

Development of The Mandangin Island Village Website As A Means of Information and A Means of Receiving Residents' Complaints

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ABSTRACT

Objective: This study aims to develop a web-based village information system for Pulau Mandangin to improve the dissemination of information and facilitate residents in submitting complaints online, addressing the long-standing challenge of ineffective communication between villagers and local authorities. **Method:** The system was designed using the CodeIgniter 4 framework due to its lightweight structure and efficiency in web application development. Key features include village profile information, historical background, vision and mission, news updates, official announcements, organizational structure, and an integrated online complaints submission module. System performance was evaluated using black box testing, and user satisfaction was assessed through a Likert-scale survey. **Results:** Black box testing confirmed that all system functionalities operated correctly and as intended. The user satisfaction survey produced a score of 77.5%, categorized as "agree," indicating a high level of acceptance and perceived usefulness among residents. **Novelty:** This research provides a practical digital solution for remote island communities with limited IT adoption, presenting an accessible and community-oriented platform that enhances transparency, communication efficiency, and public service delivery at the village level.

INTRODUCTION

Mandangin Island Village is located in Sampang Regency, East Java, and is home to approximately 21,000 people. Despite having cellular and internet coverage, information dissemination between residents and village officials is still carried out conventionally through verbal announcements or information boards. This method is considered ineffective and often leads to delays in delivering information and handling citizen complaints [1], [2].

The main problem faced is the lack of an online-based system that can accommodate complaints and convey official information from the village government. As a result, two-way communication between residents and village officials is inefficient. Based on these conditions, developing a village website was chosen as the primary solution to increase the effectiveness of information dissemination and public complaint handling. The selection of this web-based solution was based on previous research showing that implementing a website-based information system can increase transparency, efficiency, and accountability in public services at the village and government agency levels [4], [5].

Furthermore, this approach is considered most relevant to the conditions of the Mandangin Island community, which already has widespread internet access and digital devices. Through the village website, residents can obtain official information, submit

complaints, and monitor follow-up on complaints without having to visit the village office in person. Furthermore, web-based information systems can accelerate service delivery and increase public involvement in public service oversight [6].

This research used the Waterfall system development method because it has systematic stages and is easy to apply to small- to medium-scale software development projects [6]. Through sequential stages of needs analysis, design, implementation, and testing, it is hoped that the developed village information system will meet user needs and operate optimally. Thus, the development of this village website is not only a technical solution but also contributes to improving the quality of service and transparency of the Mandangin Island village government.

Mandangin Island

Mandangin Island is a village and island located in Sampang District, Sampang Regency, East Java Province. The island covers an area of approximately 90 hectares and is inhabited by approximately 21,000 people. The village is divided into three hamlets: West Hamlet, Keramat Hamlet, and Candin Hamlet. Mandangin Island is also known as a tourist destination in Sampang [1]. Based on previous research, Mandangin Island can be reached by sea using a canoe or wooden boat, with an estimated travel time of approximately 1 hour and 30 minutes [2]. These boats depart and dock at Tanglok Port, Sampang, the main transportation point to Mandangin Island. The following is an example image of Mandangin Island Village, Sampang.

Previous research also highlighted the importance of digital media design as a means of promotion and communication on Mandangin Island [4]. These research findings reinforce the view that implementing a website-based information system has significant potential to increase information dissemination, public participation, and transparency in public services. Thus, Mandangin Island serves as a relevant research context for implementing the development of a village information system that can be accessed online.

Information System

An information system is a system consisting of elements such as technology, people, procedures, and data that collaborate to collect, process, store, and disseminate information. This system is designed to assist decision-making, manage operational activities, and support analysis within an organizational entity [4].

Website

A website is a form of digital media that presents various components such as text, images, sound, and animation in an integrated manner. The combination of these elements makes a website a means of conveying information that is engaging, interactive, and easily accessible to a wide range of users. Each page on a website is generally structured as a digital document written using a markup language such as HTML (HyperText Markup Language). The process of accessing information from the website to the user is carried out through communication protocols such as HTTP or HTTPS.

Through these protocols, data is sent from the server to the user's device and displayed through a web browser application [5].

Complaints

Complaints are a means for individuals and groups to express dissatisfaction, problems, or aspirations of Mandangin Island residents regarding services, environmental conditions, or actions deemed unsatisfactory. Complaints serve as valuable input for improving the quality of public services, particularly at the village or local government level [6].

Data Flow Diagram

A Data Flow Diagram (DFD) is a diagram used to depict the flow of data within a system using specific notations. DFDs serve as a tool for modeling data-oriented systems, making it easier to understand the system's working processes in a logical, structured, and clear manner. Data Flow Diagrams are structured at several levels, including DFD Level 0, DFD Level 1, and DFD Level 2, each of which depicts the level of breakdown within the system from the most general to the most detailed [7]. DFDs depict the flow of data or information, the origin and destination of the data, and how the data is stored [17].

