

Analyzing the Web-Based Library Information System at SMKN 1 Talang Ubi

Marlindawati^{1*}, Misinem¹, Muhammad Ardiyansyah¹

¹ Faculty of Vocational, Universitas Bina Darma, Palembang, Indonesia

*Email: marlindawati@binadarma.ac.id

Abstract

In the rapidly evolving field of information technology, the transition from manual to computerized systems has become essential for improving efficiency and accessibility. This study focuses on the analysis, development, and evaluation of a Web-Based Library Information System at SMK Negeri 1 Talang Ubi, aimed at modernizing library management through automation. The system facilitates processes such as book borrowing, member registration, and data management, with the added benefit of remote accessibility. The system was developed using the Web Engineering methodology, which includes stages of Customer Communication, Planning, Modeling, Construction, and Delivery & Feedback. UML (Unified Modeling Language) tools were employed for system design, and PHP, HTML, and MySQL were utilized for programming and database management. Usability testing with 100 participants revealed positive outcomes: 80% rated the system's navigation and design as "Excellent" or "Good," and 80% found the user interface consistent across different sections. However, 10% of participants experienced issues with device accessibility, indicating a need for further improvements in cross-device compatibility. Overall, 80% of users were satisfied with their experience. The Web-Based Library Information System at SMK Negeri 1 Talang Ubi has successfully enhanced library management through improved efficiency and accessibility. The high satisfaction rates among users highlight the system's strengths, although addressing cross-device accessibility issues remains a priority. This study provides a valuable framework for other educational institutions seeking to implement similar web-based solutions.

Keywords

Analysis, Information Systems, Libraries, Web Engineering, PHP

Introduction

The rapid advancement of information technology in the current era of globalization has significantly transformed various fields, including education. This technological progress has enabled computer devices to become essential tools for processing and managing data, thereby greatly enhancing efficiency and productivity across multiple domains (Gove, 2021). In educational institutions, such as school libraries, the integration of computerized systems has

Submission: 20 June 2024; **Acceptance:** 28 July 2024



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revolutionized traditional practices. Automated library information systems now facilitate tasks such as book borrowing, returns, and data management, making these processes more streamlined and user-friendly (Pressman & Maxim, 2020).

At SMK Negeri 1 Talang Ubi, the library serves as a crucial resource center for students, offering access to a wide range of information and educational materials. Despite its importance, the library is staffed by only two personnel, the head librarian and two other staff members, which presents significant challenges in managing routine tasks such as member registration, visitor tracking, and data organization. This limited staffing can result in inefficiencies and administrative difficulties, highlighting the urgent need for a more sophisticated library information system (Sommerville, 2016).

To address these challenges, it is essential to develop a comprehensive and user-friendly library information system. Such a system should be designed to automate and streamline library operations, including data management, transaction processing, and report generation. An effective system will incorporate a well-structured database with normalized data to ensure consistency and accuracy. This approach will not only improve operational efficiency but also provide a more reliable and effective solution for managing library resources and services.

The implementation of a robust library information system at SMK Negeri 1 Talang Ubi is vital for enhancing the library's operational efficiency and overall effectiveness. By leveraging advanced technology, the system will address current administrative challenges and significantly improve the management of library data and services.

Methodology Research

Analysis

The system currently implemented is intended as a requirement that must exist in a library to carry out the process of managing books and developing existing collections. In general, the current system currently running is less efficient in carrying out the library data management process. Where officers sometimes carry out the process of managing data recorded by visitors and data recorded by officers, such as recording data on borrowing and returning books, errors often occur in the form of recording the wrong name of the borrower, recording the name of a book title that is different from the book borrowed, making the process difficult. Data collection on book loans needs to be improved, and officers must re-record errors in the process of recording loan data.

Planning

Use Case Diagram

This use case diagram describes the scope of a website-based library information system at SMK Negeri 1 Talang Ubi, as shown in Figure 1.

