

Development of a Web-Based Information System for Community Aspirations and Complaints in Bungatan Village, Bungatan District, Situbondo Regency

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Abstract: Web-based information systems can support the management of public services by providing more structured access to information and reports. This study aims to design and implement a web-based Community Aspiration and Complaint Information System in Bungatan Village, Bungatan District, Situbondo Regency. The existing process for submitting aspirations and complaints was still conducted manually through face-to-face communication or messaging applications, resulting in less structured data management and limited transparency in report monitoring. Data were collected through observation, interviews, documentation, and literature studies. System development followed the Waterfall method, consisting of requirements analysis, system design, implementation, testing, deployment, and maintenance. The system was developed using the CodeIgniter 4 framework with PHP and MySQL. The results show that the system enables the community to submit aspirations and complaints online and monitor report statuses through the website. Black-box testing was conducted on six main features: registration, login, complaint submission, aspiration submission, complaint management, and report status monitoring. All tested features functioned as expected based on the defined test scenarios. The system also provides centralized data storage and structured report management, supporting the administration of community aspirations and complaints in Bungatan Village.

Keywords: Web-based Information System; Public Service; Community Complaints; Waterfall method; CodeIgniter 4.

1. Introduction

Information technology has become increasingly relevant to public service delivery because it can support the management, storage, and distribution of service-related information. In public services, information systems can be used not only to provide information to the community but also to organize service processes and administrative data. Web-based information systems are one approach that can support these activities by allowing information and service processes to be accessed through a single platform. In addition, data submitted through the system can be stored in a structured database, making it easier for service providers to manage and retrieve information when needed.

Community aspirations and complaints are important forms of communication between the community and government. Through these services, people can submit criticisms, suggestions, and reports concerning public services and conditions in their surrounding environment (Fahrurrozi & SN, 2021; Wibowo & Firmansyah, 2020). Proper management of aspirations and complaints is needed so that submitted reports can be recorded, reviewed, followed up, and monitored. A well-organized complaint management process can also support government agencies in responding to reports and providing information about the progress of submitted complaints.

In Bungatan Village, Bungatan District, Situbondo Regency, the management of community aspirations and complaints was still conducted manually. Reports were generally submitted directly to village officials or through messaging applications such as WhatsApp. This process created several problems in managing report data, including incomplete documentation, difficulties in searching for report archives, delays in handling complaints, and limited transparency regarding the status of submitted reports. The community also had limited access to information about the progress of their complaints because the monitoring process could not be performed through a centralized system. These conditions indicate the need for a system that can organize report submission and management while providing access to information about report status.

A web-based information system can provide a means of organizing these processes in a more structured manner. Previous research has reported that web-based community service applications can support data management and access to public services (Iskandar & Saputra, 2022). Other studies have also discussed the use of web-based information systems to support more effective administration and public complaint management (Arundaa *et al.*, 2023; Setiawan & Putra, 2021). In a web-based system, community members can submit complaints and aspirations through the website, while village officials can manage submitted reports through the same system. The system can also provide functions for verifying complaints, managing report data, and displaying report status to the community. These functions are relevant to the conditions in Bungatan Village because the existing process does not yet provide centralized data management and direct access to report status information.

Several previous studies have examined the development of web-based systems for public services and complaint management. Fahrurrozi and SN (2021) reported that a web-based public service information system can support the management of public service data. Setiawan and Putra (2021) developed a web-based public complaint information system that supports more structured complaint management than manual processes. Arundaa *et al.* (2023) examined web-based information systems for administrative services, while other studies have discussed digital public service systems in government environments. However, the previous studies cited in this research differ in their application context and system features. Some focus on city-level government agencies, schools, or specific institutions, while the application of a system specifically designed for community aspirations and complaints in a village government environment remains limited. In addition, some systems focus primarily on report submission and do not provide report status monitoring and centralized management between community users and village administrators. The research gap identified from these studies provides a basis for developing a system that combines report submission, report management, and status monitoring within the village government context.

