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Design and Implementation of a Web-Based Document Archive Application at the North Sumatra Education Quality Assurance Agency

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ABSTRACT

Document archiving management is an important aspect of administrative activities in institutions. Manual archiving processes often cause problems such as delays in document retrieval, risk of data loss, and inefficiency in report preparation. This study aims to design and develop a web-based document archiving application that can manage incoming and outgoing documents in a structured and integrated manner. The research method consists of data collection, system requirements analysis, system design, application implementation, and functional testing. The application is developed using PHP as the server-side programming language, MySQL as the database management system for data storage, and the Bootstrap framework to create a responsive and user-friendly interface. The results show that the developed application is able to store, manage, and display document data properly, as well as provide document recap features based on specific periods. Therefore, this web-based document archiving application can improve the effectiveness, efficiency, and security of document management.

Keywords
Document Archiving, Web-Based Application, Incoming Documents, Outgoing Documents

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INTRODUCTION

Document archive management is a fundamental component of administrative systems in institutions, as it functions as a source of information, legal evidence, and a basis for decision-making. Properly managed archives enable institutions to maintain information continuity, improve accountability, and support administrative efficiency. However, in practice, many institutions still rely on manual archiving methods, which create various operational challenges.

Manual document archiving often results in difficulties in document retrieval, a high risk of document loss, and low administrative efficiency. Conventional recording processes also increase the likelihood of data

duplication and inconsistencies among records. These conditions directly affect employee performance and reduce the overall quality of administrative services (Anggraeni & Fatah, 2025).

Along with the rapid development of information technology, digital-based archiving systems have emerged as an effective solution to overcome the limitations of manual archiving. Modern archival information systems utilize web technologies and structured databases, enabling faster, more accurate, and integrated access to archival data. This approach enhances transparency and facilitates systematic document monitoring within institutions (Sitompul et al., 2023).

Several studies have demonstrated that the development of document archiving applications using systematic system development methods can significantly improve archival storage and retrieval processes in various institutions. Well-designed archival applications are capable of addressing issues related to document organization, storage efficiency, and archival traceability. These findings confirm the strategic role of information systems in improving administrative performance (Anisah et al., 2021).

Furthermore, the digitalization of document archiving positively impacts administrative processes by providing relevant functional features. These features include user management, access validation, document tracking for incoming and outgoing correspondence, and periodic report generation. Consequently, digital archiving systems serve not only as data storage tools but also as comprehensive information management solutions (Rani Kariam et al., 2024).

Despite these advantages, the development of effective archival information systems requires careful and systematic planning. The system development process should involve requirements analysis, system design, implementation, and functional testing to ensure that the system meets institutional needs and operates optimally. Inadequate planning may lead to systems that fail to deliver expected performance improvements (Nova Amalia, 2022).

Conceptually, archives are records of activities or events in various forms and media that are created and received by institutions during the execution of their functions. Archive management encompasses the processes of creation, utilization, maintenance, and disposal of records in accordance with organizational requirements. Effective archive management is therefore a critical indicator of professional administrative governance (Syaharani et al., 2024).

To support integrated archive management, document archival information systems are designed as computer-based systems that automate archival processes. These systems store archival data in structured databases and provide features for document search, classification, and automated reporting. As a result, administrative activities can be conducted more efficiently and systematically (Syauqi, 2022).

Web-based applications are commonly used in the development of archival information systems due to their high accessibility and flexibility. Web applications can be accessed through browsers and internet networks, allowing system usage across multiple devices without dependency on specific hardware. Such applications are typically developed using server-side programming languages such as PHP and supported by centralized databases (Murni et al., 2025).

In terms of data management, MySQL is frequently employed as a database management system due to its ability to store and manage structured data efficiently. The use of MySQL facilitates data processing activities, including data storage, updates, and retrieval, thereby enhancing system performance and reliability (Syauqi, 2022). Additionally, user interface development is often supported by the Bootstrap framework, which provides responsive and consistent design components that improve user experience (Suratno et al., 2021).

This study was conducted based on an internship program at the Educational Quality Assurance Agency (Balai Penjaminan Mutu Pendidikan/BPMP), located at Jalan Bunga Raya No. 96, Asam Kumbang, Medan Selayang District, Medan City, North Sumatra, Indonesia. BPMP is a technical implementation unit under the Directorate General of Early Childhood Education, Primary Education, and Secondary Education, with the primary responsibility of ensuring and improving educational quality. Based on observations during the internship, the document archiving process at BPMP was still predominantly manual, particularly in document recording activities. This condition led to several challenges, including difficulties in document retrieval, data duplication risks, and delays in report preparation. Therefore, this study aims to design and implement a web-based document archival application that supports structured, integrated, and efficient document management to enhance administrative performance within the institution (Kurniawan & Fachrurrazi, 2021).

