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Design of a Web-Based Digital Letter Information System for Document Management at the West Java Regional House of Representatives

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Abstract: This study aims to design and develop a web-based digital letter information system to facilitate document management at the Regional House of Representatives (DPRD) of West Java Province. Currently, the manual process causes delays in disposition and makes archive retrieval inefficient. To address this, a descriptive qualitative method was used involving observation, interviews, and document review. The system was developed following the Waterfall model with PHP as the programming language and MySQL as the database. Key features include admin login, management of incoming and outgoing letters, digital disposition, agenda book, file gallery, user management, and database backup and restore. Implementation demonstrated improved efficiency in letter distribution, archive tracking, and administrative workflow. This system is intended as an initial step toward archive digitization and can be expanded to support inter-departmental integration and enhanced document security.

Keyword: Digital Letters, Information System, Document Management, PHP, DPRD

INTRODUCTION

The current development of information technology encourages many institutions to transition to digital systems, including in document and correspondence management. A web-based digital letter information system is one solution that enables the recording, tracking, and archiving of letters to be carried out automatically and efficiently. This technology integrates document management functions such as archiving, disposition, searching, and reporting directly through the internet. By utilizing web programming frameworks and structured databases, this system can enhance administrative performance while reducing reliance on physical archives.

The Regional House of Representatives (DPRD) of West Java Province is a legislative institution with a high volume of correspondence, both incoming letters from the public and other institutions, as well as outgoing letters for formal activities. Currently, document management is still manual and scattered across various divisions. Each division keeps its own

archives, while the General Affairs Division serves as the central archive. This condition causes difficulties in tracking letters, delays in disposition, and a risk of document loss due to the absence of an integrated information system.

An information system is a collection of interconnected components designed to process data into information that supports decision-making. In the context of document management, digitally managed archives are easier to access, better organized, and protected from physical damage. A digital correspondence system also allows for metadata-based archiving, quick search, and electronic disposition to accelerate bureaucratic processes.

Based on internal observations and interviews, letter management at the DPRD of West Java faces several serious issues. Letters from commissions must go through multiple sections before reaching the leadership, making the process lengthy and complicated. Disposition of letters is still conducted manually, which can cause delays in handling. A real-time letter tracking system is not yet available, making it difficult to monitor the status of letters. Archive storage is done only physically and scattered across several divisions, increasing the risk of document loss or damage. This also complicates the retrieval of needed documents.

The study by Latif and Affiyaldi (2020) titled Analysis and Design of a Web-Based Archive Management Information System at the Secretariat of DPRD Jambi City serves as an important reference for developing a letter archiving system. They designed a web-based system to manage incoming and outgoing letters and provided features for archive management and reporting. The results showed that the system facilitated letter access and improved archiving efficiency. Compared to that study, the system developed in this research has similar objectives, namely to address manual archiving issues within the DPRD environment.

However, this system offers enhancements and adjustments better suited to the needs of the DPRD of West Java, such as a focus on digital leadership disposition, automatic agenda book features based on dates, a file gallery to view documents by time, and data backup and restore features to ensure long-term document security. The system also adopts a centralized admin and leadership disposition manager approach, making it more compatible with the organizational structure of the DPRD of West Java.

Basic Theory

a. Information Technology

With the rapid advancement of information technology, many government agencies are shifting from manual to digital systems, particularly in the management of correspondence and documents. Web-based information systems offer convenience in archiving, searching, and distributing letters, which can now be done more efficiently and in real time. For example, the study by Ibrahim, F., Broos, P., Susyana, C. M., & Muthmainnah (2023) revealed that a web-based system was designed to facilitate document archive management at Bappelitbang Bandung City, utilizing PHP and MySQL technology. In addition, Pasaribu (2021) conducted a study on designing a web-based information system for managing office asset inventory at PT. MPM Finance Bandung, which helped improve the efficiency and accuracy of data recording and inventory management. The system provides centralized data access, reduces manual errors, and accelerates asset reporting.

b. Digital Letter Information System

Web-based digital letter information systems not only accelerate work processes but also contribute to increased transparency and accountability in government administration. Traditionally, manual letter management has faced various challenges such as the risk of document loss, time-consuming searches, and low work efficiency. A study conducted by Ramadhani, Permana, Yansah, Fahriza, and Hendry (2024) on the design of a responsive web-based outgoing letter management application using Bootstrap proved that the use of a web-based system can improve the efficiency of recording and archiving outgoing letters digitally.

Moreover, the system is equipped with features such as fast search, user authentication for data security, and a responsive interface that is easily accessible across various devices.

c. Letter and Archive Management

Letter and archive management remains a challenge across various institutions, including at the sub-district level. A study by Destria, Purnamasari, Irfani, and Suhandi (2024) on the design of a letter archive management application at the Public Works and Spatial Planning Department (Dinas PU. BMTR) of South Sumatra Province showed that the developed system could enhance orderliness, efficiency, and data security. Compared to previous studies, this application offers faster search features and more structured data management.

d. PHP

Beyond the conceptual and functional aspects, the success of digital letter system implementation greatly depends on the technology used. One such technology is PHP (Hypertext Preprocessor), the most popular programming language for web-based application development. PHP is open source, flexible, and compatible with various database systems. According to Sandy, Herlinda, and Lukman (2024) in their study titled Design and Development of a Web-Based Correspondence Administration Information System at Yayasan Insan Peduli Sejahtera, PHP supports the digital management of incoming and outgoing letters, from recording to integrated archiving. This technology combination enables responsive systems that can be accessed from various devices, including mobile phones.

e. MySQL

In terms of data management, MySQL—as one of the most widely used relational database management systems (RDBMS)—is known for providing efficient and structured storage services. Additionally, MySQL offers a fairly high level of data security for long-term use. Its support for basic operations such as Create, Read, Update, and Delete (CRUD) makes it highly suitable for digital letter systems, for tasks such as recording incoming and outgoing mail, document searching, and running backup and restore processes. This aligns with the findings of Taslia, Y., Sunoto, A., & Hendrawan (2023) in their study titled Design of a Correspondence Archiving Information System at the Merlung Village Office, which states that the use of MySQL supports faster, more accurate archive management and helps streamline administrative services at the village level.

