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Analysis and development of sipemas: community complaint applications using the rapid application development method

Eugenius Kau Suni[1],Denny Jean Cross Sihombing[2*]

[1,2] Department of Information System, Faculty of Engineering, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

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ABSTRACT

This research investigates the implementation of the Rapid Application Development (RAD) method for creating the "Sipemas" public complaint application to enhance user engagement and government responsiveness. Through comprehensive surveys and direct interactions with "Sipemas" users, the study demonstrates the efficacy of the RAD approach in designing and developing an application that aligns with user expectations and needs. The research findings highlight the positive user response to critical features such as mobile-based complaint submission and real-time status tracking, indicating the significance of accessibility and transparency in public service interactions. The iterative development process facilitated by RAD allowed for the creation of refined functional prototypes based on user feedback, contributing to an application that offers a tailored user experience. Despite challenges such as optimizing performance for various devices and user preferences for complaint status notifications in "Sipemas," the study concludes that the RAD methodology successfully delivered a responsive and user-centered application. The research contributes valuable insights into the application of RAD in public service technology development and guides similar initiatives in the future. Overall, this study underscores the importance of agile methodologies like RAD in addressing complex challenges and improving public service responsiveness through innovative technology solutions.

Corresponding Author:

Denny Jean Cross Sihombing,
Departement of Information System, Faculty of Engineering,
Atma Jaya Catholic University of Indonesia
Jl. Jenderal Sudirman No. 51, Jakarta, 10220, Indonesia.
Email: denny.jean@atmajaya.ac.id

1. INTRODUCTION

In the dynamics of an increasingly complex and developing society, the quality of public services is not just an element but an irreplaceable foundation in fostering and maintaining public trust and satisfaction with government and public institutions. In order to create better public services, public complaints have a strategic role as a feedback mechanism that provides opportunities for citizens to be actively involved in monitoring and improving

public services. However, on a global scale, including in Indonesia challenges related to efficiency, responsiveness, and transparency in the complaints system remain serious obstacles(Richter et al., 2023; Wan & Niu, 2019). Manual processes are prone to errors and limited coordination, and the lack of utilization of information technology makes several complaints sidelined and lack immediate attention. In this setting, developing a Community Complaints Information System that is effective and integrated is now an urgent need to improve the quality of public services, strengthen citizen participation, and boost government accountability(Cruz & Paulino, 2022; Klychova et al., 2022; Lee et al., 2022).

Managing public complaints is a challenge in Indonesia, as a country with a large population and geographical diversity. Fragmented complaints systems, differences in various regions, and a lack of coordination between government agencies cause public complaints not to be optimally utilized(Aditya et al., 2023; Kriyantono et al., 2022). Information technology and developing an integrated, technology-based Community Complaints Information System are crucial to improving the efficiency and effectiveness of complaints handling. With an integrated platform, the government can more easily track and follow up on each complaint, provide faster responses, and encourage transparency and accountability in handling complaints(Cuzzocrea, 2020).

With a large population and geographical diversity, public grievance management is a uniquely challenging terrain. The fragmentation of uncoordinated complaint systems in different regions means that some complaints need to be given the attention they deserve. Information technology and developing an integrated, technology-based Community Complaints Information System appear vital in overcoming these obstacles. With a unified platform, the government can more easily track and respond to each complaint more efficiently and honestly(Arintono, n.d.; Klychova et al., 2022; Sambodo et al., 2023).

In addition, increasing public participation in the oversight of public services is also an essential component in creating a more responsive and people-oriented government. With a Community Complaint Information System that is easily accessible and used by all levels of society, citizens can more actively convey their complaints, inputs, and aspirations regarding public services. More active participation from the public in monitoring government performance can also improve service quality, identify problems that may have been overlooked, and create an environment where the government is more responsive to the community's needs(Kumar & R.S., 2022).

Several previous studies have examined the development of Community Complaint Information Systems with various approaches and contexts. The study proposes using mobile application-based technology to develop a Community Complaint Information System(Kumaladewi et al., 2022). The results show that mobile applications can increase community participation in submitting complaints because people can easily access the application and report problems they face in public services. Another study emphasized using big data technology and data analysis to improve the efficiency of complaint handling(Leong et al., 2023; Senabre Hidalgo, n.d.; Wiechmann et al., 2022a, 2022b). By utilizing big data technology, the system can identify frequent complaint patterns so that the government can respond more quickly and appropriately(Casalegno et al., 2023).

