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Development of a Web-Based Public Complaint System for RT10, Griya Alam Sentosa Housing, using PHP and MySQL

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Abstract
Public services at the neighborhood association (RT) level are often hampered by inefficient complaint processes, such as residents' reluctance or time constraints. This study aims to design and build a web-based public complaint system for RT 10 that can facilitate effective communication between residents and administrators. This system was developed using the Waterfall method with the PHP programming language and a MySQL database. Its main features include an online complaint form, an admin dashboard for report management, and automatic email notifications for every status update. The result of this study is a functional web application that can be accessed through the URL https://pengaduanrt10.ct.ws/. Based on Blackbox testing conducted on 13 main functional scenarios, the system demonstrated a 100% success rate where all features functioned as expected. Tests on various browsers also demonstrated good compatibility, and the results of a user satisfaction questionnaire indicated that the system was easy to use and provided a satisfactory experience. In conclusion, this complaint system has succeeded in becoming an effective digital solution to increase transparency, accelerate responses to complaints, and strengthen the relationship between residents and RT 10 administrators.
Keywords: *MySQL, Public Complaints, PHP, Information Systems, Website*

INTRODUCTION

Public service is one indicator of successful governance, both at the national level and at the smallest levels, such as neighborhood associations (RTs). However, in practice, many residents of RT 10, Griya Alam Sentosa Housing Complex, Pasir Angin Village, Cileungsi District, Bogor Regency, West Java, still experience difficulties in submitting complaints or grievances related to their neighborhood. These obstacles are often caused by reluctance, time constraints, or the lack of adequate communication channels between residents and RT administrators.

With the development of technology and advancements in information, various community needs can be met with digital solutions. Web-based technology has been widely used in various sectors, including public services. This technology allows for faster, more efficient, and better documented communication. One relevant technology is a web system equipped with an automatic notification feature to administrators when citizens submit reports.

Therefore, a web-based public complaints system that is easily accessible to residents is needed. This system not only allows residents to report complaints but also provides automatic notifications when the status of their complaint changes. This system

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is expected to increase transparency, expedite the follow-up process, and build trust between residents and neighborhood association (RT) officials.

METHODS

For this citizen complaint system application project, I used the Waterfall method. I chose the Waterfall method because the system's development flow has clear, sequential stages, from analysis to implementation. The Waterfall method development process is carried out through the following stages:

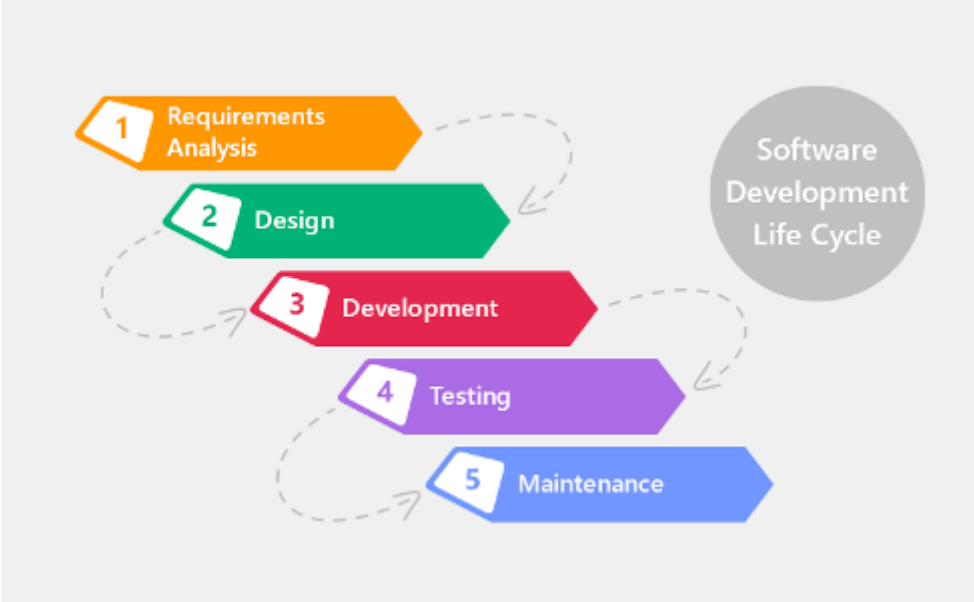

Figure 1. Research stages

1. Requirements Analysis

At this stage, an analysis process is conducted to deeply understand the system requirements. This process involves collecting data through direct observation and interviews with residents and neighborhood association (RT) administrators. The goal is to clearly identify existing obstacles and the primary needs of users in submitting complaints.

