

## Analyzing the Need for a Library Application at Madrasah Ibtidaiyah (MI) Azharyah Palembang with Recommendations

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### Abstract

This study aims to analyze the need for library applications and come out with solutions on the design for developing a library application at Madrasah Ibtidaiyah (MI) Azharyah Palembang. The need should cater to enhancing efficiency in library management and facilitating access to learning resources for both students and teaching staff. The application development process involves user needs analysis, system design, software implementation, and testing in a real-world environment. The research method employed in this study is The Analysis, Research, and Development (ARD) with an Agile approach, allowing flexibility in adapting application features according to user requirements. The research findings indicate that the developed library application accelerates administrative processes, such as recording book loans and returns, and includes a search feature that simplifies user access to the book collection. Application testing revealed a high level of user satisfaction, although some feedback was provided for improvements in features and the user interface. Therefore, this application is expected to be an effective solution in achieving more modern and efficient library management at MI Azharyah Palembang.

### Keywords

Library Application, Software Development, Management Efficiency, Madrasah Ibtidaiyah, Palembang

### Introduction

The library is a crucial component of educational institutions, serving as a central source of learning resources. In the current digital era, traditional library management faces significant challenges, particularly in terms of efficiency, accessibility, and data management. Madrasah Ibtidaiyah (MI) Azharyah Palembang, as a primary educational institution, recognizes the importance of modernizing its library to support more effective and efficient teaching and learning processes.

Madrasah Ibtidaiyah Azharyah Palembang is a primary school located at Jl. KH. Azhari, 12 Ulu, Seberang Ulu II District, Palembang City, South Sumatra. The school houses a library that

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contains a substantial collection of books to assist its students in the learning process. However, the library at Madrasah Ibtidaiyah Azharyah Palembang still employs a manual system to manage information related to books, members, borrowing and returning transactions, book searches, and report generation. This manual method is considered inefficient, as the increasing number of transactions complicates data processing, raises the risk of errors in report generation and book transactions, and hinders the process of locating books. Therefore, an innovative solution is required to address these issues, one of which is the development of a digital-based library application. With this application, the process of searching for and borrowing books can be carried out more easily and quickly, while also allowing real-time monitoring of library usage by the school administration.

Therefore, a library application is required at Madrasah Ibtidaiyah (MI) Azharyah Palembang. This system will utilize a database to systematically store information, ensuring data security and accuracy. The management of book data, member records, and book borrowing and returning transactions can be conducted quickly, accurately, and efficiently. Library users will also be able to easily access information regarding the book collection, availability, and location within the library, facilitating book searches. Additionally, library staff will be able to generate more accurate reports due to the well-integrated system. With the implementation of this system, it is expected to enhance the efficiency of the library system and encourage students to be more actively engaged in reading.

This study aims to analyze and recommend the design for a library application tailored to the needs of Madrasah Ibtidaiyah Azharyah Palembang. In its development, this research will also analyze the challenges encountered during the application development process and its impact on improving the quality of library services at the school. The results of this study are expected to make a significant contribution to supporting the digitalization of libraries in primary education, particularly at MI Azharyah Palembang.

Previous studies that serve as references, such as "Design and Development of a School Library Website Application (Wulandari et al., 2019)" and "Library Application Based on OPAC at SMK N 1 Talangpadang (Prayoga et al., 2020)", are closely related to the current research titled "Developing a Library Application at Madrasah Ibtidaiyah (MI) Azharyah Palembang." All three studies share the common goal of improving library management systems by utilizing web-based technology. In the study "Design and Development of a School Library Website Application," the main focus is on creating a web-based library system that facilitates user access to book collections, which is similar to the MI Azharyah study that also focuses on developing a web-based library application to provide easier access to information for students at the madrasah. Meanwhile, the study "Library Application Based on OPAC at SMK N 1 Talangpadang" emphasizes the use of an online public access catalog (OPAC) to simplify the book search process, a key feature in modern library applications. Similarly, the library application at MI Azharyah will be designed with a similar feature to enable students and educators to access the library collection more efficiently. Although the target users and system complexity may differ, all three studies focus on digital solutions to advance library management in educational environments, providing ease in searching, borrowing, and managing books.