Based on experiences across various institutions, the implementation of a web-based digital letter information system at the West Java DPRD is expected to resolve issues in correspondence and document management, such as distribution delays, difficulties in tracking letters, and the risk of document loss. With an integrated system, the archiving and distribution process can run efficiently, transparently, and accountably, in line with the principles of good governance.

METHOD

This study employs a descriptive qualitative approach aimed at understanding the problems of manual correspondence management at the Regional House of Representatives (DPRD) of West Java Province and designing a web-based digital letter information system that fits the actual conditions in the field. The methods used in this research are divided into two main parts: data collection methods and system design methods.

1). Data Collection Methods

Data was collected through three techniques:

a. Observation

The researcher conducted direct observations to gain a deeper understanding of the workflow of incoming and outgoing letters, as well as physical archive management at DPRD West Java. The distribution process of letters from commission sections to the General Affairs Division (as the central archive) was observed directly.

b. Semi-structured Interviews

Semi-structured interviews were conducted with staff members of Commission III and the General Affairs Division to gather information about responsibilities in archive management, challenges in the current manual system, and expectations regarding the implementation of a digital system.

c. Document Study

In addition, a document study was carried out by examining organizational documents such as the organizational structure, correspondence workflow, and existing archiving policies at DPRD. These documents served as the foundation for formulating system requirements.

2). System Design Method

In this study, the system design follows the Waterfall approach, a sequential software development model that progresses through stages in a linear order from initial requirements to final deployment.

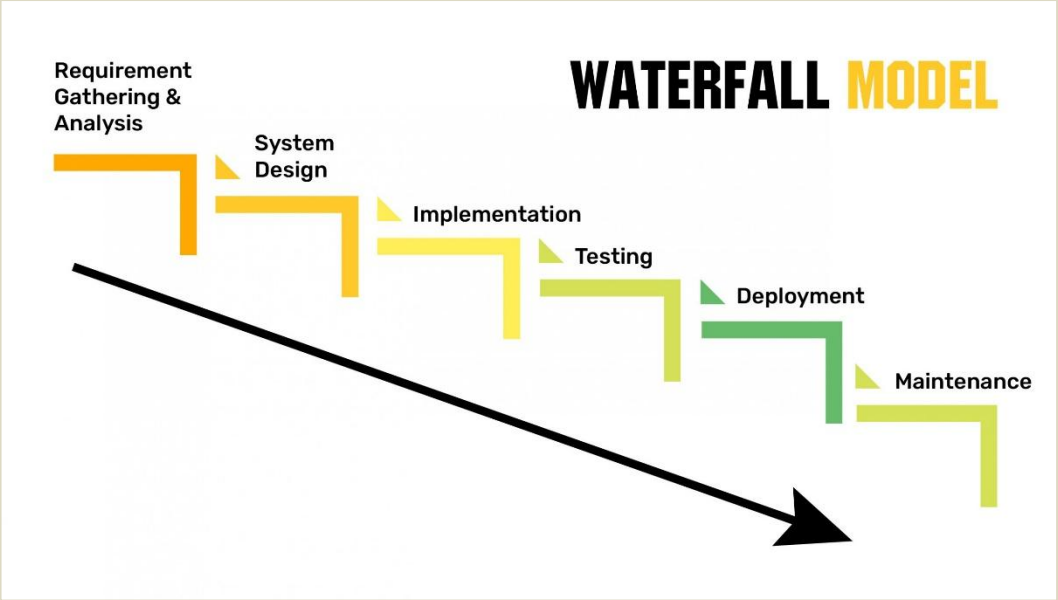


Figure 1. Waterfall

This method is suitable for projects where system requirements are clearly defined from the beginning. The stages in the Waterfall method include:

a. Requirements Analysis

This stage aims to identify the system requirements from users through observations and interviews with archiving staff at DPRD West Java. This helps ensure that the necessary features and problems in the manual system are well understood.

b. System Design

In this stage, the design includes system workflows (flowmaps), user interfaces, and technical diagrams such as the Context Diagram, Data Flow Diagram (DFD), Data Dictionary, and Entity Relationship Diagram (ERD). These visual aids serve as a guide to ensure the system aligns with user needs.

c. Implementation or Coding

The system is developed using PHP following the Waterfall model, and it uses MySQL as the database. It includes one main admin account and executive access rights for the disposition process.

d. System Testing

Testing is conducted using the black box testing method to ensure that the system's functions meet the requirements. Tested features include login, letter input and editing, disposition, data search, agenda book printing, user management, as well as backup and restore processes.

e. System Maintenance and Evaluation

The system is first deployed in a limited environment, followed by evaluations using interviews and questionnaires to measure user satisfaction and effectiveness. The evaluation results serve as the basis for future system improvements and development.

