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Development of a Community Complaint Information System to Support the Realization of a Smart Village in Sibetan, Karangasem

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ABSTRACT

A computerized (digital) village is one of the key initiatives introduced by public authorities to support the sustainable development of rural areas across the Republic of Indonesia. One of the primary objectives of a Digital Village is to disseminate information rapidly, accurately, and efficiently to local communities while promoting transparency and public participation. Sibetan Village is among those committed to becoming a digital village through the integration of information and communication technologies into its governance systems. However, in developing a local complaints website, the testing process must strictly adhere to the village's expected quality standards to ensure usability, reliability, and effectiveness. Villages are widely encouraged to leverage data-driven innovations to enhance administrative processes, improve public service delivery, and foster inclusive community engagement. In Sibetan, one such initiative is the development of a web-based Regional Complaints Information System, designed to facilitate the submission of inquiries and complaints from the public, enabling faster responses by village authorities. The system was designed using the Waterfall method to accommodate user requirements. The outcome of this research is the user interface design of the Sibetan Village community complaints website.

1. INTRODUCTION

Sibetan Village is located in Bebandem District, Karangasem Regency, Bali Province, covering an area of 11.25 km². Most of the area consists of dry land (approximately 912.616 hectares), while the remainder is used for residential yards, rice fields, and other types of land. Situated at an altitude of 400–500 meters above sea level, Sibetan Village features varied topography with slopes ranging from 3 to 45 degrees and faces southward. Sibetan is one of the tourist villages in Karangasem Regency, located on the eastern tip of Bali Island.

In line with the widespread adoption of Industry 4.0 throughout Indonesia—including rural areas—digital villages have become a development focus. A digital village represents the smallest unit of government in which the application of Information and Communication Technology (ICT) has become an integral part of providing services to the community and supporting village operational activities (Padillah & Syahputra, 2024).

The openness of information encourages villages to improve the quality of public services. Sibetan Village is one such example currently in the process of developing into a Digital Village. According to the Head of Sibetan Village, Mr. I Made Beru Suryawan, the use of technology in the operational activities of the village office is still not optimal. In Sibetan Village, problem reporting is still conducted manually through verbal communication and by listening to community issues, which results in slower response times. An effective information system can streamline workflows and offer various benefits, such as more efficient and effective data management, thereby contributing to better and higher-quality public services (Laila et al., 2024).Through the Student Organization Capacity Strengthening Program, it is hoped that Sibetan Village in Karangasem Regency can advance toward becoming a fully computerized village by digitalizing its organizational structures and involving both local and regional government stakeholders. The government of Sibetan Village is committed to improving the

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quality of public services through the development of an integrated community complaint information system. This system is expected to accelerate service delivery, enhance the capacity of village officials, and foster greater community participation in village development through the use of digital technology. In this way, it is anticipated that the productivity of village apparatus will improve and that village development efforts will become more effective and efficient (Firmansyah et al., 2020).

2. LITERATURE REVIEW

Information System

An information system is an integrated framework designed to address data processing requirements, support the operational functions of an organization, and provide accurate and relevant strategic information to external stakeholders, thereby facilitating effective decision-making. It constitutes a network of interconnected subsystems that collaborate and exchange information, ultimately generating precise, up-to-date, and actionable insights to support informed decision-making (Utomo et al., 2020).

Waterfall

The Waterfall model is a linear and sequential development methodology, where each phase must be completed before progressing to the next. This approach is often referred to as the 'waterfall' model (Aufa & Rohaini, 2024). The phases typically include: Requirements, Analysis, Design, Coding, Testing, and Maintenance.

- **Requirement**
  This stage involves the process of gathering information or data related to the software to be developed. Data collection is carried out through observation, interviews, and group discussions to obtain accurate and comprehensive information.
- **Analysis**
  The analysis stage involves studying and evaluating problems to understand them and identify appropriate solutions.
- **Design**
  The design stage is the activity of integrating system elements into an effective whole through visualization, planning, and system design.
- **Coding**
  The coding stage is the process of transforming the design into functional software.
- **Testing**
  This stage involves testing the software to evaluate its quality and functionality.
- **Maintenance**
  The maintenance stage includes the ongoing upkeep and development of the software that has been created, with the aim of fixing errors and improving performance (Nurhayati et al., 2023), (Wahid, 2020).

Website

The internet, commonly referred to as the World Wide Web (WWW), is a global network that facilitates access to a variety of services through web connectivity. A website is one such service, providing users with content through the web. It consists of a collection of interlinked pages that present various forms of content, including text, images, videos, and audio. These pages are organized within a defined structure, with hyperlinks enabling navigation between them. A website can be described as a structured and interconnected set of pages designed to present diverse types of content—such as text, images, videos, animations, and audio—within an integrated framework (Arif & Yunizar, 2020).