RESEARCH METHOD

The research method applied in this study is the Waterfall method, which was selected due to its structured and sequential stages that are suitable for web-based application development. The Waterfall method emphasizes a systematic process that begins with requirement identification and proceeds through design, implementation, testing, and maintenance. This approach ensures that each development phase is completed thoroughly before moving to the next stage, thereby reducing potential errors during system development. The context diagram illustrating the Waterfall-based application process is presented in Figure 1.

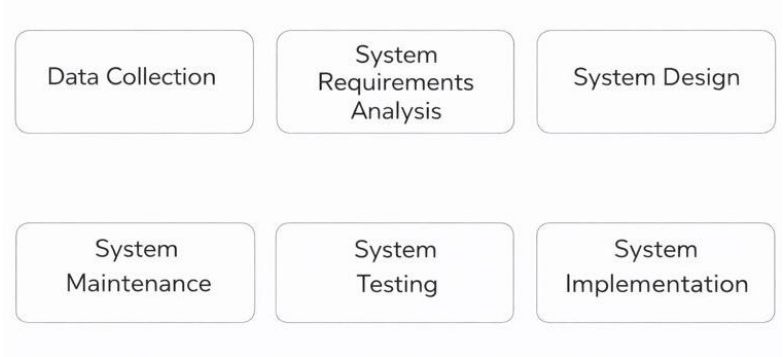

Figure 1.
System Context Diagram

This research aims to design and develop a web-based document archiving application capable of managing incoming and outgoing documents in a structured, effective, and efficient manner. The research stages were carried out systematically, starting from data collection, system requirements analysis, system design, application implementation, and system testing. The overall stages of the design and development of the web-based document archiving application are illustrated in Figure 2.

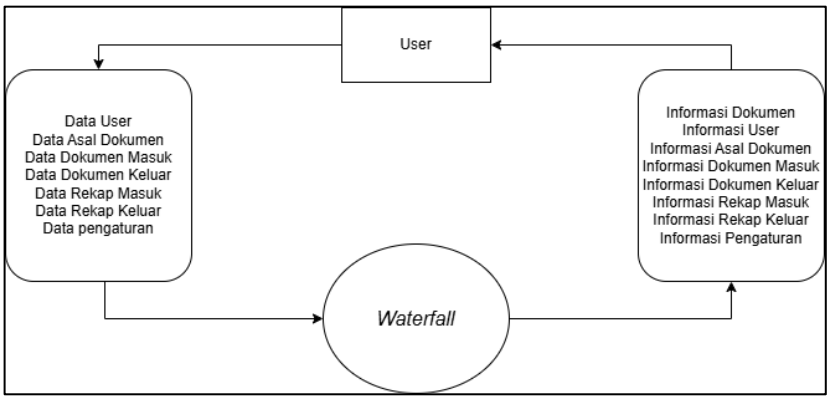

Figure 2.
Stages of Document Archiving Application Design and Development

Data collection was conducted through observation and literature study. Observation was carried out to identify the existing document archiving process within the institution, while the literature study involved reviewing e-books, scientific journals, and technical documentation related to information systems, document archiving, and web-based application development. System requirements analysis was then performed to determine the core functionalities of the application, including user login, management of incoming and outgoing documents, document upload and download features, document recap generation based on monthly and yearly periods, and application configuration management. The system design stage included database design and user interface design with an emphasis on user-friendly and responsive layouts. The implementation stage involved developing the application using PHP as the server-side programming language, MySQL as the database management system, and HTML, CSS, and the Bootstrap framework for the user interface. System testing was conducted using functional testing to ensure that all features operated as expected. The use case diagram illustrating user (admin) interactions with the system is shown in Figure 3.