Based on these conditions, this study aims to design and develop a web-based Community Aspiration and Complaint Information System in Bungatan Village, Bungatan District, Situbondo Regency, using the CodeIgniter 4 framework and MySQL database. The system is designed to provide an online channel for submitting community aspirations and complaints and to support village officials in managing the submitted reports. The system also provides report status monitoring so that community members can access information about the progress of their submissions through the website. By providing these functions within a single system, the study addresses the problems of manual report submission, unstructured data management, and limited report monitoring identified in the existing service process.

2. Related Work

2.1 Web-Based Community Service Information System

Previous studies have examined the use of web-based information systems to support public service delivery and report management. Fahrurrozi and SN (2021) reported that a web-based community service information system can support service processes by storing service-related data digitally and organizing public reports more systematically. Their findings indicate that digital data management can provide an alternative to manual processes in public service administration. Setiawan and Putra (2021) developed a web-based public complaint information system using the CodeIgniter framework. Their study focused on supporting the management of public complaints and making complaint data easier to search. However, the system described in their study focused primarily on complaint submission and management and did not provide a report status monitoring feature for the public. This difference is relevant to the present study because access to report

status information is one of the problems identified in the existing complaint service process in Bungatan Village. Arundaa *et al.* (2023) examined the implementation of web-based information systems in administrative services. Their study reported that web-based information systems can support more integrated data management in administrative processes. However, the focus was on general administrative services rather than the management of community aspirations and complaints in a village government environment. The reviewed studies indicate that web-based information systems have been applied to support public service and complaint management. However, the studies reviewed here differ in their institutional contexts and system functions. The existing studies include applications for general public services and administrative institutions, while the present study focuses specifically on community aspirations and complaints within a village government environment. In addition, the proposed system combines online report submission, report management, and report status monitoring in a single platform. These features are intended to address the problems of unstructured report documentation and limited access to report progress identified in Bungatan Village.

2.2 Community Complaints and Aspirations Information System

A community aspiration and complaint information system is a digital system that supports the submission and management of criticisms, suggestions, and reports concerning public services. Hidayat and Kurniawan (2023) discussed the use of a website-based public complaint information system to support the submission and management of public reports. The use of a centralized database can provide a structured means of storing and managing submitted reports. Web-based complaint systems can also provide functions for monitoring submitted reports. Setiawan and Putra (2021) reported that a web-based complaint system can support the management of public reports and make complaint information easier to manage. The availability of report status information can also provide users with access to the progress of their submissions. However, the specific implementation and scope of these features depend on the system developed in each study. In the present study, the Community Aspiration and Complaint Information System is designed as a multi-user application involving community users, field administrators, and super administrators. Each role is assigned different access rights according to its function in the management of community reports. The community can submit aspirations and complaints, while administrators manage the submitted data and report status. This role-based structure is intended to organize the interaction between community users and village administrators within a single system.

2.3 Waterfall Method in System Development

The Waterfall method is a sequential software development approach in which system development proceeds through defined stages. Each stage is completed before the development process moves to the next stage, allowing the development activities to follow a structured sequence (Saputra & Wahyudi, 2022). This approach also provides a clear basis for documenting the activities and outputs of each development stage. The stages applied in this study consist of requirements analysis, system design, implementation, testing, deployment, and maintenance. The requirements analysis stage identifies the needs of the community and village administrators, while the design stage defines the system structure, database, interface, and system models. Implementation converts the design into a working web application, followed by testing to examine whether the developed functions operate according to the defined requirements. Deployment places the system in its operational environment, while maintenance addresses errors and future system requirements. The Waterfall method was selected because the system requirements identified at the beginning of the study provided a defined basis for the sequential development process. The method therefore provides a structured sequence for developing the Community Aspiration and Complaint Information System, from requirements identification through system testing and deployment. The detailed implementation of each stage is described in the Methodology section.