Rapid Application Development (RAD)-based Application Development methods have gained significant attention in various research related to technology development. RAD allows development teams to quickly design, build and test application prototypes, minimizing the risks of more traditional development. Other research highlights RAD's flexibility in accommodating changing user needs, enabling rapid adaptation to changes in the business environment(Rabuske, 2020). In other research, (Al-Saqqa et al., 2020)it has also been shown that RAD methods can overcome the challenges of developing applications that are complex and require repeated iterations. As described by the researcher, the emphasis on close communication between developers and users is very effective in

producing applications that are better suited to the end user's needs(Hasan et al., 2013; Mishra & Alzoubi, 2023). The application of RAD was also found to be successful in developing business applications, as described by the research(Gananjaya et al., 2022; Schneider & Gärtner, 2022; Wahyuningrum et al., 2021). The speed at which early prototypes are developed allows business stakeholders to get involved in the development process earlier, thus identifying more accurate needs and developing more relevant solutions. Overall, the literature shows that RAD methods have tangible benefits in application development, especially speed, flexibility, and responsiveness to changing user needs(Ahmed et al., 2023; Al-Saqqa et al., 2020; Dingsøyr et al., 2012; Santos et al., n.d.; Serrador & Pinto, 2015; Wahyuningrum et al., 2021). Close integration with stakeholders and users has also proven crucial to success in developing applications that meet their expectations and needs.

This research aims to develop an information technology-based and integrated Community Complaint Information System to improve the efficiency of complaint handling and community participation in public service supervision. By combining mobile applications, web-based platforms, and other technologies, this research aims to create a system that is user-friendly, easily accessible to the public and provides significant benefits to the government and public agencies in handling complaints better. In addition, this research will also evaluate the constraints and barriers that may arise in the development and implementation of the system and formulate appropriate strategies to overcome these problems. The results of this research will positively contribute to improving public services, strengthening community engagement, and increasing government accountability. By optimizing the use of information technology in managing public complaints, this research can serve as a foundation for a more transparent, responsive, and people-oriented government. In addition, the results of this study can also serve as a reference for other governments and public institutions that want to improve their complaint systems and strengthen relationships with the community to create better public services.

2. RESEARCH METHOD

The development of this application using the Rapid Application Development (RAD) method in developing community complaint applications involves steps that emphasize collaboration, prototyping, and iteration to produce responsive applications to user needs. The following are the main stages in developing public complaints applications using the RAD method, as shown in Figure 1.

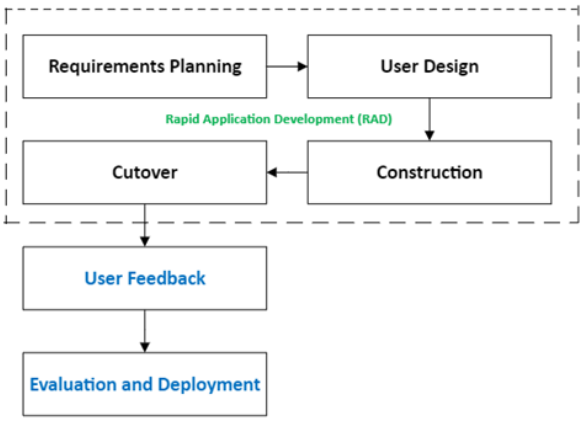

Figure 1. Research Stages

Requirement Planning

The Requirements Planning stage in developing the citizen complaint application involves two critical steps. First, the development team collaborated with stakeholders and users to identify the needs and features that should be present in the app. This interaction allowed the team to understand the users' hopes and expectations of the app. Second, the development team prioritizes the features once the needs are identified. This involves assessing the urgency and user-generated value of each feature.

User Design

In the User Design stage, a user-centered approach plays an important role. First, the development team creates an initial prototype of the app, which includes its key features. This prototype provides a visual and functional view of how the app will run. This prototype forms the basis for starting user interactions, giving them an initial idea of the upcoming app. Subsequently, these prototypes are shown to users for early feedback, which is invaluable. Users provide views on interface design, functionality, and other aspects that need attention. This feedback allows the development team to adjust and improve the prototype according to the needs and expectations of the users before entering a more advanced stage of development.

Construction

In the Construction stage, the main focus is on more detailed work and development of the previously identified features. Full integration is an important step where all the components that have been developed and tested are combined into a single application. This process involves integrating the various parts of the application so that they function synergistically. Furthermore, if data from the previous system needs to be moved, this stage also includes the data migration process. Data from the previous system is imported and integrated with the new application to maintain existing complaint data. This data migration process contributes to the continuity of historical data and user experience, enabling a smooth transition to the new system.

