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Aweb-Based Library Application Design At SMP Negeri 18 Medan

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ABSTRACT
The school library serves as a vital facility in educational institutions, providing a wide range of materials including books and non-books for teaching and learning purposes. SMP Negeri 18 Medan, located in North Sumatra, Indonesia, is equipped with its own school library. However, the management of these libraries is currently manual, with borrowing and returning recorded transactions using traditional methods, resulting in time-consuming processes for both recording and retrieving book data.

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INTRODUCTION

School libraries have an important role as educational facilities that provide various kinds of library materials, including books and non-book materials for teaching purposes, to support teaching, and as learning resources. SMP Negeri 18 Medan is one of the first middle schools in Medan City, North Sumatra, which is equipped with a library. However, currently, library management is still done manually. The process of borrowing and returning books is recorded manually in a notebook, which takes quite a long time both in recording and searching for book data. To overcome these obstacles, computerized data processing is needed through the implementation of a library information system at SMP Negeri 18 Medan. By using this system, the process of inputting, editing, searching and deleting book data can be carried out efficiently and structured using a computer.

METHODS

The research method in developing information systems or software is the waterfall model. Where this model adopts a systematic and sequential approach. The stages in the waterfall model include requirements analysis, design, implementation, testing and maintenance.

1. Needs analysis: Carried out through direct observation and interviews with the research object, namely the library of SMP Negeri 18 Medan. The observation results are used to study user needs and requirements and determine the required features and functions.
2. Design: Involves creating a system design to describe the formation of the system and facilitate the creation of applications. This includes creating Unified Modeling

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Language (UML), database, and user interface design, using use case diagrams, class diagrams, activity diagrams, and sequence diagrams.

3. Implementation: Application development is carried out by creating program code based on the design that has been created. The PHP programming language is used to implement the application, with MySQL as the database.
4. Testing: This stage aims to ensure that the library application functions properly.
5. Maintenance: Involves the activities of repairing, updating, and expanding software according to user needs.

RESULTS AND DISCUSSION

Running System Analysis

From the evaluation of the system operating at SMP Negeri 18 Medan, the author concludes that there are still many shortcomings that need to be corrected. The process of manually inputting student data and storing data in archive form results in several problems, such as incomplete data input, slow student data search processes, and difficulties in making changes to student data.

Analysis of the System Built

The application developed is a library application which functions to manage library data at SMP Negeri 18 Medan. This application was built using XAMPP version 8.0.30 for Windows.

Use Case Diagram Design

A Use Case Diagram is a graphical representation of the interaction between one or more actors (entities) and a running system. In the context of the Library Application, there is a Use Case diagram that describes the interaction between the admin and the system. This diagram shows how admins use system functionality in library management.

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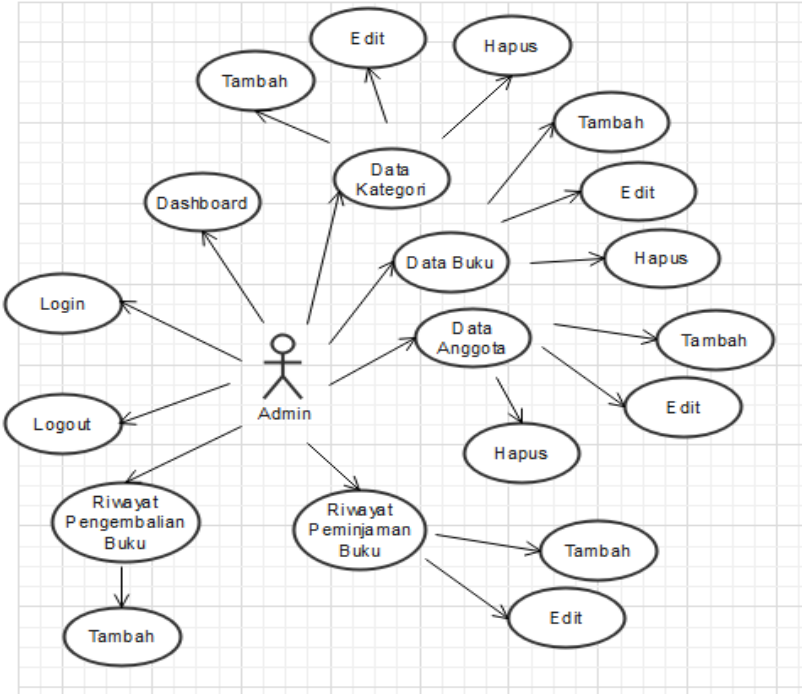