## Methodology

To achieve the objectives of this research, namely designing and developing a library application tailored to the needs of Madrasah Ibtidaiyah (MI) Azharyah Palembang, using Research and Development (ARD) approach was employed (Judijanto et al., 2024); (Rahmadhani et al., 2022). In this study, the method is modified to The Analysis, Research, and Development (ARD) which approach involves several structured stages, including user needs analysis, system design, software implementation, and application testing in a real-world environment.

### Preliminary Study and Needs Analysis

The initial stage of the research began with an analysis for a preliminary study to understand the current condition of the library, user needs (students, teachers, and library staff), as well as to identify existing issues. Data collection techniques in this stage included interviews, observations, and questionnaires to gather in-depth information regarding users' needs and expectations for the library application. This work focused on the Preliminary Study and Needs Analysis stages.

1. Initial Observation (Rahardjo & Gudnanto, 2022),
  - a. Library Visit: The researcher conducted a direct visit to the MI Azharyah Palembang library to observe its physical condition, layout, and existing workflows. This observation aimed to understand the current operation of the library, including the processes of book borrowing and returning, inventory recording, as well as the interactions between library staff and users
  - b. Documentation of the Current System: The researcher documented the existing library management system, both manual and digital, if applicable. This includes recording process workflows, the software utilized (if any), and the challenges encountered in library management.
2. In-depth Interview (Equatora & Awi, 2021),
  - a. Interviews with Library Staff: The researcher conducted in-depth interviews with library staff to gather information about their experiences in managing the library, the challenges they frequently encounter, and their expectations for the library application to be developed. These interviews also aimed to identify the technical knowledge and skills of the staff related to the use of technology.
  - b. Interviews with Teachers: Interviews were conducted with several teachers to understand how the library supports the teaching and learning process and how they utilize the library's facilities in their instruction. Teachers were also asked to provide their opinions on the needs and features they consider important for the library application.
  - c. Interviews with Students: Interviews with student representatives were conducted to understand how they use the library, the challenges they face, and their expectations for a more modern and easily accessible library service.
3. Problem and Needs Identification
  - a. Analysis of Collected Data: The data gathered from observations, interviews, and questionnaires were analyzed to identify the key issues in the current library management, as well as the specific needs that the library application is expected to address.
  - b. Determination of Key Features: Based on the needs analysis, the researcher formulated the key features to be implemented in the library application, such as an integrated borrowing record system, digital-based book search, and automated notifications for book returns.

### Proposed System Design

Based on the results of the needs analysis, this stage involves designing the application's workflow using use case modeling. The use case diagram illustrates the interactions between the actors and the system being developed. The following is the use case diagram that has been created for the web-based library information system at MI Azharyah Palembang (Kurniawan, 2018); (Bittner & Spence, 2003); (Faitelson & Tyszberowicz, 2017). The use case diagram workflow can be seen in Figure 1.

