

Design of Web-Based E-Perpus Information System (Study at One MTS School in Cianjur)

Asri Wasiatun Saadah¹, Rohmat Nur Ibrahim², Dheni Apriantsani Budiman³
STMIK Mardira Indonesia, Bandung^{1,2,3}
asriwasiatun19020011@gmail.com¹, rohmat@stmik-mi.ac.id², dheni@stmik-mi.ac.id³

Abstract

The library of a specific MTS school in Cianjur currently employs a manual data processing system, which involves the utilization of handwritten notes in the form of notebooks. This research aims to transform the manual process of book data input and borrowing into a web-based digital medium utilizing object-oriented system development techniques and descriptive research methodologies. The application features a library menu that enables users to access a comprehensive list of available libraries remotely without needing a physical presence at the library. The software system has been developed utilizing the PHP programming language and MySQL database and is furnished with the Bootstrap framework. The findings of this investigation suggest that the utilization of computerized data processing procedures would facilitate ease of processing and yield outcomes of greater precision in contrast to manual methods.

Keywords : *Web-Based, Library, Information System.*

INTRODUCTION

The implementation of a web-based design for the E-Library Information System is a significant advancement in the realm of digital technology. In order to remain relevant as repositories of knowledge and information, libraries must possess the capacity to adapt to technological progress and shift from traditional, manual systems to digital ones. The proposed system architecture ought to fulfill the requirements of end-users regarding accessibility and convenience while ensuring the provision of efficient and efficacious services. The study was conducted by Ardhana and colleagues in 2022.

The fundamental components of this system architecture encompass the graphical user interface (GUI), the underlying computational infrastructure, and the data storage mechanism. The design of the user interface ought to be such that it facilitates comprehension and utilization by individuals with diverse backgrounds and

varying degrees of digital proficiency. Here is a reference to the 2020 study by Cutler and colleagues. Facilitating efficient and effortless access to desired information is imperative for an optimal user experience. Furthermore, it is imperative that the user interface exhibit responsiveness and user-friendliness across a diverse range of devices, including but not limited to computers, tablets, and smartphones.

The data processing center, commonly called the back-end system, necessitates a design that can adeptly and precisely manage many processes. The system should efficiently execute data searching, filtering, and organization tasks. By implementing a robust back-end infrastructure, the library can ensure the consistent delivery of reliable and current services. The study conducted by Hamdani et al. (2021) is noteworthy in the academic field.

Simultaneously, it is imperative to construct the database structured and systematically to

optimize accessibility, searchability, and data manipulation. The database should be able to accommodate diverse categories of data, ranging from book to user data, and facilitate smooth and expeditious data interactions.

The incorporation of security measures is deemed imperative in the development of this system. The sources cited in the text are Din and Fazal Fazla (2021) and Hendriani and Indrawan (2021). The contemporary digital landscape is fraught with challenges, particularly the potential for hacking and data misuse. These issues must be effectively addressed. Consequently, designing the system with a robust security framework is imperative to safeguard user data and information. The studies conducted by Artikatama et al. (2019) and Balaji et al. (2021) are relevant to the topic at hand.

The implementation of a web-based design for the E-Library Information System is a significant advancement in the realm of digital technology. In order to remain relevant as hubs of knowledge and information, libraries must possess the capacity to adapt to technological advancements and shift from traditional, manual systems to digital ones. In 2022, Ardhana et al. conducted a study aimed at verifying the extent to which the system design meets the accessibility and convenience requirements of users while simultaneously providing efficient and effective services.

Including comprehensive system testing during the design, phase is of utmost importance. By conducting tests, system designers can detect and resolve problems before the system's widespread deployment. Through the implementation of this measure, it is possible to

ensure the seamless functioning of the system and the fulfillment of the anticipated requirements of its users. The sources cited in the text are Lazarus and Suryasen (2022) and Xu et al. (2019). Moreover, the system should be able to manage modifications and revisions, encompassing technological advancements and user requirements. In a swiftly changing technological landscape, systems must exhibit adaptability to novel advancements and sustain their pertinence. The source cited is Sembiring (2021).