2. System Design

Once all requirements have been identified, the next stage is to design the overall system architecture and logic. This includes creating a navigation structure, designing a database structure to manage complaint data, and designing a user interface (UI) to ensure the application is easy to access and use. Additionally, UML (Unified Modeling Language) diagrams will be used to visualize the architecture and interactions between system components.

3. Implementation & Testing

This stage is the process of translating the design results into functional program code. The system was built using the PHP programming language with a MySQL database and also implemented an automatic notification feature via email. After the system was

completed, thorough testing was conducted to ensure its quality. Functional testing aims to verify that every feature and function in the application, such as sending complaints and notifications, functions correctly as designed.

4. Maintenance

The final stage of the Waterfall cycle is maintenance. After the system is deployed to users, this stage includes bug fixes, minor adjustments, and ensuring the application continues to run stably and optimally in the long term.

RESULTS

1. Needs Analysis

During the needs analysis phase for the web-based RT 10 Community Complaints application, we collected data and information from various sources. This data is essential to support the application's functional and non-functional requirements, both in terms of software and hardware. This application is designed for two main types of users: admins (RT administrators) and residents (community members), each with different functional needs:

1.1. Admin Page

On this page, admins can manage the complaints system. They can add, edit, and delete complaint categories, manage the status of incoming complaints, and view and archive citizen complaint data.

1.2. Citizens' Page

On this page, citizens can view a list of available complaint categories and submit new complaints. They can also monitor the status of previously submitted complaints and view their previous complaint history. Citizens can fill in the complaint details and submit it for follow-up.

2. Design

In this stage, the system is designed using the website's navigation structure and UML. The diagrams used include use case diagrams, activity diagrams, and class diagrams. Furthermore, the website's visual design is also developed during this stage.

2.1. Navigation Structure Design

A navigation structure is a framework that describes the organization and flow of user movement within a system or application. This website has two navigation structures shown in the image: the admin navigation structure and the user navigation structure.

Based on the diagram, the type of navigation structure used is a Hierarchical Navigation Structure, the most common and easiest to understand model because it organizes content like a tree from the most general to the most specific. In this structure, the admin workflow begins after successfully logging in via the Admin Login Page, which then directs the admin to the Admin Dashboard, the main control center. From this dashboard, the admin has two main options: managing complaints by accessing the Complaint List Page or logging out to return to the login page. While on the Complaint List Page, the admin can select a report to view its details, where they have the authority to update the

report status (such as from "Incoming" to "Processing" or "Completed") and provide a written response to the citizen.