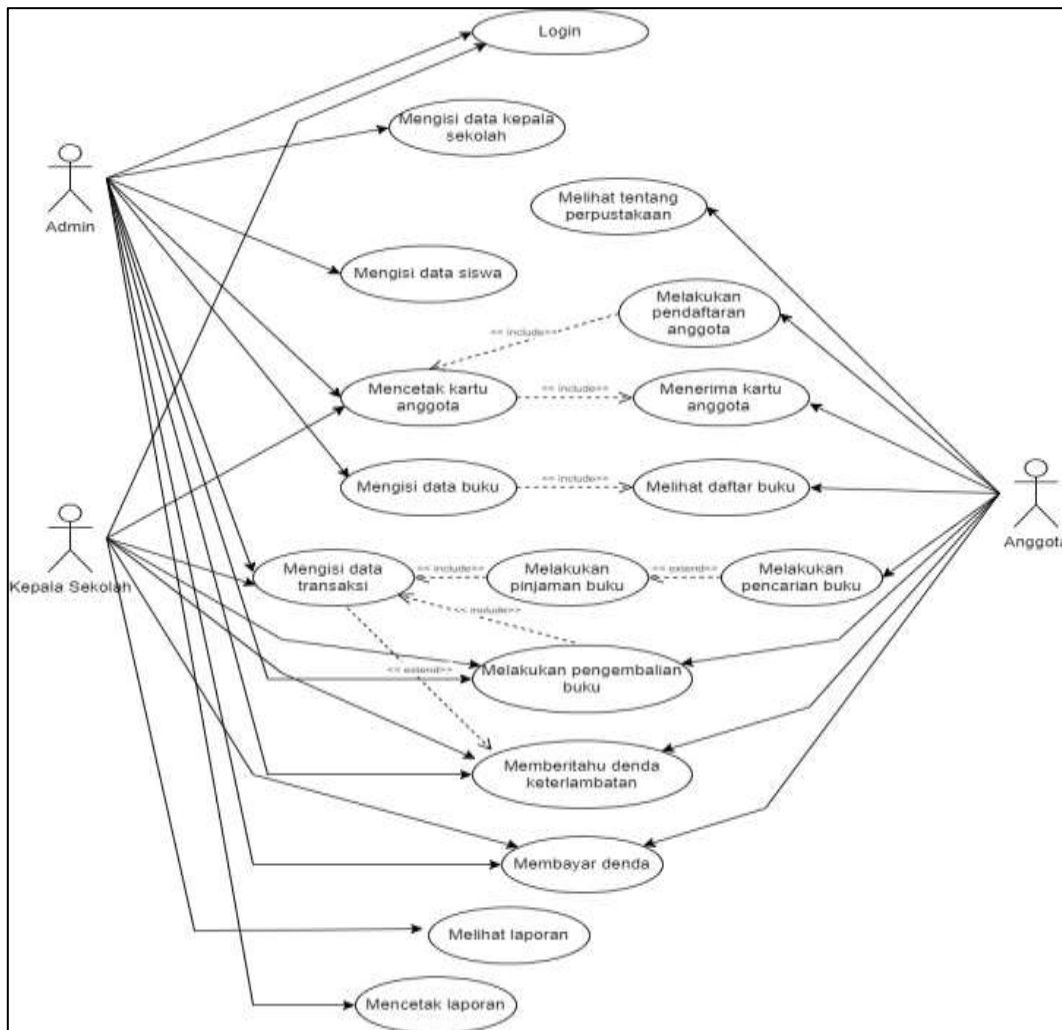


Figure 1. Use Case Diagram of the proposed Application

Figure 1 illustrates that the developed application consists of three actors: members, administrators, and the school principal. The activities available to members include submitting a registration request, assisted by the administrator for data entry, and receiving a membership card. Members can also view the list of books, search for books, and proceed with the borrowing process, as well as view fines for overdue book returns. The activities performed by the administrator include entering data for the school and students, printing membership cards, entering book data, managing book borrowing and return transactions, displaying overdue fines,

processing fine payments, and generating reports. The school principal can print member reports, enter book borrowing and return transaction data, process overdue fines, and view reports.

## Results and Discussion

### Results

Based on the previous steps, the outcome of all activities within the application has been achieved. The researcher utilized the PHP programming language to develop the system, with data stored in a MySQL database. Users can access the application through the Chrome or Mozilla Firefox browsers. Users will be able to view and interact with the library application at Madrasah Ibtidaiyah Azharyah Palembang. The details of this library information system are as follows:

- a. The main menu consists of pages for viewing the list of books, a page providing information about the library, and a login page.
- b. The staff menu includes several options such as member data, class data, book data, category data, shelf data, author data, publisher data, province data, transaction data, fine data, staff data, and reports consisting of book data reports and book return transaction reports.
- c. The principal's menu includes various options such as member data, class data, book data, category data, shelf data, author data, publisher data, province data, transaction data, fine data, and reports consisting of book data reports and book return transaction reports.

### Suggestions on the Application Development

The development stage involves the implementation of the designed framework into application software. This process is carried out using appropriate programming languages and platforms and includes initial internal testing to ensure that all components of the application function properly.