Use Case Diagram

A Use Case Diagram is a form of modeling that describes the behavior of an information system to be developed. A Use Case describes the interactions that occur between one or more actors and the system being designed. In other words, a Use Case is a series of interconnected interactions between actors and the system. This model is implemented through communication between the user and the system and illustrates the types of interactions that occur within the application or software. The primary purpose of a use case is to describe and define how a system interacts with external actors, such as users or other systems, in carrying out its functions [8].

Activity Diagram

An activity diagram is a visual representation of the workflow or series of activities within a system, business process, or software menu. This diagram displays the activities that occur within the system, not the actions taken by the actors [9].

Waterfall Method

The Waterfall Method is a software development method consisting of sequential stages, where each stage is interdependent and must be completed before the next stage begins [16].

RESEARCH METHOD

This study employed two main methods: the "Data Collection Method" and the "System Development Method." The Data Collection Method involved observation and interviews to obtain relevant information. Meanwhile, the System Development Method employed the "Waterfall Method" to ensure needs were met and the development process ran smoothly [10].

Data Collection Method

The data collection method in this study aimed to obtain information related to complaints from residents and the Village Head on Mandangin Island, Sampang. Data were collected through two methods: observation and interviews [11]. Observations were conducted directly by the researcher in the field to observe conditions within the village, including how information delivery and complaint management have been carried out [12]. Interviews were conducted with both residents and the village head. Through these interviews, the researcher obtained data in the form of responses, experiences, and expectations regarding the village information system and complaints in the village [13].

Waterfall Method

The author used the Waterfall method in system development. The Waterfall method is a linear or sequential system development model, where each stage must be completed before proceeding to the next stage [14]. This method consists of several main stages: "Requirements Analysis," "System Design," "System Implementation," "System Testing," and "System Maintenance" [15]. Each stage is explained in more detail in the figure below.

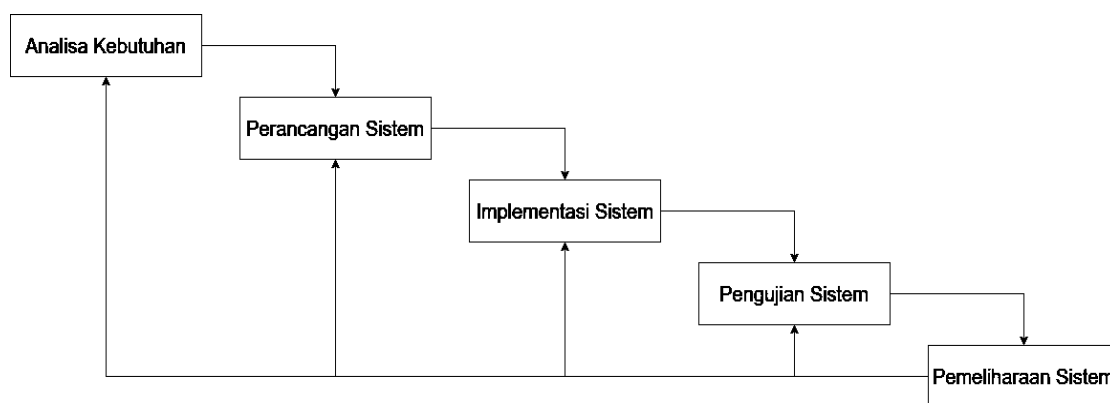


Figure 1. Waterfall Method.

Black Box Method

Testing is conducted using the black box testing method, which aims to ensure that each function in the system operates as expected based on visible inputs and outputs, without considering the program code structure.

RESULTS AND DISCUSSION

Needs Analysis

The needs analysis aims to identify and formulate the key features that must be available on the website to fulfill the desired goals and functions. Based on the system design, several key features will be developed, namely:

1) Village Location Feature (Admin)

This feature allows the admin to add and update village location information. The goal is to make it easier for website visitors to clearly identify the village's geographic location.

2) Complaints Feature (Residents and Village Head)

a) Residents can create and submit complaints regarding village issues, complete with the category, location, date, content of the complaint, and supporting evidence such as photos.

b) The Village Head can respond to incoming complaints, update the complaint status (processing or completed), and provide evidence in the form of photos or PDFs if the complaint is in the final stage. This feature supports effective two-way communication between residents and the village government.

3) Complaint Report Feature (Village Head)

This feature is used by the village head to create and manage processed complaint reports. Reports can be presented in the form of summary data, graphs, or tables to facilitate monitoring, evaluation, and documentation of complaint handling performance.

System Design

System design is the stage that aims to clearly describe the workflow and interactions between users and the system before the development process begins. At this stage, several modeling tools are used, including Use Case Diagrams and Data Flow Diagrams (DFDs), to visualize the system's functionality.

1) Use Case Diagram

Use Case Diagrams are used to model the interactions between actors (users) and the system based on available functionality. On this village website, there are three main actors: the Admin, the Village Head, and the Residents.