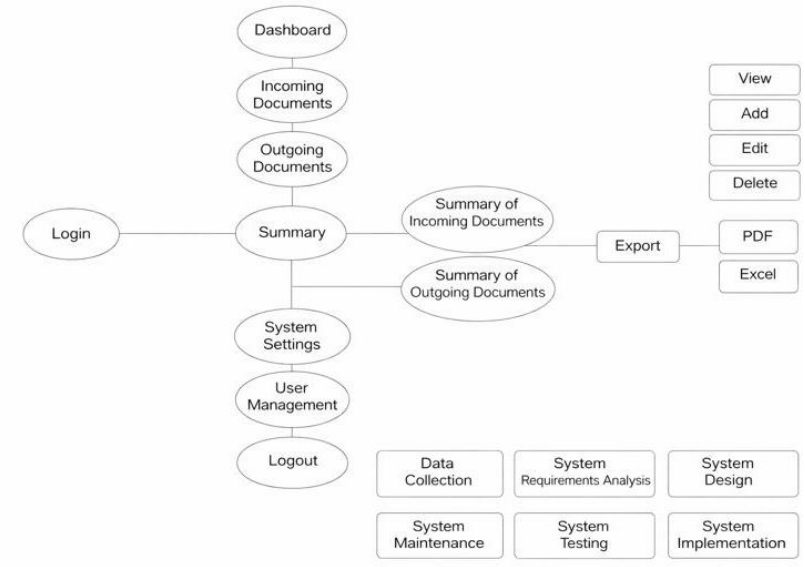

Figure 3.
Use Case Diagram of the Document Archiving Application

RESULT AND DISCUSSION

The results of the implementation and testing of the developed web-based document archiving application focus on the main functions of each page within the system to ensure that the application operates in accordance with user requirements.

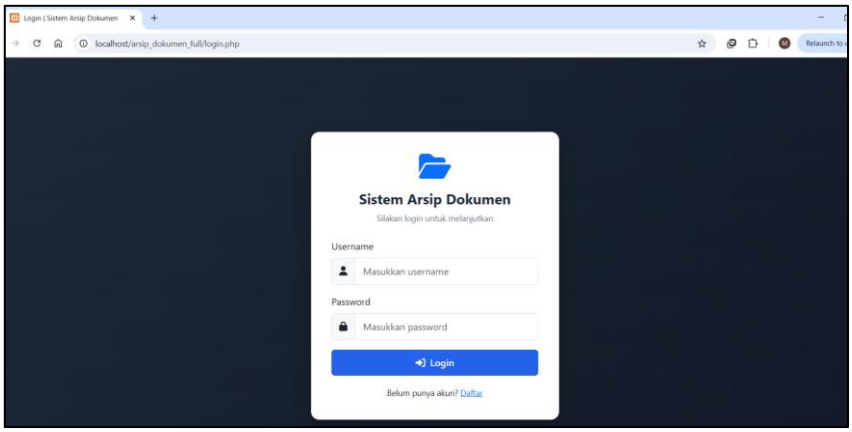

Figure 4.
Application Login Page

On this page, users are required to enter a registered username and password stored in the database. The system performs an authentication process by matching the user's input data with the data stored in the database to verify access authorization.

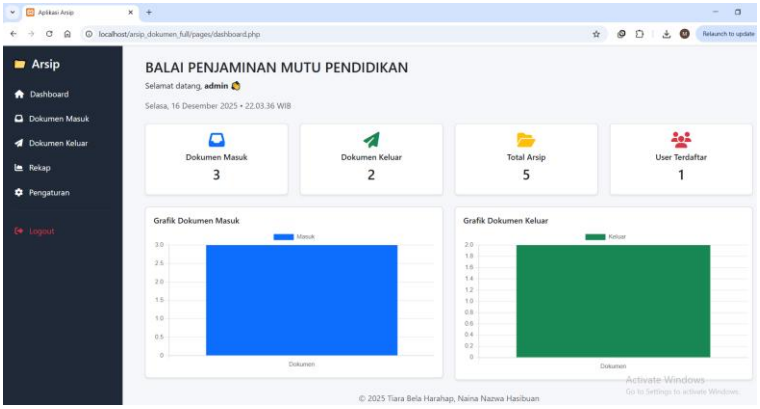

Figure 5.
Dashboard Page

The dashboard page is the main interface displayed after a successful login. It serves as the central information hub that presents an overall summary of archival data. In addition, the dashboard displays real-time date and time information as well as graphical data visualizations that illustrate document activity over specific periods. Based on testing results, the dashboard is capable of dynamically displaying data according to the current state of the database.

