

Web-Based Campus Facility Loan Application Using CodeIgniter 4

Fitrotuzzahwannisa^{1*}, Siti Sufaidah², Munawarah³

^{1,2,3}Information System Study Program, Universitas KH. A. Wahab Hasbullah

*Email: zahwansa25@gmail.com

ABSTRACT

The conventional process of campus facility borrowing often leads to delays in information delivery and difficulties for users in understanding facility availability. In addition, the presentation of borrowing schedules in non-visual formats makes it challenging for users to quickly interpret facility usage status. This study aims to design and develop a web-based campus facility borrowing application that provides visual schedule information and supports a fully digital submission process. The system development employs the Software Development Life Cycle (SDLC) using the Waterfall model, which consists of requirement analysis, system design, implementation, and testing stages. The application is developed using the CodeIgniter 4 (CI4) framework, PHP programming language, and MySQL database. System testing is conducted using the black-box testing method to ensure that all system functions operate according to user requirements. The results indicate that the developed system successfully simplifies the campus facility borrowing process, presents borrowing schedules through a visual calendar interface, and clearly displays submission status and borrowing history. These features improve efficiency, transparency, and accessibility in the management of campus facility borrowing.

Keywords: Information System; Campus Facility Loan; Web Application; CodeIgniter 4

INTRODUCTION

The rapid development of information and communication technology has significantly influenced various sectors, including higher education administration. Digital transformation has become an essential strategy for improving efficiency, transparency, and service quality in academic institutions. The implementation of web-based information systems is increasingly needed to support administrative processes that require accuracy, accessibility, and timely information delivery (Khairi et al., 2024)

One important aspect of academic administration that requires effective management is campus facility borrowing services. Facilities such as classrooms, laboratories, halls, and supporting infrastructure play a crucial role in supporting academic and non-academic activities. However, conventional facility borrowing processes often rely on manual procedures or non-visual information presentation, which can lead to delays, scheduling conflicts, and difficulties in monitoring facility availability (Putro et al., 2022).

In many cases, borrowing schedules are still presented in tabular or textual formats, making it difficult for users to quickly understand facility usage status. The lack of visual representation reduces clarity and increases the risk of miscommunication between users and facility managers. Previous studies indicate that the absence of interactive scheduling features may negatively impact efficiency and transparency in facility management systems (Bernadus et al., 2024).

At Universitas KH. A. Wahab Hasbullah, a web-based facility borrowing system has been implemented to facilitate online submission of borrowing requests. Although the system supports digital submission, the presentation of borrowing schedules is still limited to list-based displays and does not provide an interactive visual calendar. Additionally, users must manually check their submission status, as automatic notification features are not yet fully integrated. These limitations reduce the effectiveness of the system and affect user experience.

Several previous studies have addressed the development of web-based facility borrowing systems in higher education environments. Developed a campus facility management system using the Waterfall model to improve administrative efficiency (Khairi et al., 2024). Proposed a web-based borrowing system to reduce scheduling conflicts and improve data accuracy. While these studies demonstrate the benefits of

digital facility management, most of them focus on basic submission and approval processes without emphasizing visual schedule representation and real-time notification features.

Based on these issues, this study aims to design and develop a web-based campus facility borrowing application that focuses on visual schedule presentation through an interactive calendar and supports digital submission processes. The system is developed using the CodeIgniter 4 framework and applies the Software Development Life Cycle (SDLC) with the Waterfall model. The expected outcome of this research is to improve efficiency, transparency, and user accessibility in campus facility borrowing management while enhancing the overall user experience.

METHOD

This study develops a web-based campus facility borrowing application using the Software Development Life Cycle (SDLC) with the Waterfall model. The Waterfall model is selected because it provides a systematic and sequential development process, allowing each stage to be completed and evaluated before proceeding to the next stage. This approach is suitable for systems with clearly defined requirements and structured administrative workflows (Khairi et al., 2024)

The Waterfall model applied in this study consists of requirement analysis, system design, implementation, testing, deployment, and maintenance. Each stage is carried out in a structured manner to ensure that the developed system aligns with user needs and institutional requirements.

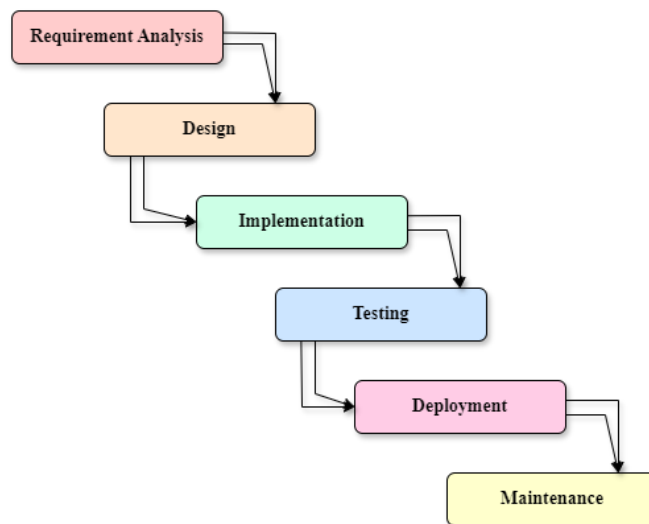


Figure 1. Waterfall development model

The stages in the Waterfall model applied in this research are explained as follows:

1. Requirement Analysis

The requirement analysis stage aims to identify both functional and non-functional requirements of the system. Functional requirements include user authentication, visual display of facility borrowing schedules, digital submission of borrowing requests, monitoring of submission status, and automatic notification delivery. Non-functional requirements focus on system accessibility, data security, usability, and interface responsiveness. Data collection at this stage is conducted through interviews with the campus facilities management unit and supported by literature studies related to facility management information systems (Putro et al., 2022).