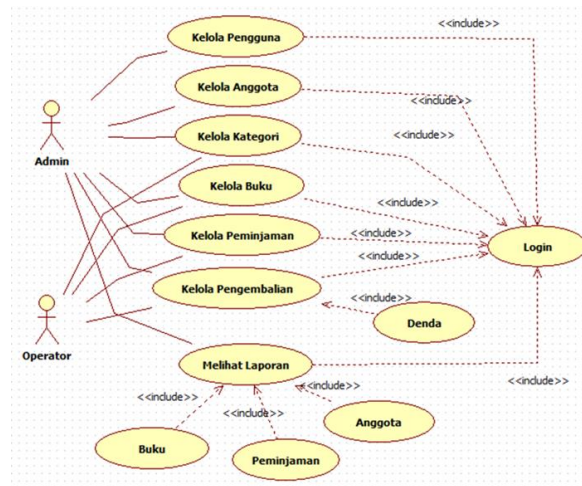


Figure 1. Use case diagram

Activity Diagrams

An activity diagram describes the workflow or activities of a library. Activities are divided into 2 categories.

Admin actor, as shown in Figure 2.

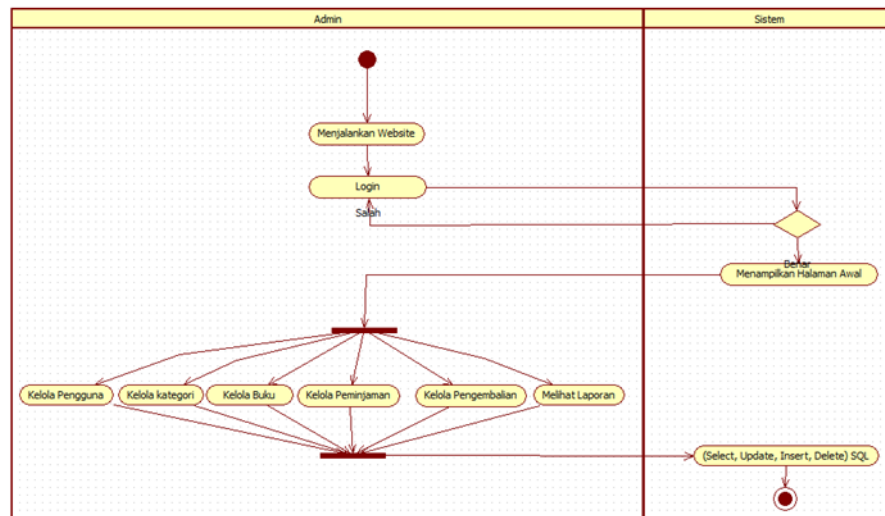


Figure 2. Admin Activity Diagram

Operator actor, as shown in Figure 3.