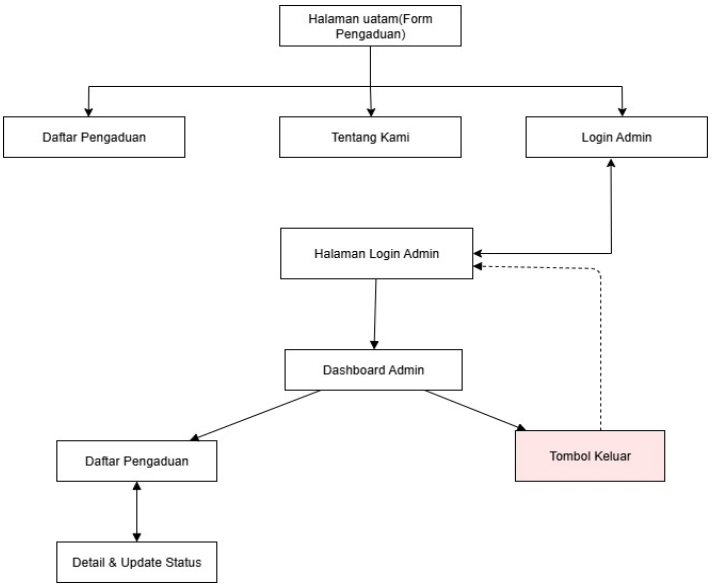

Figure 2. Admin Navigation Structure

Within the user-friendly hierarchical navigation structure, the workflow is straightforward and efficient. Users don't need to go through complicated steps to submit a complaint. Upon first accessing the application, users are immediately taken to the Home Page, which also serves as the Complaint Form. On this page, users can immediately fill in their report details, including their name, email address, and complete address, and add images if necessary. Furthermore, on the same page, users can also view the total number of complaints received and browse the list of existing complaints. This design ensures that all the primary reporting and monitoring needs of users are available in one place, in accordance with the principle of a hierarchical structure that places the most important functions at the top.

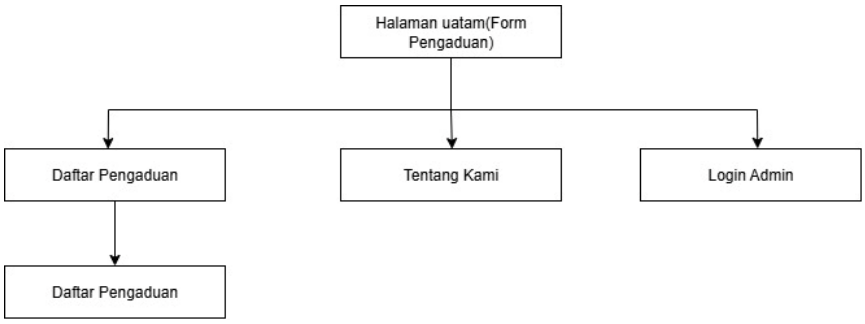

Figure 3. User Navigation Structure

2.2 Unified Modeling Language (UML) Design

Use Case Diagram

A use case diagram consists of two main components: actors and use cases. Actors are the individuals who interact with the website, while use cases describe the functionality of the website. The actors on the RT10 Griya Alam Sentosa Housing Complex Public Complaints website are the admin and the user.

