

Real-Time Smart System for Complaint Information System in Campus: Code of Conduct and Infrastructure

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Abstract--In today's competitive business environment, maintaining high levels of customer satisfaction is crucial for the success of any organization. To effectively address customer complaints and concerns, businesses are increasingly relying on digital solutions such as complaint reporting systems. This paper presents the development of an online complaint reporting system designed to streamline the process of receiving, managing, and resolving customer complaints. The system incorporates features such as user-friendly interfaces, secure data storage, automated notifications, and real-time reporting functionalities. Through the implementation of this system, businesses can enhance their customer feedback management processes, improve customer satisfaction levels, and ultimately, strengthen customer relationships. Real-time reporting functionalities provide businesses with valuable insights into trending issues and customer pain points, allowing them to proactively address recurring problems and improve their products and services. By leveraging the online complaint reporting system, organizations can effectively capture, analyze, and respond to customer feedback in a timely manner, enhancing overall service quality and customer satisfaction.

In conclusion, the development of an online complaint reporting system represents a significant step towards improving customer feedback management practices. By implementing this system, organizations can establish a more transparent and customer-centric approach to handling complaints, leading to enhanced customer loyalty and positive brand perception.

Key words: Complaint, Reporting, Feedback, Satisfaction.

I. INTRODUCTION

Campus services are important and need to be prioritized because they are related to community satisfaction. Any unsatisfactory service will become a complaint for the campus community and make complaints. Complaints from the community arise due to a lack of action by responsible officers within the campus regarding ethics and infrastructure. Complaints can be made verbally or by using a complaint letter included in the campus mailbox and viewed manually by

officers on campus.

The specific objectives of this research are to analyze, design, and implement campus community complaint reports related to ethics and infrastructure on campus to produce a system that is able to record real-time audio and visual data on community complaints on campus. The urgency of this research is that there are complaints that require quick and accurate action; therefore, it is necessary to develop an Android-based system for recording and monitoring the status of handling complaints related to ethics and infrastructure. The research data obtained will become the basis for further research to design a mapping system on campus that aims to minimize complaints.

The developed system provides an information system that helps the academic community see the complaint process regarding public facilities, codes of ethics, sanitation, and other public issues within the Indorama Engineering Polytechnic campus environment using an Android-based mobile phone device. There are problems related to complaints from the campus community based on user needs by interview with stakeholder:

1. The campus does not yet have a system that is capable of obtaining precise locations from mobile phone Global Positioning System (GPS) regarding complaints.
2. The campus does not yet have a system capable of providing notifications to users regarding the status of complaints reported.
3. Campus does not yet have a system to provide emergency button functions that require immediate handling. The emergency button can provide the telephone number to be addressed based on user complaints, such as being stuck in an elevator.
4. The campus does not yet have a system to display information on the status of complaints for certain users, such as

complaints that have been successfully resolved or pending (postpone).

5. The campus does not yet have a system that can provide facilities for uploading the results of handling in the form of photos, if complaints have been resolved by related parties.

Based on the background described above, the formulation of the problem in this study is to build a system with the following facilities:

1. A system capable of recording complaints in the form of photos, audio, and video, as well as precise GPS locations.
2. A system capable of obtaining a precise location from a cell phone GPS regarding complaints.
3. The system can provide notifications to users regarding the status of reported complaints.
4. This system provides an emergency button function that requires immediate handling. The emergency button can provide the phone number to be addressed based on user complaints, such as accidents, crimes, and sexual violence.
5. The system can display information regarding the status of complaints for certain users, such as the status of complaints that have been successfully resolved or pending (postpone).
6. The system can provide facilities for uploading the results in the form of photos, audio, and video if the complaint has been resolved by the relevant party.

A. Information Systems

An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control within an enterprise. In addition to supporting decision-making, coordination, and control; information systems can also help managers and workers analyze problems, visualize complex subjects, and create new products. Information systems contain information about important people, places, and things in organizations or their surroundings [4].

Information is data that have been formed into a form that is meaningful and useful to humans. In contrast, data are a stream of raw facts that represent events that occur in organizations or the physical environment before being organized into a form that people can understand and use [11].

Information systems are designed to collect, process, store, and distribute information [5]. Although information systems do not need to be computerized, Information Technology (IT) is playing an increasingly important role in organizations because of the fast pace of technological innovation. Today, most information systems beyond the smallest are IT-based because modern IT enables efficient operation as well as effective management in organizations of all sizes.

B. Database

A Database Management System (DBMS) is a software that allows users to define, load, maintain, and manage access to databases. A DBMS is a software that interacts with users of application programs and databases [10].