The main page serves as the initial display that appears when accessing the library application at Madrasah Ibtidaiyah (MI) Azharyah Palembang. This page includes elements such as the institution's logo, a book catalog menu, an information menu about the library, and a login menu for accessing the system. The main page is shown in Figure 2.



Figure 2. Main Page

The login page functions as a means for users to access the application. Users are divided into two categories: administrators and the school principal, each with a distinct username and password corresponding to their roles and authority within the system. The login page is shown in Figure 3.



Figure 3. The Proposed Login

The admin main page serves as the interface for the library administrator to manage all administrative aspects of the library at Madrasah Ibtidaiyah (MI) Azharyah Palembang. The admin main page is nearly identical to the principal's main page, with the key difference being that the principal's page is limited to printing cards, processing book borrowing and returning transactions, and viewing reports. The main menu page is displayed in Figure 4.

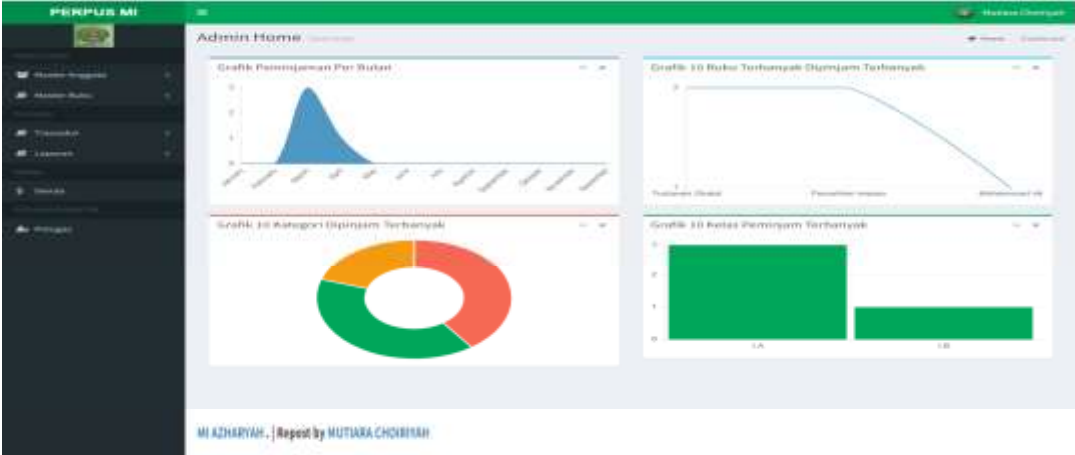


Figure 4. The proposed Admin Main Page

In the master member menu on the admin page, there are sub-menus that include member data, member data entry, class data, and class data entry. The member data page displays a complete list of members of the MI Azharyah Palembang Library and provides a facility for inputting new member data. The class data page shows the list of classes at MI Azharyah Palembang and allows for the entry of new class data. The library administrator has full authority to add, modify, delete,

and search for member information through this menu. Meanwhile, the principal has access to view the member list but does not have the authority to edit the data. The master member data menu page is shown in Figure 5.



Figure 5. The proposed Member Master Menu

In the book master menu on the admin page, there are sub-menus that include book data, book data entry, category data, category data entry, shelf data, shelf data entry, author data, author data entry, publisher data, publisher data entry, as well as province data and province data entry. The book data page displays the list of books available in the MI Azharyah Palembang Library and provides a feature for entering new book data. The category data page shows the list of existing book categories and allows for the entry of new categories. The shelf data page presents the list of bookshelves and permits the input of new shelf data. The author data page shows the list of registered book authors and provides a feature for author data entry. The publisher data page lists the book publishers and allows for the entry of new publisher data. Finally, the province data page displays the list of provinces and provides a feature for entering province data relevant to the library's collection. The book master page is shown in Figure 6.

