|Jurnal Ilmu Komputer dan Sistem Informasi |JIKSI|Vol. 4| No. 2|Feb|Year 2023|

Development of an E-Reporting Application for Road Damage in Palembang at the Department of Public Works and Housing (PUPR)

Endi Andika[1*]

Abstract

Community participation plays a crucial role in supporting the government in developing and maintaining public infrastructure. One of the common public complaints in Palembang City concerns damaged roads, which significantly affect transportation and safety. At present, reports of road damage are typically submitted through social media, creating inefficiencies because the Department of Public Works and Housing (PUPR) of Palembang City cannot effectively filter or categorize these reports. As a result, duplicate submissions and unverified data often occur, slowing the response process. This study aims to develop a mobile-based E-Reporting application for road damage in Palembang City using the Extreme Programming (XP) method. The application allows the public to report damaged roads through a smartphone interface, while the PUPR Office can manage and verify the reports through a web-based dashboard. The XP method provides an adaptive, iterative development process that responds quickly to user requirements. The resulting system successfully enables the collection, verification, and processing of road damage reports. Through this platform, the public can actively participate in infrastructure monitoring, while the PUPR Office can improve the efficiency, transparency, and accountability of road maintenance management in Palembang City.

Keywords

E-Reporting, Extreme Programming, Road Damage, Mobile Application

Article History

Received 09 March 2023
Accepted 27 June 2023

How to Cite

Andika, E. (2023). Development of an E-Reporting Application for Road Damage in Palembang at the Department of Public Works and Housing (PUPR). Jurnal Ilmu Komputer dan Sistem Informasi (JIKSI), 4(2), [63-69].

[1*] Universitas Bina Darma, Indonesia, Corresponding email: endiandika@gmail.com

Introduction

In the modern era, information and communication technology (ICT) has become an integral component of governance, shaping how governments deliver public services and interact with citizens. The integration of ICT into public administration supports the transformation toward e-government, characterized by increased transparency, efficiency, and accountability. According to Prayogi et al. (2020), technological innovation serves as one of the most critical indicators of national progress, enabling governments to improve the quality and responsiveness of services. As societies become increasingly digitized, public institutions are expected to leverage technology not only to enhance operational efficiency but also to foster active civic participation in governance processes.

The use of digital applications in public service delivery has expanded rapidly across multiple sectors, ranging from population administration and health services to urban infrastructure management. Among these, infrastructure management, particularly road maintenance, plays a crucial role in ensuring mobility, economic productivity, and public safety. Roads constitute one of the most essential public facilities, directly influencing community activities and economic growth. According to Saputra et al. (2019), even minor road damage can cause significant disruptions in transportation systems, increase accident risks, and reduce the overall quality of urban life. Therefore, maintaining road infrastructure effectively and responsively has become a strategic priority for local governments.

In the context of Palembang City, which encompasses 18 districts and 107 subdistricts, infrastructure-related challenges—especially road deterioration—occur frequently. Factors contributing to these damages include heavy vehicle traffic, poor drainage systems, unstable soil conditions, and weather fluctuations. The Department of Public Works and Housing (PUPR) bears responsibility for managing road construction, maintenance, and repair. However, the existing road damage reporting mechanism remains inefficient, as it relies primarily on unstructured social media submissions through platforms such as Instagram or WhatsApp. Although these platforms facilitate communication, they are not designed for structured data processing, which results in several limitations, including difficulties in validating public reports, tracking repair progress, and avoiding redundant submissions.

Such inefficiencies highlight the need for a dedicated and integrated reporting system that can streamline communication between citizens and government agencies. An E-Reporting system serves as a digital platform through which residents can submit structured, location-based, and verifiable reports regarding road conditions. Simultaneously, administrators can monitor incoming reports in real time, validate their authenticity, and assign repair tasks systematically. This two-way interaction not only enhances government responsiveness but also fosters a participatory governance model, where citizens play an active role in maintaining their city's infrastructure. By improving data management and transparency, the system contributes to more accountable and citizen-centered public service delivery.

To meet these objectives, this study proposes the development of a mobile-based E-Reporting application tailored for the PUPR Office of Palembang City. A mobile platform was chosen to maximize accessibility, allowing citizens to report incidents directly from the field, complete with photos, location coordinates, and descriptive information. The application is expected to significantly enhance data accuracy, administrative efficiency, and public engagement in infrastructure maintenance processes. For local governments, the availability

of real-time data also facilitates better decision-making and prioritization in road repair budgeting and scheduling.