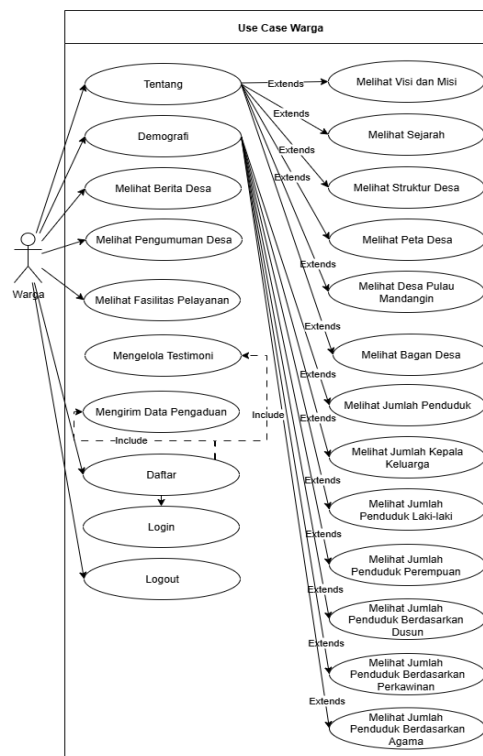


Figure 2. Resident Use Case Diagram After Logging In and After Logging In.

Residents must first register to log in to the application. If successful, they can submit complaints through the application and provide testimonials. Other menus in the application are accessible to residents even when not logged in.

The village head can log in to the application to view village structure data, village history, vision and mission, village news management, village announcement management, and village complaints management.

Admins can log in to the application to manage the village structure, history, vision and mission, village maps, testimonials, validate registered residents, manage news, manage population data, manage announcements, manage complaints, and manage service facilities.

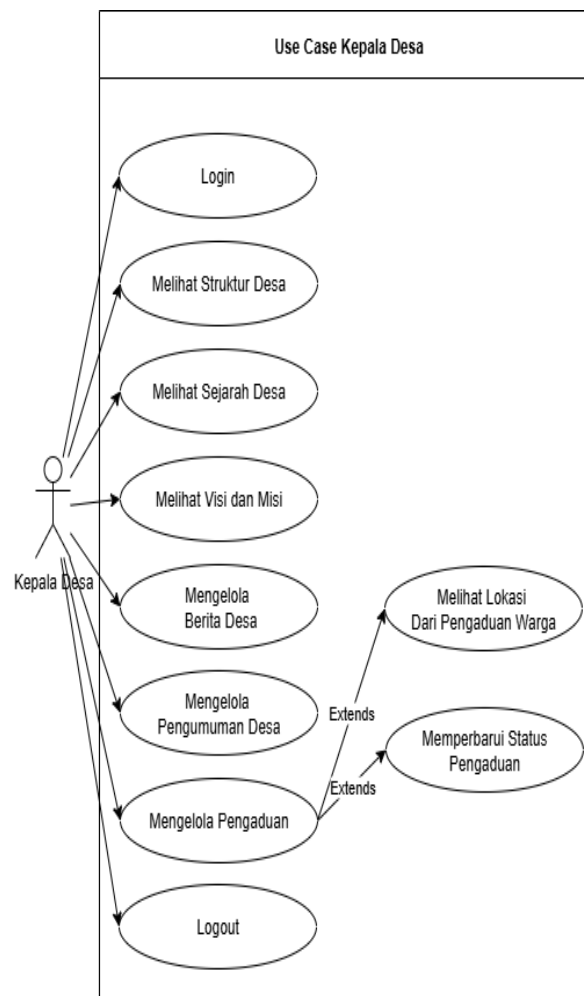


Figure 3. Village Head Use Case Diagram.

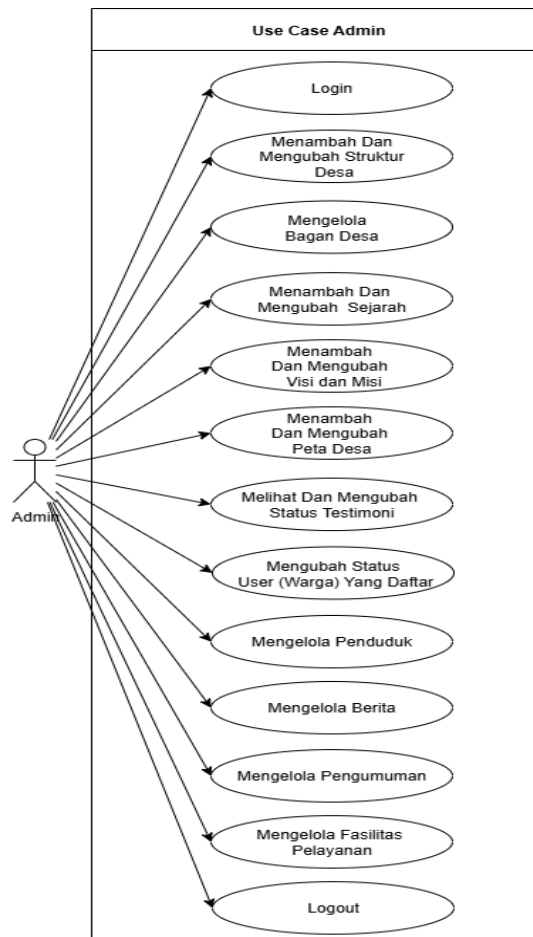


Figure 4. Admin Use Case Diagram.