Purba et al. (2022) posit that a library is a designated location that houses a compilation of library materials, encompassing both printed and recorded formats, that have been systematically arranged to aid library users in accessing the information they require. The primary objective of a library is to cater to the information needs of the community it serves rather than for commercial purposes.

One of the MTS schools in Cianjur established a library to raise the level of education. The MTS school had a student population 870 in 2021 and possessed various reference books for instructional purposes.

The library personnel employed a manual record-keeping system, utilizing physical logbooks to manage the books. The library staff classified the record books into distinct categories, including book records, membership records, borrowing and returning records, and acceptable records. The approach mentioned above was deemed inefficient because of the substantial quantity of data that necessitated manual transcription. Consequently, implementing an efficient information system is

imperative to enhance students' inclination towards visiting the library, exploring, and perusing books.

The progress of information technology has influenced the integration of information technology in libraries, resulting in a shift from traditional libraries to automated, hybrid, and digitized ones. The studies conducted by Gunawan et al. (2021) and Manz et al. (2023) are referenced in the text.

Consequently, implementing an efficient information system is imperative to enhance students' motivation to visit the library, conduct book searches, and engage in reading activities. The sources cited in this text include Fadhilah and Maryam (2021) and Suri and Arifin (2020). In order to tackle this concern, the author opted to utilize web-based programming languages due to their capacity to facilitate easy updates of the displayed information, thereby enhancing cost-effectiveness and time efficiency.

The depiction above highlights the imperative necessity of an information system within libraries. Hence, the researcher conducted a study to comprehend the architecture of the internet-based e-Perpus information system within an MTS educational institution in Cianjur.

METHOD

The implementation of a web-based design for the E-Library Information System represents a significant advancement in the realm of digital technology. In order to remain relevant as hubs of knowledge and information, libraries must possess the capacity to adapt to technological advancements and shift from traditional, manual

systems to digital ones. The proposed system architecture ought to satisfy the end-users' requirements concerning accessibility and convenience while concurrently delivering services that are both efficient and effective. Ardhana and colleagues conducted the study in 2022.

The study employed a descriptive analysis research methodology. Nazir (2019) asserts that researchers utilize the descriptive method to investigate the current status of a particular group of individuals, a collection of circumstances, a system of beliefs, an object, or a category of occurrences.

The topic of discourse pertains to Jepin's System Development Method, as presented in 2018. The present application utilizes the Object-Oriented Analysis and Design (OOAD) approach, which accords precedence to objects over data or processes. The OOAD procedure bifurcates into two discrete stages: Object-Oriented Analysis (OOA) and Object-Oriented Design (OOD).

Object-Oriented Analysis (OOA)

The Object-Oriented Analysis (OOA) approach analyzes system requirements by focusing on the classes and objects that are relevant to the problem at hand. Object-oriented analysis (OOA) involves examining a problem through object-oriented techniques, either by defining or observing the problem. The system analysis process typically begins with acquiring a request document from all relevant stakeholders. Analyzing the implementation of object-oriented or object-based systems must be entrusted to individuals who profoundly comprehend the subject matter. Please do so to

avoid developing an impractical system when implemented based on objects.

Object-Oriented Design (OOD) is a programming paradigm that emphasizes using objects, which are instances of classes, to represent and manipulate data.

The Object-Oriented Design (OOD) approach directs the software architecture by manipulating objects within a system or subsystem. The Object-Oriented Design (OOD) methodology involves breaking down objects and visually representing them through notations that depict both static (class diagrams) and dynamic (statechart diagrams) models of the system. Object-oriented design (OOD) allows software engineers to understand the objects generated by individual classes and the interconnections among objects. Furthermore, Object-Oriented Design (OOD) pertains to the implementation of relationships between objects, object behavior, and object communication.

