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Design of A Web-Based Online Disposition Information System Case Study: Medan City Police

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ABSTRACT

In the digital era, efficiency in managing information is crucial, especially within the police force. The Medan City Police require an information system that can support a fast and integrated mail disposition process. This study designed and built a web-based Online Disposition Information System using the Waterfall method. The system design includes a responsive interface and an appropriate database structure. Testing used the Black Box method to ensure the accuracy of input and output. This application was developed with PHP and MySQL. The results show that the system facilitates Medan City Police personnel in receiving, processing, and tracking incoming mail efficiently.

1. INTRODUCTION

Police organizations need streamlined internal workflows to ensure timeliness, auditability, and service quality in the digital-government era [1]. Manual mail-disposition often triggers delays, routing errors, and weak audit trails that hamper decisions and accountability. A web-based Online Disposition Information System (ODIS)[2] can centralize intake, routing, tracking, and archival, aligning with e-government goals of efficiency and transparency in Indonesia [3][4]. Beyond generic e-gov, policing brings specific requirements chain-of-custody, audit logs, and secure document validation which smart-governance research addresses through document-monitoring and rule-based verification [5][6]. Broader police-IS scholarship also shows how data-driven systems reshape police operations, collaboration, and accountability, underscoring the need for robust information flows and privacy-aware design [7][8]. Building on these insights, this study designs and evaluates a web-based ODIS for Medan City Police using a Waterfall process [9] and Black-Box testing[10] to ensure correct I/O behavior and reliable, auditable disposition.

Furthermore, the rapid adoption of digital transformation in Indonesian public institutions has highlighted the urgency of developing domain-specific information systems that address administrative bottlenecks and data integration challenges [11]. Within police organizations, effective correspondence management is essential not only for operational efficiency but also for accountability and documentation integrity. Several studies emphasize that web-based systems can significantly reduce manual workload, increase transparency, and provide real-time monitoring for decision-makers in hierarchical institutions [12][13]. The implementation of a web-based [14] disposition system in the Medan City Police thus aligns with broader e-government initiatives by integrating structured data processing, access control, and audit trails into a single application. This integration enhances both administrative agility and institutional trust, supporting Indonesia's strategic move toward digital governance and public sector innovation [15][16][17].

2. LITERATURE REVIEW

2.1 Requirements Analysis

The first stage in the Waterfall method is to gather, define, and thoroughly document the project requirements. This requirements document forms the basis for the entire project and serves as a guide throughout development.

2.2 Design

Once the requirements are well understood, the design phase begins. At this stage, the system architecture and detailed design of the solution are defined. The design includes aspects such as the software architecture, database structure, user interface, and system workflow.

2.3 Implementation

Once the design is complete, the development team begins writing code based on the design. The code written must comply with the previously agreed-upon specifications and design.

2.4 Testing

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The testing phase is when the application or system is thoroughly tested to ensure that everything functions properly according to specifications. Testing includes unit testing, integration testing, system testing, and acceptance testing.

2.5 Deployment

After successful testing, the system is ready to be deployed in a production environment or to end users. Implementation includes installation and configuration in the production environment.

2.6 Maintenance

After the system is operational, the maintenance phase begins. This involves bug fixes, software updates, and routine maintenance to ensure good performance. The difference between this research and previous studies is that the waterfall method for the mail disposition system makes it easier for admins and users to access mail sent by the admin. The web-based system allows users to receive incoming mail easily and privately.

3. RESEARH METHODS

The software development method employed in this study was the Waterfall model[18], consisting of five sequential phases: requirements analysis, system design, implementation, testing, and maintenance. Data collection was conducted through direct observation, structured interviews, and document review at the Medan City Police Headquarters. These methods aimed to gather comprehensive information on the existing correspondence disposition process and identify functional requirements for system development.

The interviews with administrative staff and IT officers at the Medan City Police provided essential insights into workflow procedures, document routing mechanisms, and approval hierarchies that guided the design phase. The system was developed using PHP as the programming language and MySQL[19] as the database management system, ensuring scalability and compatibility with the institution's existing infrastructure.