The Waterfall model was chosen because it has several advantages, including making the system design process easier since each phase must be completed sequentially. This ensures that the research process remains focused and uninterrupted (Fachri, B., Rizal, C., & Supiyandi, 2024).

RESULT AND DISCUSSION

A. Result

The discussion in this study includes analysis of the current system, design of the web-based digital letter information system, system testing using the black box method, and evaluation through the distribution of questionnaires to respondents. The objective is to ensure that the developed system truly meets user needs and can address the problems related to manual document archiving that still occur within the Regional House of Representatives (DPRD) of West Java Province.

Analysis was conducted to identify both functional and non-functional system requirements based on observation and interview results. The findings from this analysis served as the foundation for designing the user interface, process flow, and database structure. System testing was carried out to evaluate functionality, while a questionnaire was used to measure user satisfaction in terms of ease of use, interface design, and feature accuracy.

Analysis

Archiving is a systematic process consisting of receiving, recording, storing, maintaining, reducing, and eventually disposing of documents. Its primary purpose is to ensure that information can be accessed easily, quickly, and appropriately to support administrative processes and informed decision-making. In government institutions such as the DPRD of West Java Province, the archiving system plays a crucial role as the foundation for managing official documents of both administrative and strategic importance.

One application of the archiving system at the DPRD Secretariat of West Java involves the management of incoming external letters, which refers to all official letters sent from outside the institution addressed to the Secretary or the Chairperson of the DPRD. The management of these letters must be structured and well-documented to ensure the accuracy, accountability, and traceability of documents.

The following flowmap illustrates the process flow of external incoming letter archiving.

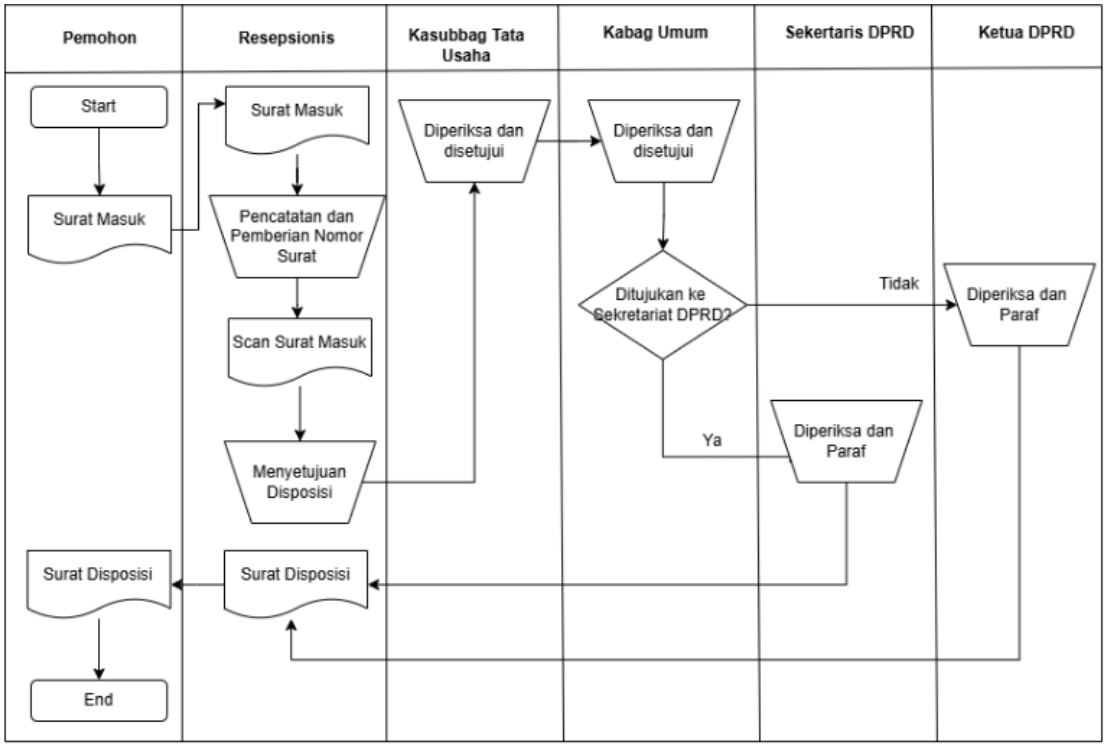


Figure 2. Manual System Flowmap

Based on Latif & Effiyaldi (2020), as well as observation and interview results, the process of managing incoming letters begins with their receipt by the receptionist. At this stage, each received letter is assigned a reference number as an initial record. The letter then enters a waiting period for disposition, which can take between one to four weeks depending on its urgency and the leadership's schedule. During this waiting period, the letter is reviewed and initialed sequentially by the Head of General Affairs Subdivision (Kasubbag Tata Usaha), then by the Head of General Division (Kabag Umum), and finally by the Secretary of the DPRD. If the letter is not addressed to the Chairperson of the DPRD, the disposition is issued directly by the Secretary, after which the letter is returned to the receptionist for distribution to the relevant official or department.

However, if the letter is intended for the Chairperson of the DPRD, the Secretary only provides an initial without issuing a disposition. The letter is then forwarded to the Chairperson, who will issue the disposition directly. Once the Chairperson's disposition process is completed, the letter is returned to the receptionist and becomes ready to be collected by the designated official or unit based on the contents of the disposition. This procedure indicates that the archiving system at the Secretariat of the West Java Provincial DPRD follows an organized document management structure, although the disposition time heavily depends on administrative factors and internal policies.

