

# Development of a Digital Academic Handbook Based on the Multimedia Development Life Cycle (MDLC) Method

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## Abstract

Academic education at a university or higher education institution is a long process; therefore, a handbook is required to ensure that the educational process runs effectively and the quality of graduates can be maintained. The main problem underlying this research is the limitations of printed academic handbooks, particularly in terms of flexibility and students' interest in reading. Common issues include difficulties in access for students and academic staff, high printing and distribution costs, and the lack of flexibility in updating information. Furthermore, printed handbooks do not support the rapid and efficient dissemination of information. With digitalization, these problems are expected to be resolved; however, further research is needed to ensure proper implementation. To address these issues, the Multimedia Development Life Cycle (MDLC) method was chosen as the approach for developing a digital academic handbook. By applying the MDLC method, the resulting digital academic handbook is expected to be easily accessible to all students and academic staff while providing up-to-date information. The final outcome targeted is the creation of an efficient, cost-effective, and interactive digital handbook that enhances the quality of academic services in educational institutions while offering students convenient access anytime and anywhere.

**Keywords:** *academic handbook, academic education, Multimedia Development Life Cycle (MDLC), students*

## 1. Introduction

The rapid development of information and communication technology has brought significant changes in various aspects of life, including the field of education. The academic handbook is an important document that contains information regarding curriculum, academic regulations, administrative procedures, and guidance for both students and academic staff. Academic education at a university or higher education institution is a long process; therefore, a handbook is required to ensure that the educational process runs effectively and the quality of graduates is maintained [1]. In other words, the academic handbook is a mandatory reference for every student, serving as a guide throughout their study period [2]. With the advancement of digitalization, printed academic handbooks face limitations in terms of effectiveness. Therefore, this study aims to design a digital academic handbook using the Multimedia Development Life Cycle (MDLC) method as the main object and subject of discussion in this research.

The problems underlying this research are the limitations of printed academic handbooks, particularly in terms of flexibility and students' interest in reading. Common issues include difficulties in access for students and academic staff, high printing and distribution costs, and the lack of flexibility in updating information. Furthermore, printed handbooks do not support the rapid and efficient dissemination of information. Through digitalization, these problems are expected to be resolved; however, further research is required to ensure that implementation runs effectively.

To address these issues, the Multimedia Development Life Cycle (MDLC) method was selected as the approach for developing the digital academic handbook. The term multimedia does not only refer to subjects, learning materials, or courses in schools and universities but also encompasses expertise fields, professions, and even the tools used to operate such programs [3]. MDLC consists of several stages, including concept, design, material collection, assembly, testing, and distribution [4]. This method has the advantage of being systematic and well-structured. Its effectiveness can be seen in various studies in which multimedia development is the primary focus, as the majority employ MDLC as their development method [5]. Nevertheless, MDLC also has disadvantages, such as requiring relatively more time compared to other methods. However, previous studies have shown that this method is effective for developing complex multimedia products that require high quality.

By applying the MDLC method, the resulting digital academic handbook is expected to be easily accessible to all students and academic staff, while also providing up-to-date information. The final expected outcome is the creation of an efficient, cost-effective, and interactive digital handbook that improves the quality of academic services in educational institutions and provides students with convenient access anytime and anywhere.

## 2. Theoretical Framework

### Digital Book (E-book)

An e-book is defined as “a publication consisting of text, images, or audio content, disseminated in a digital format that can be accessed on computers or other electronic devices such as Android systems, smartphones, or tablets.” Alternatively, an e-book represents the digital counterpart of a traditional printed volume. While printed books consist of sheets containing textual or graphical content, e-books comprise digital data that can also manifest as text or images. Some e-books are developed without commercially produced printed counterparts and are designed specifically for use with e-book readers, commonly referred to as e-readers. Nevertheless, due to the characteristics of the contemporary digital era—where almost all electronic devices are equipped with display screens capable of operation, including computers and most smartphones—users can conveniently access and read e-books through these platforms [7].

### Handbook

A handbook can be defined as a textual resource that encompasses relevant information concerning specific activities. It serves as an essential medium for learning or reading, catering to a wide range of audiences. Typically, a handbook provides comprehensive explanations regarding a particular activity. Handbooks are widely used in educational institutions as instructional resources to enhance teaching programs. From the various interpretations of the concept, it can be concluded that a handbook is a volume that offers systematic guidance on procedural steps for carrying out specific activities, carefully formulated by specialists within their respective domains [8].