System evaluation was carried out using the Black Box testing method to verify functional accuracy, interface responsiveness, and user interaction consistency. This method ensured that all input and output processes met predefined requirements and operated as intended. The overall research procedure for the study titled *"Design of A Web-Based Online Disposition Information System: Case Study of Medan City Police"* is presented systematically in the following stages.

1. Preliminary Study
   a. Gathering information about the letter disposition process currently used at the Medan Polrestabes.
   b. Analyzing the challenges and problems that arise in the manual letter disposition process.
   c. Conducting a literature review on letter disposition information systems and relevant technology.
2. Needs Analysis.
3. Information System Design.
4. Information System Development.
5. Trial and Evaluation
6. Refinement and Implementation

The following are data collection methods that can be used in the research *"Design of A Web-Based Online Disposition Information System: Case Study of Medan City Police":*

1. Observation, Direct observation was conducted at the Medan City Police Headquarters to examine the existing mail disposition process. This method aimed to identify workflow patterns, bottlenecks, and system requirements necessary for the development of an online disposition information system.
2. Interviews, Structured interviews were carried out with key personnel, including officers responsible for document disposition and administrative management. The purpose of these interviews was to obtain detailed insights into user needs, system expectations, and operational challenges faced in the current manual process.
3. Document Study, A review of relevant documents was undertaken, including official correspondence guidelines, disposition policies, and internal administrative records at the Medan City Police Headquarters. This method provided secondary data supporting the analysis of system requirements and workflow design.
4. Questionnaire, A structured questionnaire was developed to gather quantitative feedback from staff involved in document management and disposition activities. The questionnaire focused on assessing user satisfaction, system usability expectations, and perceptions of digital transformation within the institution.

The Waterfall method is a linear and sequential software development approach. This approach consists of a series of sequential stages, with each stage dependent on the completion of the previous stage. This method has five interrelated stages, as shown in the image below:

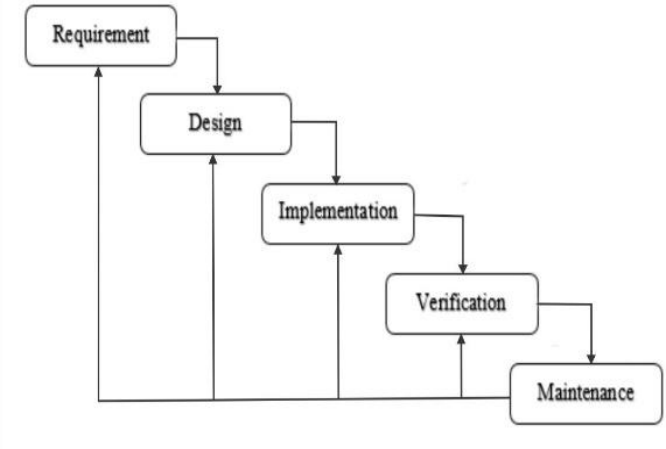

Figure 1. Waterfall Method

System design is the process of planning and designing the structure, components, and functions of a system consisting of interacting elements. The goal of system design is to create a system that is efficient, effective, reliable, and meets user needs. The following is an image of a Use Case Diagram:

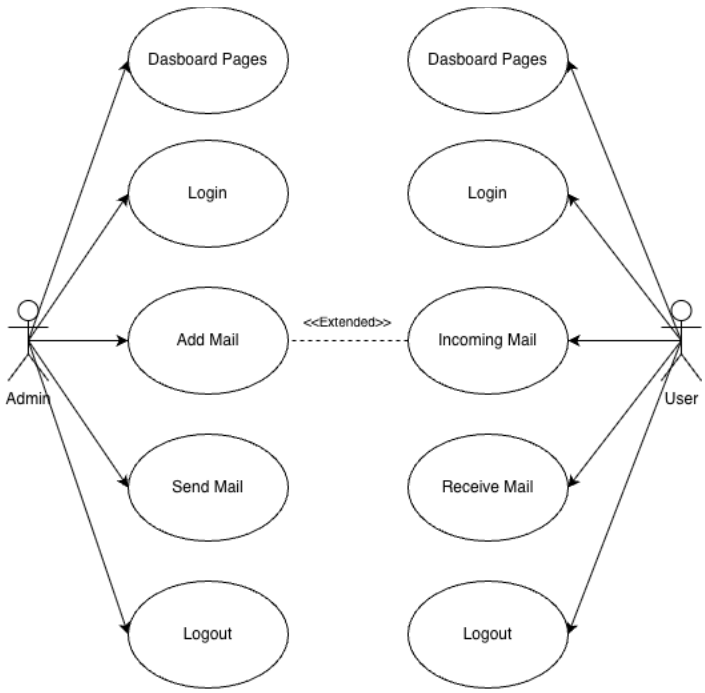

Figure 2. Use Case Diagram

An activity diagram is a type of diagram in the Unified Modeling Language (UML)[20] used to model the workflow or flow of activities within a business process or system. An activity diagram depicts a series of activities, actions, and decisions that occur within the system, as well as the relationships between these elements.

4. RESULT AND DISCUSSIONS

4.1 User Activity Diagram

The User Activity Diagram displays the login of users, each with their own account. Users access the system using a username and password that are known only to them.

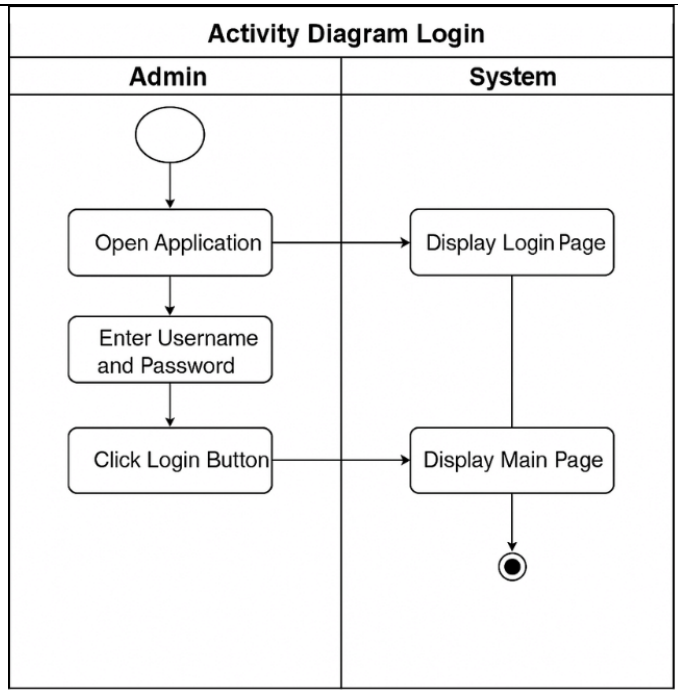

Figure 3. User Activity Diagram

4.2 Sequence Diagram

A sequence diagram is a type of diagram used to model interactions between system objects. This diagram depicts the sequence of messages or calls between objects involved in a scenario. Figure 4 above illustrates how an admin opens the application, then the dashboard page appears, then the main page is accessed.