B. System Design

The system design was carried out based on the analysis of the manual processes currently in place at the Secretariat of the West Java Provincial DPRD. The previous manual system involved the physical recording of incoming and outgoing letters, a disposition process that depended on the physical presence of officials, and time-consuming archive searches due to the absence of an integrated digital search system.

The system designed in this study maintains the existing workflow but enhances it through a digital approach to simplify document tracking, enable archive searches by date or keyword, and ensure more structured documentation management. The goal of this design is to

provide a solution aligned with user habits while improving efficiency and reliability in document handling.

System Modeling Context Diagram (DC)

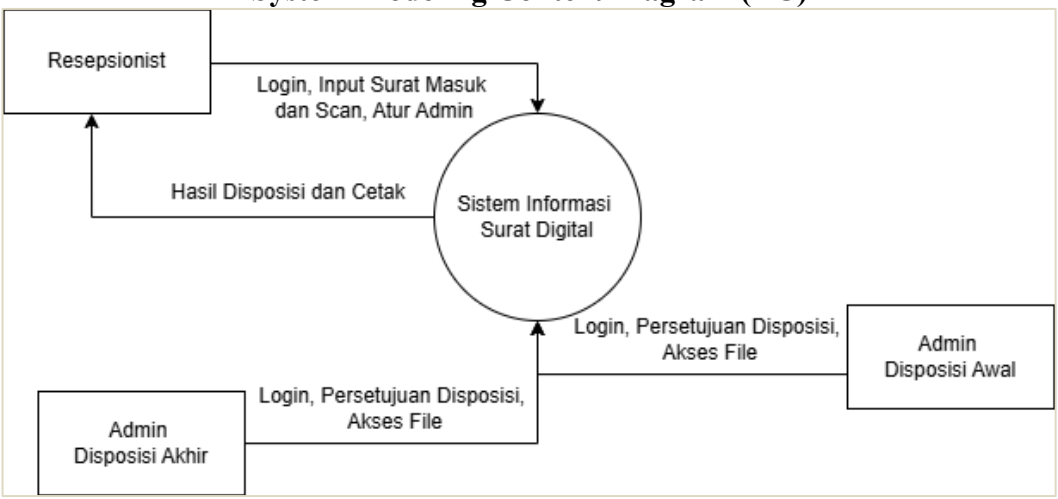


Figure 3. Context Diagram of Digital Letter SI

This diagram shows the data and control flow that occurs between the system and the three main actors, to support a more efficient and organized digital letter administration process.

Data Flow Diagram (DFD)

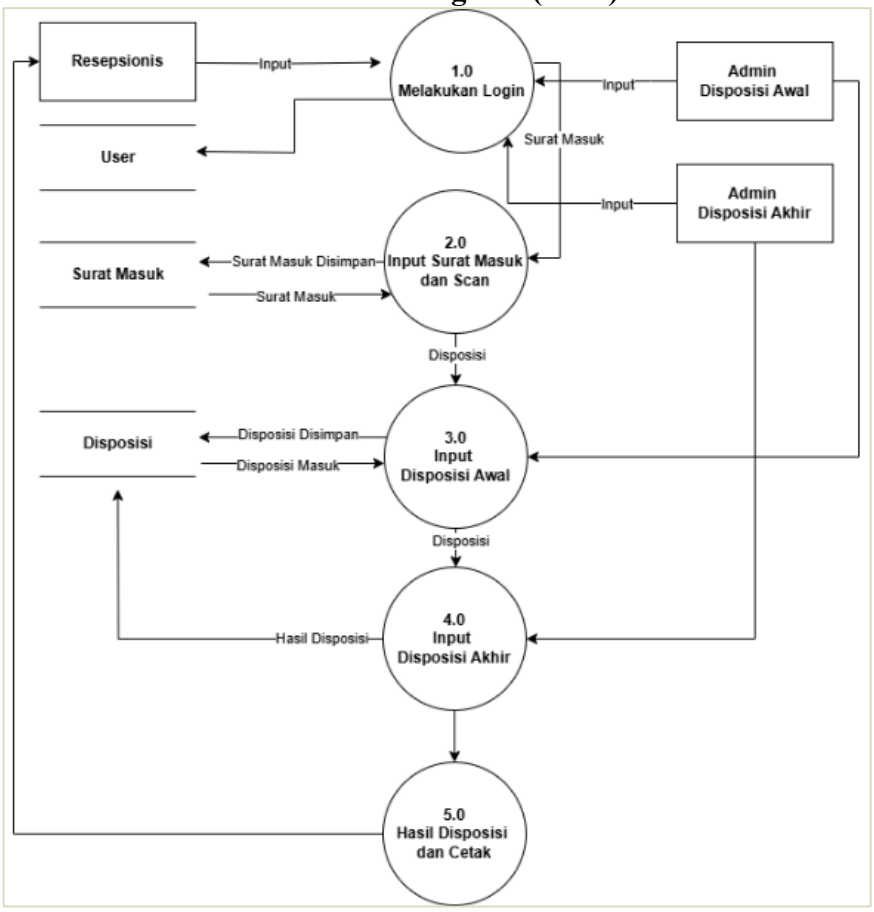


Figure 4. DFD Level 0

Entity Relationship Diagram (ERD)