People commonly accomplish object-oriented modeling documentation using object-oriented modeling tools, including the Unified Modeling Language (UML).

UML, as a language or notation, represents a form of modeling. As per the creators' definition, UML is a visual language utilized for elucidating, specifying, designing, modeling, and documenting various facets of a system

RESULTS AND DISCUSSION

Proposed System Analysis

The implementation of a web-based design for the E-Library Information System represents a significant advancement in the realm of digital

technology. In order to remain relevant as hubs of knowledge and information, libraries must possess the capacity to adapt to technological advancements and shift from traditional, manual systems to digital ones. The design of this system ought to satisfy the requirements of its users concerning accessibility and convenience while simultaneously delivering efficient and effective services. The study conducted by Ardhana and colleagues in 2022 is referenced here.

Creating a library system in the form of an application offers numerous benefits. By utilizing the proposed application system, administrators can enhance their performance and streamline the efficiency of previously manual processes by implementing a computerized system. Administrators of libraries can access this system as master data administrators, enhancing its efficacy. The process of developing the application involved the utilization of the PHP and MySQL programming languages to execute the application. The application is designed to depict the library administrator's role as a book data administrator and oversee all library activities. The utilization of this application expedites and streamlines the operational procedures of the library.

The topic of discussion is the field of System Design.

According to Rusdi Nur (2018), the system design concept is the systematic approach to developing and designing a novel system. The system design process entails the system's arrangement into distinct subsystems, encompassing hardware, software, and procedures. The first phase, commonly known as

the initial stage, involves taking an initial approach to tackle the selected problem.

Use Case Diagram

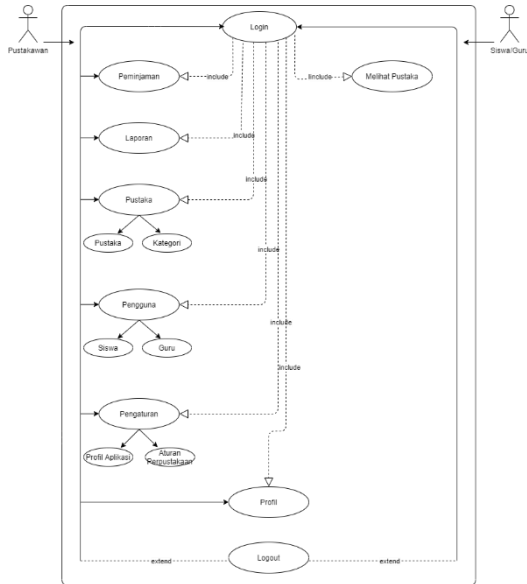


Figure 1. Use Case Diagram of MTs E-Library.

Muslim

Identify Use cases

Identification of use cases are use cases that work on the system and use cases that work on the system. Identification of use cases for the Library Information System for one of the MTS schools in Cianjur are as follows:

Table 1. Identification of the proposed System

Use Case

No	Use Case	Decription
1	Login	Aktor login ke sistem untuk menentukan hak asesnya.
2	Adding Loans	Actor added new loan
3	Print Reports	The actor prints reports that occur

		in the desired time range.
4	Manage Libraries	Actor adds library data
5	Manage Users	The actor adds student and teacher data
6	Arrangement	Actors can manage application profiles and library rules
7	Setting Profile	Actors can set user profiles and logout from the system