3. Methodology

This study uses the Waterfall method as the system development model. The method follows a sequential development process in which each stage is completed before proceeding to the next stage. This approach provides a structured sequence for system development and supports documentation and evaluation at each stage (Mudassar & Khan, 2021). The Waterfall method was selected because the system requirements identified during the initial analysis provided a defined basis for developing the system from requirements analysis through testing (Saputra & Wahyudi, 2022). Data were collected through observation, interviews, documentation, and literature review. Observation was conducted in Bungatan Village, Bungatan District, Situbondo Regency, to identify the existing process for managing community aspirations and complaints. Interviews were conducted with village officials and community members to obtain information about the

existing complaint service process and its limitations. Documentation was used to collect relevant information related to the existing service process, while the literature review examined journals, books, and previous studies related to web-based public service information systems. The study involved 3 village officials and 5 community members from Bungatan Village. The information obtained from these participants was used to identify system requirements and provide a basis for designing the functions of the proposed system. The system development stages using the Waterfall method consisted of requirements analysis, system design, implementation, testing, deployment, and maintenance.

3.1 Requirements Analysis

The requirements analysis stage was conducted to identify the functional needs of the system based on observations, interviews, documentation, and literature review. The analysis focused on the existing process for managing community aspirations and complaints, which was still conducted manually. Several problems were identified, including poorly documented report data, difficulties in retrieving report archives, delays in report handling, and limited transparency regarding complaint status. The identified problems were then used to determine the functions required in the proposed system. These functions include user registration and login, submission of complaints and aspirations, complaint data management, and report status monitoring. Requirements analysis provides a basis for determining the functions that need to be implemented so that the developed system corresponds to the operational needs identified during the study (Pujiono *et al.*, 2025).

3.2 System Design

The system design stage was conducted to define the structure and functions of the proposed system. The design included the database structure, user interface, and system modeling using Unified Modeling Language (UML). The UML models used in this study consisted of a use case diagram, activity diagram, and sequence diagram. The use case diagram represents the interactions between system actors and the system. The proposed system includes three user roles: community members, field administrators, and super administrators. Each role has different functions and access rights according to its responsibilities in managing community aspirations and complaints. The use case diagram was used to identify the functional requirements associated with each actor (Taufan *et al.*, 2022; Putri *et al.*, 2024).

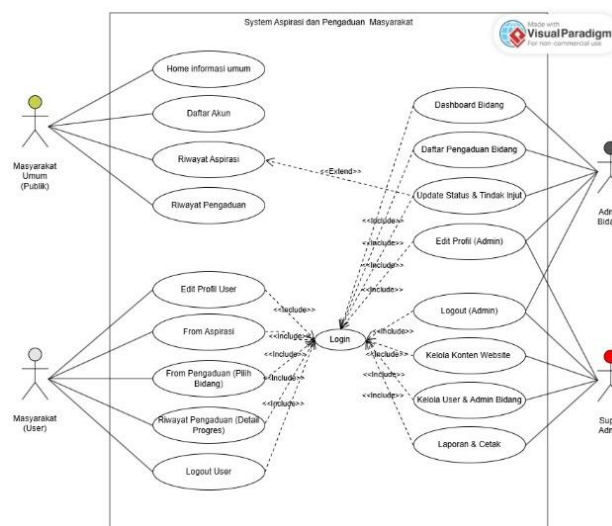


Figure 1. Use Case Diagram

The activity diagram illustrates the flow of activities performed by users during the use of the system. The diagram describes the main processes, including login, submission of complaints and aspirations, management of submitted reports, and follow-up of reports by field administrators. Activity diagrams can be used to represent the sequence of activities in a system and support the analysis of system processes (Pratama & Wijaya, 2022; Harlina *et al.*, 2025).