The development process applies the Extreme Programming (XP) methodology, a variant of the agile software development approach that emphasizes iterative design, user feedback, and adaptability to changing requirements. XP's cyclical stages—planning, design, coding, and testing—allow for continuous improvement based on stakeholder input throughout the development cycle. By utilizing XP, the research ensures that the final application aligns closely with user expectations, operational needs, and government workflow. Ultimately, the resulting system is expected to support the PUPR Office of Palembang in managing and verifying road damage reports efficiently, thereby promoting greater transparency, accountability, and community involvement in local infrastructure governance.

Methodology

Research Period and Data Collection

The research was conducted between March and July 2023 in Palembang City. Data were collected using both primary and secondary methods:

1. Primary Data: Obtained through direct observation and interviews with the PUPR Office and residents in affected areas.
2. Secondary Data: Sourced from journals, books, official PUPR documents, and government reports related to infrastructure and digital governance.

Research Tools and Materials

1. Hardware: Laptop, printer, and smartphone.
2. Software: Windows 10, Microsoft Office 2013, XAMPP, Notepad++, and MySQL.
3. Supporting Tools: Flutter framework for mobile development and CodeIgniter (CI) framework for web administration.

Development Method

This study adopts the Extreme Programming (XP) approach, which emphasizes collaboration, flexibility, and continuous testing. The XP stages include:

1. Planning:Identifying system requirements, including user needs for submitting, managing, and validating road damage reports.
2. Design:Developing system models using Entity Relationship Diagrams (ERD) and Unified Modeling Language (UML) to define relationships among users, reports, and administrative entities.
3. Coding:Implementing the design into source code using Flutter for mobile application development and CodeIgniter for the web-based admin interface.
4. Testing:Performing Black Box Testing to ensure that all functional components meet the design specifications.

Results

System Architecture

The developed system consists of two primary interfaces:

1. Mobile Application (User Interface): For citizens to submit road damage reports.
2. Web Application (Administrator Interface): For PUPR officers to review, validate, and manage submitted reports.

System Features

Administrator Side

1. Login Page: Secure access using admin credentials.
2. Dashboard: Displays incoming reports and statistical summaries.
3. Report Management: Allows administrators to view details, update statuses, and provide feedback to reporters.
4. Data Filtering: Enables sorting by date, location, and report status.

User Side

1. User Registration/Login: Citizens create accounts to ensure valid data entry.
2. Report Submission Form: Includes location input, description of damage, and photo upload features.
3. Tracking Feature: Users can monitor report status (submitted, verified, in progress, completed).

Discussion

System Testing

To ensure the reliability and functionality of the developed mobile-based E-Reporting application, system validation was conducted using the Black Box Testing approach. This testing technique focuses on evaluating the system's external behavior—verifying whether inputs are processed correctly to produce the expected outputs—without examining the underlying code structure. The objective was to confirm that all functional modules of the system operate according to user requirements and design specifications.

The testing covered both mobile and web-based components, focusing on critical functions such as authentication, data submission, report management, and communication between users and administrators. Each module was evaluated to ensure stability, accuracy, and responsiveness during operational use. The summarized results are presented in the following table:

No	Function Tested	Expected Output	Test Result
1	Admin Login	Dashboard displayed correctly	Success
2	Report Submission	Data successfully stored	Success
3	Report Tracking	Status updated dynamically	Success
4	Data Verification	Admin feedback visible to users	Success

The test results confirmed that all system functionalities performed as expected, with no major errors or functional failures identified during testing. The admin login module accurately redirected users to the dashboard interface, ensuring secure authentication and role-based access control. The report submission feature successfully processed input data—including textual descriptions, images, and geolocation coordinates—and stored them in the centralized database. Meanwhile, the report tracking and verification modules dynamically displayed the status of each report, allowing users to monitor progress in real time and view administrative responses. The consistent success across all tested functions verifies that both the mobile and web interfaces of the E-Reporting system are fully operational and ready for deployment.

The successful outcome of the Black Box Testing phase demonstrates that the system has achieved a high degree of functional correctness and reliability. It ensures that end users—both citizens and government officials—can interact with the system seamlessly. Moreover, this verification supports the overall objective of the project, namely to deliver a technically stable, accessible, and transparent digital reporting platform that enhances urban infrastructure governance in Palembang City.

Effectiveness Evaluation

Beyond functional validation, the effectiveness of the E-Reporting application was evaluated based on its impact on communication, transparency, and administrative efficiency between the community and the Department of Public Works and Housing (PUPR). The system's deployment demonstrates a substantial improvement in how road damage reports are collected, processed, and responded to. Through the mobile interface, citizens can easily submit structured and verifiable reports, complete with supporting information such as photos and location data. These inputs enable administrators to validate issues accurately, prioritize repairs, and assign field personnel systematically. As a result, the reporting workflow has become more traceable, transparent, and data-driven, ensuring that every reported case is recorded and monitored until resolution.