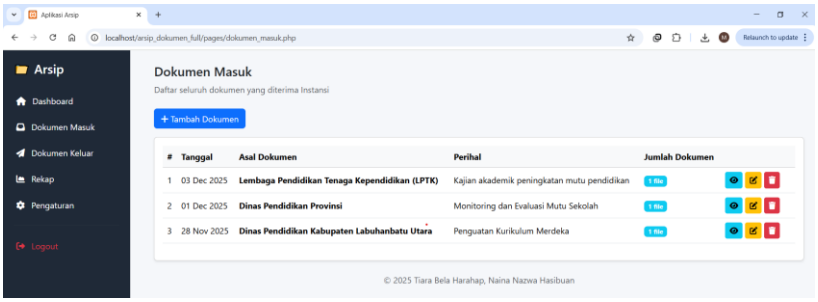

Figure 6.
Incoming Documents Page

When the admin selects the Incoming Documents menu from the sidebar, the system redirects to the incoming documents page as shown in Figure 6. This page is used to manage all documents received by the institution from external parties. Testing results indicate that the system successfully stores incoming document data in the database, including files uploaded to the server. Any data modification is immediately reflected in the table displayed on the page.

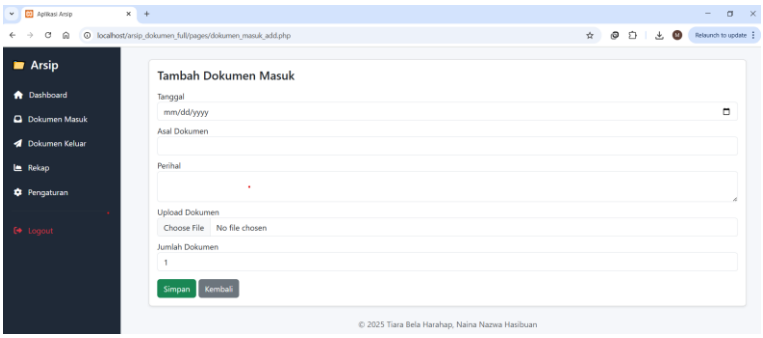

Figure 7.
Add Incoming Document Page

On this page, the admin can enter document information such as the date, originating institution, document subject, and number of files, then save the data so that it is stored in the database and displayed in the incoming documents table.

Figure 8.
Outgoing Documents Page

When the admin selects the Outgoing Documents menu from the sidebar, the system redirects to the outgoing documents page as shown in Figure 8. This

page functions to record documents issued by the institution to other parties. The structure and operational mechanism of this page are similar to those of the incoming documents page; however, the recorded data focuses on the destination institution and the subject of the dispatched documents.

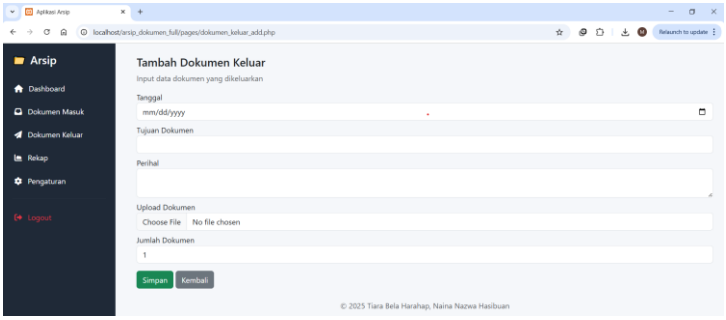

Figure 9.
Add Outgoing Document Page

On this page, the admin can enter document details such as the date, destination institution, document subject, and number of files, then save the data so that it is stored in the database.

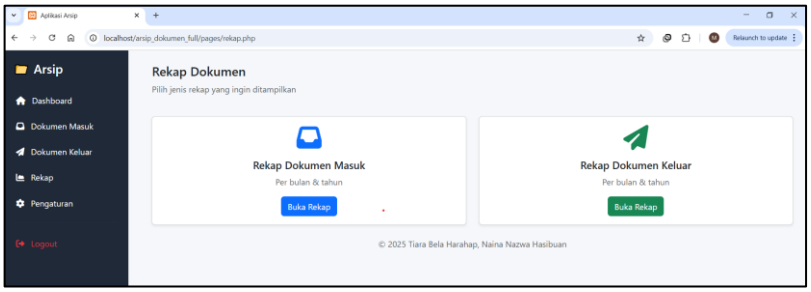

Figure 10.
Document Recapitulation Page

The document recapitulation page is divided into two sections: incoming document recapitulation and outgoing document recapitulation. Both pages are used to display archival summaries based on specific periods.