Figure 1. Use Case Diagram Admin

The administrator has full authority to manage all website content. To access the admin page, the admin must carry out the login process first. After successfully logging in, the admin will be directed to the admin page which displays various menus, including the dashboard menu, category data, book data, member data, book borrowing history, and book return history.

Class Diagrams

Class Diagrams are a visual representation of the relationships between classes in a system, as well as depicting dependencies and system behavior. The class diagram of the Library Application can be seen in the image below.

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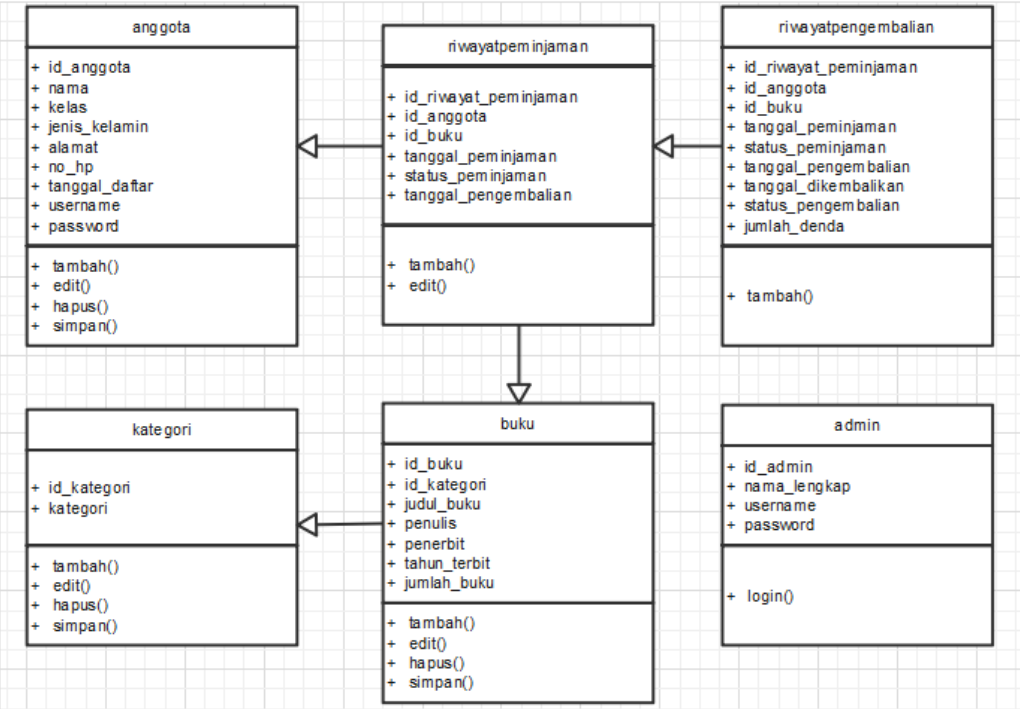

Figure 1. Class Diagrams

Result Activity

Activity Diagrams

*Activity Diagrams*describes the workflow (work flow) or activities of a system or business process. Activity Diagram Login (Admin)