C. Xamarin Framework

The technology used in developing the system was based on the Xamarin Framework. Xamarin is a Microsoft system development platform that makes it possible to create cross-platform mobile applications on Android, IOS, and Windows applications. Using the concept of a single programming language for all platforms allows software developers to develop systems quickly, cheaply, and reliably. System developers are allowed to access all Application Programming Interface (API) frameworks from the core program. Application frameworks simplify the reuse of components. Different applications can use and access their functional components (but must follow the security framework [1]).

D. Global Positioning System (GPS)

The system to be developed is a system that is able to handle some of the problems as stated above. The system has a location-detection feature using a Global Positioning System (GPS). GPS allows integration with the developed system [3].

E. System Testing

This phase describes how the system operates according to the users and system requirements. This phase also describes the testing of a system developed using a black box [9]. Black-box testing involves testing the functions contained in the system and verifying whether the system meets user requirements.

F. Real Time Applications

A real-time application manages a hardware and software system that is limited by a time span and has clear deadlines relative to the time an event or operation occurs, such as manufacturing process control or high-speed data acquisition devices [6]. The unique characteristic of real-time applications is that the system not only provides the correct response, but also responds within a certain time frame. A real-time system is a set of all the hardware, operating system, and application system elements required to meet the system requirements.

II. METHOD

The research method consists of several phases, including analysis and design, system construction, and implementation. In the analysis phase, developers and users meet and define the overall objective of the software, identify all requirements, and outline the scope of the system. Analysis of information needs is carried out by discussing with users, namely the Civil Section at the Indorama Engineering Polytechnic, so that at this stage, results will be obtained in accordance with the wishes of the user. At this stage, several steps can be taken to identify and analyze needs [4]:

A. Problem Identification

The problem faced is the development of a system for monitoring complaints from the campus community. Data were collected by conducting observations and interviews to identify complaints and grievances. Data collection was conducted according to the type of data, objects, and data sources, as well as preparation for data collection. Objects and data sources consisted of elements, characteristics, populations, and samples. Data collection was performed using technical and non-technical methods. Data could be obtained directly or indirectly. The collection of data was carried out through the process of collecting information from information sources by users of information for their environment.

B. User Analysis and Boundary

The process carried out at this stage determines user limits. The information obtained from the results of discussions with the civilian section is that the system users only consist of 6 users,

namely Administrators, Lecturers, *Tendik*, Students, Management, Security.

C. System Requirements Analysis

At this stage, the process of determining several functions to be built, including determining the function of monitoring complaints from the campus community regarding campus ethics and infrastructure.

D. Analysis of User Needs

The activity carried out at this stage determines the needs of system users. The intended need for system users is to determine system functions where they are able to access information related to complaints and infrastructure on campus.

E. Analysis of Information Needs

At this stage, an analysis of the information needs of system users was carried out. The information requirements in question are the information required to display detailed data, notification systems, and search systems.

F. System Analysis

At this stage, observations were made to collect the system requirements. The specification of the system requirements being analyzed is a system that is able to obtain detailed information on complaints, and a system that is able to notify the computer administrator if there are problems related to the code of ethics and infrastructure.

The design phase consists of several sub-activities, including:

A. System Design Details

The system was designed using a unified modeling language (UML) model that represents the program and flow as a whole. The design stage can use the following steps: [12]

1. Analysis of data and information flow
2. System database design.
3. User interface design.

B. Interface

The system interface is designed according to the colors on the campus logo; namely gray, white, and orange.

C. Alternative System Configuration

The hardware requirements for servers and clients are different.

III. RESULT AND DISCUSSION

Base on interview and user need analysis, some common problems faced by users when reporting a complaint include:

1. Lack of responsiveness: Users might face challenges when the company or organization being contacted is unresponsive or slow to address their complaint.
2. Complex complaint process: Users might find the process of reporting a complaint to be overly complicated or confusing, which can deter them from lodging a complaint.
3. Poor customer service: Users may encounter unhelpful or unfriendly customer service representatives when trying to report a complaint, which can lead to frustration and dissatisfaction.
4. Long wait times: Users might experience long wait times when trying to reach customer service or complaint resolution teams, which can be time-consuming and aggravating.
5. Lack of follow-up: Users may not receive proper follow-up communication or updates regarding the status of their complaint, leaving them feeling neglected and unsupported.
6. Dismissal of concerns: Users might feel their complaints are not taken seriously or are dismissed without proper investigation or resolution, leading to further frustration and dissatisfaction.
7. Technical issues: Users could face technical difficulties when trying to report a complaint online or through automated systems, hindering their ability to effectively communicate their concerns.