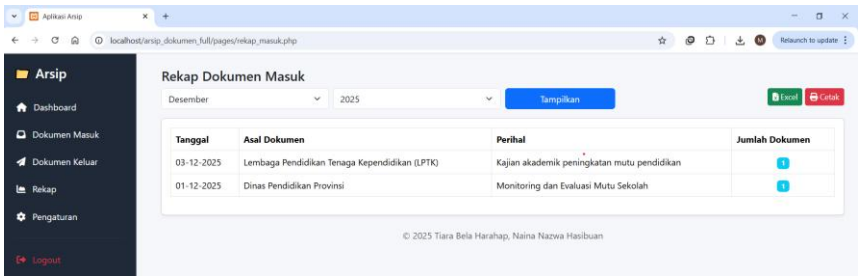

Figure 11.
Incoming Document Recapitulation Page

On the incoming document recapitulation page, the admin can specify the month and year to view the summary of incoming documents. From this page, the admin can directly export the document recapitulation into PDF or Excel formats.

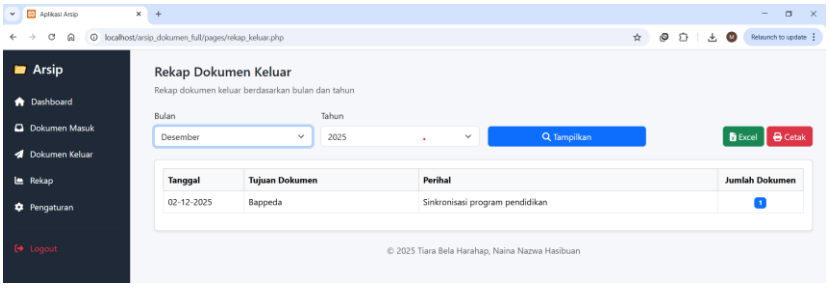

Figure 12.
Outgoing Document Recapitulation Page

On this page, the admin can specify the month and year to view the outgoing document recapitulation. The admin can also directly export the recapitulation data into PDF or Excel formats. Based on testing results, the recapitulation feature successfully displays data according to the selected period, and the exported files can be downloaded without issues.

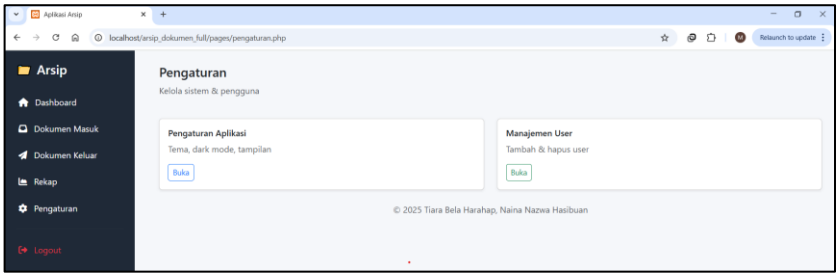

Figure 13.
Settings Page

The settings page is divided into two sections: application settings and user management.

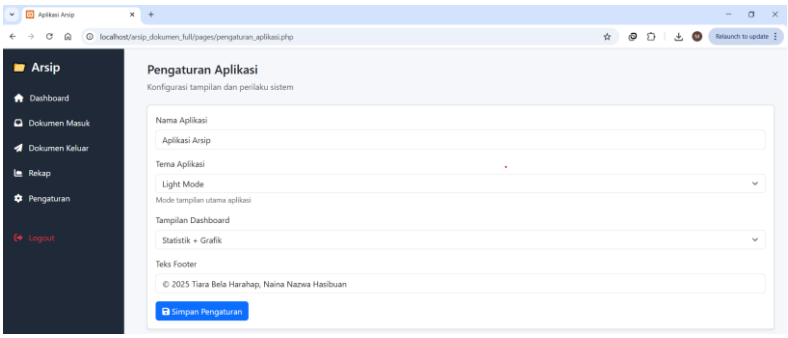

Figure 14.
Application Settings Page

The application settings page is used to manage the general configuration of the system. These settings are stored in the database, ensuring that any changes made are immediately applied across all pages of the application.

Figure 15.
User Management Page

The user management page functions to display and manage user accounts that have access to the system.

CONCLUSION

The web-based document archiving application that has been developed is capable of managing incoming and outgoing documents in a structured manner, from the recording and storage processes to the retrieval of archived data. With this system in place, document management, which was previously done manually, can be transferred to a more effective and efficient digital system.

Based on the results of functional testing, all the main features of the application, such as user login, document management, application settings, and user management, can run well in accordance with the system design. Therefore, this web-based document archiving application is suitable for use as a digital solution in document archiving management in agencies.

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