Data Flow Diagram (DFD)

Data Flow Diagrams are used to illustrate data flow, processes occurring within the system, and interactions between users and the system. In this design, the DFD is explained step by step, from Level 0 to Level 1, in a single sequence to facilitate understanding.

a) Level 0 DFD

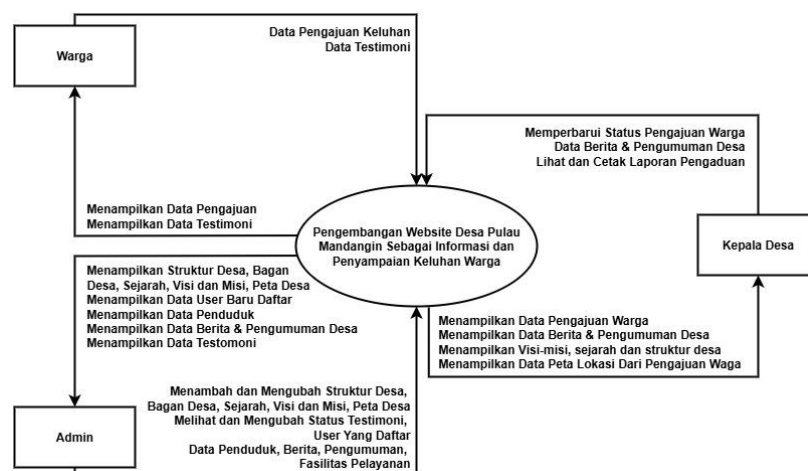


Figure 5. Level 0 DFD.

This Level 0 DFD contains three entities: residents, the village head, and the administrator. Residents can submit complaints and testimonials through the application. The village head can update the status of resident complaints, manage news and announcement data, and print complaints. The administrator can manage all features within the application.

b) Level 1 DFD: Residents

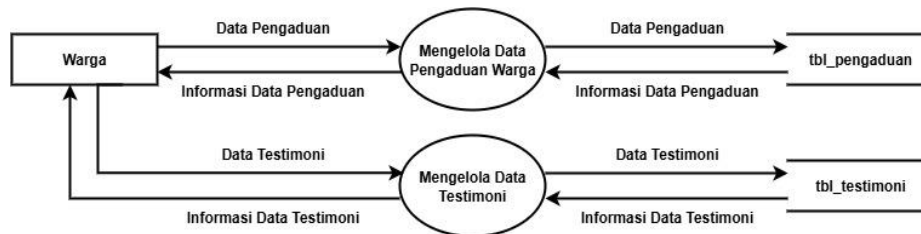


Figure 6. Level 1 DFD: Residents.

Residents can submit complaints and testimonials through the application, which will be stored in the tbl_pengaduan and tbl_testimonial tables.

c) Village Head Level 1 DFD

The Village Head can view and print reports and manage complaints in the application, which will be stored in the tbl_complaints table. The Village Head can also manage announcements and news stored in the tbl_announcements and tbl_news tables.

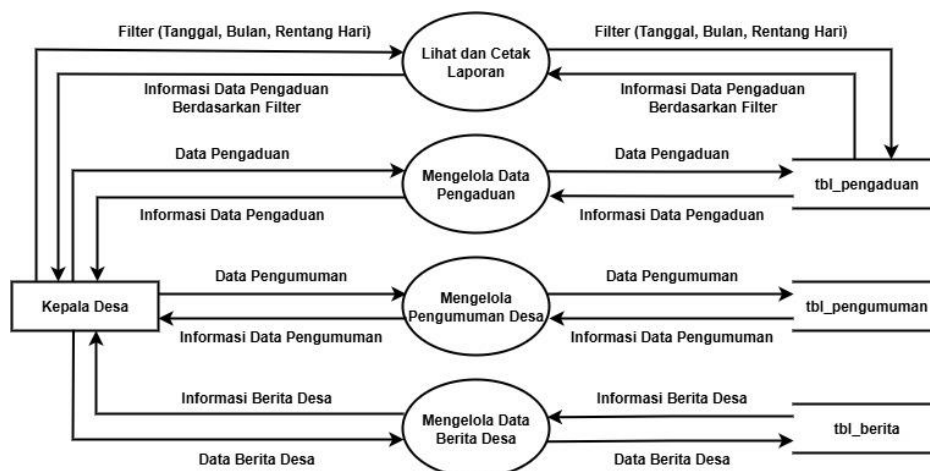


Figure 7. Village Head Level 1 DFD.

d) Admin Level 1 DFD

Admins can manage village announcement data stored in the tbl_announcements table, manage population data stored in tbl_population, manage user or resident data stored in the tbl_user table, manage news data stored in the tbl_news table, and manage service facility data stored in the tbl_service_facilities table.