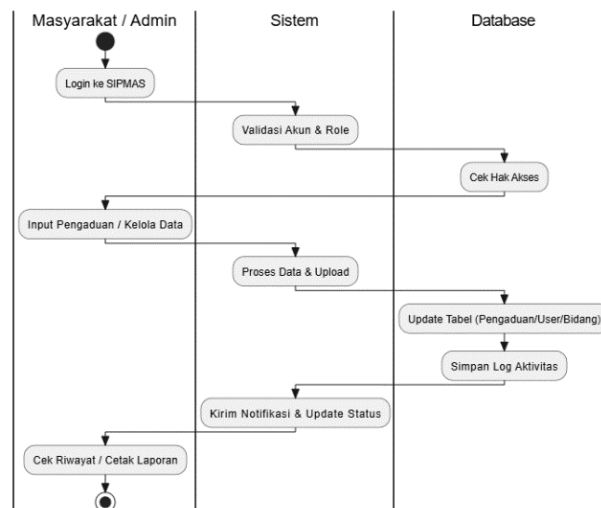


Figure 2. Activity Diagram

The sequence diagram represents the sequence of interactions among users, the system, and the database during the processing of community complaints and aspirations. The diagram describes how requests and responses are exchanged between the actors and system components during the relevant processes (Nugraha *et al.*, 2023).

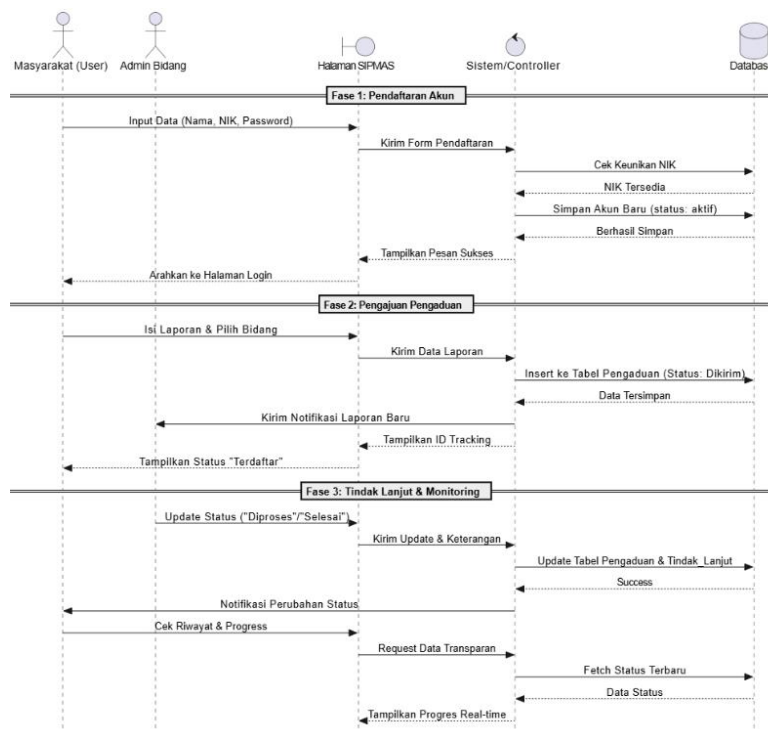


Figure 3. Sequence Diagram

3.3 Implementation

During the implementation stage, the system design was translated into a web-based application using the CodeIgniter 4 framework, PHP programming language, and MySQL database. The system was designed as a multi-user application in which each user role has different access rights according to its functions and responsibilities.

3.4 Testing

The testing stage was conducted using black-box testing to examine whether the implemented functions operated according to the defined requirements. Six main features were tested: registration, login, complaint submission, aspiration submission, report status monitoring, and complaint data management. Testing involved the system administrator and users consisting of village officials and community members. Each feature was tested by providing the required input and comparing the actual system output with the expected result. A test case was considered successful when the actual output corresponded to the expected result and

no functional error occurred during the test. Based on the testing procedure, six main test cases were used, representing the six main system features. The test cases covered registration, login, complaint submission, aspiration submission, report status monitoring, and complaint data management. Each test case was evaluated based on whether the corresponding function produced the expected output.

3.5 Deployment

The deployment stage involved preparing and applying the developed system in its intended environment so that it could be accessed by community members and village officials for managing aspirations and complaints. The deployed system provides an online channel for submitting reports and supports village officials in managing submitted data and report statuses. This stage also ensures that the implemented functions can be accessed and operated according to the requirements identified during the development process.