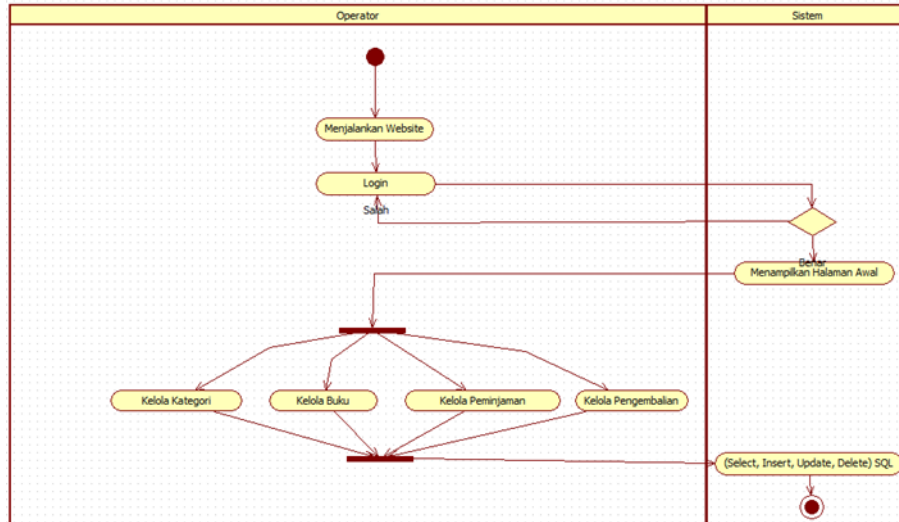


Figure 3. Operator Activity Diagram

Database Design

The database design consists of several related tables. The table design that will be created in the database to meet the needs of the business functions defined in the modeling phase, following the proposed table design:

1. User Table
 Table Name : Pengguna
 Primary Key : Kode_pengguna
 Foreign Key : -

Table 1. User Table Data Structure

Field Name	Data Type	Information
Kode_Pengguna	Int (5)	Kode pengguna as primary key
Nama_Pengguna	Varchar (75)	Nama pengguna system
Username	Varchar (35)	Username from Member
Password	Text	Password
Level	Enum	Admin, Students and Teachers

2. Category Table
 File Name : Kategori
 Primary Key : Kd_Ktg
 Foreign Key : -

Table 2. Member Table Data Structure

Field Name	Data Type	Information
Kd_Anggota	Int (5)	Kode Anggota as <i>Primary Key</i>
Tanggal_Registrasi	Date	Student registration date
Nipd	Varchar (8)	Student identification number
Nama_Siswa	Varchar (35)	Student's name
Alamat	Text	Address

Telepon	Varchar (25)	Customer telephone number
Status	Enum	Active, Inactive
Password	Text	<i>Member password</i>

The database design for the Web-Based Library Information System is structured around several interrelated tables, meticulously crafted to align with the requirements identified during the modeling phase. This design ensures that each table effectively supports the business functions and operational needs of the library. By organizing the data into a coherent structure of related tables, the system facilitates efficient data management, retrieval, and integrity.

The proposed table design encompasses various essential components, each tailored to address specific aspects of library operations, such as book management, member registration, and transaction processing. This approach not only supports seamless data integration but also enhances the system's overall functionality and performance.

The thoughtfully designed database schema will serve as the backbone of the Web-Based Library Information System, ensuring that it meets the institution's needs efficiently and reliably.

Results and Discussion

This section presents the results and discusses the usability testing and overall performance evaluation of the Web-Based Library Information System developed for SMK Negeri 1 Talang Ubi. The purpose of this analysis is to assess the system's effectiveness in meeting its intended goals and identify areas for improvement.

The results are derived from a comprehensive evaluation involving 100 participants, who provided feedback on various aspects of the system, including usability, design, and functionality. The subsequent discussion interprets these results, focusing on how well the system aligns with user expectations and requirements.

This section examines user feedback and performance metrics to provide insights into the system's strengths and weaknesses. It also explores the implications of these findings for future enhancements, ensuring that the system continues to effectively meet its users' evolving needs.

Admin Login View

The login page display is the page used by system users to enter the system, as shown in Figure 4.

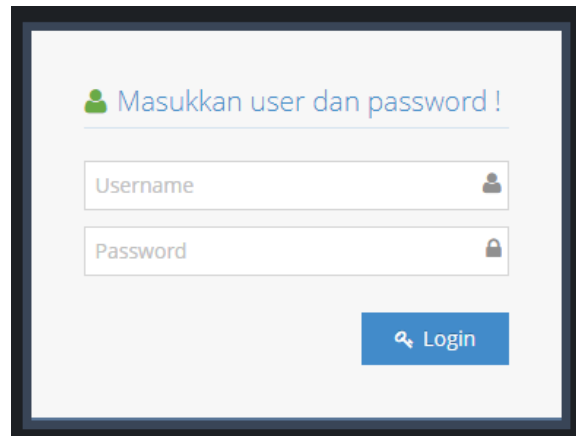


Figure 4. Login page display

Page Views

It is the initial display (menu) on the page, which connects all existing pages to library staff, as shown in Figure 5.