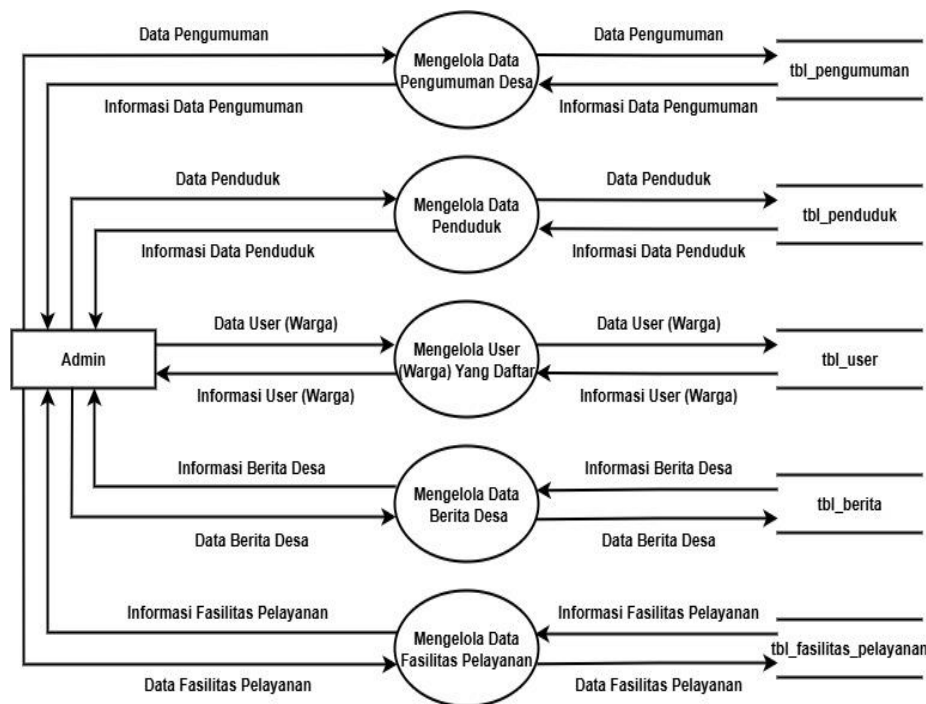


Figure 8. Admin Level 1 DFD.

System Implementation

1) Main Website Landing Page

On this page, users can view general village information, including the latest news, important announcements, and a brief village profile. The purpose of this Landing Page is to provide a quick and informative overview of activities and developments occurring in the village environment, so that the community can continue to obtain information in an up-to-date and efficient manner.

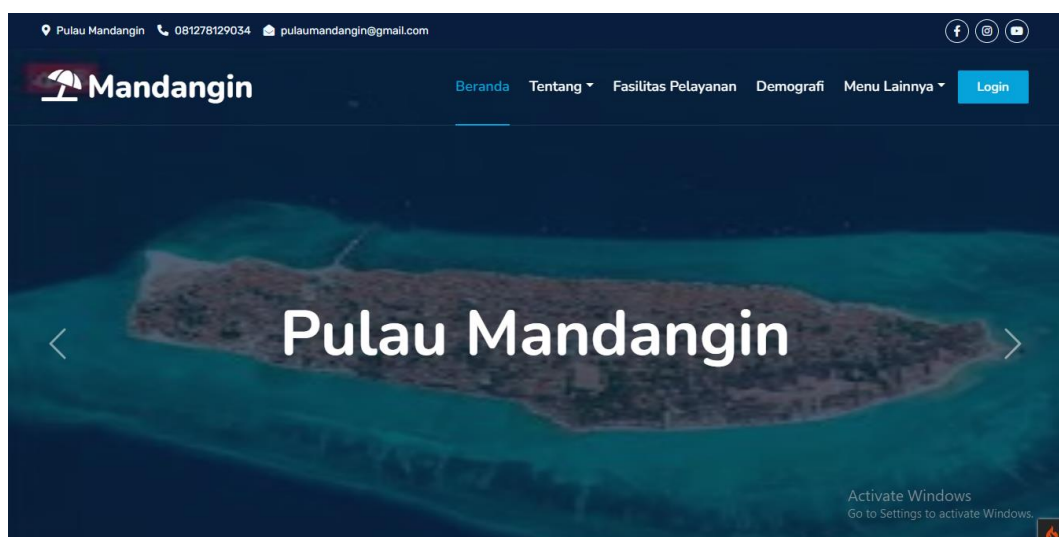


Figure 9. Main Website Landing Page.

2) Residents' Page

This page is designed for village residents who have registered and verified in the system. On this page, residents have access to submit complaints regarding issues

occurring in the village, whether regarding public services, infrastructure, or other complaints. Additionally, residents can write testimonials or provide suggestions regarding the performance of the village government or the services provided. On this page, residents can fill out complaints directly using the provided form. The form contains columns for the complaint, location, category, date, and supporting evidence such as photos or documents. Once submitted, the system will display a notification that the complaint has been successfully saved, and residents can view the status of the complaint, including whether it is still being processed or has been followed up by the village.