3.6 Evaluation and Validation Scheme

Model performance was measured using accuracy, precision, recall, and F1-score. ROC curve and AUC analysis was incorporated using the One-vs-Rest (OvR) approach for multi-class AUC calculation, with the Precision-Recall curve employed as a supplementary evaluation instrument — particularly relevant in security contexts where the cost of false negatives is asymmetric. A 5-Fold Cross-Validation scheme was applied to ensure generalization capability and freedom from overfitting, with sequential execution adopted to maintain memory efficiency without compromising validation integrity.

3.7 Maintenance

The maintenance stage is intended to maintain the operation of the system after deployment by addressing errors and making adjustments when additional system requirements are identified. Maintenance may include correcting functional errors, updating system components, and adjusting existing features according to future requirements (Tjahjanto *et al.*, 2022). In this study, maintenance is described as part of the Waterfall development process to support the continued use of the system after deployment. Specific maintenance activities performed after system deployment were not quantitatively documented in this study.

4. Result and Discussion

4.1 Results

The research resulted in a web-based Community Aspiration and Complaint Information System for Bungatan Village, Bungatan District, Situbondo Regency. The system provides functions for community members to submit complaints and aspirations and for village administrators to manage submitted reports according to their respective access rights. The results presented in this section include the implementation of the system, functional testing using black-box testing, and a comparison between the previous manual service process and the web-based system. The developed system applies a multi-user concept involving community members, field administrators, and super administrators.

4.1.1 Implementation Results

The implementation resulted in a web-based Community Aspiration and Complaint Information System. The system uses a MySQL database to store and manage user, complaint, aspiration, and service-related data in a structured manner (Stephanus Suwita *et al.*, 2023). The system also applies role-based access for community members, field administrators, and super administrators so that each user can access functions according to their responsibilities (Lestari *et al.*, 2025). The login page is used to authenticate users before they access the system. Users enter their registered email address and password, after which the system validates the credentials and provides access according to the user's role. The registration page allows community members to create an account before using the aspiration and complaint services. Users are required to enter identity information, including full name, email address, phone number, address, and password. After successful registration, users can log in and access the available system functions.

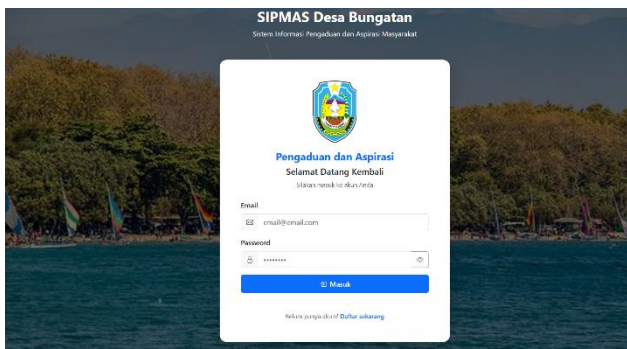


Figure 7. Login Page

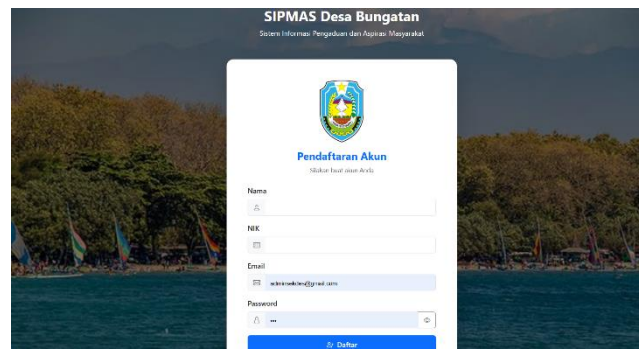


Figure 8. Registration Page

Figure 7 shows the login page used to authenticate registered users before accessing the system. The page provides fields for entering an email address and password. Figure 8 shows the registration page used by community members to create an account. The page contains fields for entering the required user identity and account information. The dashboard is the main page displayed after a successful login. The information and functions displayed on the dashboard depend on the user's access rights. The dashboard provides access to complaint reports, aspiration data, report status, and relevant data management functions. The complaints page allows community members to submit complaint reports through the website. Users can enter the report title, complaint category, description, incident location, and supporting photographs. The submitted complaint data are stored in the database and made available to the field administrator for further processing.