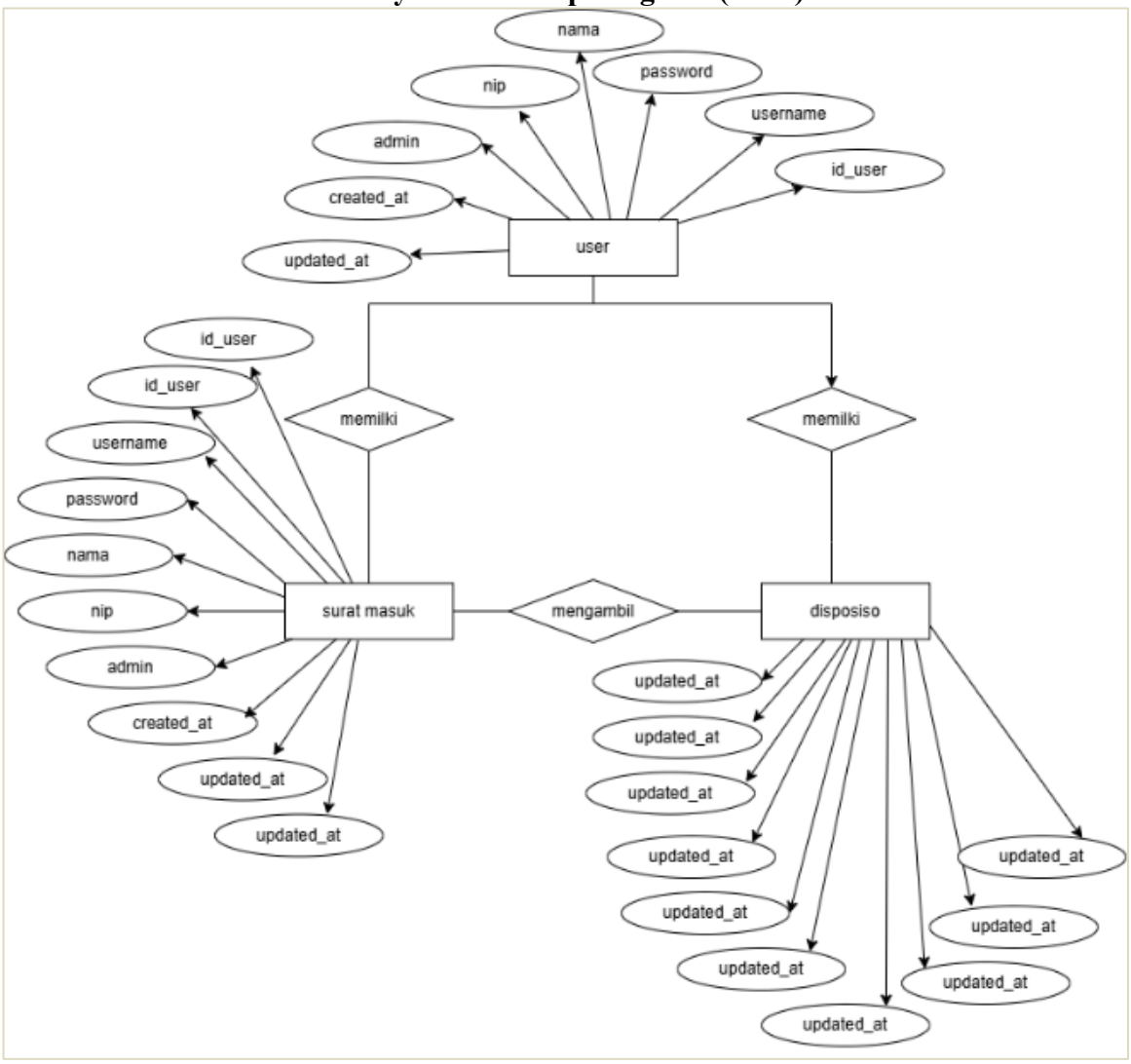
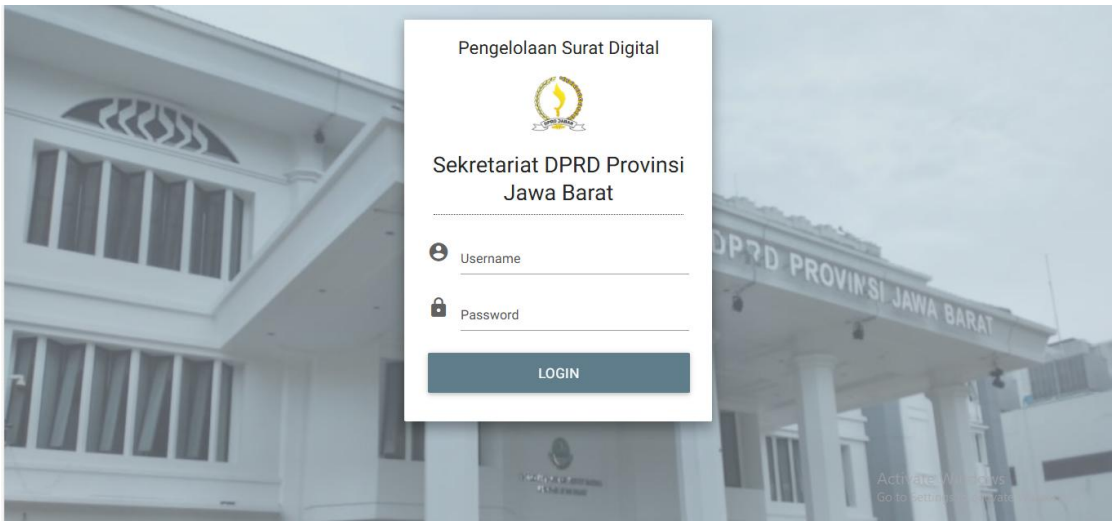


