

Design and Development of Interactive Media in Vocational High Schools Using the Multimedia Development Life Cycle Method Based on Android

Inayatul Izzati Diana Yusuf*, Muhamad Jahiri, Henderi, & Al-Bahra Bin Ladjamudin

Informatics Engineering Study Program, University of Raharja, Tangerang City, Indonesia

Abstract

This research aims to develop interactive media as a learning medium. Now Indonesia is entering the era of industrial revolution 5.0 which prioritizes technology in all fields, including education. However, unfortunately, learning media, especially in vocational schools, is not sufficient, and teachers must use interactive media to teach students using technology. The method used is the Multimedia Development Life Cycle (MDLC) method with six main stages, namely: Concept, Design, Material Collection, Assembly, Testing and Distribution. From the results of the review, revisions were made according to suggestions from media and material experts. At the Distribution stage, the product was tested on students, the test subjects were class X SMK Yanisba Boarding School Vocational School. Data is collected through surveys. After that, the data is examined, and recommendations are used to update the final product. The aim of this research is to: (1) Create interactive media using Kodular at SMK Yanisba Boarding School (2) Determine the feasibility of interactive media using Kodular at SMK Yanisba Boarding School. Validator assessment of interactive media using Kodular.

Keywords: kodular, ICT development, MDLC method.

Received: 28 March 2024

Revised: 12 July 2024

Accepted: 27 July 2024

1. Introduction

Indonesia will enter the era of Industry 5.0 (Fitriani et al., 2023), which emphasizes technology in all aspects of life, including education. Unfortunately, interactive media is still very rare, especially in schools where very few educators use it. As a vital teaching tool, it is important to use interactive media to introduce students to technology.

According to (Jahiri et al. 2023), the aim of developing and designing this interactive media is to facilitate interactive learning, especially at SMK Yanisba Boarding School. This is because student achievement has not improved despite using books and PowerPoint presentations as media. This is intended to make students, especially those in grade 10, more interested in attending classes at SMK Yanisba Boarding School.

The lecture approach is the most frequently used approach by teachers at SMK Yanisba Boarding School (Lia Sihite et al., 2023) As in the information and communication technology (ICT) classes, this approach can cause students' focus to be diverted by external distractions, making it difficult for them to understand the material. Conversely, many students become uninterested and bored with learning, eventually memorizing and imagining without realizing the big picture of its development (Jamila et al., 2021) Students will not be interested in learning ICT History content if it is only delivered through lectures, as it involves ideas supported by images.

Students at SMK Yanisba Boarding School often have a poor understanding of information and communication technology because the ICT presentation materials are somewhat outdated, and the student-teacher interaction during the learning process is not very active. This is because many students struggle to understand the explanations given by teachers since the explanations consist of various materials that need to be studied, including animations and computer videos that are not available during ICT lessons, making it difficult for students to understand them.

Each student at SMK Yanisba Boarding School has different qualities and levels of enthusiasm for learning the content presented by teachers (Yonanda et al., 2022). Therefore, educators need to be sensitive in guiding their students according to their talents, interests, and abilities to maximize each student's potential. Students' talents, especially their

understanding abilities, will improve if their potential is well-developed. Furthermore, in applying interactive media, teachers at SMK Yanisba Boarding School must be able to use engaging, successful, and interactive methods, particularly Kodular-based interactive media. In this context, the author raises the topic of the History of Information and Communication Technology.

The process of using Kodular-based Android (Djuredje et al., 2022) for interactive media aligns with the standardization of harmonized learning. However, with this interactive media, learning will be easier because it can now be represented through interactive media that can be installed on Android-based smartphones (Tambunan & Siagian, 2022). Interactive media using Kodular can be presented in the form of text, data, links, videos, audio, images, and interactive quizzes. Based on the above problems, it is crucial to conduct research on the creation and design of Android-based interactive media using Kodular for ICT subjects, specifically the topic of ICT History at SMK Yanisba Boarding School.

2. Method

This research uses the Multimedia Development Life Cycle method, which consists of six cycles: concept, design, material collecting, assembly, testing, and distribution (Borman & Purwanto, 2019). The technique of this method can be seen in Figure 1.

2.1. Research Stages

The overall aim of this research stage is to determine whether the Android-based interactive media for ICT courses is feasible. Here are the stages of the MDLC (Ami, 2023).