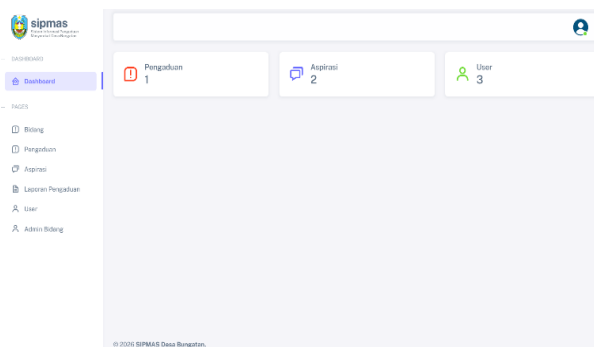


Figure 9. Dashboard Page

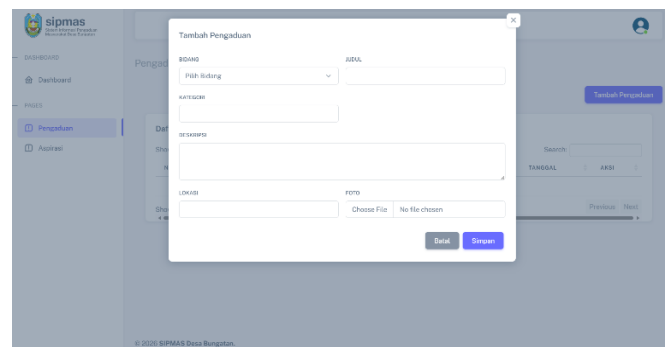


Figure 10. Complaints Page

Figure 9 shows the main dashboard after a successful login. The displayed information and menu options are adjusted according to the user's access rights. Figure 10 shows the complaint submission page where community members can enter the required report information and upload supporting photographs. The aspirations page allows community members to submit criticisms, suggestions, and other forms of input to the village government. The submitted aspiration data are stored in the database and can be managed by the field administrator. The complaint history page displays submitted reports and their current status, such as pending, processed, and completed. This function allows community members to check the status of their submitted reports through the website.

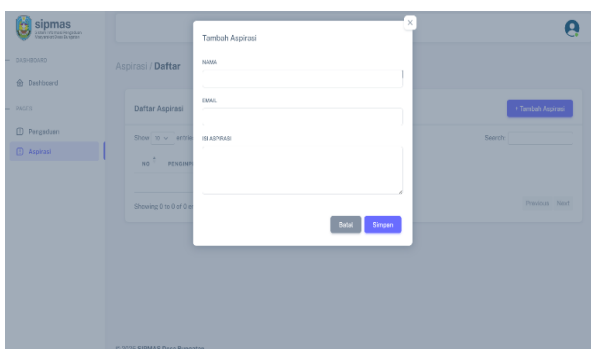


Figure 11. Aspirations Page

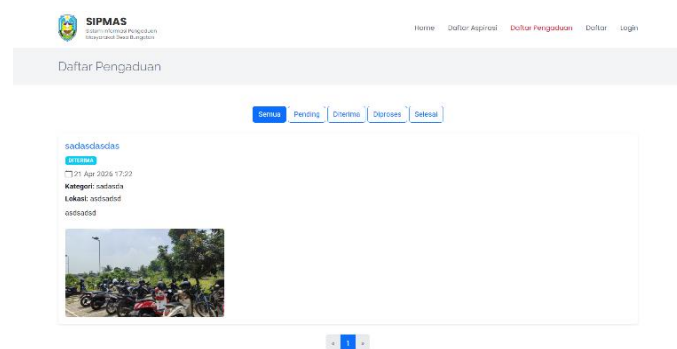


Figure 12. Complaint History Page

Figure 11 shows the aspiration submission page used by community members to provide criticisms, suggestions, and other input to the village government. Figure 12 shows the complaint history page containing submitted reports and their current status, allowing users to check the progress of their reports. The data

management page is used by field administrators and super administrators to manage user data, complaint data, aspiration data, and service categories. The data are stored in a centralized database, allowing administrators to manage and retrieve the information through the system.