XAMPP

XAMPP is an open-source software bundle that combines PHP and MySQL, enabling easier and more efficient development of PHP-based applications. XAMPP is used for managing data because it enhances the MySQL database application with a more user-friendly interface. It offers a comprehensive set of tools that meet the requirements for database planning. In addition, XAMPP is a free application.

HTML (Hypertext Markup Language)

HTML is a framework used to structure documents with tags that define how content should be presented and how different sections of a document are interconnected. HTML enables the creation of client-server, multimedia, form-based, and interactive applications. Technically, HTML is a plain text format written in ASCII and is designed to be platform-independent. It is defined as a subset of SGML (Standard Generalized Markup Language). An HTML file can be considered a representation of an SGML document. SGML originated from GML (Generalized Markup Language), which was developed by IBM in the late 1960s as a solution to document formatting and exchange issues across different computer systems Arif & Yunizar, 2020).

MySQL

MySQL is a relational database management system (RDBMS) that contains one or more tables. Each table is composed of rows and columns, where each row represents a data entry and each column represents an attribute of that data. PHP provides functionality to interact with MySQL databases, including features for managing connections, data retrieval, and the separation or integration of data across MySQL servers to support efficient data processing (Yandri, 2022).

3. METHOD

Conceptual Framework

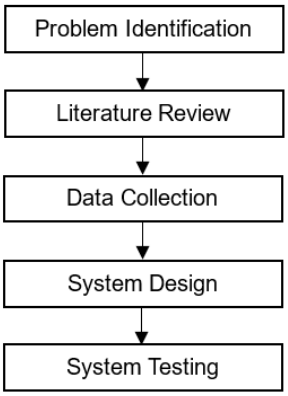

Figure 1. Conceptual Framework

Research Methodology

This study adopts the Waterfall method, a sequential and systematic approach to system development. The Waterfall model is selected because it enables the researcher to progress through each phase in a structured and orderly manner. In this method, each phase must be completed thoroughly before proceeding to the next stage, ensuring that all requirements and deliverables are properly addressed at each level (Aufa & Rohaini, 2024).

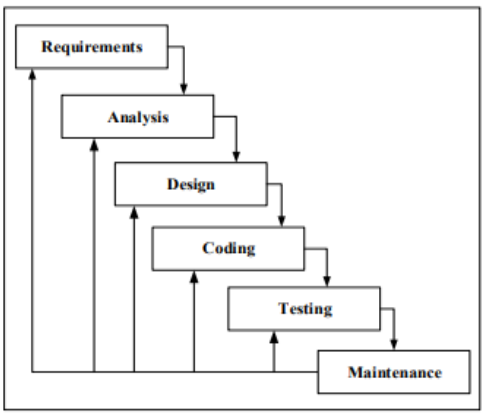

Figure 2. Waterfall Method Source: (Aufa & Rohaini, 2024).

Requirement

The first phase involves data collection, where the researchers gather information through interviews with the Head of Sibetan Village and a literature review. The discussions and interviews revealed that the limited use of technology in Sibetan Village has led to issues being addressed slowly, as information is primarily communicated through word of mouth.

Analysis

The collected information is subsequently processed and analyzed to identify the problems or user needs related to the software that will be developed(Juarsyah & Mulyono, 2021). This web-based community complaint system enables residents of Sibetan Village to report issues more easily and efficiently, while also expediting the response of the village authorities in addressing these issues (Juarsyah & Mulyono, 2021).

Design

This phase involves designing a model or system architecture based on the user's requirements. The resulting design is a user interface (UI) prototype aimed at providing a clearer understanding of the system's functionality. The UI design serves as a visual representation that facilitates a comprehensive grasp of how the system operates, as outlined below:

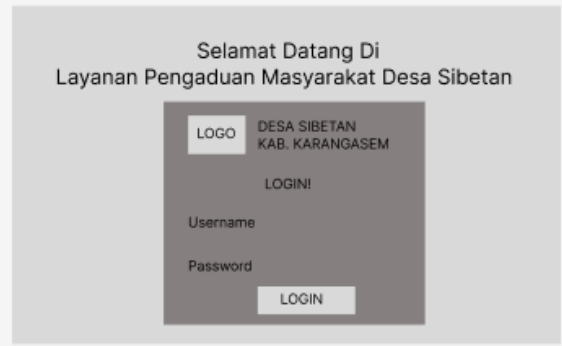

Figure 3. Login Page Design

Figure 4. Admin Dashboard Design

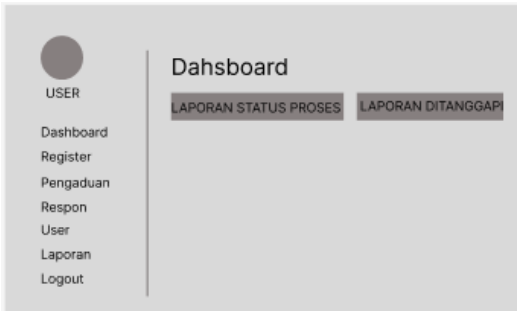

Figure 5. Officer Dashboard Design

Figure 6. Public Dashboard Design

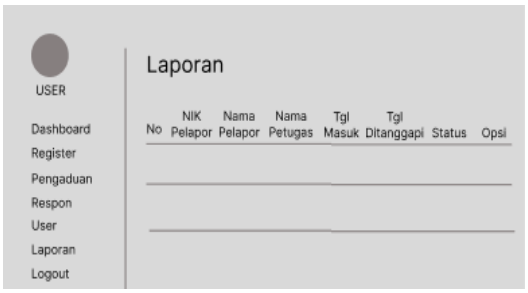

Figure 7. Daily Complaint Report Design

Figure 8. Response Page Design

Coding

The coding phase involves the development of a system tailored to meet user requirements through the use of appropriate software tools. In this study, the system developed to support the planning of a Community Complaint Data Framework for Sibetan Village utilizes the following components:

- A web browser (e.g., Google Chrome, Mozilla Firefox, Opera) for accessing the application interface.
- XAMPP as a standalone local server environment (localhost).
- MySQL as the database server and Apache as the web server.
- PHP, HTML, CSS, and JavaScript as the primary web programming languages.

This combination of tools and technologies was selected to ensure efficient development, deployment, and accessibility of the system within the target environment.

Testing

This phase involves the implementation of the planned design, specifically by preparing the system for deployment. The design and implementation strategies are developed to ensure that the system framework operates as intended.The primary objective of the testing process is to verify that the system meets the predefined specifications and user requirements. This is achieved by evaluating the system's functionality, the accuracy of the information presented, and the overall performance of the final product.

Maintenance

This phase enables continuous development by initiating an analysis of the existing system specifications to update and enhance the software. The goal is to improve both the efficiency and effectiveness of the system over time. Through regular maintenance activities, the system can adapt to evolving user needs, address potential issues, and incorporate technological advancements, thereby ensuring sustained system performance and reliability(Badrul, 2021).

4. RESULT AND DISCUSSION

The implementation results of the proposed community complaint information system for Sibetan Village are presented in the figures below. These figures illustrate how the system design has been realized into a functional application, demonstrating the interface and features developed based on the specified requirements.

Main Page

When accessing the system, users are directed to the main login page, where they are required to enter their username and password. This page serves as the initial entry point for different user roles.

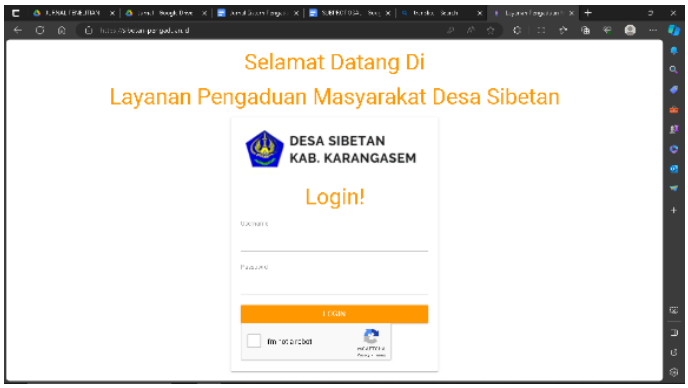

Figure 9. Login Page for Admin, Officer, and Public Users

Admin Dashboard

On the admin dashboard, administrators can view the total number of reports submitted and the number of reports that have been resolved. This dashboard provides a quick overview of the system's status and facilitates efficient management of complaint data.

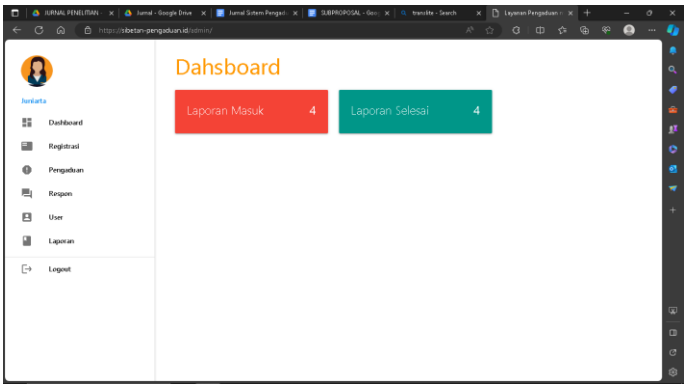

Figure 10. Admin Dashboard

Officer Dashboard

The officer dashboard allows designated staff to monitor reports that are in progress as well as those that have already been addressed. This view helps officers track and manage complaint handling effectively.