2. System Design

The system design stage translates the identified requirements into a technical blueprint. This stage includes the design of system workflows, database structures, and user interface layouts. Use case and activity diagrams are utilized to describe interactions between users and the system, while database design ensures structured and integrated data management. User interface design emphasizes simplicity and

clarity, particularly in presenting borrowing schedules through a visual calendar to enhance user understanding (Bernadus et al., 2024).

3. Implementation

In the implementation stage, the system design is transformed into a functional web-based application. The application is developed using the CodeIgniter 4 framework with PHP as the programming language and MySQL as the database management system. The implementation focuses on client-side functionality, including dashboard presentation, borrowing submission forms, visual schedule displays, and notification integration to support efficient user interaction.

4. Testing

System testing is conducted using the black-box testing method to evaluate whether each system function operates according to the specified requirements. The testing process focuses on input and output validation without examining the internal code structure. Key features tested include login functionality, schedule visualization, borrowing submission, status monitoring, and notification delivery. Black-box testing is widely used to ensure system reliability from the user's perspective.

5. Deployment

After successful testing, the system is deployed in the campus environment and made accessible to users through a web browser. This stage includes system configuration and initial usage trials to ensure that the application functions properly in real operational conditions.

6. Maintenance

The maintenance stage is carried out to ensure long-term system reliability and performance. Maintenance activities include fixing detected errors, updating system features based on user feedback, and adapting the system to potential changes in facility management policies or user requirements (Azdiansyah & Chalik Azhar, 2025).

RESULT AND DISCUSSION

This section presents the results of the development and implementation of the web-based campus facility borrowing application. The discussion focuses on how the system supports the facility borrowing process, improves schedule visualization, and enhances user interaction. The results are described based on system features and user workflows, followed by a discussion of system performance based on testing outcomes.

Result

The dashboard serves as the main interface accessed by users after logging into the system. This page displays summary information related to campus facilities and borrowing activities. One of the main features on the dashboard is a visual calendar that represents facility usage schedules using color indicators. This visualization enables users to quickly understand facility availability and reduces the risk of scheduling conflicts.

1. Dashboard Interface

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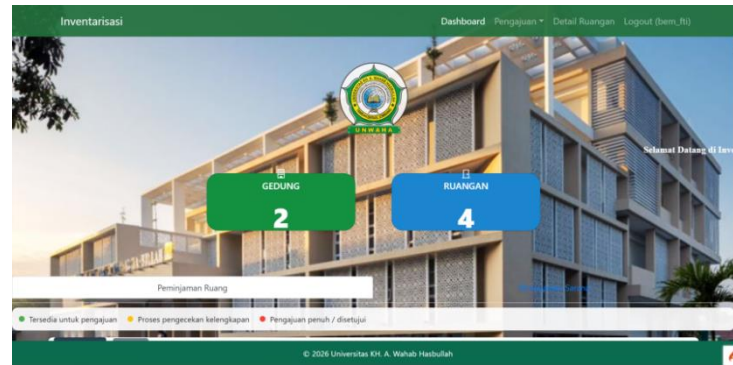


Figure 1. User Dashboard Interface

2. Visual Borrowing Schedule

The system provides a visual borrowing schedule presented in the form of an interactive calendar. Users can select specific dates to view detailed information about facility usage on those dates. This feature replaces conventional tabular schedule displays and improves clarity in understanding borrowing status.

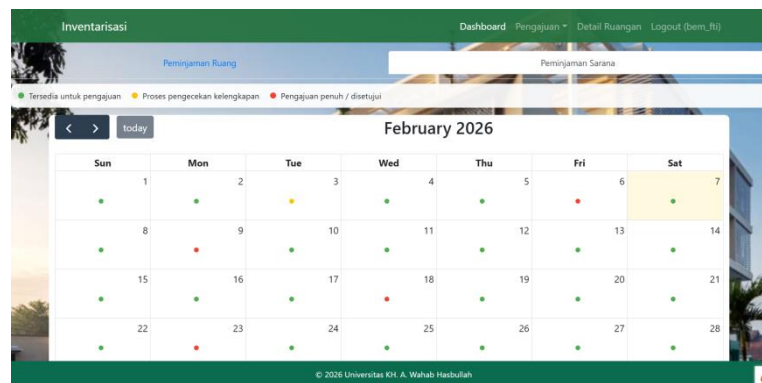


Figure 2. Visual Calendar for Facility Borrowing Schedule

3. Facility Borrowing Submission Form

The borrowing submission form allows users to submit facility borrowing requests digitally. Users are required to fill in information such as activity details, borrowing dates, time duration, and selected facilities. The system performs validation to ensure that all required data is completed before submission. This process helps minimize input errors and ensures that submitted requests meet administrative requirements.