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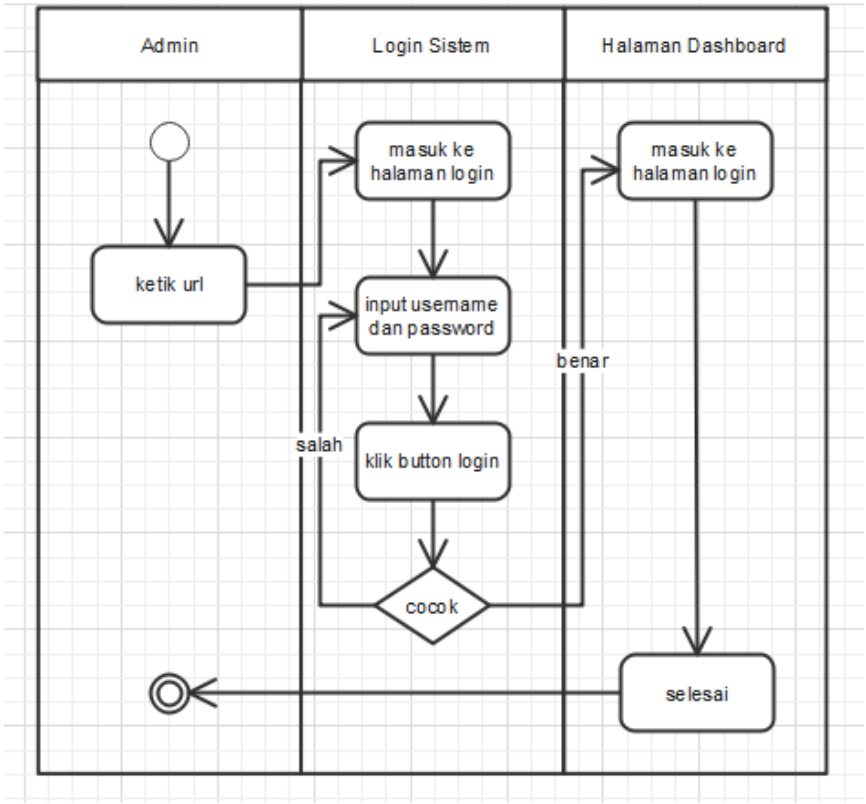

Figure 3. Activity Diagram Login (Admin)

This image is an activity diagram of the admin login process so that admins can enter the admin dashboard page.

Sequence Diagrams

Sequence diagramswill explain in more detail the flow process of a system. Login Sequence Diagram (Admin)

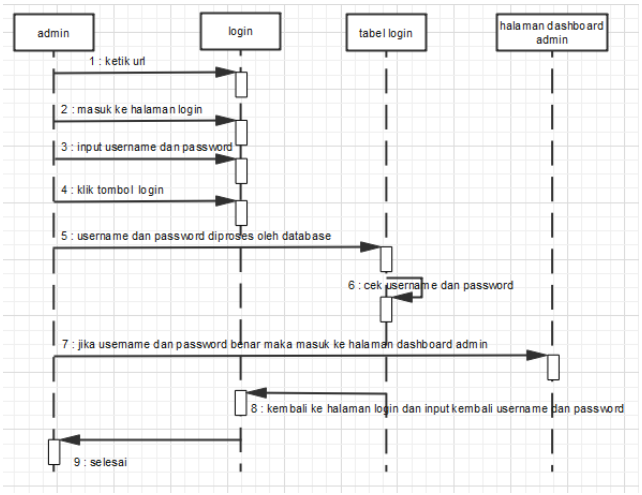

Figure 4. Login Sequence Diagram (Admin)

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The image depicts the steps that occur in the admin login process. Admin enters the URL address and goes to the login page. Then, the admin enters the username and password, and clicks the Login button. Username and password information is processed by the admin table in the database. If the username and password entered are correct, the admin will be directed to the main admin page. However, if the username and password do not match, the admin will return to the login page to re-enter the correct username and password.

Entity Relationship Diagram (ERD)

Entity Relationship Diagrams(ERD) from the Library Application can be seen in the following image.