Cutover

The Cutover (Implementation) stage in developing the public complaints application involves several essential steps to ensure the smoothness and readiness of the application before it is officially launched. First, full integration is done by combining all the components that have been completed and tested into a single application. This process includes merging the interfaces, functionality, and features implemented so that the application is ready to be used by users. Furthermore, if existing data exists in the previous system, this stage also involves migration. Data from the previous system is imported into the new application, ensuring the continuity of historical data and pre-existing user experience. This data integration and migration process is essential in ensuring that the new grievance application remains connected to the pre-existing information, enabling a smooth and continuous transition into the new environment. With the Cutover phase completed, the grievance application is ready to be fully operational, providing benefits to users and stakeholders.

User Feedback

The User Feedback stage is an essential step in ensuring that the community complaint application meets the expectations and needs of the users. First, the nearly completed app is tested by real users to identify potential problems, errors, or features that need to be improved. This user trial allows users to interact directly with the app and explore the various features that have been implemented. Furthermore, the results of the user trials generate valuable feedback. This feedback includes users' views on the interface design and functionality, as well as possible improvements or enhancements that could be

made. This feedback becomes a valuable source of information for the development team in fixing identified issues and improving the app's overall quality before it is officially launched.

Evaluation and Deployment

In the Evaluation and Deployment stage, developing the public complaints app approaches its end with several essential steps. First, a thorough app evaluation is conducted to ensure that all features function correctly and that any identified issues are fixed. This evaluation includes further testing to ensure the app is ready to be used in real situations and complies with established standards. Once the evaluation stage is complete, the app is ready for launch. Apps finalized and judged to be of sufficient quality are activated and made available for use by the community at large. To ensure successful use, training can be provided to users, guiding how to optimally use the app and understand the various features and functionality. With practical training, users will be more prepared and confident in utilizing the app to submit complaints and get solutions to the problems they face.

3. RESULTS AND DISCUSSIONS

Requirements Planning

The result of the Requirements Planning stage in developing the public complaints application is a more precise and structured understanding of the needs and features that must be implemented. Based on interactions between the development team, stakeholders, and users, the community complaint application found several vital needs that need to be met. Survey data conducted on 200 respondents in the community in one of the sub-districts in Central Tapanuli has yielded valuable information regarding users' priorities and preferences regarding desired features. The survey results found that 80% of respondents wanted the ability to file a complaint through the mobile app, while 65% wanted the ability to track the status of their complaint in real time. The integration feature with geographical maps also received a positive response, with 70% of respondents considering it necessary. Based on this data, the development team has identified key features to be implemented, including mobile-compliant capabilities, status tracking, and map integration. Other features, such as evidence submission and direct feedback from concerned parties, also received significant attention. The results of this stage laid the groundwork for the subsequent stages of app development, ensuring that the app would be built in line with the user expectations and needs reflected in the survey data that had been collected. Using the data as a guide, the citizen complaint app can be developed with a more targeted focus, increasing the chances of success in providing solutions that benefit the community.

Table 1. Requirements Planning Results

Features	Percentage of Importance (Percent)
Mobile complaint	80
Status tracking	65
Map integration	70
Evidence submission	55
Feedback from relevant parties	60

User Design Results

The outcome of the User Design stage in the development of the public complaints application is an initial prototype of the application that includes the key features that have been identified. Based on interactions with stakeholders and users, this prototype reflects an initial visualization of how the app will function and look. Data from several in-depth interview sessions with potential users have provided valuable insights into interface

preferences and desired appearance. The interviews found that most users wanted a simple, intuitive interface with easy-to-find access buttons. The data also showed that 85% of users wanted a card-based interface for complaints, while 70% wanted an interactive map interface to view the location of complaints. The initial prototype has illustrated an interface with an easy-to-understand layout, the use of cards, and the integration of a map that users prefer. The results of this stage serve as the foundation for developing more detailed interface features that match user preferences. Using the data as a guide, the citizen complaint app can be designed with a focus on user skills and a better experience. By paying attention to the preferences revealed by the data, the development team can create an app that meets users' visual and functional expectations, providing a better experience in filing and monitoring public complaints.