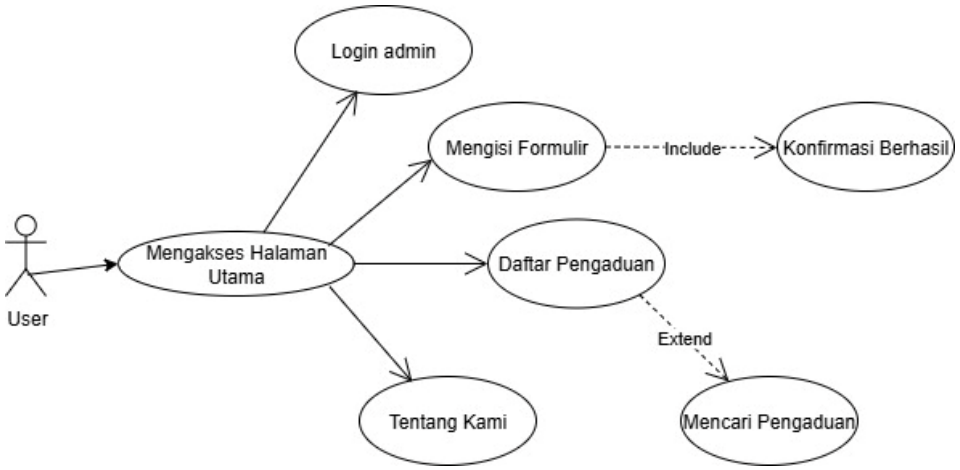

Figure 4. Use Case Diagram User

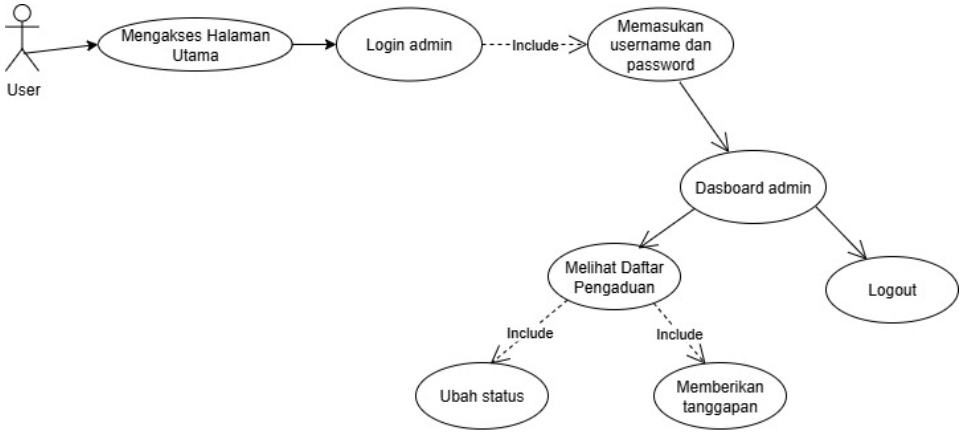

Figure 5. Use Case Diagram Admin

Activity Diagram

After completing the Use Case Diagram, the next step is to describe the Use Case Diagram in the form of an Activity Diagram. Activity diagrams are used to illustrate the flow of activities, both in business processes and use cases.

User dan Admin

Users can directly open the website's main page to submit a complaint without logging in. After selecting "Create a Report," the user fills out the form and clicks the "Submit Complaint" button. The system will validate the data; if successful, a success notification will be displayed; if unsuccessful, an error message will appear. This flow aligns with the Reporter Use Case Diagram, where actors can directly access the Complaint Form Filling and Complaint List functionality from the main page. Admin login is an activity where the admin carries out processes on the system.