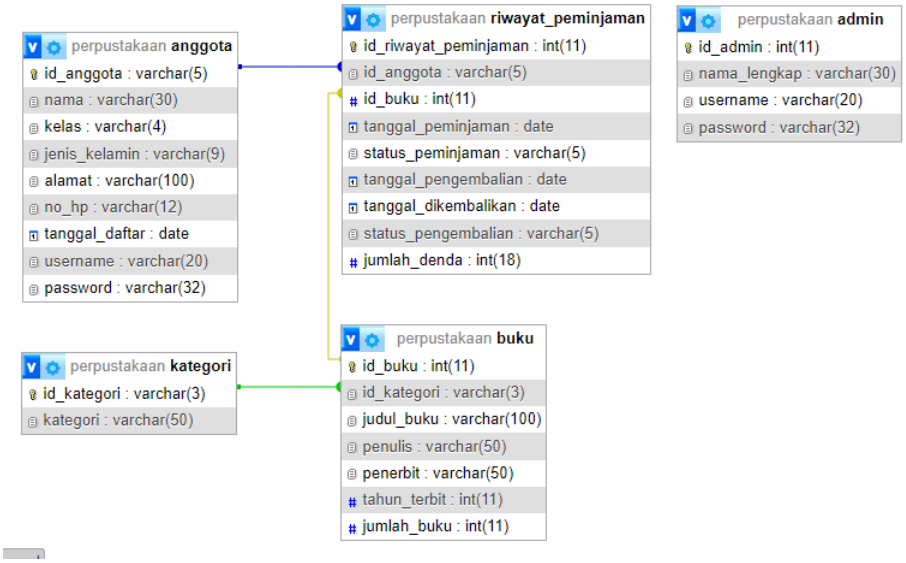

Figure 5. Entity Relationship Diagram (ERD) from Library Applications

Interface Design

Admin Login Interface Design. The Admin Login Interface design can be seen in the following image.

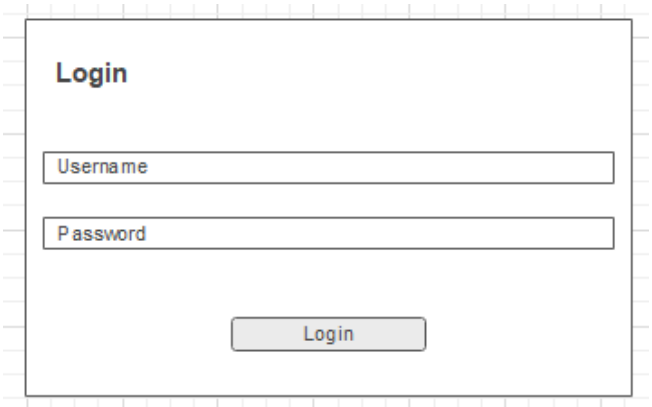

Figure 2. Admin Login Interface Design

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The Dashboard Page Interface Design can be seen in the following image.

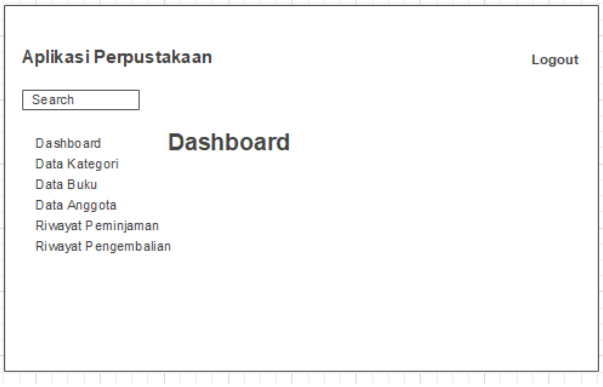

Figure 3. Dashboard Page Interface Design

Category Page Interface Design

The Category Page Interface Design can be seen in the following image.