Lending Activity Diagram

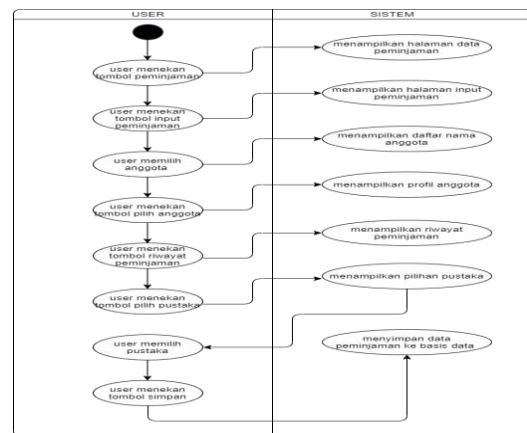


Figure 2. Lending Activity Diagram

Activity Diagram Report

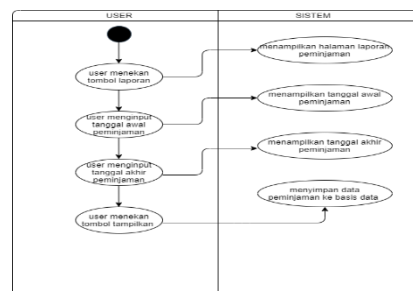


Figure 3. Activity Report Diagram

Lending Sequence Diagram and Loan Details

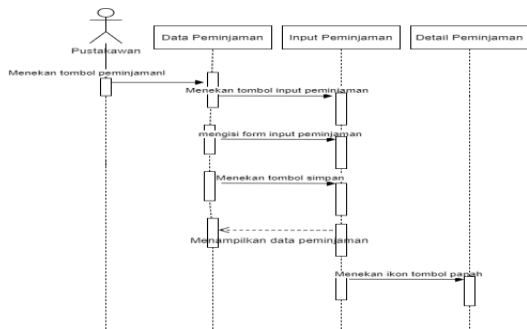


Figure 4. Lending Sequence Diagram and Loan Details

Class diagrams help us visualize the class structure of a system and are the most widely used type of Diagram. The class Diagram shows each class's relationship in a system's design model. The following is a Class Diagram for a Web-Based E-Library for one of the MTS schools in Cianjur:

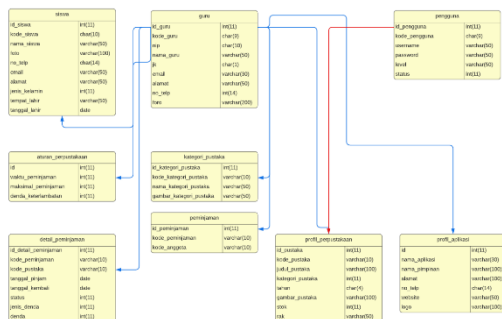


Figure 5. E-library Class Diagram One of the MTS schools in Cianjur

The menu structure has the purpose of defining and presenting the main program interface image.