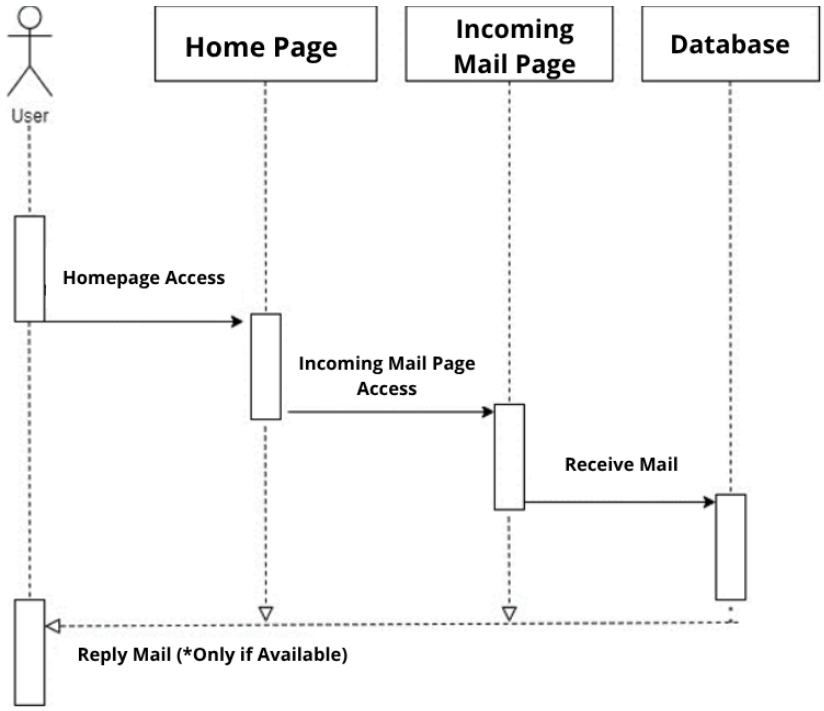

Figure 4. Sequence Diagram

4.3 Login Page

This menu serves as the gateway to the application, where users must enter valid information such as a username and password. Once the information is entered and verified. The purpose of this login menu is to ensure that only authorized users can access and manage incoming mail and its disposition within the Medan City Police Headquarters.

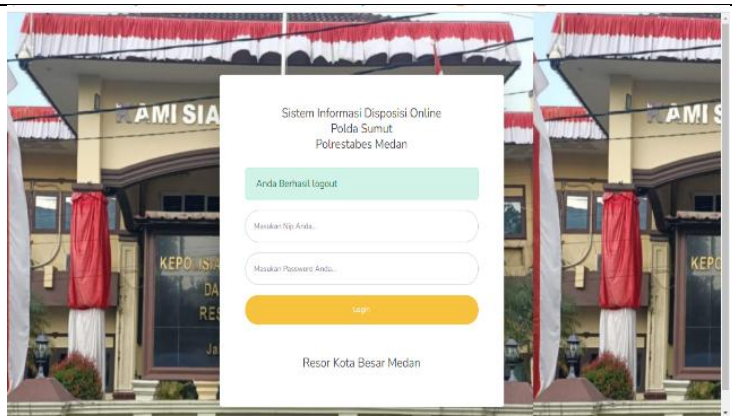

Figure 5. Login Page

4.4 Dashboard Page

The dashboard menu in the Medan City Police Headquarters letter disposition application is the main page that provides a comprehensive overview of various information and activities related to letter disposition.

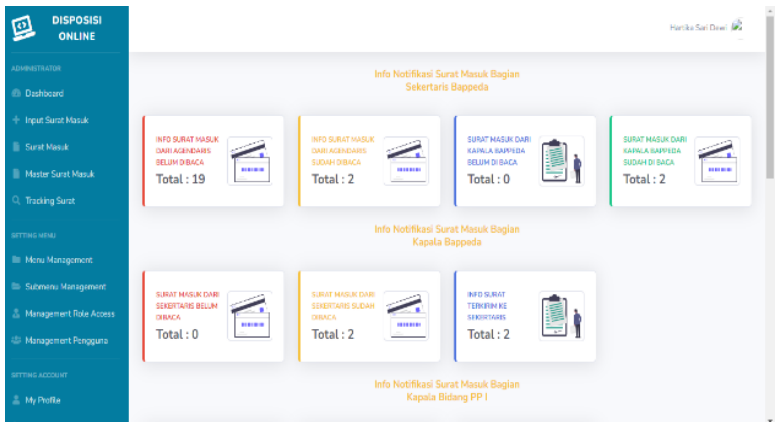

Figure 6. Dashboard Page

The purpose of the dashboard menu is to provide users with a quick and comprehensive view of the status and performance of the letter disposition process. This helps users, such as administrative officers or managers, monitor the efficiency and productivity of managing incoming mail and ensure that letter disposition is proceeding according to established schedules and policies. With easily accessible and visually presented information, the dashboard menu helps users make informed decisions based on actual data occurring in the letter disposition workflow at the Medan City Police Headquarters.

4.5 Incoming Mail Input Page

The incoming mail input menu in the Medan City Police Headquarters letter disposition application is a feature that allows users to enter information related to incoming mail into the system.