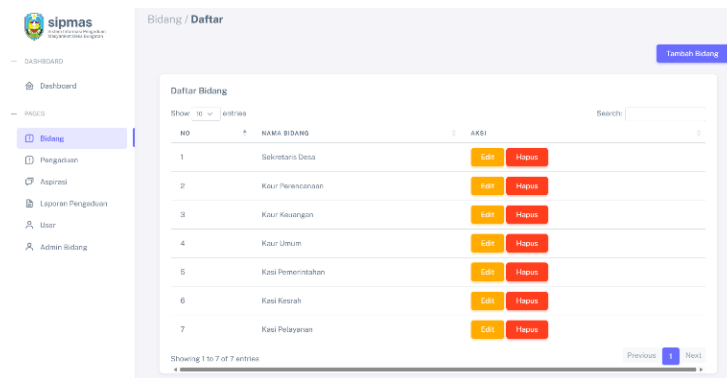


Figure 13. Data Management Page

Figure 13 shows the data management page used by administrators to manage user, complaint, aspiration, and service category data according to their respective access rights. The implementation provides an online alternative to the previous manual process, in which community members submitted reports directly to the village office or through WhatsApp. In the web-based system, complaints and aspirations are submitted through dedicated forms and stored in the database. This arrangement provides a more structured mechanism for storing and managing reports than the previous manual process.

4.1.2 Test Results

System testing was conducted using black-box testing to examine whether the main functions operated according to the predefined requirements. Six main features were tested: registration, login, complaint submission, aspiration submission, complaint management, and report status monitoring. The testing involved 8 participants consisting of 3 village officials and 5 community members as system users. The black-box testing focused on the functional behavior of the system without examining its source code. The tested parameters included input validation, user authentication, storage of complaint and aspiration data, administrator data management, and report status monitoring. Each feature was evaluated using a predefined test scenario. A test case was considered successful when the actual system output corresponded to the expected result.

Table 1. System Test Results

Yes	System Features	Testing Scenarios	Expected Results	Status
1	Registration	User fills out the registration form	Account created successfully	Successful
2	Login	The user enters the email and password	System displays dashboards	Successful
3	Complaints	User sends complaint data	Saved complaint data	Successful
4	Aspirations	Users send aspiration data	Aspiration data stored	Successful
5	Complaint Management	Admin manages complaints	Data processed successfully	Successful
6	Report Status	System displays report status	Status of showing up as per process	Successful

Based on Table 1, all six tested scenarios produced successful results. The registration function successfully created user accounts, while the login function authenticated users and provided access according to their roles. The complaint and aspiration functions successfully stored submitted data in the database. The complaint management function allowed administrators to process submitted reports, while the report status function displayed the status of submitted reports through the system. The black-box testing results indicate that the six tested functions operated according to their predefined scenarios. Therefore, the developed system met the functional requirements represented by the tested cases. However, the testing results do not provide quantitative evidence regarding service response time, usability, or user satisfaction.

4.1.3 Comparison of Manual and Web-Based Services

Before the implementation of the proposed system, community members submitted complaints and aspirations directly to the village office or through WhatsApp. Report data were therefore managed through a

combination of direct communication and manual records. The web-based system provides an alternative process in which reports can be submitted through an online form and stored in a centralized database.