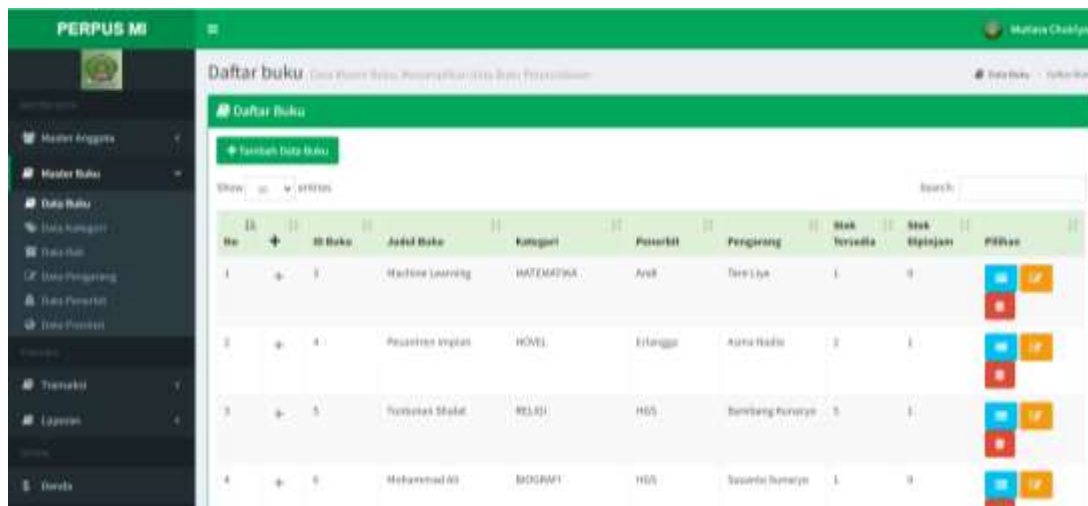


Figure 6. The proposed Book Master



The loan and return menu can be accessed by both the admin and the school principal, and it functions to process loan data. Within the loan data menu, there are several submenus that allow for inputting book loan data, displaying the book loan details page, searching for borrowed book data, and processing book returns. The loan and return menu page is shown in Figure 7.

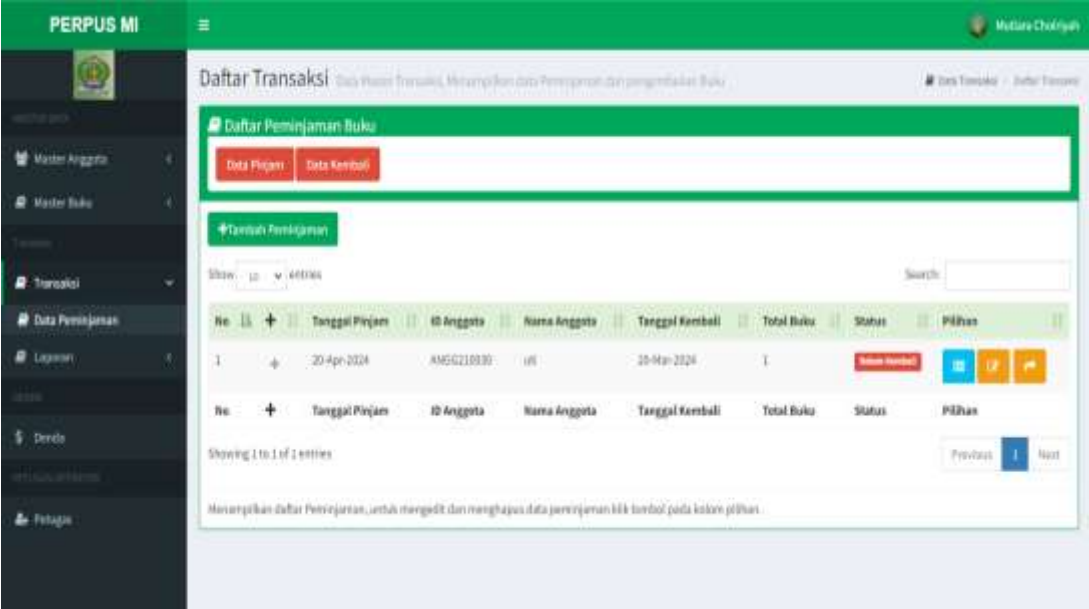


Figure 7. The proposed Book Loan and Return Page

The report menu can be accessed by both the admin and the school principal, with the distinction that the admin can view and print reports, while the school principal can only view them. The available reports include book data reports and book return reports. The report page is shown in Figure 8.