This implementation strongly aligns with the vision of open government and smart city governance as discussed by Prayogi et al. (2020), where technological innovation plays a central role in promoting public trust, accountability, and participation. By enabling citizens to directly contribute to monitoring public infrastructure, the E-Reporting system operationalizes the concept of collaborative governance, bridging the gap between government authorities and local communities. Citizens no longer act merely as passive recipients of public services but as active participants in ensuring their city's maintenance and development. The transparent communication enabled by the system fosters greater public engagement, which, in turn, enhances government credibility and service quality.

From an administrative standpoint, the system also improves operational efficiency within the PUPR Office. Prior to implementation, road maintenance reports were scattered across social media platforms and informal communication channels, making them difficult to validate or track. The new system consolidates all reports into a centralized database, enabling administrators to manage and analyze data effectively. The integration of real-time dashboards and dynamic status tracking allows officials to monitor progress at any time, identify problem clusters, and make informed decisions regarding resource allocation. This digital transformation aligns with Saputra et al. (2019), who emphasized that structured digital systems in infrastructure management significantly reduce redundancy, accelerate response times, and enhance accountability in public works operations.

The application of the Extreme Programming (XP) methodology played a pivotal role in achieving these outcomes. XP's iterative and user-centered approach facilitated rapid prototyping, continuous user evaluation, and adaptive revision throughout the development process. Frequent feedback loops from both PUPR staff and citizen testers ensured that the application met real-world operational needs. This methodology also contributed to a more user-friendly and flexible final product, capable of accommodating future updates such as integration with GIS systems or predictive maintenance analytics. Consequently, the system is not only effective in its current form but also scalable and sustainable for long-term implementation.

In summary, the combination of successful system testing and proven operational effectiveness indicates that the mobile-based E-Reporting system has achieved its design objectives. It facilitates transparent and accountable interaction between citizens and government, improves the efficiency of infrastructure management, and strengthens Palembang City's trajectory toward digital governance and participatory urban development. The findings reaffirm that the integration of ICT in public administration—supported by agile methodologies such as XP—can significantly enhance service delivery, community involvement, and governance transparency at the local level.

Conclusion and Recommendations

1. The E-Reporting application for road damage in Palembang City successfully integrates public participation with administrative management under the PUPR Office.
2. Applying the Extreme Programming (XP) method ensured efficient, iterative development with direct user feedback loops.
3. The application enhances the efficiency, accuracy, and transparency of road maintenance reporting and encourages greater community participation in public service innovation.

Disclosure Statement

The authors declare no conflicts of interest regarding the research, authorship, or publication of this article.

Acknowledgments

The authors express their sincere gratitude to the Department of Public Works and Housing (PUPR) of Palembang City for its collaboration and data support, and to Universitas Bina Darma for providing academic and technical guidance during this research.

References

Faiqoturrohmah, H., & Aji, S. (2020). Road Damage Complaint Service Information System Based on Geographic Information System. *Journal of Informatics Innovation, 5*(1), 1–10.

Prayogi, Y. R., Hardiansyah, F. F., Ramadijanti, N., Ahsan, A. S., & Erifani, U. (2020). Implementation of a Mobile-Based Village Service Application with the Smart Village Concept in Pegantenan Village, Pamekasan Regency. *Selaparang Journal of Progressive Community Service, 4*(1), 646–652.

Purnamasari, S. D., & Panjaitan, F. (2020). Development of a Mobile-Based E-Reporting Application for Streetlight Damage. *JUSIKOM: Musirawas Computer Systems Journal, 5*(1), 59–69.

Santoso, S., Surjawan, D. J., & Handoyo, E. D. (2020). Development of a Barter Information System for Unused Items Using the Flutter Framework. *Journal of Informatics Engineering and Information Systems, 6*(3).

Saputra, A., Herdiansyah, M. I., & Udariansyah, D. (2019). Design of an Android-Based Community Service E-Reporting Application for Buay Madang District. *Bina Darma Conference on Computer Science (BDCCS).*

Saputra, I. P. (2020). Design and Development of SISKA (Career Information System) Android Application. *Journal of Informatics Management, 10*(2).

Siradjuddin, H. K., & Do Abdullah, S. (2019). Implementation of a Social Network-Based E-Complaint Prototype for Customer Service at PDAM Office. *JIKO: Journal of Informatics and Computers, 1*(1), 27–33.

Wicaksono, A., Pradana, F., & Bachtiar, F. A. (2019). Development of an Android-Based Road Damage Reporting System in Malang City Using the Crowdsource Concept. *Journal of Information Technology and Computer Science Development, e-ISSN 2548-964X.*

Biographical Notes

ENDI ANDIKA Undergraduate Student, Department of Informatics Engineering, Faculty of Computer Science, Universitas Bina Darma, Palembang. His research interests include mobile application development, geographic information systems, and community-based information technologies.