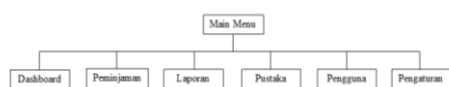


Figure 6. Menu Structure Design

Dashboard Interface Design

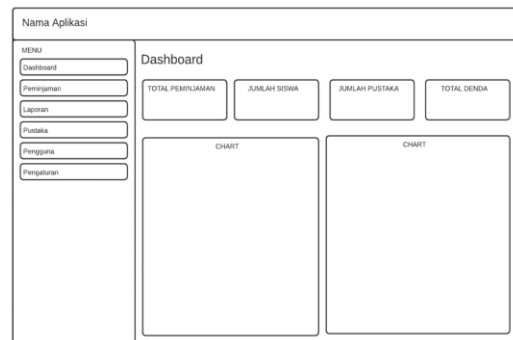


Figure 7. Admin Dashboard Interface Design

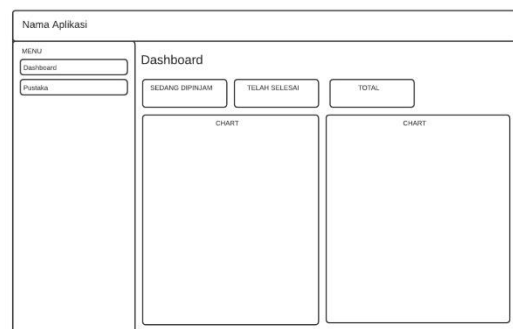


Figure 8. User Dashboard Interface Design

Lending Interface Design

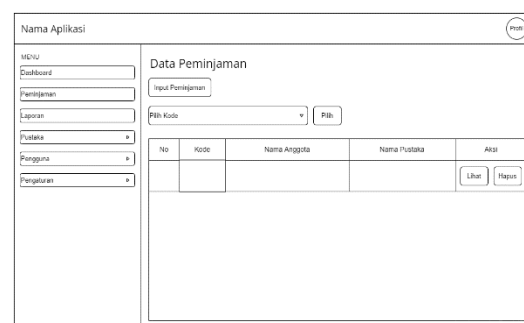


Figure 9. Lending Interface Design

The Administrator page is a program display with Librarian Login access rights. The following shows the program that is on the Administrator page.

Dashboard View

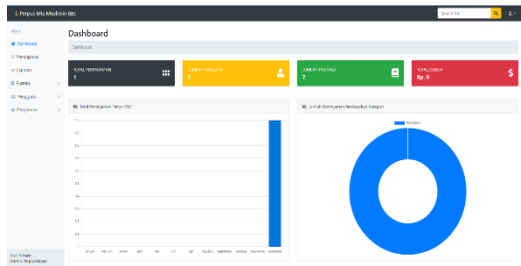


Figure 10. Dashboard Page Display

Loan Display

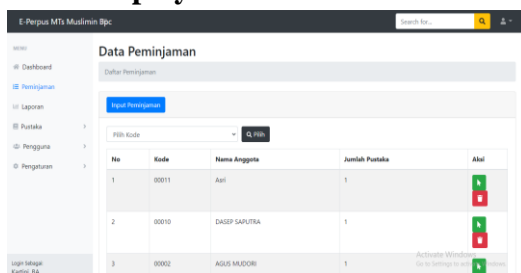


Figure 11. Loan page display

Report View

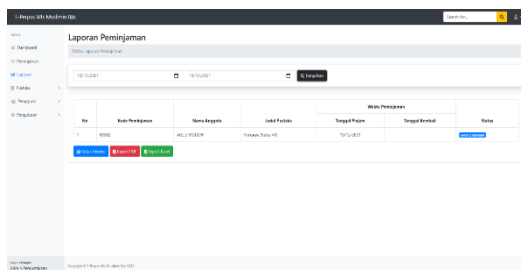


Figure 12. Report Page Display

Library View

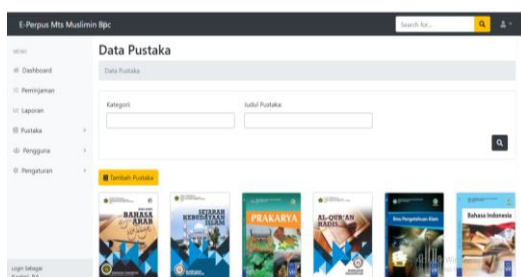


Figure 13. Library Page Display

CONCLUSION

Several conclusions can be drawn based on the previous chapter's description. The design of the web-based e-library information system is an essential innovation in the digital era. The library, as a center of knowledge and information, must be able to respond to technological advancements and transition from manual systems to digital systems. This system design should meet users' needs in terms of accessibility and convenience while providing efficient and effective services. (Ardhana et al., 2022)

With the implementation of this web-based e-library information system, book cataloging, borrowing, and returning transactions and acceptable records are transformed from manual to computerized processes, resulting in increased effectiveness. The system is capable of quickly inputting data, making it more efficient. The library's information system in one of the MTS schools in Cianjur can become more accurate and well-structured.