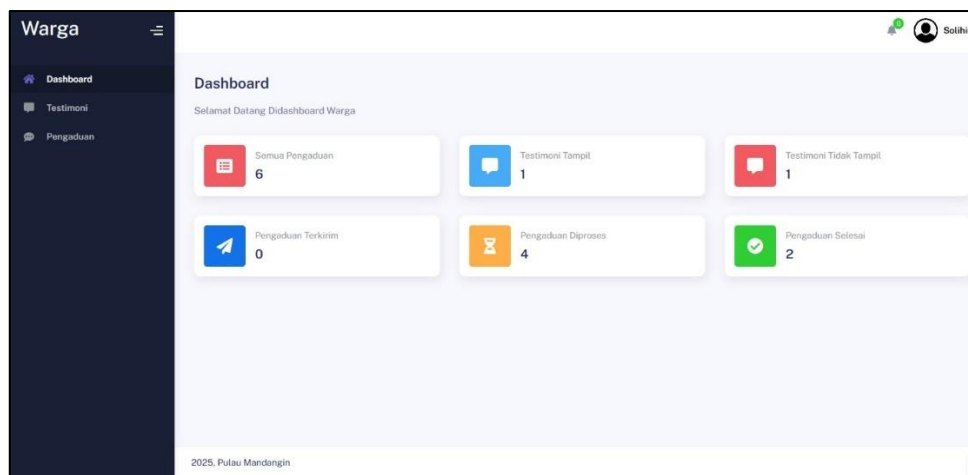


Figure 10. Residents' Page.

Village Head Page

Through this page, the village head can provide official information to residents by creating and publishing village news and announcements. Furthermore, the village head also has access to follow up on every complaint received from residents. This follow-up takes the form of status updates on complaints received, ensuring open communication between residents and the village government.

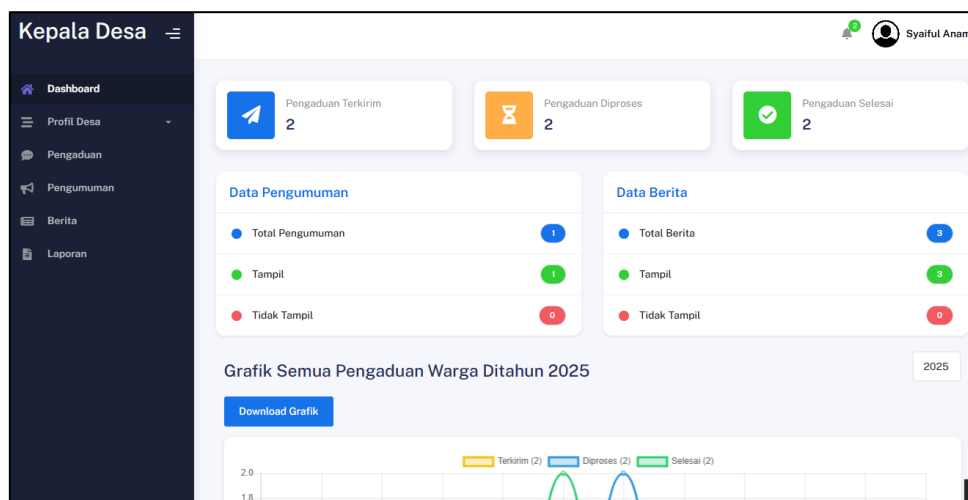


Figure 11. Village Head Page.

Admin Page

The admin page is part of the system that can only be accessed by users with the admin role. Through this page, the admin has full authority to manage all content displayed on the main website, particularly regarding the management of village news and announcements. In addition, the admin is also responsible for verifying user accounts, such as residents, and ensuring that all data and information presented is in accordance with regulations.

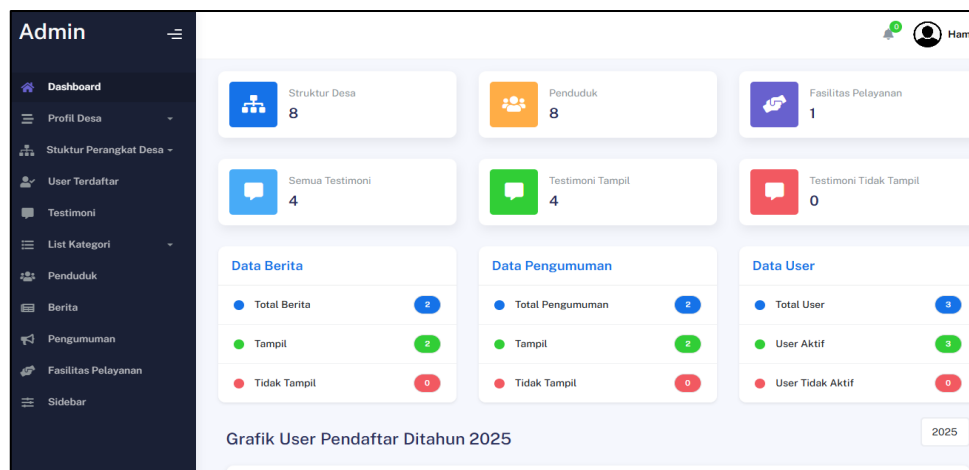


Figure 12. Admin Page.