### Multimedia Development Life Cycle (MDLC)

The methodological approach employed in this research is the Multimedia Development Life Cycle (MDLC) method. This methodology consists of six distinct phases: concept, design, material collection, assembly, testing, and distribution.

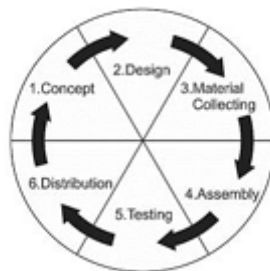


Fig. 1: Stages of the MDLC Method

The six stages of the Multimedia Development Life Cycle (MDLC) are as follows [8]:

1. **Concept:** This initial phase defines the objective and conceptual framework of the application while identifying the demographics of the target users.
2. **Design:** This phase involves formulating a blueprint of the program’s structure, including style or theme elements, visual presentation, and the components required for application development.
3. **Material Collection:** This phase focuses on gathering resources aligned with the application’s requirements, such as images, videos, audio clips, and animations.
4. **Assembly:** This phase consists of systematically organizing all collected materials. The application is built based on the design established in the previous phase.
5. **Testing:** This phase involves executing the application and verifying the presence or absence of errors.
6. **Distribution:** The final phase includes analyzing the developed application to identify potential areas for improvement. In practice, these six stages do not always need to be executed linearly; earlier phases may be revisited as needed. Nonetheless, the concept phase remains the fundamental starting point.

## 3. Research Method

### Current System Analysis

The Academic Handbook is a compilation of academic regulations, curriculum structure, learning implementation guidelines, and all aspects related to and supporting academic activities within the campus environment. Currently, STMIK-TIME has an academic handbook in printed form. However, the printed academic handbook has limitations in terms of flexibility and students’ interest in reading. Common issues include difficulties in access for both students and academic staff, high printing and distribution costs, and the lack of flexibility in updating information. Furthermore, printed handbooks do not support the rapid and efficient dissemination of information. With digitalization, these problems are expected to be resolved; however, further research is required to ensure that implementation can be carried out effectively.

### Application Concept

The application concept refers to the principle of assigning a unique identifier to the application for configuration management and traceability purposes. This identifier is used to connect technical resources to high-level abstractions within the organization’s application

portfolio. The digital academic handbook application is designed to make it easier for students to access academic guidelines at the campus. The information provided in the digital academic handbook application includes:

1. Campus identity, including the history of the institution, motto, vision, mission, objectives, and the meaning of the campus logo.
2. An explanation of the study programs available at the campus.
3. Procedures for the new student admission system.
4. Academic services available at the campus.
5. Regulations and codes of conduct that students must comply with while on campus.
6. Academic sanctions imposed on students who violate campus rules and regulations.
7. Educational facilities available at the campus.
8. Methods of assessment and evaluation of students' learning outcomes.
9. Academic activities provided by the campus.
10. Information regarding graduation requirements (yudisium).
11. Information regarding the campus curriculum.

### User Identification

The users of the digital academic handbook application consist of several groups, including:

1. Prospective students who intend to apply for admission to the campus.
2. Parents and/or guardians of both current students and prospective students.
3. Active students currently enrolled at the campus.
4. Lecturers actively teaching at the campus.

Before designing the proposed new system, a system modeling process must first be carried out. The system modeling will be conducted using a use case diagram. The proposed system's use case diagram can be seen in the following image

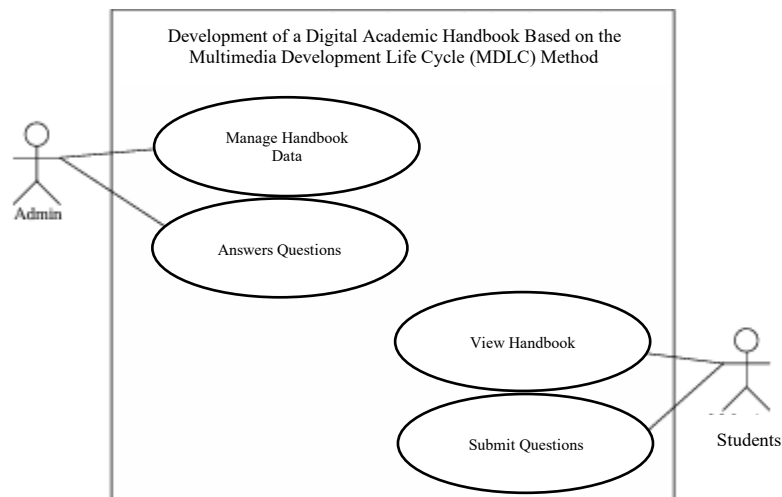


Fig. 2: Use Case Diagram Design for a Digital Academic Guidebook Application Using the Multimedia Development Life Cycle Method