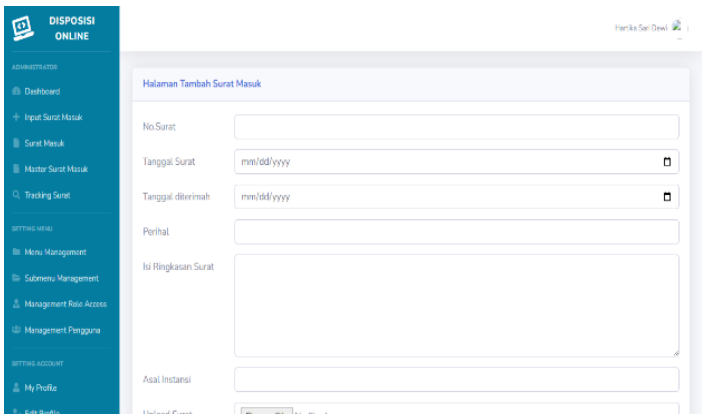

Figure 7. Incoming Mail Input Page

The purpose of the incoming mail input menu is to create an organized starting point in the letter disposition process. By entering information accurately and completely, users help establish a record of incoming mail and facilitate future retrieval and management of mail. This menu also helps prevent the loss of important information about incoming mail and ensures that each letter is managed appropriately and efficiently within the Medan City Police Headquarters.

4.6 Incoming Mail Page

The incoming mail menu in the Medan City Police Headquarters letter disposition application is part of the system that allows users to view and manage all information related to mail received by the institution.

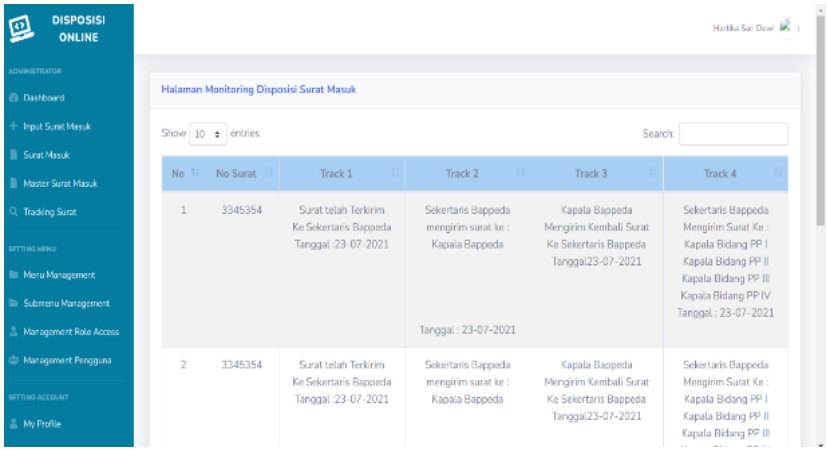

Figure 8. Incoming Mail Page

On this page, users can view a list of incoming mail chronologically or by various customizable filters, such as date, letter number, or letter type. Each incoming mail entry in the list displays complete details about the letter, such as the letter number, date, sender, subject, and associated attachments. Users can also view the letter's disposition status, including whether it has been disposed of, is in progress, or has not yet been handled.

4.7 Mail Recipient User Dashboard Page

This page in the Medan City Police Headquarters letter disposition application is a dedicated display for users responsible for receiving and managing incoming mail to the institution. This page provides mail recipients with a clear overview of their duties and responsibilities regarding mail disposition.

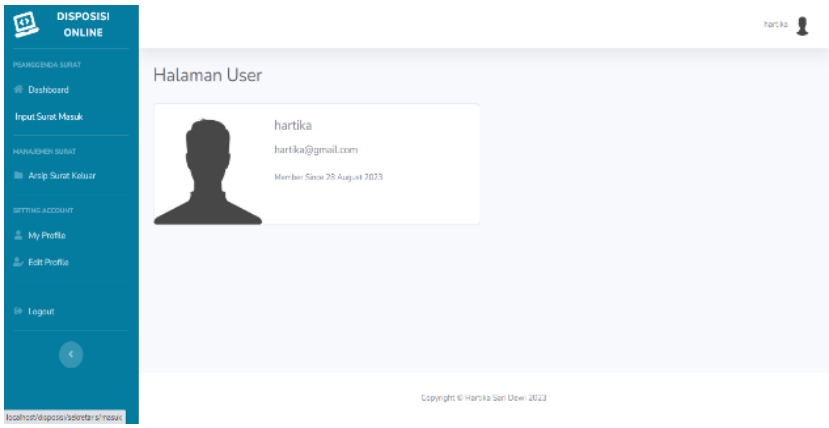

Figure 9. User Transaction Page

4.8 Incoming Mail Master Data Page

The incoming mail master data page allows users to edit the data and determine whether to correct it. The admin can also delete the data if it was sent incorrectly.