Figure 5. ERD

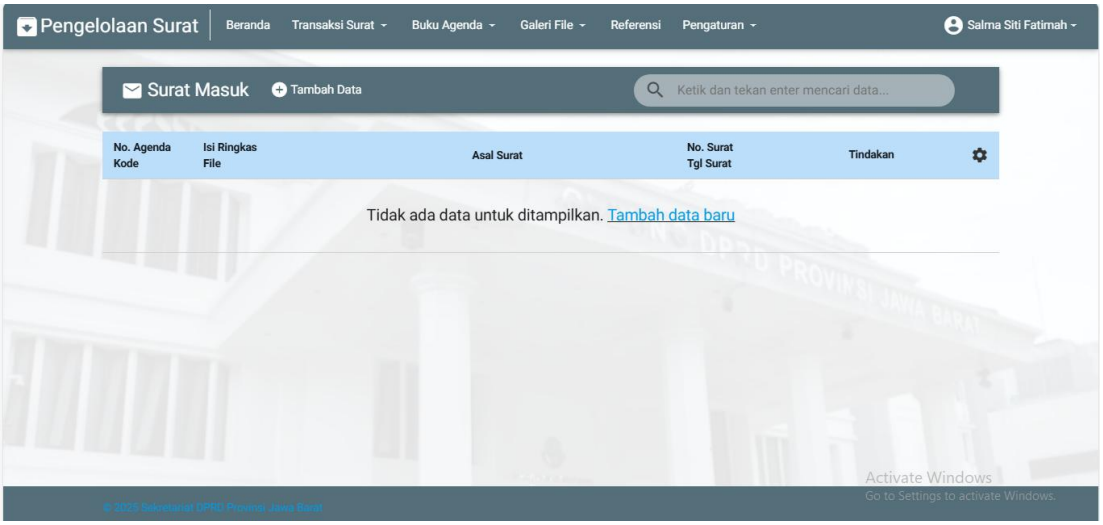
C. UI/UX Design

a. Login Page

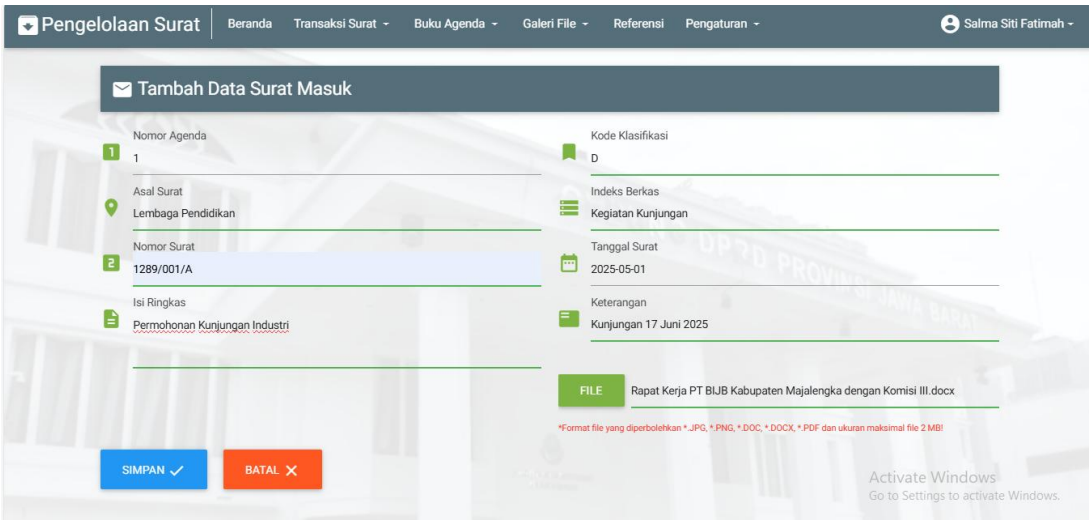


b. Dashboard

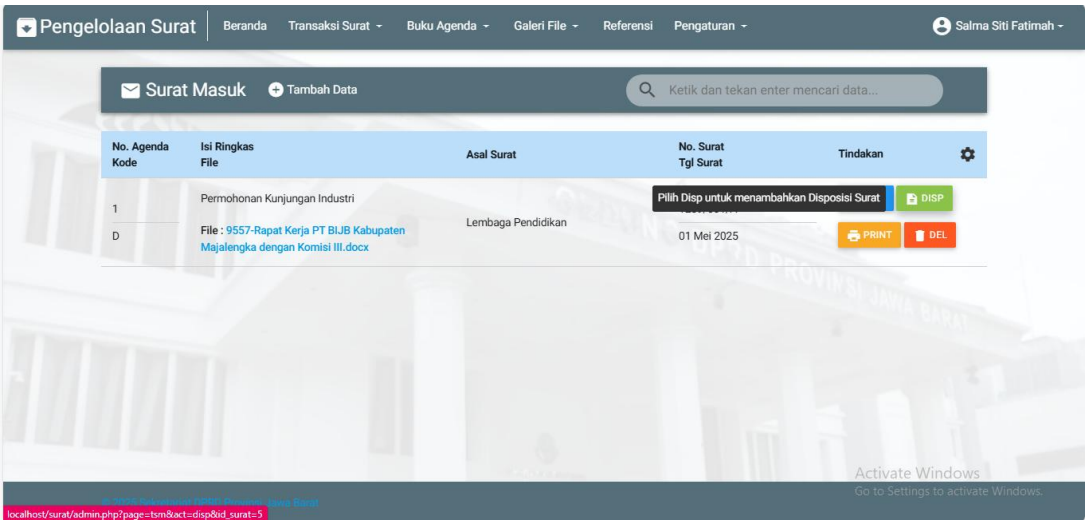
c. Incoming Mail Page



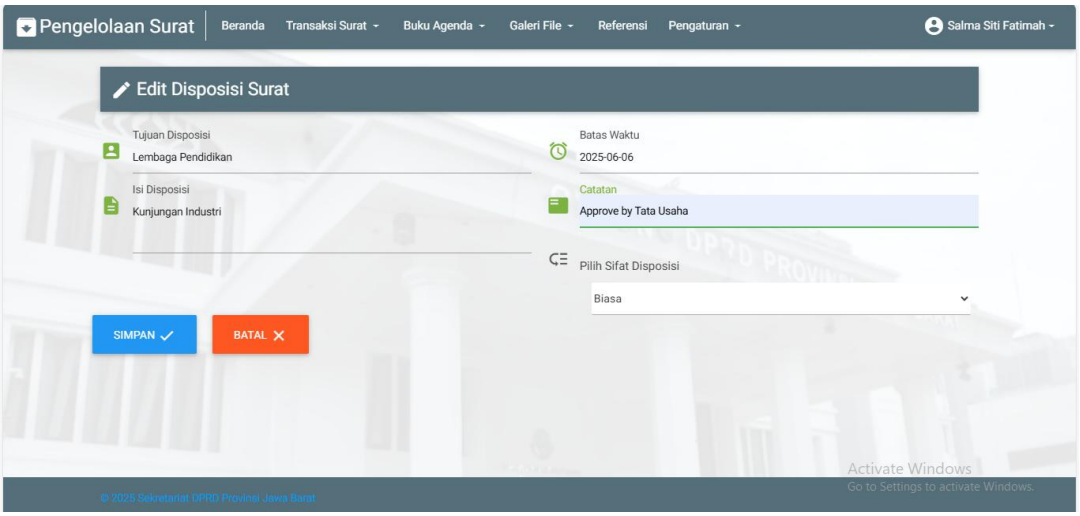
d. Incoming Mail Input Page



e. Disposition Page



f. Disposition Input Page



g. Print Disposition Results Page

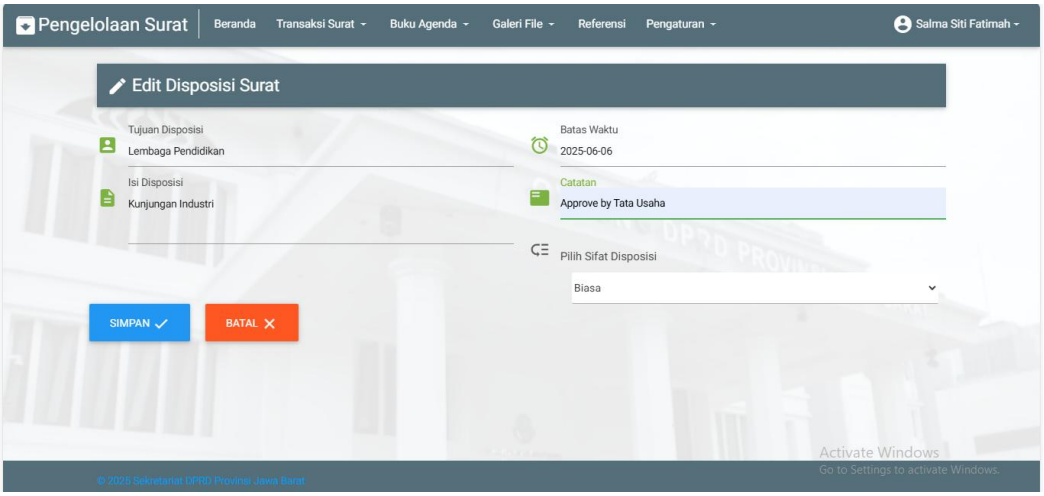


Table 1. Testing Black Box

No	Feature	Tested Input	Expected Output	Actual Output	Status
1	Super Admin Login	Valid username and password	Successfully logged into dashboard	As expected	Passed
2	Input Incoming Letter	Complete form + upload file	Data saved and displayed	As expected	Passed
3	Edit Incoming Letter	Modify previously entered letter data	Data updated	As expected	Passed
4	Delete Incoming Letter	Click delete on a letter	Letter data deleted	As expected	Passed
5	Disposition of Letter	Select letter and fill in disposition	Disposition saved	As expected	Passed
6	Print Incoming Letter	Click print button	PDF/print view opens	As expected	Passed
7	Input Outgoing Letter	Complete the form	Outgoing letter data saved	As expected	Passed
8	Edit/Delete Outgoing Letter	Edit or delete outgoing letter data	Data updated/deleted	As expected	Passed
9	Letter Agenda	Filter by date	Letters displayed according to date	As expected	Passed
10	File Gallery	View and search files by date	Files displayed based on filter	As expected	Passed
11	Letter Classification	Add/edit classification	Classification data saved	As expected	Passed
12	Backup Database	Click backup button	Database file downloaded	As expected	Passed
13	Restore Database	Upload backup file	System data restored	As expected	Passed
14	Add Admin	Enter new admin user data	New admin successfully added	As expected	Passed
15	Logout (Super Admin)	Click logout button	Returned to login page	As expected	Passed
16	Regular Admin Login	Valid username and password	Successfully logged into dashboard	As expected	Passed
17	View Incoming & Outgoing Letters	Click letter menu	Complete letter list displayed	As expected	Passed
18	Fill Disposition	Select letter and fill in disposition	Disposition saved	As expected	Passed