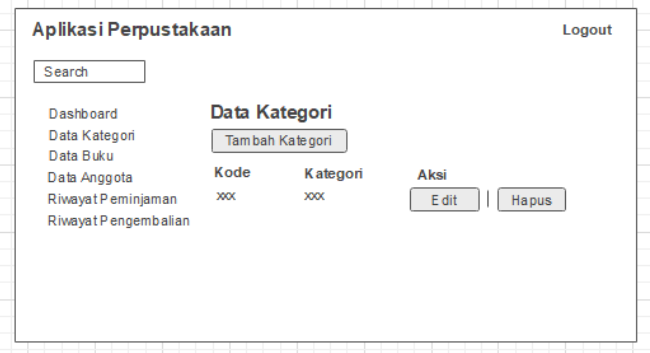

Figure 8. Category Page Interface Design

The Book Page Interface Design can be seen in the following image.

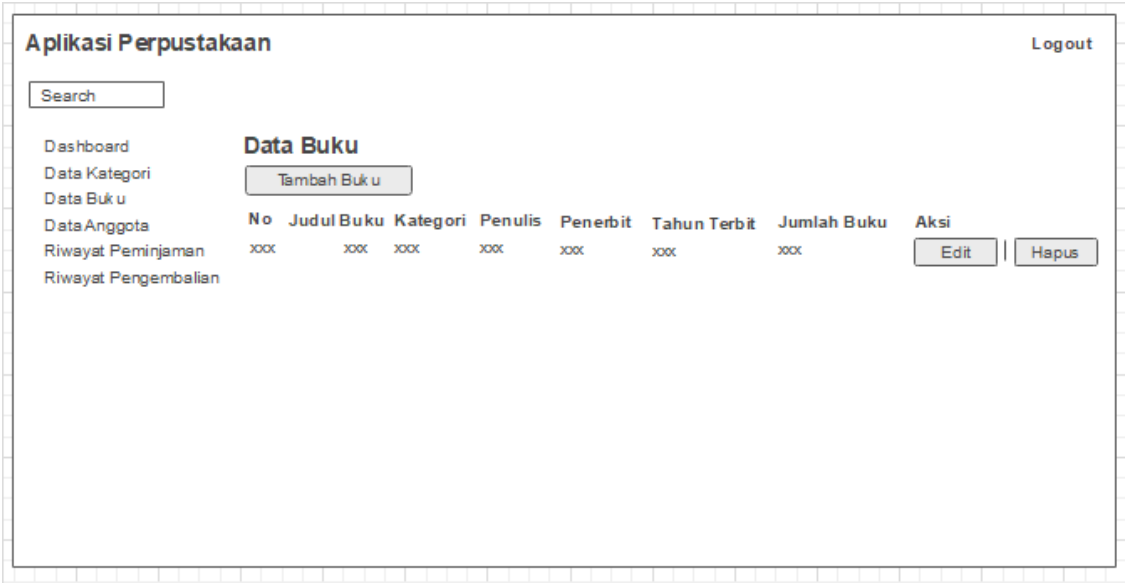

Figure 4. Book Page Interface Design

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The Member Page Interface Design can be seen in the following image.