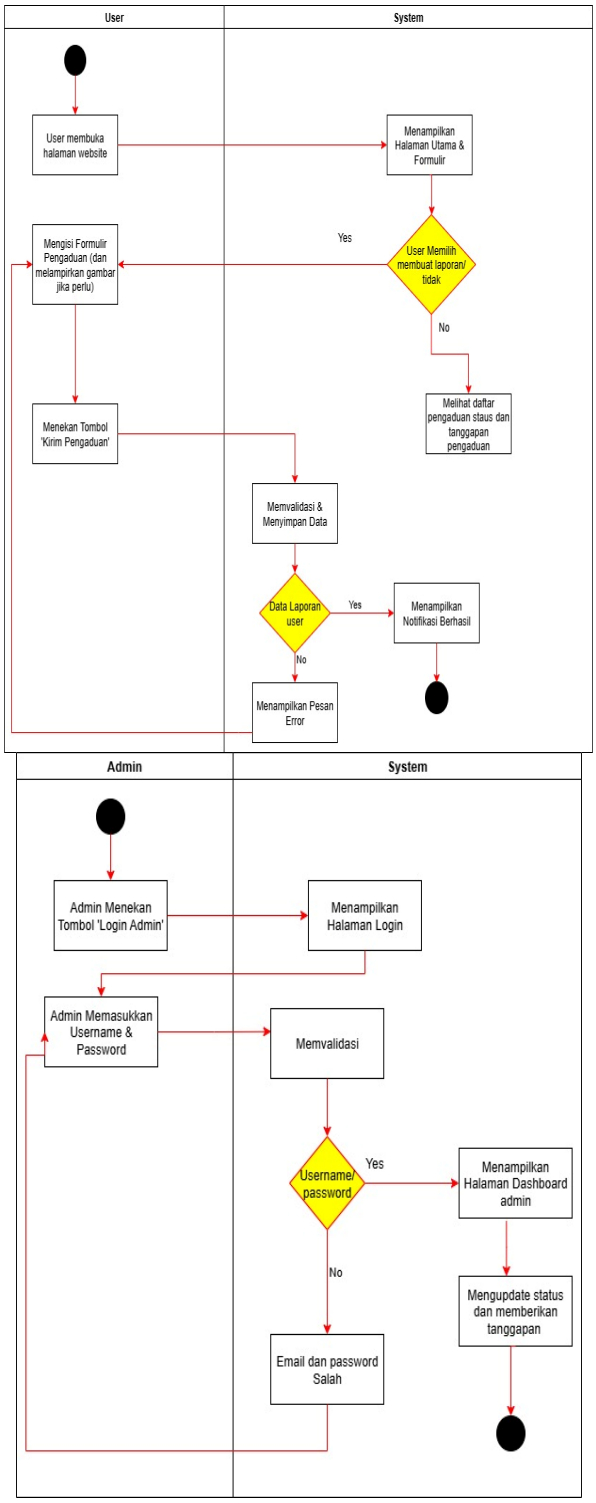

Figure 6. Activity Diagram User and Admin

Class Diagram

A Class Diagram is a type of diagram in software modeling used to describe the static structure of a system. This diagram displays the classes (or entities) in the system and their attributes. The relationships are as follows:

- The complaints table has a one-to-many relationship with the responses table (one complaint can have many responses).
- The officers table has a one-to-many relationship with the responses table (one officer can provide many responses).
- The complaints table also has a foreign key, id_pejabat, to record the officer handling the complaint.

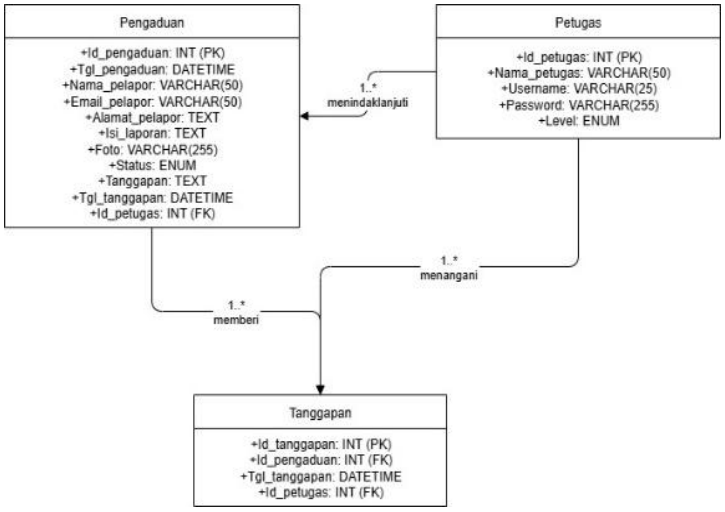

Figure 7. Class Diagram

Database Design

Database design is crucial because all data and information received and used must be stored and organized properly. The database design for the Dapur Reliq website is illustrated in the form of tables that include field names, data types, character lengths, and descriptions.

The complaint table is the main digital container in the database that functions to store all complaint data or reports sent by the public via your website.

Table 1. Complaint Table Design

Nama Field	Tipe Data	Panjang/Nilai	Keterangan
Id_pengaduan	INT	11	AUTO_INCREMENT
Tgl_pengaduan	DATE TIME		
Nama_pelapor	VARCHAR	50	
Email_pelapor	VARCHAR	50	
Alamat_pelapor	TEXT		
Isi_laporan	TEXT		
Foto	VARCHAR	255	
Status	ENUM		
Tanggapan	TEXT		
Tgl_Tanggapan	DATE TIME		
Id_Petugas	INT	11	

The Complaints Table contains a list of people who have the "keys" to enter and manage the website.

Table 2. Officer's Table Design

Nama Field	Tipe Data	Panjang/Nilai	Keterangan
id_petugas	INT	11	AUTO_INCREMENT
nama_petugas	VARCHAR	50	
username	VARCHAR	25	
password	VARCHAR	255	
level	ENUM		

The response table is a table that functions to store all official replies or responses given by the admin or officer to a complaint.

Table 3. Response Table Design

Nama Field	Tipe Data	Panjang/Nilai	Keterangan
id_tanggapan	INT	11	PRIMARY KEY, AUTO_INCREMENT
id_pengaduan	INT	11	
tgl_tanggapan	DATETIME		
id_petugas	INT	11	

Home Page Design

When users first access the website, they are directed to the homepage. On this page, they can immediately fill out a complaint using the format provided on the complaint form. They can also view a list of complaints previously filed by complainants and access the "About Us" page, which contains information about the neighborhood association.

Figure 8. Home Page Design

Complaint List Page Design

After completing a complaint, the public can view the complaint and its status on the complaint list page. They can also search for complaints through filters by entering the address, content, name, and status of the complaint.