19	Letter Agenda	Search by date	Agenda displayed according to date	As expected	Passed
20	Print Agenda	Click to print filtered results	PDF/print view displayed	As expected	Passed
21	File Gallery	Access and filter by date	Files displayed according to date	As expected	Passed
22	Change Password	Enter old & new password	Password successfully updated	As expected	Passed
23	Edit Profile	Edit name/email	Profile saved	As expected	Passed
24	Logout (Regular Admin)	Click logout button	Returned to login page	As expected	Passed

Questionnaire

To assess user satisfaction and acceptance of the developed digital letter information system, a survey was conducted using a questionnaire with a rating scale from 1 to 5, where 1 indicates Strongly Disagree and 5 indicates Strongly Agree. The questionnaire involved 10 respondents and covered several key aspects, including ease of use, user interface appearance, feature accuracy, and overall system evaluation.

Questions:

1. Is the system easy to use even if it is your first time accessing it?
2. Is the process of entering incoming and outgoing letter data easy to perform?
3. Is the navigation between menus in the system easy to understand?

4. Does the system interface look appealing and not confusing?
5. Is the information displayed on the screen easy to read and understand?
6. Are the menu, buttons, and other features easy to locate?
7. Are the incoming and outgoing letter data displayed correctly according to input?
8. Do the letter printing features function well and meet your needs?
9. Do the search and file gallery features display results accurately according to the entered keywords or selected dates?
10. Does this system help you in managing letter documents?
11. Are you satisfied with the system overall?

Based on the data collected from the respondents, the questionnaire results show that the majority of users gave positive feedback about the system. The following chart illustrates the distribution of respondents' answers for each question using the categories: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Let me know if you need the questionnaire results compiled into a table or graph.