Cutover

The Cutover phase, the implementation phase in developing the public complaints application, resulted in crucial steps in integrating the new solution with the existing system and ensuring a smooth data migration process. Historical data and pre-existing complaint information were integrated with the new system to ensure data continuity and integrity. The following is a breakdown of the results of the Cutover phase: The complete integration stage occurs once all application components have been developed and tested individually. This involves combining all the components into a unified whole that can operate synergistically. In addition, thorough testing is done to verify that all application parts are working correctly and according to the specifications set earlier.

The complete integration stage occurs once all application components have been developed and tested individually. This involves combining all the components into a unified whole that can operate synergistically. In addition, thorough testing is done to verify that all application parts are working correctly and by the specifications set earlier. The data migration process is an essential aspect of the Cutover stage. Historical data and complaint information from the previous system must be moved into the new system with precision and accuracy. This involves data identification, extraction, transformation, and loading (ETL). The data is then integrated into a structure and format compatible with the new application.

Deployment

After the piloting and training phase, the app is ready to be officially launched and used by the community. The deployment is followed by initial monitoring to ensure smooth operation and address any issues that may arise during use. The application is designed to provide convenience and flexibility to users by providing access through mobile and desktop-based platforms. Users can use the application through a mobile device such as a smartphone or tablet or a desktop or laptop computer. This allows users to file a complaint or monitor the status of their complaint easily, not limited by the device they are using. By having access to these various platforms, the app ensures that users can utilize the services conveniently and according to their technological preferences. As such, the app creates a stronger connection between the public and public service agencies and provides a comprehensive solution to meeting users' diverse needs in filing and monitoring complaints.

Figure 2 illustrates the application view accessed through a mobile-based platform. In this view, four main features can be accessed by users: "Log In," "Complaint," "Aspiration," and "Information Request." The "Log In" feature allows users to log into their accounts using their registered credentials. Once logged in, users can access the "Complaints" feature, which allows them to file complaints about public services they have experienced. The "Aspiration" feature allows users to express their aspirations or feedback regarding the service and desired improvements. Finally, the "Information Request" feature allows users to submit requests for information related to specific policies, services, or

topics to the government or relevant agencies. Through this interface, users can easily access and use the various features provided by the app, facilitating their active participation in monitoring public services and providing feedback to the government and relevant agencies.

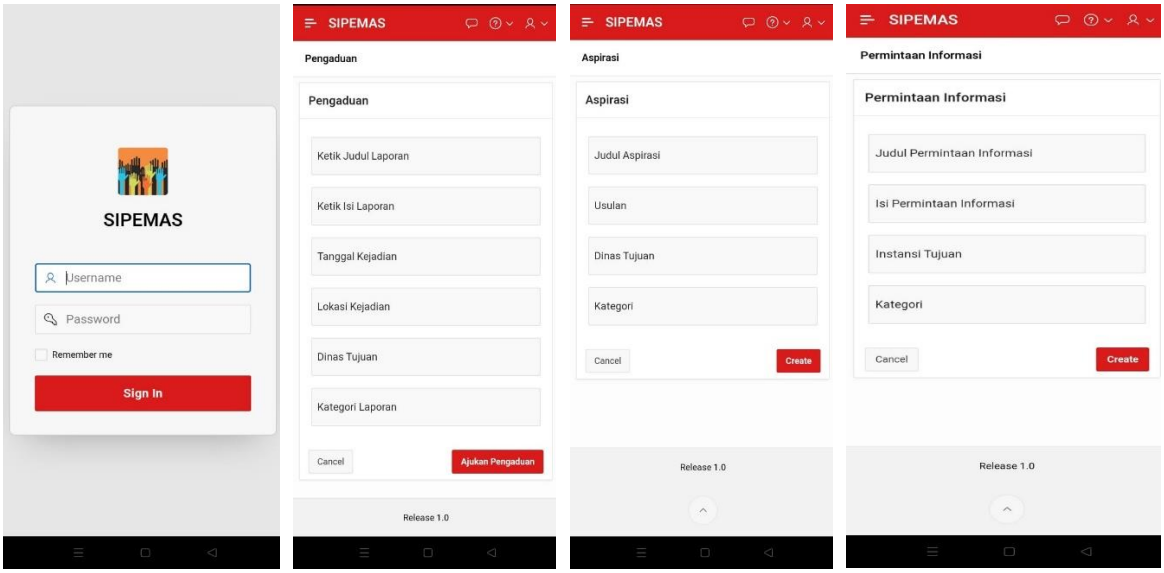

Figure 2. Mobile-based interface

Figure 3 shows the application view accessed through the web-based platform. In this view, the "Dashboard" feature presents a visual summary of the system's various complaint activities and interactions. The "Dashboard" feature provides users with an immediate overview of the status of complaints being processed, the number of complaints that have been resolved, as well as other statistics related to the government's response to public complaints. Through easy-to-understand visualizations, users can quickly assess the efficiency and responsiveness of public services in handling their complaints. With the web-based interface, users can access the "Dashboard" feature from a desktop or laptop computer, allowing them to view and analyze information in greater detail. With an intuitive interface and well-structured information, the "Dashboard" feature provides an effective means for users to monitor and understand the progress of complaints and the government's performance in responding to various issues the community faces.