Figure 3. Facility Borrowing Submission Form

4. Borrowing History and Status Monitoring

The system provides a borrowing history page that displays all borrowing requests submitted by users along with their respective statuses. Through this feature, users can monitor whether their requests are still being processed, approved, or rejected. The clear presentation of status information enhances transparency and reduces the need for manual confirmation with facility administrators.

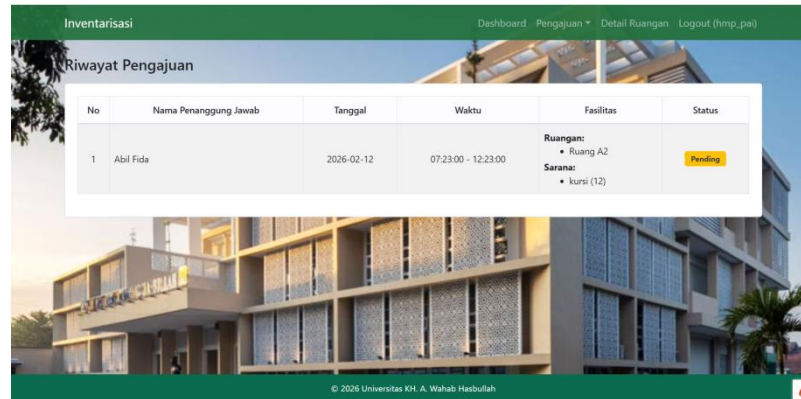


Figure 4. Borrowing History and Submission Status Page

5. Facility Data Information

The application also provides information related to campus facilities, including building data, room data, and supporting facilities. This feature allows users to access facility details before submitting a borrowing request, helping them select appropriate facilities based on their needs.

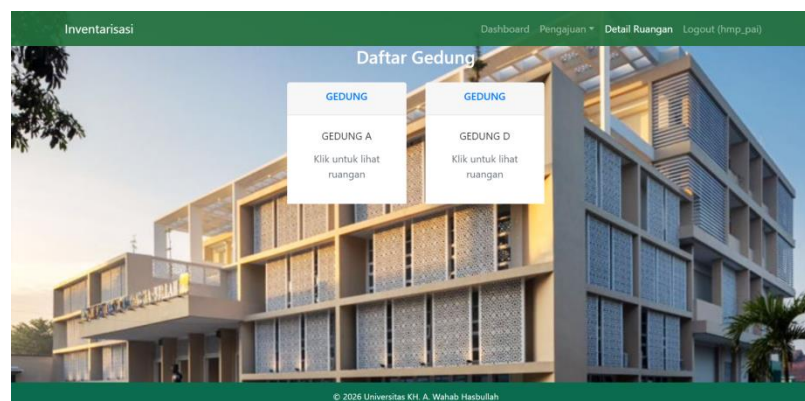


Figure 5. Campus Facility Data Page

Discussion

The discussion focuses on evaluating the performance of the developed web-based campus facility borrowing application based on implementation results and system testing. The evaluation emphasizes whether the system functionalities align with user requirements and successfully address the problems identified during the analysis stage.

Table 1. System Functional Testing Results

No	Feature Tested	Expected Result	Test Result
1.	User Login	User can access system with valid credentials	Pass
2.	Dashboard Display	Visual calendar and summary displayed correctly	Pass

3.	Borrowing Submission	Data saved and validated successfully	Pass
4.	Borrowing History	Submission status displayed correctly	Pass
5.	System Security	Unauthorized access blocked after logout	Pass

System testing was conducted using the black-box testing method to verify the functionality of each main feature without examining the internal program code. The summary of functional testing results is presented in **Table 1**, which shows that all tested features produced outputs in accordance with the expected results without critical functional errors.

The testing results indicate that the application operates reliably and supports efficient user interaction. The successful implementation of visual schedule and digital submission features confirms that the system effectively addresses the identified problems in the campus facility borrowing process.

CONCLUSIONS

This study successfully developed a web-based campus facility borrowing application using the CodeIgniter 4 framework and the Software Development Life Cycle (SDLC) with the Waterfall model. The developed system addresses existing limitations in conventional facility borrowing processes, particularly in the presentation of non-visual schedules and manual status monitoring.

The application provides an interactive visual calendar to display facility availability, supports digital submission of borrowing requests, and enables users to monitor submission status and borrowing history clearly. The integration of automatic notifications further enhances communication efficiency between users and facility managers. Functional testing using the black-box testing method confirms that all system features operate according to user requirements and perform reliably.

Overall, the developed system improves efficiency, transparency, and accessibility in managing campus facility borrowing. This application can serve as a practical reference for the development of similar information systems in higher education institutions and may be further enhanced through additional feature integration and system scalability improvements in future research.

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