WhatsApp Display

In the implementation of this web-based complaint system, automatic notifications via WhatsApp are used as a means of communication between residents and the village head. These notifications are sent in real time when interactions occur on the complaint feature, both when residents submit complaints and when the village head updates the complaint status.

WhatsApp Messages from Residents to the Village Head

This message is sent automatically when residents submit complaints on the village website. The message will contain important information such as the sender's name, WhatsApp number, complaint category, and the contents of the complaint. The goal is to ensure the village head is immediately aware of the report and can take follow-up action.

Figure 13 below shows an example of a WhatsApp message from a resident to the village head:



Figure 13. WhatsApp Message from a Resident to the Village Head.

WhatsApp Message from the Village Head to a Resident

This message is sent automatically when the village head updates the status of a resident's complaint through the system, for example, changing the status to "processing" or "completed." The message will contain the complaint category, content, latest status, and follow-up information. The goal is to provide residents with information on the progress of their complaint without having to open the website.

Figure 14 below shows an example of a WhatsApp message from the village head to a resident:



Figure 14. WhatsApp Message from the Village Head to a Resident.

System Testing Using the Black Box Method

The system testing used the Black Box method, the test results of which can be seen in the table below.

Table 1. Black Box Method Testing.

No	Scenario	Test Case	Expected Result	Actual Result	Conclusion
1	Successful Login	Valid username and password	System displays user dashboard	System displays user dashboard	Valid
2	Login with inactive account	Username: xxxx Password: xxxx	Error message appears: "Account has not been verified by admin"	Error message appears: "Account has not been verified by admin"	Valid
3	Citizen successfully adds a complaint	Fill complaint description, category, date, and upload file	Complaint is successfully submitted and success notification appears	Success notification appears	Valid
4	Citizen fails to add a complaint	Submit the form empty	Validation message appears stating all fields are required	Validation message appears stating all fields are required	Valid
5	Access without login	Access complaint page without logging in	Redirected to login page	Redirected to login page	Valid
6	View complaint detail	Click action button then detail	Detail info displayed including location	Detail info displayed including location	Valid
7	Update status (In Process)	Change status to 'In Process' without proof	Status updated successfully	Status updated successfully	Valid
8	Update status (Completed)	Change status to 'Completed' and upload proof	Status changed and proof required	Status changed and proof required	Valid

No	Scenario	Test Case	Expected Result	Actual Result	Conclusion
9	Failed update status	Change to 'Completed' w/out proof	System rejects and requires proof	System rejects and requires proof	Valid
10	Proof file validation	Upload invalid format	System rejects invalid format	System rejects invalid format	Valid
11	Filter by year	Select a year	Data filtered by year	Data filtered by year	Valid
12	Filter by month	Select a month	Data filtered by month	Data filtered by month	Valid
13	Filter by date range	Input start and end date	Data filtered by range	Data filtered by range	Valid
14	PDF format validation	Click download	PDF displays without auto-download	PDF displays without auto-download	Valid

Respondent Satisfaction Level Using the Likert Scale

The measurement of respondent satisfaction using the Likert scale is shown in the table below.

Table 2. Respondent Satisfaction Level Using the Likert Scale.

No	Question	SS	S	N	TS	STS
1	Is the village website interface visually appealing and comfortable to view?	5	4	1	0	0
2	Are the font type and text size easy to read?	3	5	2	0	0
3	Does the complaint feature help citizens?	4	4	2	0	0
4	Do the news & announcements provide useful info?	4	4	2	0	0
5	Does the app have good validation & secure login?	3	6	1	0	0
6	Is the password change feature secure and easy?	3	5	2	0	0

No	Question	SS	S	N	TS	STS
7	Is complaint/testimony submission simple?	2	6	2	0	0
8	Overall, is the website comfortable to use?	4	5	1	0	0

Based on the example in Table 2 above, the following conclusions can be drawn:

- 1) Is the village website interface attractive and comfortable to look at?
 Strongly Agree (SS): 5
 Agree (S): 4
 Neutral (N): 1
- 2) Are the fonts and text sizes used on the website easy for users to read?
 Strongly Agree (SS): 3
 Agree (S): 5
 Neutral (N): 2
- 3) Does the complaint feature make it easy for residents to submit complaints to the village?
 Strongly Agree (SS): 4
 Agree (S): 4
 Neutral (N): 2
- 4) Do the news and announcement features provide accurate and useful information for residents?
 Strongly Agree (SS): 4
 Agree (S): 4
 Neutral (N): 2
- 5) Does this application have input validation to help prevent data errors and a secure login process?
 Strongly Agree (SS): 3
 Agree (S): 6
 Neutral (N): 1
- 6) Is the password change feature in the application secure and easy to use?
 Strongly Agree (SS): 3
 Agree (S): 5
 Neutral (N): 2
- 7) Is the process for filling out complaints or testimonials simple and straightforward?
 Strongly Agree (SS): 2
 Agree (S): 6
 Neutral (N): 2
- 8) Overall, was using this website a pleasant experience?
 Strongly Agree (SS): 4
 Agree (S): 5
 Neutral (N): 1

Next, a calculation was performed to determine the weight of each level as follows:

1. Strongly Agree (SS): 28
2. Agree (S): 39
3. Neutral (N): 13
4. Disagree (TS): 0
5. Strongly Disagree (STS): 0

Or it can be viewed in graphical form, as shown in the figure below.

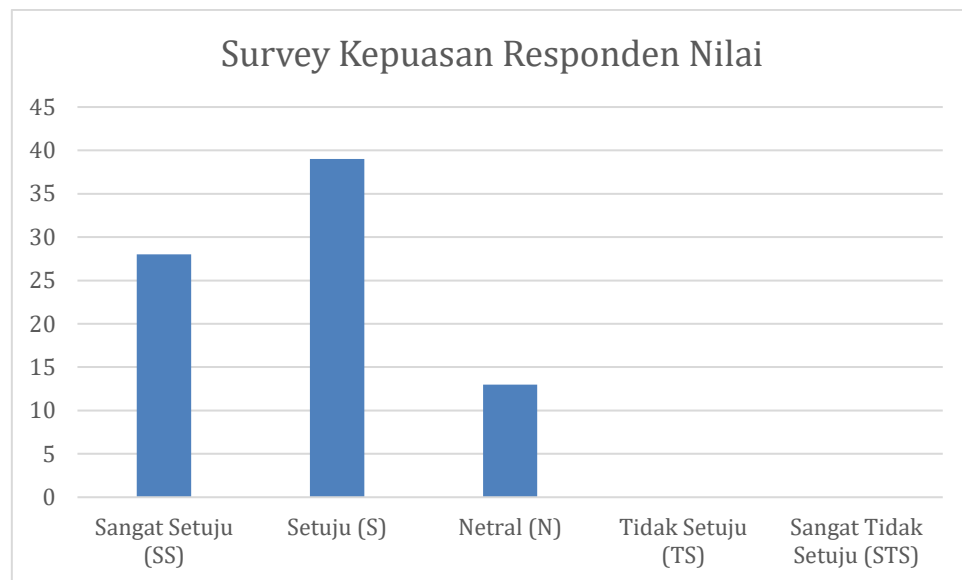


Figure 15. Respondent Satisfaction Survey Graph.

The calculation details are as follows:

Respondents answering Strongly Agree (SS): $28 \times 5 = 140$

Respondents answering Agree (S): $39 \times 4 = 156$

Respondents answering Neutral (N): $13 \times 3 = 39$

Total score: $140 + 156 + 39 = 355$

Number of answers: $8 \times 5 = 40$

Maximum score: $40 \times 10 = 400$

Furthermore, the scoring criteria are determined based on the following intervals:

Index 0% – 19.99%: Strongly Disagree

Index 20% – 39.99%: Disagree

Index 40% – 59.99%: Neutral

Index 60% – 79.99%: Agree

Index 80% – 100%: Strongly Agree

Index Formula (%) = $(\text{Total Score} / \text{Maximum Score}) \times 100$

= $(355 / 400) \times 100$

= 88.75%

Therefore, the score obtained is 88.75%. When associated with the established assessment interval, this figure falls into the "Strongly Agree" category. These results

indicate that the majority of respondents gave a very positive assessment of the development of the Pulau Mandangin Village website as an information medium and a means for conveying citizen complaints. This assessment covers aspects of ease of use, feature functionality, and the website's interface. This score also reflects the website's suitability for use in submitting complaints digitally.

CONCLUSION

Fundamental Finding : The results of this study demonstrate that the village information system functions effectively based on comprehensive Black Box Testing, where all evaluated features—including the public website, admin dashboard, citizen page, and village head page—performed as expected without encountering functional errors, confirming its readiness for operational use. **Implication :** The positive user satisfaction score of 77.5% further indicates that the system provides a practical and user-friendly digital service platform for information management and citizen complaints. These findings suggest that such a system can enhance transparency, streamline administrative workflow, and improve digital public service delivery at the village level. **Limitation :** However, this evaluation is limited to functional testing and user perception, without assessing system performance under high traffic, security penetration testing, or long-term usability. **Future Research :** Future research should explore the integration of stronger security mechanisms, implementation of Progressive Web App (PWA) capabilities for offline access, performance stress testing, and the development of advanced analytics features to support data-driven decision-making in village governance.

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