The software requirements collected is displayed in Table I. The mapping between users and system functions is shown in Table II. Data collection techniques and methods form the basis of this research, including Observations, Interviews and Literature Studies [8]. Based on this method, the system is generally divided into several parts: a complaint system involving several users, such as lecturers, students, academic sections (Education, Maintenance, and Alumni), and non-academic sections (Public Facilities, HR, and Cooperation). This facility provides a function to report various problems related to academic issues (Education, Maintenance, and Students-Alumni) and non-academic issues (Public Facilities, HR, and Cooperation).

TABLE I
System Requirements

Feature	Descriptions
Registrasi Akun	This feature provides a function for system user registration. The data used can be Student Identification Number (<i>NIM</i>) or Employee Identification Number (<i>NIP</i>). After successful registration, users can change profiles such as passwords to be able to log into the system.
Login Pengguna	This feature provides a function to log into the system using <i>NIM/NIP</i> and Password.
Get Location	This feature provides a function to obtain the precise location of the mobile device in relation to the location of the complaint.
Lapor	This feature provides a function to report complaints to academic (education, maintenance, and expensive) and non-academic (public facilities, human resources, and venture & cooperation) related departments/agencies.
Beranda Informasi Pengaduan Terkini	This feature provides the function of displaying the information homepage related to complaints from users.
Chat User	Provides communication between users.
Informasi Pengaduan	Provides function to manage complaints data.
Post Status Pengaduan	This facility provides a function to upload statuses. The status is divided into two, pending and completed. If the status is completed, then the relevant section/agency user can upload a photo of the complaint handling of the relevant user.
Monitor Status	Monitor complaints status.
Validasi Pengaduan	This facility provides a function to validate the status of the complaint. After validation, the data will be sent to the Administrator for direct checking to the reported location.
Validasi Pengguna	Verify user account.
Monitor Status Sistem	This facility provides a function to perform monitoring the status of the complaint.
Sistem Monitoring	This facility provides a function to perform monitoring of complaint status. The user, in this case the Dean, can view reports on the number of resolved and pending status of complaint reports.

The user section has the following features:

1. Publish Report
2. View Complaint Status
3. Notifications
4. Emergency Phone

TABLE II
User Mapping

Feature	Descriptions
Dosen, Mahasiswa, dan Tenaga Kependidikan	<ol style="list-style-type: none"> 1. Register for an account. 2. Login to the system. 3. Submit current location from mobile device. 4. Reporting complaints/complaints View homepage information related to different users' complaints. Communicate with other users.
Manajer	<ol style="list-style-type: none"> 1. User data validation 2. Monitoring user complaint status data.
Surveyor	<ol style="list-style-type: none"> 1. Monitoring the handling of complaints from other users. 2. Manage user complaint status data. Monitoring the handling of complaints from other users.
Wakil Dekan/Direktur	View reports on the status of resolved and pending complaint reports.

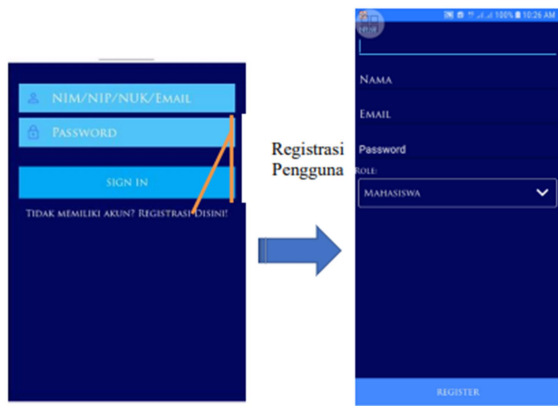


Fig. 1. Login and Registration Form

An interesting feature of this application is the Emergency Phone feature that is for emergency information that requires immediate handling. This feature uses the campus security staff emergency number so that they can be contacted directly. The system has a message feature in real time. This is needed if there are obstacles in reporting complaints to the surveyor. The message feature is equipped with end-to-end user features to ensure messages reach the intended person.