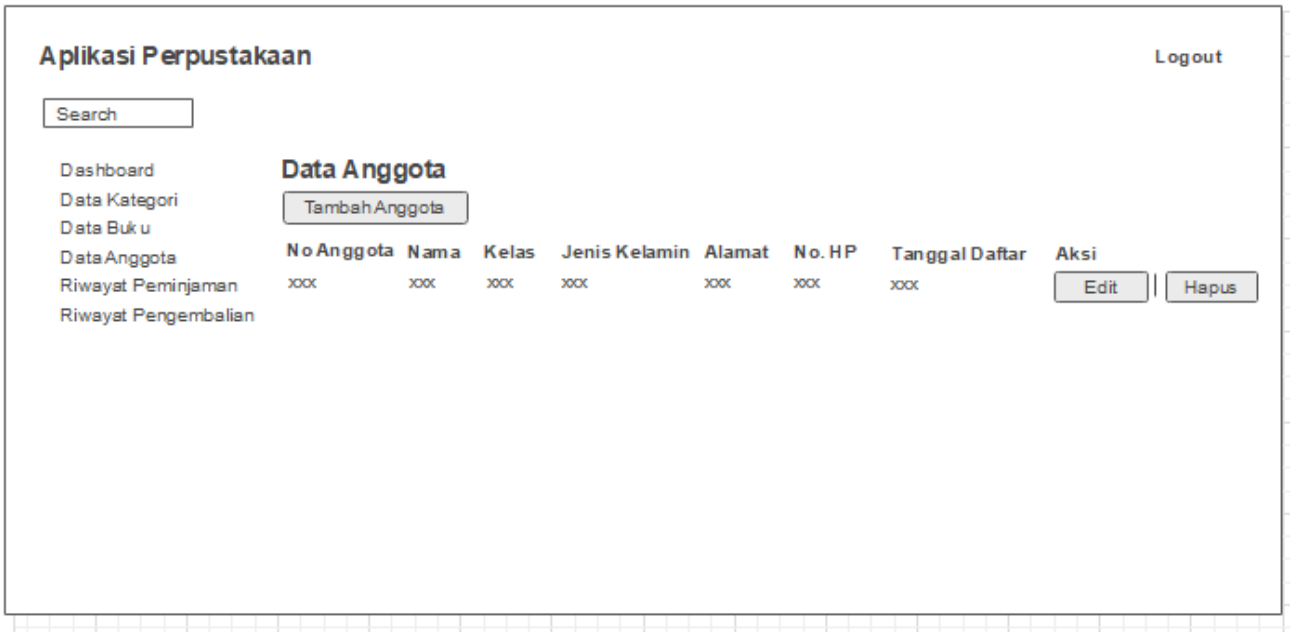

Figure 5. Member Page Interface Design

The Loan History Page Interface Design can be seen in the following image.

Figure 6. Loan History Page Interface Design

The Return History Page Interface Design can be seen in the following image.

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Figure 7. Return History Page Interface Design

Implementation

The results of the application interface can be seen in the following image.