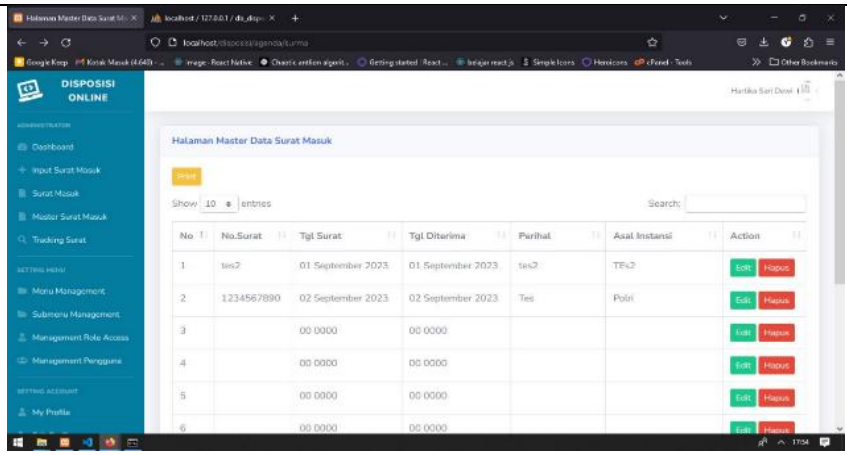

Figure 10. Incoming Mail Master Data Page

4.9 Incoming Mail Disposition Monitoring Page

This page aims to check whether the user has responded to the mail and whether the data is important. The user is free to reply to the mail. For example, if a reply is needed, the admin will see it in the monitoring display.

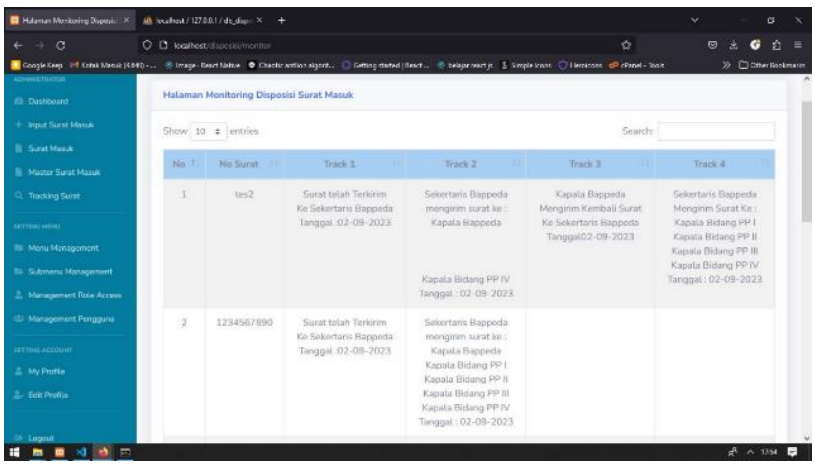

Figure 11. Incoming Mail Master Data Page

4.10 Discussion

The Mail Disposition application implemented at the Medan City Police Headquarters has brought significant transformations in the management of incoming mail and its disposition process. Built with the primary goal of replacing the previously existing manual approach, this application allows.

5. CONCLUSSION

Based on the discussion in the previous chapters, the following conclusions can be drawn:

1. By using the Online Disposition Information System Design Application, administrators can easily personally check letters distributed by the administrator. This is because the letters can be confidential or non-confidential.
2. Using this application, users can access the letters, ensuring that the data received is accurate and addressed to the correct user.
3. When a letter is received by the user, the user must mark the data as read so that the administrator knows whether the letter has been received or not.
4. This is more efficient and data is received correctly.
5. The data sent matches the specified section.

The suggestions presented by the author are expected to further improve the results obtained. The following are some of the suggestions made by the author:

1. The system has a mass, which determines whether the system is implemented long-term or not. Ensure the system is designed flexibly to accommodate developments.

2. After the system is launched, continue to monitor performance and solicit feedback from users. Make repairs and updates as needed to maintain system quality.

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