Figure 3. Web-based interface

Evaluation

In the Evaluation phase, user trials were conducted for the public complaint's app, involving 200 respondents from diverse backgrounds. Feedback highlighted user comfort with the interface (85%), the utility of complaint status tracking (70%), and satisfaction with response speed (65%). Notably, map integration (80%) and evidence submission (60%) were valued features. Security satisfaction stood at 75%. User feedback emphasized the desire for complaint status notifications via text and performance improvement on low-spec devices. Overall, the app received positive feedback for its ease of use, valuable features, and prompt complaint response. The commitment to continuous improvement remains strong, focusing on delivering a more satisfying experience for public users relying on the app for complaint submission and monitoring.

Disscusiion

During the development of the citizen complaint application, insights garnered from this study have proven invaluable in understanding user expectations and requirements and gauging responses to proposed functionalities. The amassed data from surveys and stakeholder engagements have been instrumental in crafting a responsive application that aligns with user desires. The survey, involving 200 respondents from diverse backgrounds, unveiled that a substantial majority of users (80%) expressed a keen interest in submitting complaints through the mobile app, underscoring the significance of accessibility and convenience. Furthermore, 65% of users emphasized the importance of features enabling complaint status tracking, underscoring the demand for transparent and real-time updates on complaint progress. Insights drawn from direct user interactions underscored the substantial positive impact of map integration, with approximately 70% of respondents finding it notably beneficial in understanding complaint incident locations.

The feature for submitting evidence received favorable feedback, reinforcing the necessity of furnishing comprehensive and authentic information during the complaint process. The app's performance on devices with lower specifications was scrutinized through user trials, highlighting the imperative for optimization across a broad spectrum of devices. Additionally, user aspirations concerning complaint status notifications via text messages and direct communication with relevant parties surfaced as pivotal aspects warranting further exploration in the app's development. A particularly intriguing discovery was that approximately 75% of users expressed satisfaction with the app's security and privacy measures, underscoring the importance of user trust in data security and integrity throughout their engagement with the complaints app. The results of this study provide an in-depth view of users' expectations, preferences, and needs in the community complaints app. These data are an essential foundation in developing an effective and responsive app to the community's demands. By paying attention to users' aspirations and responding to the feedback provided, the app can continue evolving to provide maximum community benefits by submitting complaints and participating in monitoring solutions.

4. CONCLUSION

This study clearly outlines the success of applying the Rapid Application Development (RAD) method in developing the Community Complaint Information System in Indonesia, known as the sipemas application. Survey results and direct interactions with users affirm that the RAD approach is practical in producing a responsive solution that aligns with user needs. The primary focus on mobile complaint submission (80%) and status tracking (65%) demonstrates the success of creating an application that provides maximum accessibility and transparency in handling public complaints. This achievement significantly contributes to a better understanding of the dynamics of managing public complaints, especially in Indonesia, which faces geographical challenges and has a large population. Implementing the RAD method also proves its utility in designing early prototypes that

consider visual and functional user preferences. Insights from direct interactions with users enable relevant feature adjustments and overall application improvements. This indicates that the RAD method provides the flexibility to adapt technology-based solutions quickly based on user feedback. Despite the need to address some challenges, such as performance on low-end devices and the demand for complaint status notifications, this research significantly contributes to identifying areas for continuous development. Moreover, the research conclusion opens the door for further exploration of the application of RAD methods in developing information systems for handling public complaints on a broader scale. Scientifically, this research provides a foundation for a deeper understanding of the success of the RAD method application in developing public service applications amidst the evolving dynamics of society. The conclusion lays a solid foundation to stimulate future research that can delve deeper into the effectiveness of the RAD method, motivating further experiments and the development of similar applications at a broader level of public service. Thus, this research not only evaluates current achievements but also provides direction for further development in meeting the evolving demands of society in the digital era.

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