Figure 5. Login page display

Member Data Page Display

The "Member Data" page displays data on members and students registered as members of the library staff, as shown in Figure 6.

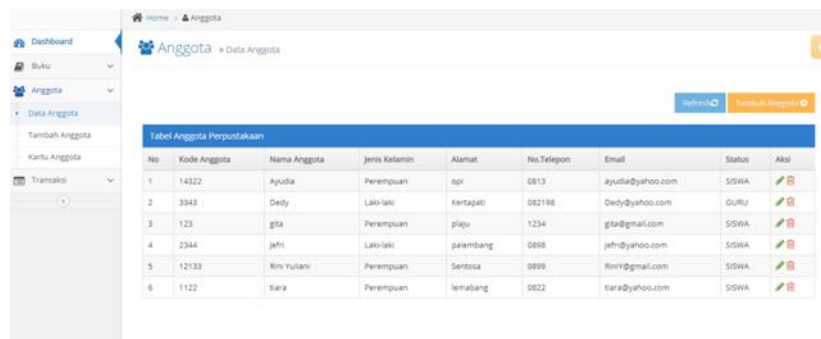


Figure 6. Member Data Page Display

Book Category Page View

A book category is a page that displays book category data information to library staff, as shown in Figure 7.

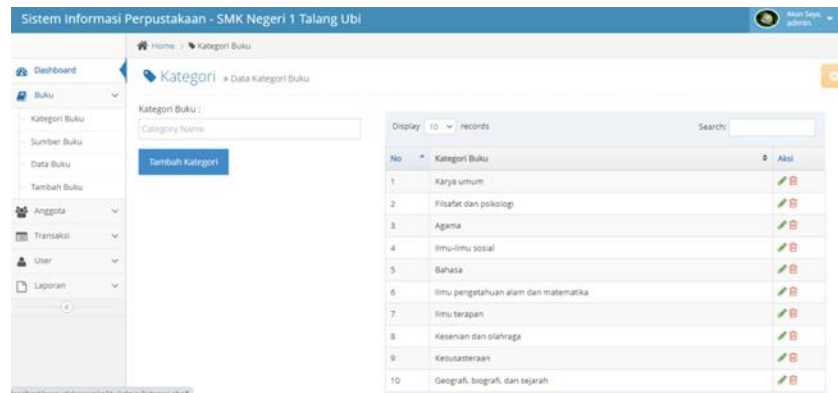


Figure 7. Book Category Page Display

Transaction page display

Borrowing Book is a page used by library staff to record every loan transaction from members, as shown in Figure 8.