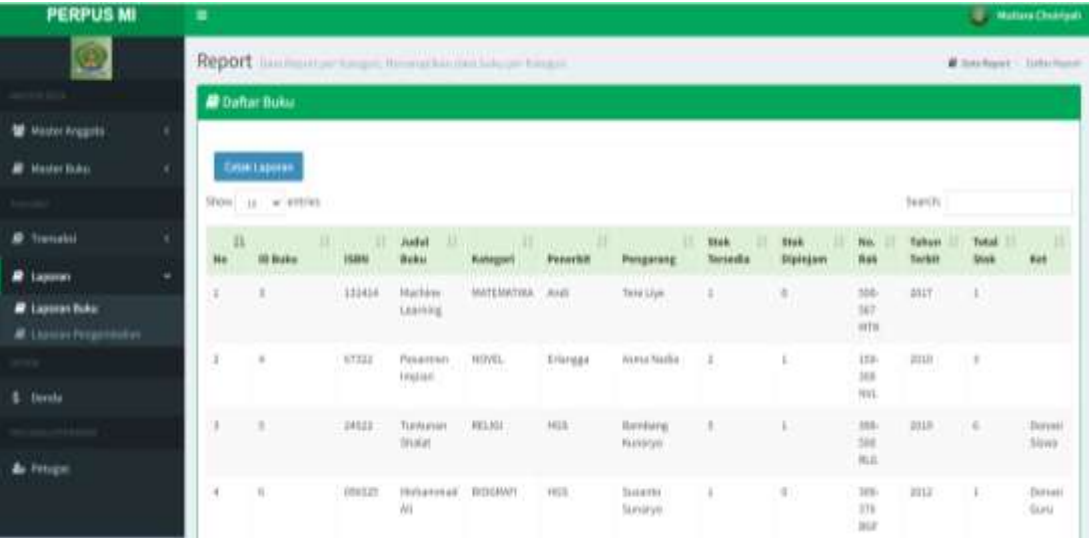


Figure 7. The proposed Report Page



### Application Testing

The testing process used the Black Box method, which focuses on validating the application's functionality. This testing is meant conducted from the end-user's perspective, examining inputs, outputs, and user interactions with the system. The details of the Black Box testing on the Library Application at Madrasah Ibtidaiyah (MI) Azharyah Palembang are provided below. The results of the library application testing can be seen in Table 1.

Table 1. The Example of Library Application Testing

No	Menu	Scenario	Description
1	User Login	Open the login page. Enter a valid username and password. Click the 'Login' button.	Successfully logged in
2	Book Master Data	Access the book master menu. Add a new book or modify existing book data. Save the changes.	Process successful
3	Member Master Data	Access the member master menu. Add, modify, or delete users. Save the changes.	Process successful
4	Book Search	Enter a search keyword in the search bar. Click the 'Search' button.	Search process successful
5	Book Borrowing	Select an available book to borrow. Click the 'Borrow' button.	Borrowing process successful
6	Book Return	Select the book to be returned. Click the 'Return' button.	Return process successful
7	Borrowing and Returning Reports	Access the report menu. Select the time period for the borrowing and returning report. Click 'Generate Report'.	Report successfully processed

Based on the test results, all the features tested functioned properly and performed according to their intended purposes.

### Conclusion

Based on our analysis, it is crucial to have a Library Application, and we recommend the proposed application designs. The development of the Library Application at MI Azharyah Palembang aims to facilitate the efficient management of books and library activities. Based on the results of the black box testing, this application successfully meets key requirements, such as user registration, login, book search, borrowing, returning, and book data management. Each feature was tested through scenarios aligned with expected functionalities, and the test results indicated that the system operates smoothly without any critical bugs. The application also provides significant benefits in terms of speed and accuracy in recording library data, as well as simplifying access to book information for students and teachers through digital means. Therefore, this application can be implemented as a digital solution to enhance the efficiency of library management at the Madrasah Ibtidaiyah level. Recommendations for further development include improving the user

interface. Overall, this application has the potential to improve literacy and accessibility to books among students at MI Azharyah Palembang.

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