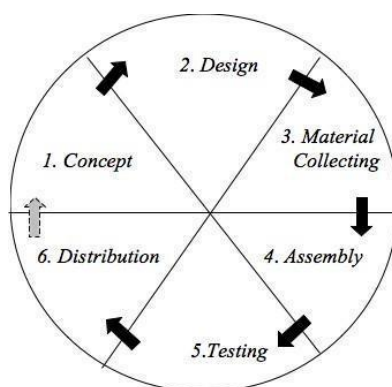


Figure 1. MDLC Diagram

a. Concept

There are several steps to consider at this stage, starting with understanding the purpose of the application, which is to facilitate access to images, increase learning motivation, and improve student achievement.

b. Design

The application design creates comprehensive application specifications, while the UML design serves as the basis for making adjustments.

c. Material Collecting

At this stage, the teaching materials are obtained from the independent learning curriculum with a focus on the history of ICT.

d. Assembly

When creating multimedia content, all items or resources go through the assembly step. The application development is based on UML. Each item or resource is created and integrated into a single application, namely Kodular.

e. Testing

This stage, often referred to as the “black box testing” stage, is when the program’s functional requirements become the primary focus of the black box testing methodology. Therefore, software experts can design a series of input conditions that will execute each functional requirement of a program through the use of black box testing.

f. Distribution

The application that has undergone testing and is deemed suitable for use will now be provided to SMK Yanisba School to be used as an interactive teaching tool.

2.2. Data Collection Method

Data collection in this research flow is divided into three parts: interviews, observation, and surveys. Using such data collection techniques can support the analysis.

a. Observation

Participating in actions and understanding what is seen from the observer's point of view is the goal of observation. Observation at SMK Yanisba Boarding School involves directly observing the objects to be studied in order to collect data.

b. Interview

Dialogue occurs when the researcher asks questions, which are then answered by the students. This interview is conducted to determine the required system. The information below is derived from 10 respondents in grade X TKJ.

Table 1. Number of Respondent (X TKJ)

No	Respondent Name	Gender	Class
1	Muhamad Syah Roni	Male	X-TKJ
2	Humaedi	Male	X-TKJ
3	Suja'i	Male	X-TKJ
4	Maesyaroh	Female	X-TKJ
5	Towabulloh	Male	X-TKJ
6	Danuri	Male	X-TKJ
7	Jupri	Male	X-TKJ
8	Muhamad Bayu	Male	X-TKJ
9	Ainun Syafitri	Female	X-TKJ
10	Fitri Romdanah	Female	X-TKJ

Source: Administration Office of SMK Yanisba Boarding School

2.3. Research Design

a. Use Case Diagram

Use case diagram modeling is very important for depicting many functional parts of the system derived from UML (Lia Sihite et al., 2023). The use case diagram serves as a visual representation of use cases in the context of the system being developed. In this use case, students and instructors are the two (2) factors. The use case diagram of the application looks like this shown on Figure 2.

b. Diagram Class

The class diagram is (Dimas Indra Andhika et al., 2022) a depiction of the types of objects found in this system. The class diagram can be seen in Figure 3.

c. Coding Kodular

(Djuredje et al., 2022) The use of the Kodular application allows developers to easily create applications by dragging and dropping without manual coding. An example in the image below includes student practice questions.

3. Results

3.1. Application Interface

a. Login Interface

The initial login screen is part of the process to access the menu page, which displays the logo and the school's name on the interactive media. It also includes a username and password that will be accessed by students and teachers (on

Figure 5 and 6).