Table 2. Comparison of Manual and Web-Based Services

Aspects	Manual System	Web-Based System
Submission of Complaints	Face-to-face and WhatsApp	Online through the website
Data Storage	Manual archive	Centralized database
Monitoring Status	Difficult to monitor	Real-time
Data Management	Unstructured	Integrated
Time Efficiency	Less efficient	Faster
Transparency	Low	More transparent

The comparison shows differences between the previous manual process and the proposed web-based process. In the manual process, users needed to visit the village office or contact village officials through a messaging application to submit reports. In the proposed system, complaints and aspirations can be submitted through dedicated online forms, while the submitted data are stored in the database. The centralized storage also provides a structured mechanism for administrators to manage and retrieve complaint and aspiration data. In addition, users can check the status of their submitted reports through the website without having to contact village officials directly. This comparison describes differences in the service process and system functions. It should not be interpreted as a quantitative measurement of service performance because this study did not measure response time, processing time, or user satisfaction before and after implementation.

4.2 Discussion

The results indicate that the developed system provides an online mechanism for submitting and managing community aspirations and complaints in Bungatan Village. The system combines report submission, data storage, report management, and status monitoring within a single web-based application. This arrangement addresses several limitations of the previous manual process, particularly the separation of report submission and data management.

The findings are consistent with Fahrurrozi and SN (2021), who reported that web-based public service information systems can support more structured management of public service data, and with Setiawan and Putra (2021), whose study developed a web-based complaint information system to support the management of public reports. The present system differs from the reviewed studies in its focus on community aspirations and complaints in a village government environment, and it provides separate access roles for community members, field administrators, and super administrators, allowing the functions available to each user to be adjusted according to their responsibilities in the service process. Within this arrangement, the report status function provides community members with access to information about the progress of their submitted reports through the website, addressing the limitation of the previous manual process, in which users had limited access to information about the progress of submitted complaints. However, the study does not quantitatively measure whether this function reduces response time or increases user satisfaction.

The use of CodeIgniter 4 provides an MVC-based application structure that separates the model, view, and controller components, supporting the organization of application components and routing within the developed system (Hakim, 2018; Supono & Putratama, 2018). The present study did not conduct a dedicated security evaluation, so the results should not be interpreted as evidence of improved system security. The black-box testing results show that all six tested system functions produced successful results according to the predefined test scenarios, indicating that the tested functional requirements were implemented successfully. However, the results do not establish that the system operates faster or is more effective in quantitative terms because no measurements of processing time, response time, or user satisfaction were conducted.

This study has several limitations. The system is currently focused on web-based services and does not provide a dedicated Android application, and it does not include automatic notifications through email or WhatsApp for informing users about changes in report status. In addition, the evaluation was limited to functional black-box testing and did not include quantitative measurements of service performance, usability, or user satisfaction, while the number of participants involved in the system testing was limited to eight. Future studies can evaluate the system with a larger number of users and include usability, satisfaction, response-time, and notification evaluations.

5. Conclusion and Recommendations

Based on the results of the research, the web-based Community Aspiration and Complaint Information System for Bungatan Village, Bungatan District, Situbondo Regency was successfully designed and developed

using the CodeIgniter 4 framework, PHP programming language, and MySQL database. The system provides an online mechanism for community members to submit aspirations and complaints and provides village administrators with functions for managing the submitted data. The implementation results show that the system provides a more structured mechanism for storing, managing, and retrieving complaint and aspiration data than the previous manual process, and the online report status monitoring function allows community members to check the status of their submitted reports through the website, supporting the management of community aspirations and complaints within the village government environment.

Black-box testing was conducted on six main features: registration, login, complaint submission, aspiration submission, complaint management, and report status monitoring. All six tested features produced the expected results according to the predefined test scenarios. These results indicate that the tested functional requirements were successfully implemented. However, the study did not include quantitative measurements of response time, processing time, usability, or user satisfaction; therefore, the results should not be interpreted as evidence of optimal system performance or a measured increase in service effectiveness.

For further development, the system can be extended with automatic notifications through email or WhatsApp to provide users with information about changes in report status, and an Android-based mobile application can be developed to provide an additional access platform. Further work can include a dedicated security assessment, implementation of appropriate security improvements, and automatic database backup to support data protection and system continuity. Future evaluations should also consider response time, usability, user satisfaction, and other quantitative service indicators to provide stronger evidence of the system's impact on community services.

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