REFERENCES

- Ardhana, V. Y. P., Sapi'i, M., Hasbullah, H., & Sampetoding, E. A. M. (2022). Web-Based Library Information System Using Rapid Application Development (RAD) Method at Qamarul Huda University. *The IJICS (International Journal of Informatics and Computer Science)*, 6(1), 43. <https://doi.org/10.30865/ijics.v6i1.4031>
- Artikatama, K., Yuana, R. A., & Maryono, D. (2019). The Comparative Analysis of Teknolib Library Information System

- (Library Management System) with SLiMS (Senayan Library Management System) Based on ISO 9126. *Journal of Informatics and Vocational Education*, 2(1).
<https://doi.org/10.20961/joive.v2i1.356>
 96
- Balaji, B. P., M. S., V., K. V., A., Khan, M. R., E., E., & B.G., S. (2021). A review of integrated library systems and web-scale discovery services in India. *Library Hi Tech News*, 38(7), 14–18.
<https://doi.org/10.1108/LHTN-09-2021-0061>
- Cutler, Z., Gadhav, K., & Lex, A. (2020). Ttrack: A Library for Provenance-Tracking in Web-Based Visualizations. 2020 IEEE Visualization Conference (VIS), 116–120.
<https://doi.org/10.1109/VIS47514.2020.00030>
- Din, M. M., & Fazal Fazla, A. (2021). Integration of Web-Based and Mobile Application with QR Code implementation for the library management system. *Journal of Physics: Conference Series*, 1860(1), 012018. <https://doi.org/10.1088/1742-6596/1860/1/012018>
- Fadhilah, W. N., & Maryam, M. (2021). Development of Library Information System Web-based of SMA Negeri 1 Mojolaban Sukoharjo. *Jurnal Teknik Elektro*, 21(2), 78–86.
- Gunawan, D., Ar Raniri, I. A., Setyawan, R. N., & Prasetya, Y. D. (2021). WEB-BASED LIBRARY INFORMATION SYSTEM IN MADRASAH IBTIDAIYAH NEGERI SURAKARTA. *Jurnal Teknik Informatika (Jutif)*, 2(1), 33–41.
<https://doi.org/10.20884/1.jutif.2021.2.1.44>
- Hamdani, F., Zaen, M. T. A., Yuliadi, Y., & Julkarnain, M. (2021). Design and Build a Web-Based People’s Library Application in Jambi City. *The IJICS (International Journal of Informatics and Computer Science)*, 5(3), 224.
<https://doi.org/10.30865/ijics.v5i3.3240>
- Hendriani, R. H., & Indrawan, E. (2021). Web-Based School Library Information System with Wordpress Vocational High School. *Jurnal Ilmiah Pendidikan Profesi Guru*, 4(3), 475–482.
<https://doi.org/10.23887/jippg.v4i3.31945>
- Lazarus, F. C., & Suryasen, R. (2022). Enhancing Users’ Perceived Significance of Academic Library with MOOC Services. *Evidence Based Library and Information Practice*, 17(2), 25–47.
<https://doi.org/10.18438/ebliip30016>
- Manz, T., L’Yi, S., & Gehlenborg, N. (2023). Gos: a declarative library for interactive genomics visualization in Python. *Bioinformatics*, 39(1).
<https://doi.org/10.1093/bioinformatics/btad050>
- Purba, E. N., Asnerlius Ginting, A., & Simamora, R. J. (2022). Web Based Library Information System At Public Senior High School 1 Tigapanah. *Journal of Information Systems and Technology*
-

- Research, 1(3), 158–167.
<https://doi.org/10.55537/jistr.v1i3.217>
- Sembiring, Z. (2021). Design and Development of Web-Based Library Information System at Sdn 060922 Medan Sunggal Subdistrict. *Journal of Research Computer Science*, 1(1), 36–46.
- Suri, G. P., & Arifin, N. Y. (2020). PENGEMBANGAN DAN IMPLEMENTASI APLIKASI PERPUSTAKAAN BERBASIS WEB: DEVELOPMENT AND IMPLEMENTATION OF WEB-BASED LIBRARY APPLICATIONS. *Engineering and Technology International Journal*, 2(1), 21–28.
- Xu, H., Demir, I., Koylu, C., & Muste, M. (2019). A web-based geovisual analytics platform for identifying potential contributors to culvert sedimentation. *Science of The Total Environment*, 692, 806–817.
<https://doi.org/10.1016/j.scitotenv.2019.07.157>
-