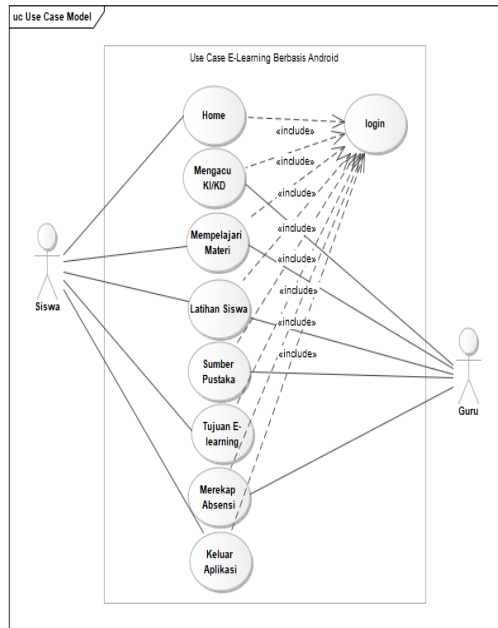


Figure 2. Use Case diagram

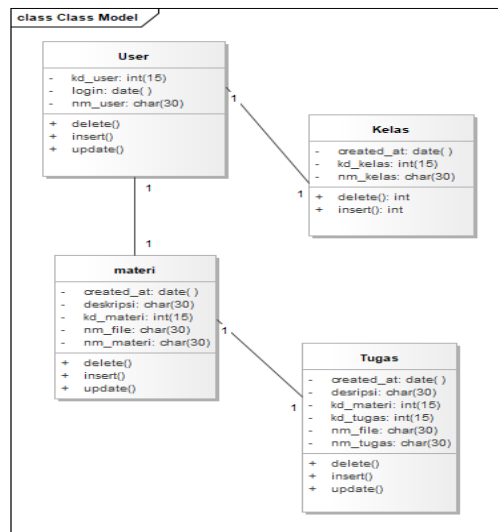


Figure 3. Diagram Class

```

when Latihan01.Initialize
do
  call Web_Viewer1.Go To URL
  url "https://docs.google.com/forms/d/e/1FAIpQLSf-CtRj..."
  call Floating_Action_Button1.Show

when Floating_Action_Button1.Click
do
  open another screen screenName "Latihan1"
  
```

Figure 4. Practice question coding



Figure 5. Screen Interface

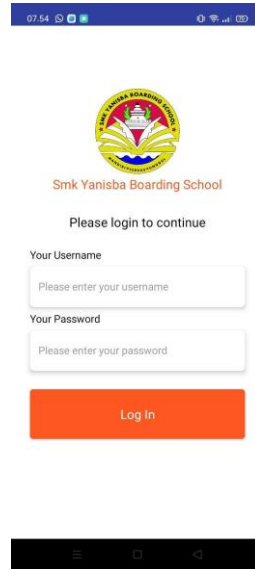


Figure 6. Login Interface

b. Menu Content Interface

Figure 7 shows the menu interface. In this section, there will be main menu buttons such as Ki/Kd, Materials, Practice, Exit Application, Videos, Profile, Learning Objectives, Student Profile, and Attendance to record student attendance. The main menu also includes a background to enhance the appearance.



Figure 7. Home Interface

c. Core Competencies and Basic Competencies Content Interface

The page displayed in this section is shown in Figure 8. The basic skill materials and core competency standards based on the lesson plan (RPP) are presented in this presentation.



Figure 8. Interface Competencies

d. *Material Content Interface*

Figure 9 shows the explanation of computers, their background, and images of various generations of computers that will be discussed in this section. This interface includes nine main chapters on the history of ICT.



Figure 9. Material Interface

e. *Exercise Interface*

Figure 10 shows the exercise interface. This interface includes a motivational text for practice and a Start button to begin working on the practice questions.



Figure 10. Exercise Interface

f. Practice Question Interface

The practice question interface in Figure 11 consists of five essay questions and ten multiple-choice questions. Students must select the alternative a, b, c, d, or e that they believe is correct to answer the questions.



Figure 11. Exercise Question Interface

g. Practice Result Interface

Figure 12 shows the interface displaying the results of the practice questions completed by the students. Additionally, this interface shows the students their scores from the practice session. The total score is obtained by multiplying the number of correct answers by 10. The highest possible score in this practice session is 100.

	A	B	C	D	E	F	G	H	I
1	Timestamp	nama siswa	Kehadiran						
2									
3									
4	01/06/2023 21:28:03	abdullah	hadir						
5	01/06/2023 22:05:11	andika	hadir						
6	01/06/2023 22:11:17	andika	hadir						
7	09/06/2023 20:50:04	abdullah	hadir						
8	09/06/2023 20:54:35	andika	hadir						
9	09/06/2023 20:55:55	abdullah	hadir						
10	09/06/2023 20:58:31	sinta	hadir						
11	14/06/2023 16:32:00	andika	hadir						
12	14/06/2023 16:57:24	andika	hadir						
13	14/06/2023 17:07:33	andika	hadir						
14	14/06/2023 17:09:36	andika	hadir						
15									
16									
17									
18									
19									
20									

Figure 12. Practice Result Interface

h. Exit Button Interface

Figure 13 shows the exit button interface. The exit button is used to exit the learning application.



Figure 13. Exit Interface

i. Video Button Interface

Figure 14 shows the learning video interface. The learning video provides an audiovisual overview of the history of computers when the lesson is conducted.



Figure 14. Video Interface

j. Profile Interface

Figure 15 shows the Profile Interface. The profile itself displays the identity of students at SMK Yanisba Boarding School.



Figure 15. Profile Interface

k. Attendance Interface

Figures 16 and 17 show the attendance interface. Attendance is a record of student presence that can be compiled by the teacher to monitor student attendance in class. Students simply scan, and the system will automatically compile the names of students who are present during the lesson. The images below are examples of the compiled attendance records noted by the teacher.