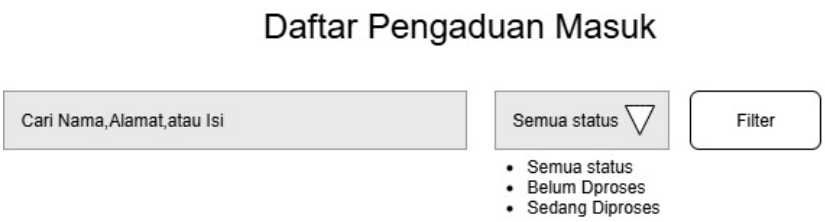

Figure 9. Complaint List Page Design

Admin Login Page Design
On this page, admins can log in using the username and password they created to access the admin dashboard.

Figure 10. Admin Login Page Design

Status Update Page Design
On this page, admins can update the complaint status and respond to the complaints submitted.

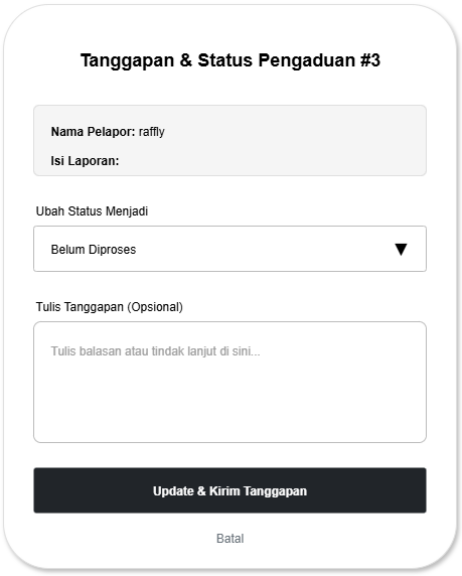

Figure 11. Status Update Page Design

Implementation

The implementation phase is the process of applying the system design created in the design phase into a executable application. At this stage, the program code is written using the PHP programming language with a MySQL database, supported by HTML and CSS technologies.

Table 4. Complaint Table

Table structure | Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id_pengaduan	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	tgl_pengaduan	datetime			No	None			Change Drop More
3	nama_pelapor	varchar(50)	utf8mb4_general_ci		No	None			Change Drop More
4	email_pelapor	varchar(50)	utf8mb4_general_ci		No	None			Change Drop More
5	alamat_pelapor	text	utf8mb4_general_ci		No	None			Change Drop More
6	isi_laporan	text	utf8mb4_general_ci		No	None			Change Drop More
7	foto	varchar(255)	utf8mb4_general_ci		Yes	NULL			Change Drop More
8	status	enum('Belum Diproses', 'Sedang Diproses', 'Selesai...	utf8mb4_general_ci		No	None			Change Drop More
9	latitude	decimal(10,8)			Yes	NULL			Change Drop More
10	longitude	decimal(11,8)			Yes	NULL			Change Drop More

Check all With selected: Browse Change Drop Primary Unique Index Spatial Fulltext Add to central columns

Table 5. Admin Table

Table structure | Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id_petugas	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	nama_petugas	varchar(50)	utf8mb4_general_ci		No	None			Change Drop More
3	username	varchar(25)	utf8mb4_general_ci		No	None			Change Drop More
4	password	varchar(255)	utf8mb4_general_ci		No	None			Change Drop More
5	level	enum('admin', 'petugas')	utf8mb4_general_ci		No	None			Change Drop More

Table 6. Response Table

Table structure | Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id_tanggapan	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	id_pengaduan	int(11)			Nc	None			Change Drop More
3	tgl_tanggapan	datetime			No	None			Change Drop More
4	tanggapan	text	utf8mb4_general_ci		No	None			Change Drop More
5	id_petugas	int(11)			No	None			Change Drop More

Creating Website Page Design

This stage involves creating the website's page design, which is a crucial part of web-based application development. The website's page design is designed to have an attractive, responsive, and user-friendly interface. Good design enhances the user experience and helps them efficiently access the information and features available on the website.