## 4. Results and Discussion

The admin interface is designed using the PHP scripting language with the Laravel framework. This interface is web-based and can be displayed through a browser. The first page that appears when the system is executed is the Login page, as shown in the following image:

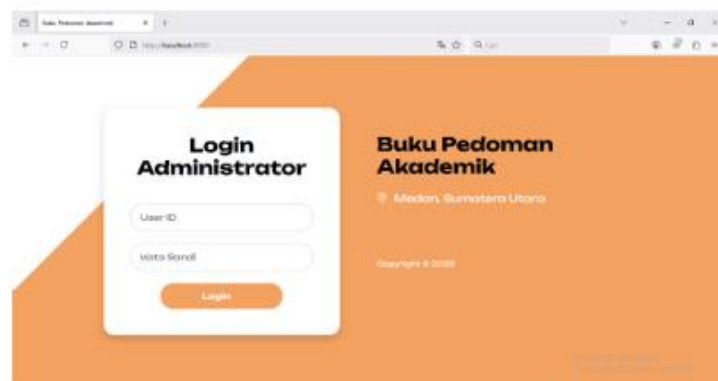


Fig. 3: Display of the Login Page on Web

The admin user must enter valid credentials in order to access the system. If the entered data is valid, the system will display the Admin Home page, as shown in the following image:



Fig. 4: Administrator Home Page on Web

Users can initiate the creation of a new key pair by pressing the Generate New Key button, after which the system generates both private and public keys for the user and then navigates to the History page.

On the Administrator Home page, several menus can be accessed, namely:

1. Home Menu – functions to display the Administrator Home page.
2. Book Entry Menu – functions to display the Book Entry List page.
3. Question List Menu – functions to display the Question List page.
4. Logout Menu – functions to log out from the administrator section of the system and return to the Login page.

If the admin user wishes to display the list of book entries stored in the database, they can access the Book Entry List Menu, and the system will display the Book Entry List page, as shown in the following image.

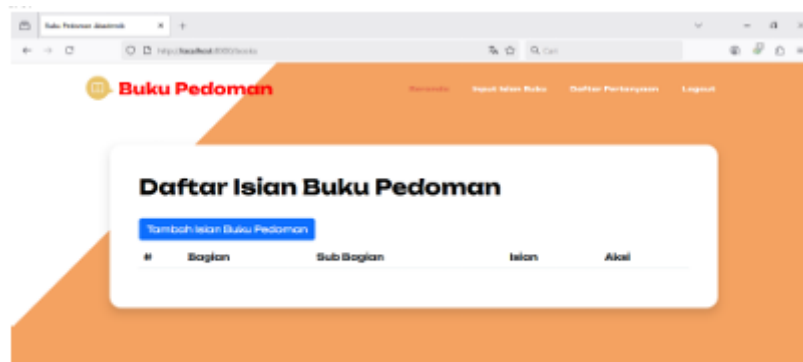


Fig. 5: Display of the Book Entry List on Web

To add new handbook entry data, the admin user can click the Create Entry List button. The system will then display the Entry Input page, as shown in the following image:

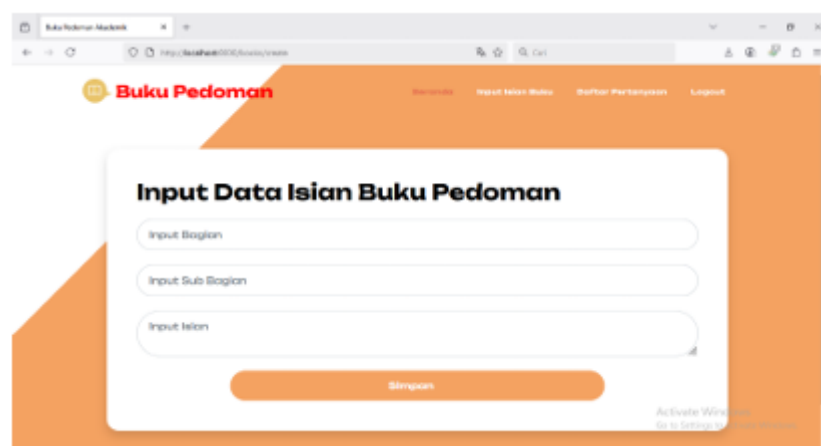


Fig. 6: Display of the Entry Input Page on Web

The admin user must enter valid handbook entry data and click the Save button to store the information. Meanwhile, if the admin user wishes to view the list of questions submitted by users, they can access the Question List menu, and the system will display the Question List page, as shown in the following image:

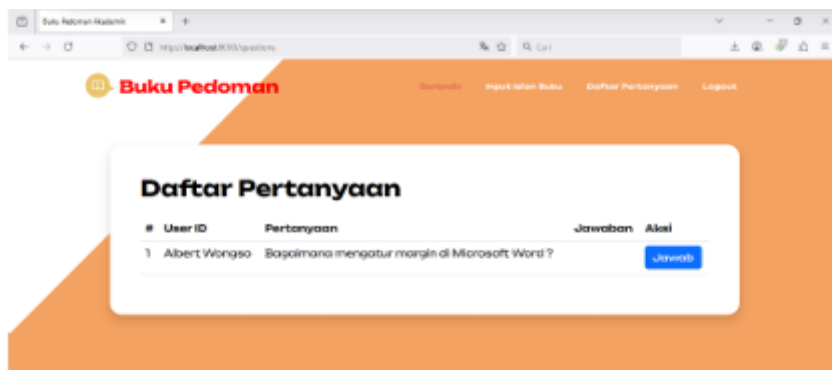


Fig. 7: Display of the Question List Page on Web

On the Question List page, all questions submitted by users are recorded. If the admin user wishes to respond to a user’s question, they can click the Answer button, and the system will display the Answer Question page, as shown in the following image:

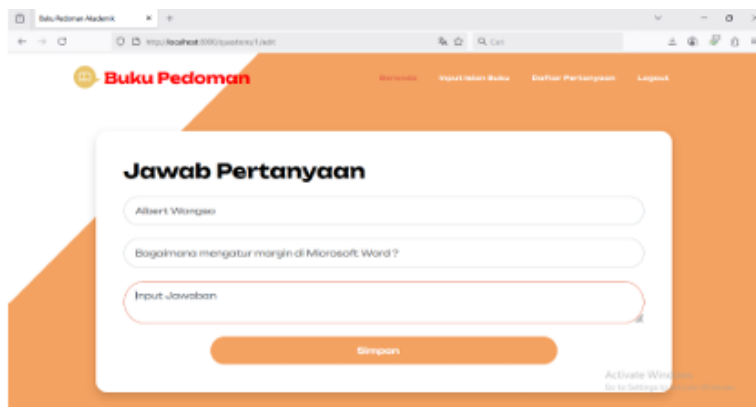


Fig. 8: Display of the Answer Question Page on Web

The admin user can respond to questions submitted by users and click the Save button to store the answers in the database. The user section of the digital academic handbook application, developed using the Multimedia Development Life Cycle method, is designed with Android Studio and the Kotlin programming language. The first page that appears when the user runs the application is the Table of Contents page, as shown in the following image:



Fig. 9: Display of the Table of Contents Page on Android Studio

In the Table of Contents page, various sections and subsections of the handbook entries are displayed. Users can access the desired section by clicking the corresponding button, after which the system will display the Handbook Content page, as shown in the following image:



Fig. 10: Display of the Handbook Contents Page on Android Studio

If the user wants to see the answers to the questions submitted to the admin staff, they can click the Questions List button, and the system will display the Questions List page, as shown in the following image:



Fig. 11: Display of the Question List Page on Android Studio

The user can view the answers to their submitted questions on the Questions List page. If the user wants to submit a new question to the system admin, they can click the Add New Question button, and the system will display the Question Input page, as shown in the following image:



Fig. 12: Display of the Input Question Page on Android Studio

## 5. Conclusion

From the discussions in the previous chapters, this final project research can be concluded as follows:

1. The feature of adding academic handbook content on the administrator side is able to improve accessibility and efficiency in distributing information within educational institutions, making it easier to manage and disseminate the academic handbook to students.
2. The implementation of the Multimedia Development Life Cycle (MDLC) method plays a role in organizing and directing the development of features in the digital academic handbook application, so that the design process becomes more structured, systematic, and aligned with user needs.

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