Admin Login Page Display

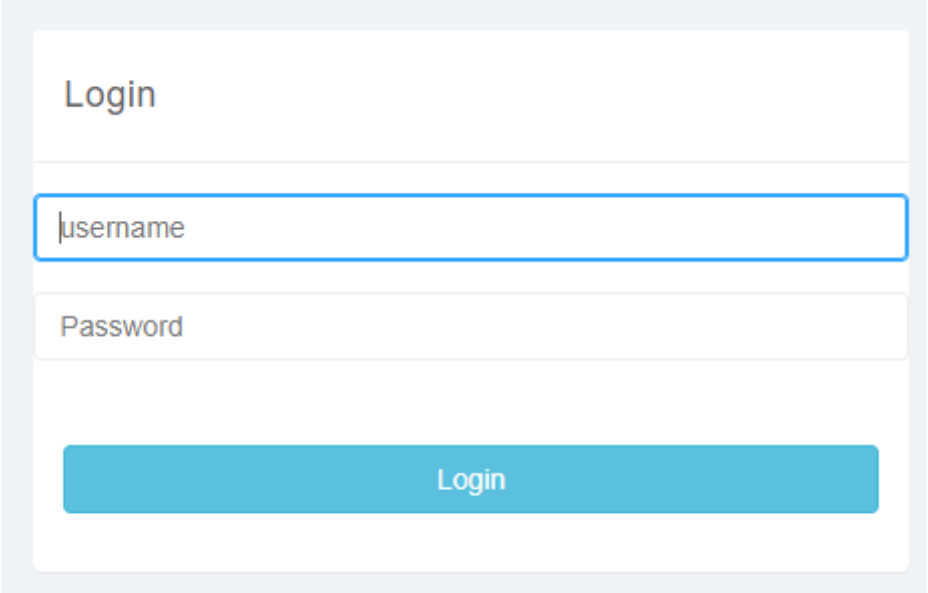

Figure 8. Admin Login Page Display

Dashboard Page View

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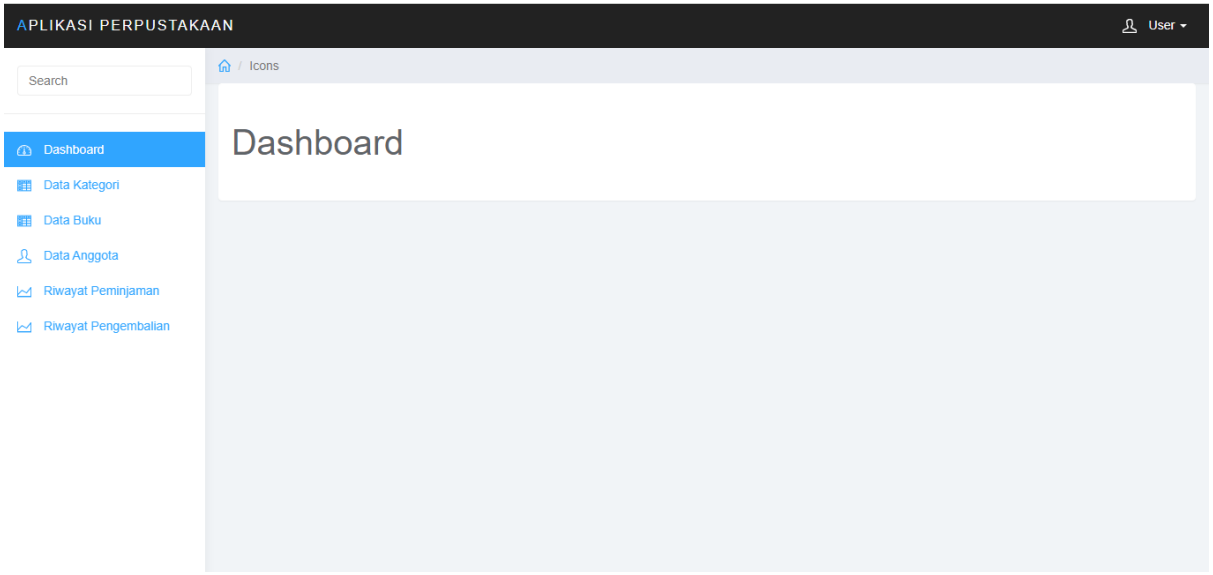

Figure 9. Dashboard Page View

Testing

Admin Login Page Testing

Table 1. The Admin Login Page Testing Table is as follows.

No	Testing Scenarios	Test Cases	Expected results	Test result	Conclusion
1	*Username*and the password is not filled in then click the login button	*Username*= (blank) *Passwords*= (blank)	The system will reject the user	According to expectations	Valid
2	Type a blank username and password, then log in	*Username*= admin *Passwords*= (blank)	The system will reject the user	According to expectations	Valid
3	*Username*not filled	*Username*= (blank) *Passwords*= admin	The system will reject	According to expectations	Valid

Hardware and software support for this Library Application is as follows.
Processor: Intel(R) Core(TM) i5-6200U CPU @ 2.30GHz 2.40 GHz
Memory (RAM): 4 GB
Hard disk: 1 TB
Operating System: Windows 10 Enterprise
Web Server: XAMPP for Windows 8.0.30
Text Editor: Notepad++ 8.6.Installer.x64
Image Editing: EDrawMax

Maintenance is carried out so that the website runs as expected, namely providing fast, precise and accurate information. Information on the website must always be updated.

CONCLUSION

The research results show several conclusions, including: The Library application simplifies the process of inputting and searching for book data. The Library App helps reduce the time required to provide library data. The information presented by the Library Application is more precise and accurate.

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