Complaints Page Display

On this page, users can directly submit their complaint without having to enter a username or password, making it easier. This page displays a complaint form. Users can directly fill in the information provided. Users can also include an image for their complaint. This page also includes buttons for "Register Complaint," "About Us," and "Admin Login." Clicking these will switch to the next page.

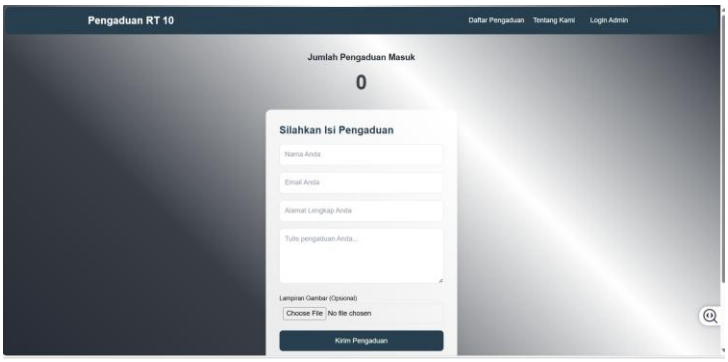

Figure 12. Complaint Page View

Complaint List Page View

When a user clicks "Complaint List," the page doesn't change. Instead, they move to the bottom of the page, below the complaint entry field. Here, users can sort/filter complaints by the complainant's name, content, address, and available complaint status.

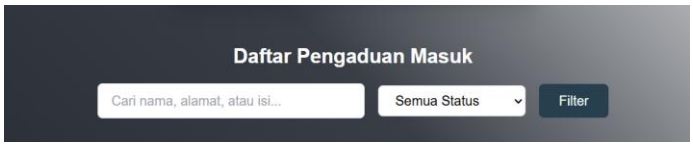

Figure 13. Complaint List Page View

Admin Login Page Display

Here, the admin can enter the username and password they created. If the username or password is entered incorrectly, an invalid message will appear

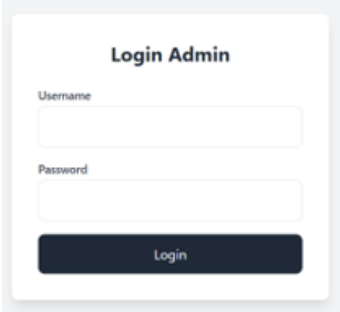

Figure 14. Admin Login Page View

Admin Dashboard Page View

On this page, admins can view reports submitted by the public. There's also a feature for updating the complaint status. They can also respond to submitted complaints.

Figure 15. Complaint List Page View

User Satisfaction Testing

User testing was used to determine the user experience when accessing this website. The method used in this testing phase was an online questionnaire consisting of five research-related statements. This online questionnaire was distributed and received a total of 59 respondents. The following are the results of the user testing of the Community Complaints website for RT10 Griya Alam Sentosa Housing Complex.

Table 7. User Satisfaction Test Table

No	(Question)	(Answer)
1	Is the website user-friendly?	Very good
2	Does the website display information well?	Very good
3	Is the website effective and efficient in its use?	Fairly good
4	Does the website meet the user's needs?	Fairly good
5	Overall, is the user satisfied with the developed website?	Fairly good

CONCLUSION

This research has successfully achieved these objectives by creating a well-functioning, smooth, and accessible RT 10 Public Complaints website via the URL https://pengaduanrt10.ct.ws/. Based on the results of the Blackbox test, it was concluded that all features on the website functioned properly. This system has been proven to make the complaint management process more efficient and transparent, one of which is by ensuring that admins receive automatic notifications for each new report received. Furthermore, the results of the user satisfaction test indicate that this website is considered quite good and easy to use.

SUGGESTIONS

Based on the results of system development and testing, several suggestions can be considered for future development and implementation by relevant parties. Technically, the website is recommended for further development by adding an account/login system for residents to increase data validity and allow each resident to view their own report history. Furthermore, the admin dashboard can be enhanced with a statistics page that displays data in graphical form, such as monthly complaint trends and frequently occurring problem categories, to assist neighborhood heads in decision-making. To enhance the mobile experience, the website also has the potential to be developed into a Progressive Web App (PWA) for easier access, similar to an app.

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