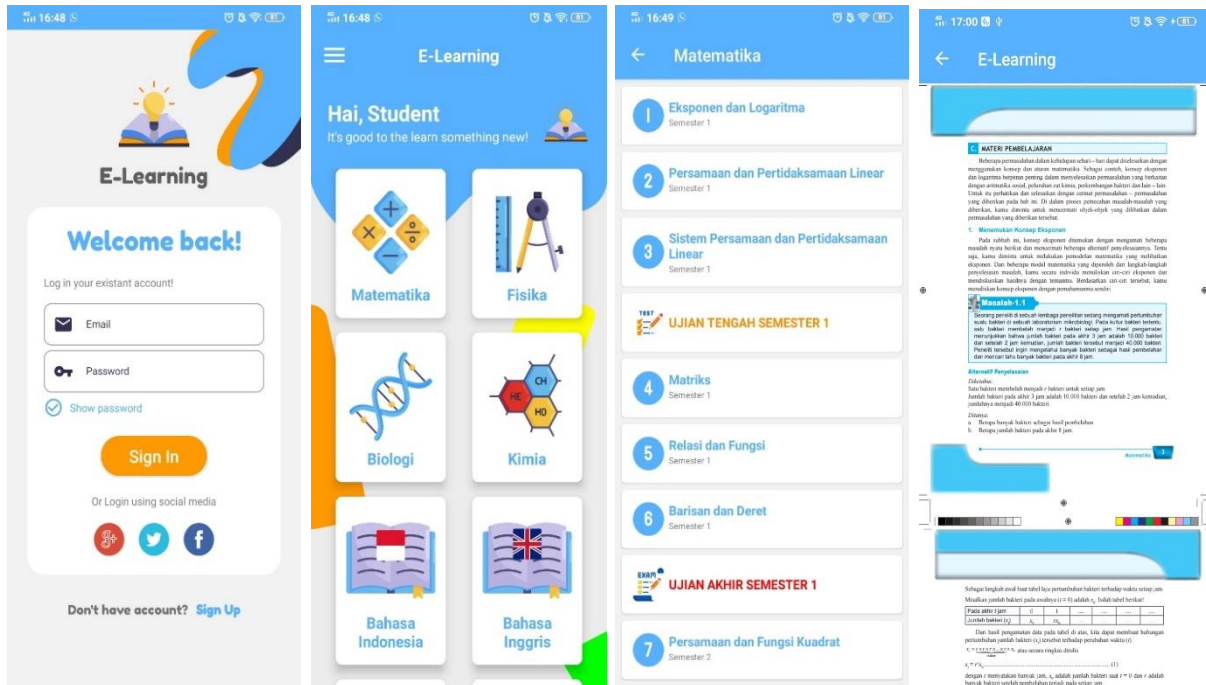Figure 3. Android Studio IDE for E-Learning Application Development

Figure 4. Android Based E-Learning Application

3.5.Testing

At this stage, testing or testing is performed after assembling and combining all components. The test was conducted using the Black Box Testing Method to observe the input and output results of the software in order to determine whether the designed application was functioning properly, and the smartphone compatibility test was used to determine the minimum requirements for using the developed E-Learning application.

A. Blackbox Testing

Table 2. Forecasting Percentage Calculation

No	Test	Page	Input	Expected Output	Happened Output	Conclusion
1	Login successful	Login	Email and password	The user is directed to the main page	The user is directed to the main page	Succeed
	Login failed	Login	Incorrect or empty email and password	The system displays an error message and displays the login page again	The system displays an error message and displays the login page again	Succeed
2	Add data	Admin pages,	Subject matter and	Data is successfully saved in the	Data is successfully	Succeed

		teachers and students	student work	appropriate tables in the database	saved in the appropriate tables in the database	
3	Edit data	Admin pages, teachers and students	Subject matter and student work	Data was successfully changed in the appropriate tables in the database	Data was successfully changed in the appropriate tables in the database	Succeed
4	Delete Data	Admin pages, teachers and students	Subject matter and student work	Data was successfully deleted in the appropriate tables in the database	Data was successfully deleted in the appropriate tables in the database	Succeed

From the results of the Black Box test, it can be concluded that the designed application has been functioning properly.

B.   Smartphone Compatibility Test

Table 3. Test of Compability With Smartphone

No	Device Specification	The Initial Time Duration Of Running The Application	Appearance	Conclusion
1.	Samsung Galaxy J2 • Screen size: 4.7 inc • Chipset: Exynos 3475 • OS: Android 5.1.1 (Lollipop) • RAM: 1GB • Internal memory: 8GB	2.1 minute	Suitable	Enough
2.	Samsung Galaxy A10 • Screen size: 6.2 inc • Chipset: Exynos 7884 • OS: Android 9.0 (Pie) • RAM: 2GB • Internal memory: 32GB	30 second	Suitable	Good
3.	Samsung Galaxy A13 • Screen size: 6.2 inc • Chipset: Exynos 850 • OS: Android 12 (Snow Cone) • RAM: 4GB	9 second	Suitable	Very Good

• Internal memory: 128GB			

The conclusion that can be derived from the compatibility test results is that the minimum required parameters for smartphones running the Android 9 operating system are 2GB RAM and 32GB internal memory.

3.6. Distribution

In the final step, the application is stored on a storage medium; if the capacity of the storage medium is insufficient, application compression is performed. This phase also includes activities to distribute or communicate the results with relevant parties.

4. Conclusion

The conclusion of this study is that the developed E-Learning application was able to support teaching and learning activities during the COVID-19 pandemic because the application had a centralized database of teachers and students, it was easier to manage classes and learning, and it was simpler to monitor the activities of teachers and students. The application of the MDLC method in the development of this E-Learning application produces interactive multimedia learning that can generate motivation and stimulation of student learning activities, assist students in gaining a better understanding of learning materials, and foster learning creativity, thereby contributing to the enhancement of the learning quality. The advancement of E-Learning based on intelligent systems will be the subject of additional study.

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