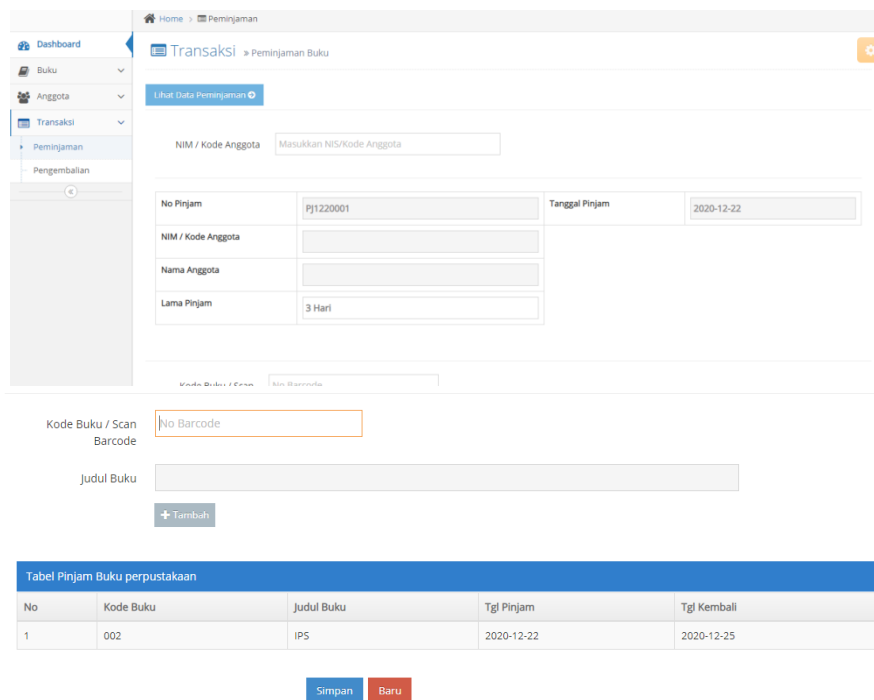


Figure 8. Borrowing Book Page Display

Usability Testing

Usability testing was conducted with 100 participants to evaluate the effectiveness and user satisfaction of the Web-Based Library Information System implemented at SMK Negeri 1 Talang Ubi. The testing aimed to assess various aspects of the system, including ease of navigation, design and layout, user interface consistency, device accessibility, and overall user experience. This

section summarizes the results of the usability testing and provides a detailed analysis of the findings, as shown in Table 3.

Table 3: Usability Testing Results

Aspect	Excellent/Good	Fair	Poor
Ease of Navigation	80%	10%	10%
Design and Layout	80%	15%	5%
User Interface Consistency	80%	15%	5%
Accessibility Across Devices	70%	20%	10%
Overall User Experience	80%	15%	5%

The usability testing of the Web-Based Library Information System demonstrates that the system largely meets user expectations and provides a positive user experience. While the results are encouraging, addressing the areas with lower ratings, particularly related to device accessibility and navigation, will be essential for further enhancing the system's effectiveness and user satisfaction.

The results of the usability testing indicate a generally positive reception of the Web-Based Library Information System. The high ratings in ease of navigation, design, and layout suggest that the system is user-friendly and visually appealing. The consistency of the user interface across different sections further supports the system's effectiveness in providing a coherent and intuitive user experience.

However, the analysis also reveals areas for improvement. The 10% of participants who rated navigation as "Poor" and the 20% who experienced issues with device accessibility highlight the need for enhancements in these areas. Addressing these concerns will be crucial for improving overall user satisfaction and ensuring the system performs optimally across various devices.

The overall user experience rating further underscores the system's strengths, with 80% of users expressing satisfaction. The feedback suggests that while the system is well-received, ongoing refinements are necessary to address the identified issues and enhance the system's usability.

Conclusion

The usability testing of the Web-Based Library Information System at SMK Negeri 1 Talang Ubi provides a comprehensive overview of the system's performance and user satisfaction. Overall, the results demonstrate that the system effectively meets the needs of its users and contributes positively to library operations.

The testing highlights several key strengths of the system. A substantial majority of users, 80%, rated the ease of navigation, design, and layout as either "Excellent" or "Good," indicating that the system is both intuitive and visually appealing. The high ratings for user interface

consistency across different sections further support the system's user-friendly design, reflecting its effectiveness in maintaining a coherent and accessible interface.

However, the testing also uncovered areas needing improvement. Notably, 10% of participants found the navigation experience to be "Poor," and 20% encountered issues with the system's accessibility across various devices. These findings point to specific challenges that must be addressed to enhance the system's functionality and user experience. Improving navigation and ensuring better compatibility with different devices will be crucial for optimizing the system and addressing user concerns.

Despite these areas for improvement, 80% of participants rated the overall user experience positively. This feedback underscores the system's effectiveness and the value it adds to library services. Addressing the identified issues, particularly those related to navigation and device accessibility, is essential to sustain and build on this positive reception.

While the Web-Based Library Information System is largely successful and well-received, focusing on resolving the highlighted issues will be vital for further enhancing user satisfaction and operational efficiency. By addressing these areas, the system can provide an even more seamless and effective experience for its users.

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