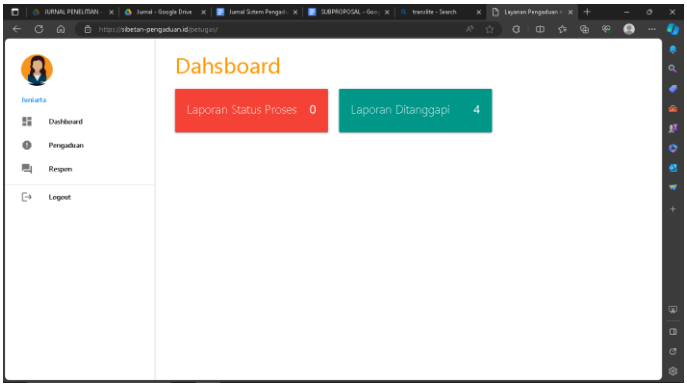

Figure 11. Officer Dashboard

Public User Dashboard

On this page, members of the public can submit complaints or reports related to village issues, optionally including supporting evidence. The dashboard also displays a list of all reports that have been submitted to the system, providing transparency and tracking capabilities for users.

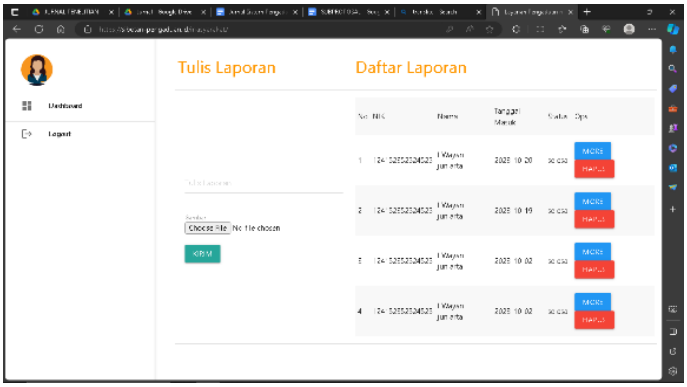

Figure 12. Public Dashboard Display

Daily Complaint Data

This page displays daily complaint data that has been submitted to the system and subsequently responded to. It allows administrators and officers to monitor the volume and status of complaints on a daily basis, supporting effective tracking and response management.

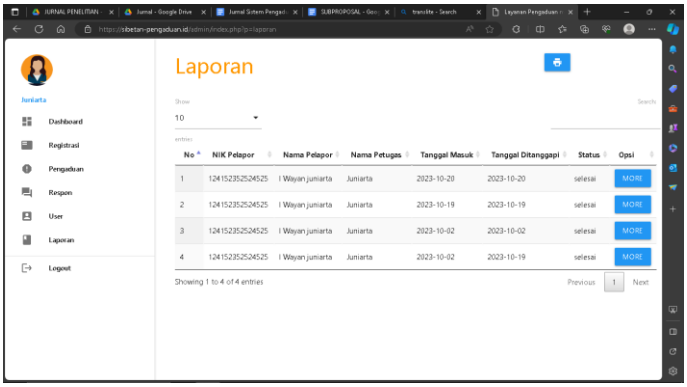

Figure 13. Daily Complaint Data Display

Response Data Display

This page presents data on complaints that have already been addressed. It provides an overview of the responses given, enabling users to review how each complaint has been handled.

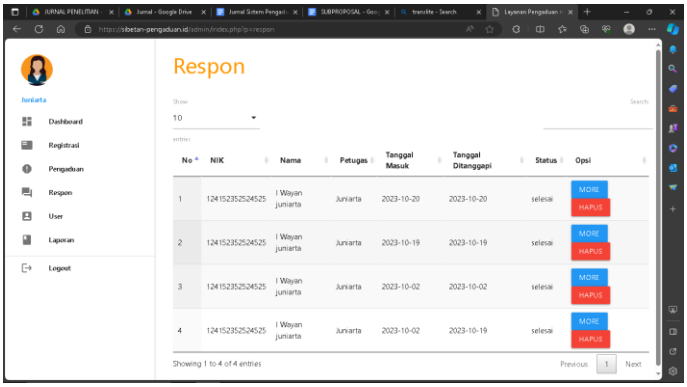

Figure 14. Response Data Display

5. CONCLUSION

Based on the results of this study, which employed the Waterfall method, the Community Complaint Information System for Sibetan Village, Karangasem, was successfully developed in accordance with the initial design specifications. The system can be utilized in a computerized manner by both village officials and the local community. The implementation of this system enables Sibetan Village to address public issues more quickly and effectively, thereby enhancing overall community satisfaction.

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