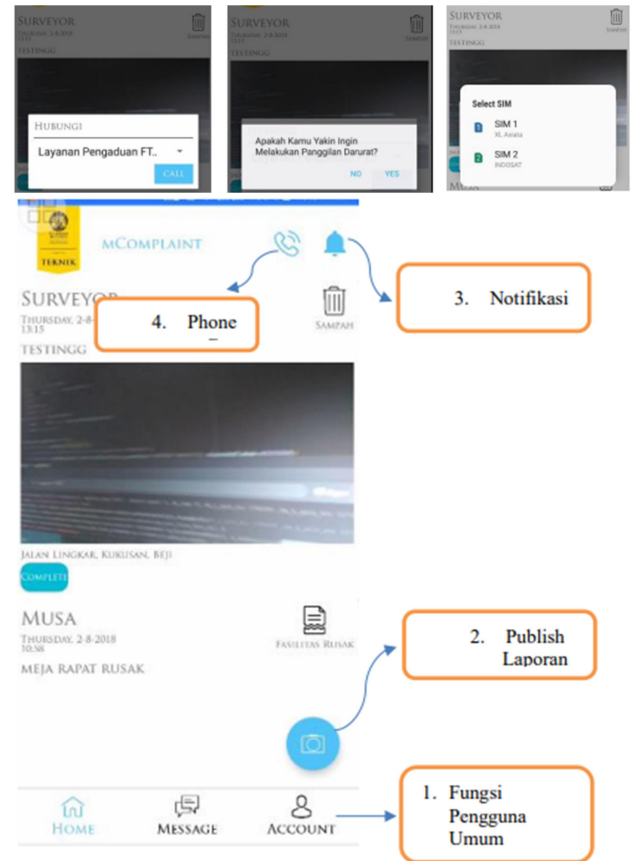


Fig. 2. Emergency Service

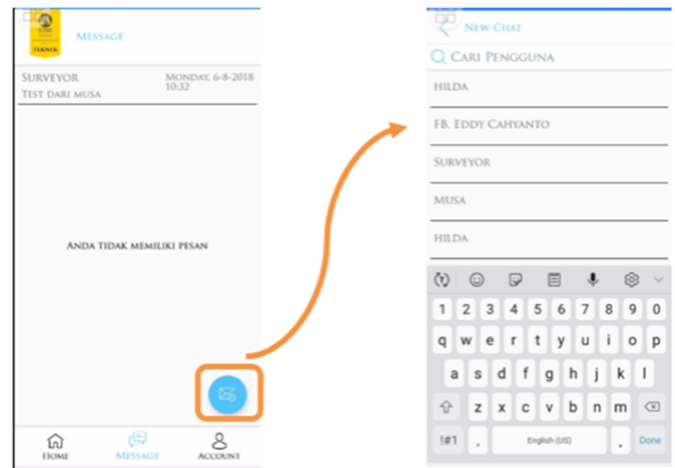


Fig. 3. Messaging Service

The complaint status is divided into three parts: Publish, Postpone and Complete. When the report is successfully uploaded to the server, the surveyor can verify the data. Surveyors can click the Publish button so that the complaint status can be seen on the system's homepage (Fig. 4).

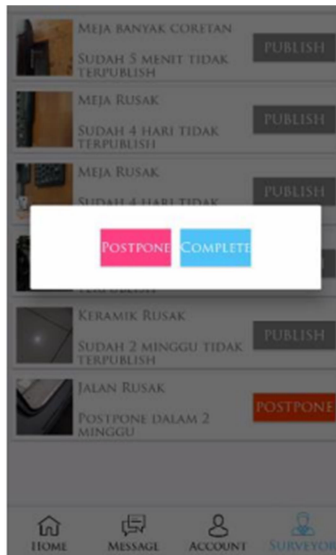


Fig. 4. Complaint Status

When the Publish button is clicked, two status options appear: Postpone and Complete. Postpone means that the status is still in the process of being repaired. When the user clicks the Complete button, the system automatically opens the camera application to obtain repair photos from complaints.

The complaint status on the administrator menu is divided into three sections, the same as the Surveyor, Publish, Postpone and Complete menus. When the report is successfully uploaded to the server, the Surveyor can verify the data. The administrator can verify the user data to ensure that the user is a member of the Indorama Engineering Polytechnic. Administrators can also see the status and percentage of complaints (Fig. 5).



Fig. 5. Complaint Status Verification

IV. CONCLUSION

The developed system generally meets the objectives of the internal complaint reporting and handling system of the Indorama Engineering Polytechnic. The developed system can display complaint notification information, publish reports based on certain criteria, process emergency calls, and verify complaint data from users. IIS web server is considered reliable in handling requests and responses [7]. The web server used in the construction of this system uses Internet Information Services (IIS) because it supports full performance on the Windows operating system and has good error checking on the server. The database used was SQL Server 2017, which is capable of accommodating large-scale capacities. The programming language used was the C# language, which is capable of developing multiplatform applications (Android, IOS, desktop, and web applications).

The developed system is also able to display the percentage of customer complaint data reporting, so that the deputy director can find out which complaints have been resolved properly, are in the process of being handled, or are still not properly verified.

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