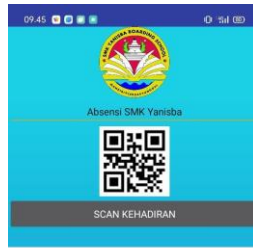


Figure 16. Attendance Interface

	A	B	C	D	E	F	G	H	I
1	Timestamp	Score	LOGIN PESERTA	Nama	Kelas / Jurusan	Cara berkomunikasi di m	Yang bukan contoh komu	Google+ hangouts adal	Tujuan Komunik
2	10/06/2023 7:59:06	66 / 100		91 Hafidz Nurahman	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	d. Mengambark
3	10/06/2023 7:59:09	56 / 100		91 THOWWABULLAH	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	b. Menjelaskan f
4	10/06/2023 8:05:02	58 / 100		91 A. Danuri	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	d. Mengambark
5	10/06/2023 8:05:11	62 / 100		91 SANUDIN	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	d. Mengambark
6	10/06/2023 8:19:38	68 / 100		91 ilawati	X TKJ	c. Komunikasi Jaringan	d. Google+ Hangouts	a. Google	b. Menjelaskan f
7	10/06/2023 8:19:38	68 / 100		91 ROSIDAH	X TKJ	c. Komunikasi Jaringan	d. Google+ Hangouts	a. Google	b. Menjelaskan f
8	10/06/2023 8:32:42	98 / 100		91 REINA DOTULONG	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	c. Menjelaskan f
9	10/06/2023 9:28:00	68 / 100		91 Dika Anggara	X TKJ	c. Komunikasi Jaringan	c. Email	a. Google	a. Mengidentifi
10									
11									
12									

Figure 17. Final Attendance Interface

3.2. Expert Validation Data for Media and Materials

Experts in media and content have approved the implementation of this Android-based interactive media at SMK Yanisba Boarding School. Media validation was obtained through observations and interviews, while content validation was derived from teaching materials, including the curriculum. The purpose of validation by media and content experts is to gather data, feedback, and recommendations to ensure that the Android-based interactive media created becomes a quality product in terms of application, content, language, and learning. Table 2 presents the validation findings. Each statement item on the validation sheet has a maximum score of five and a minimum score of one.

Table 2. Expert Validation of Media and Materials

No	Indicator	Score
1	Relevance of ICT History Material	5
2	The interactive media used has an attractive appearance	4
3	Clarity of Material	4
4	Learning with this interactive media can stimulate student learning activities	5
5	This interactive media can stimulate students' thinking	3
6	Students feel happy and interested when learning with interactive media	3
7	Interactive media matches my own learning pace	3
8	Appropriateness of video selection to explain the material	4
9	Application safety feasibility	4
10	Relevance of questions to the material	5
11	Level of difficulty of the questions	4

12	Material is easy to understand	4
13	Accuracy of language and spelling	4
14	Concept accuracy	4
Total Score		56
Average Score		3.5

In addition to the aforementioned data, there are several guidelines for refining the media from its source materials. These corrections will constitute the first review stage. Based on the analysis of the related media and materials, the product is ready to be reviewed and modified according to the guidelines. The following are errors noted by content experts:

- a. Explaining material in the film about disengagement.
- b. Augmentation of material in case studies.
- c. Creating more diverse topics.

3.3. Validation Result

Calculating the average score of the collected data is to ensure whether the interactive media at SMK Yanisba Boarding School is suitable for use. Fourteen assertions were included in the media and content expert validation sheet as a consequence of the content expert validation. Media and content experts confirmed it once. Based on statistics, the “good” category for media and content has an average score of 3.5%, resulting in a total score of 56.

Table 3. Expert Validation Conversion

Average Score	Category
$X > 4.2$	Very Good
$3.4 < X \leq 4.2$	Good
$2.6 < X \leq 3.4$	Enough
$1.8 < X \leq 2.6$	Bad
$X \leq 1.8$	Very Bad

4. Conclusion

After the design and development of the interactive media, the following findings were obtained for the learning objectives of the ICT topic at SMK Yanisba Boarding School:

- a. Several steps were taken in designing interactive media for Android using Kodular, including concept, design, material collection, assembly, testing, and distribution. The results of the Kodular program design are found in the Android application.
- b. Based on student evaluations, the interactive media product for the Information and Communication Technology discipline at SMK Yanisba Boarding School was rated and given a quality rating of “very good.” Therefore, it can be utilized by grade X students as interactive media.

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