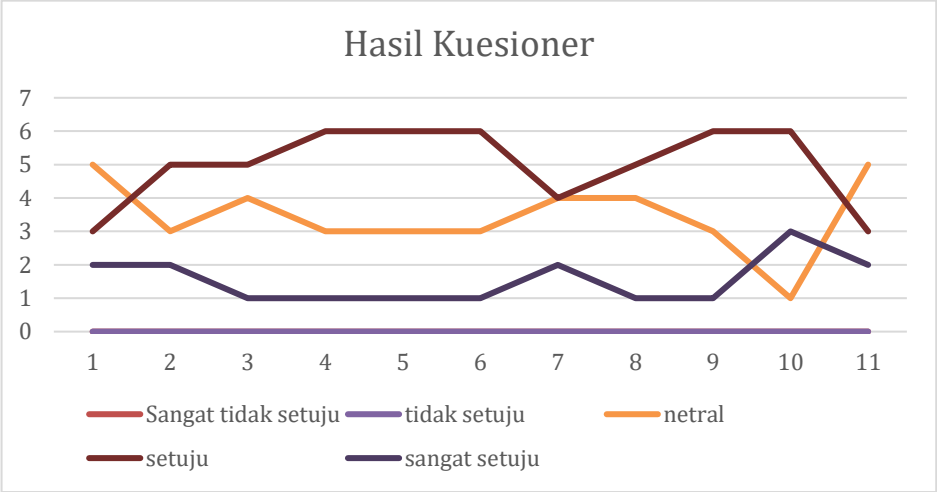


Figure 6. Questionnaire Results

The majority of respondents selected the "Agree" and "Strongly Agree" categories for nearly all questions, indicating a high level of satisfaction and acceptance of the web-based digital mail information system. This suggests that the system successfully meets user needs and facilitates the document management process within the West Java Provincial DPRD.

CONCLUSION

1. Resume

Based on the results of the research and development of the web-based digital mail information system at the West Java Provincial DPRD, it can be concluded that the system has successfully improved the efficiency of mail and archive management. With features such as incoming and outgoing mail management, digital disposition, agenda book, file gallery, and user settings, the system facilitates easier archive tracking and speeds up the mail distribution process. User satisfaction levels also show positive results, indicating that the system meets the users' needs and effectively addresses the problems of the previous manual system.

2. Suggestion

To further improve the system, the following suggestions are proposed:

1. Integrate the system with other departments or units within DPRD to expand the scope of digitalization and facilitate interdepartmental collaboration.

2. Add more advanced data security features, such as document encryption and two-factor authentication, to protect sensitive information.
3. Optimize the user interface to be more user-friendly and intuitive, minimizing user errors and accelerating the adaptation process for new users.
4. Provide regular training for users to help them fully utilize the system's features effectively.
5. Implement automated and scheduled backup and restore mechanisms to ensure comprehensive data security.

By implementing these suggestions, it is expected that the digital correspondence information system can continue to evolve and deliver greater benefits for administrative management at DPRD West Java.

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