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Developing a User Interface Based on Prototyping of a Website Based Traffic Member Activity Recapitulation System

Moch Nadhif Fadhillah[1], Tedi Budiman[2]
[1,2]Information System, Indonesian Institute of Education, Indonesia
moch.nadif15@gmail.com

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ABSTRACT
The development of information technology has accelerated the need for administrative digitalization within law enforcement institutions, including traffic units. This study aims to design a web-based User Interface (UI) for the activity recap system that facilitates faster, more accurate, and integrated reporting by traffic officers. The research applies the Prototyping method, where system development is conducted iteratively with user involvement in each design evaluation stage. The main features include login, activity report input and verification, data recap, and user account management. The results indicate that the implementation of a responsive and intuitive UI design improves reporting efficiency, reduces data entry errors, and enhances transparency in internal reporting processes. The main contribution of this study lies in providing a user-centered UI design model for activity recapitulation systems in law enforcement environments, particularly for traffic police units, which can serve as a reference for similar digital transformation initiatives.

Keywords : Activity Recapitulation System; Prototyping Method; Traffic Police; User Interface Design; Web-Based Application.

INTRODUCTION

Advances in information technology and the increasing use of smartphones have revolutionized the way public agencies collect and manage their operational data. Traffic enforcement is one sector that has felt the impact, where the use of mobile applications has proven to accelerate the process of reporting incidents, documenting locations, and summarizing officers' daily activities. Several international studies on the use of mobile applications for traffic safety and reporting have also confirmed that this technology is effective in supporting faster responses and improving data accuracy.[1] In regional police environments, particularly traffic units, activity recording and recapitulation are still often done manually or spread across several separate systems. This method presents significant obstacles such as late reports, duplicative data, and difficulties in auditing and verification. Several studies on police information systems emphasize that digitizing the recapitulation process can improve administrative efficiency and accuracy.[2]

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Several studies report that manual activity reporting systems are generally time-consuming and prone to human error. In the conventional reporting process, officers take around 10-15 minutes to complete one activity report, which often results in delayed report submission, incomplete records, and duplicate data. This condition reduces the accuracy of reporting and complicates the verification and recapitulation process, especially in operational units with high activity intensity.[3]

Despite the increasing implementation of digital systems in law enforcement institutions, most existing studies focus on system functionality and data management, while the role of user interface design in supporting usability and operational efficiency remains underexplored. In particular, there is a lack of studies that address user-centered UI design tailored to the working conditions of traffic police officers. This gap indicates the need for research that emphasizes UI development as a key factor in improving the effectiveness of activity recapitulation systems.[4]

Based on these issues, this study designed a mobile application user interface to support the recapitulation of traffic officer activities at the Garut Police Department. In addition to accelerating administrative processes, implementing a mobile-based recapitulation system can also be a strategic step towards modernizing police services. With a responsive and easy-to-understand user interface, traffic officers can report directly in the field without having to wait for manual processing. This approach aligns with the National Police's efforts to realize digital transformation to support effective, efficient, and transparent governance.[5]

METHOD

Prototyping Method

The prototyping method is an approach to software development that emphasizes creating an initial version of a system as a working model that can be tested and iteratively refined. This prototype allows users and developers to interact from an early stage, allowing requirements to be gathered, evaluated, and refined based on real-world feedback. One of its advantages is flexibility: changes to the system's design and functionality can be made before the final system is fully coded and produced. [6]

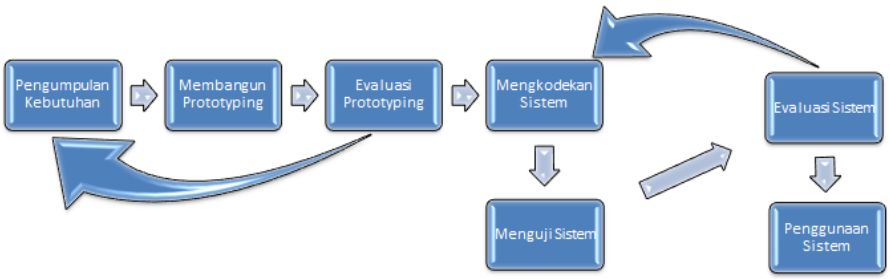

Figure 1. Prototype Method

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Based on the figure above, the Prototyping method consists of several iterative stages, where each stage can return to the previous process to refine the system until it meets user needs. These stages are explained as follows:

1. Requirement Gathering
   In this initial stage, the developer analyzes user needs through interviews, observations, and document studies. The goal is to understand the main features and functions required in the system. The results of this stage form the basis for creating an initial prototype.
2. Build Prototype
   After requirements are gathered, the developer begins creating an initial system model (prototype) that displays the basic interface and main functions. This prototype is not the final system, but rather an initial representation used to assess whether the design and workflow meet user expectations.
3. Evaluate Prototype
   The prototype is then tested and evaluated by users. At this stage, users provide feedback regarding the system's appearance, features, and flow. The evaluation results are used to inform improvements for the next iteration. This process can be repeated several times until the prototype is deemed suitable for the needs.
4. Coding the System
   Once the prototype is approved, developers begin coding using the appropriate programming language and technology. This stage transforms the prototype design into a functional system.
5. System Testing
   The coded system is then tested to ensure there are no bugs and that all functions operate as designed. Testing covers aspects of functionality, reliability, and usability.
6. System Evaluation
   After testing, the system is re-evaluated to ensure it meets user needs and organizational goals. This evaluation also serves as the basis for determining whether the system is ready for use or requires additional revisions.
7. Implementation & Use
   The final stage is implementation, where the system is fully deployed to users. The system begins to be used in actual operational activities, and user feedback is continuously sought to improve the next version.

UI (User Interface)

The user interface (UI) is the visual aspect of a system that connects users with the software through elements such as buttons, icons, and menu layouts. The primary goal of UI design is to create interactions that are efficient, intuitive, and easy for users to understand without requiring special training. A well-designed UI can minimize user errors and improve work efficiency, especially in mobile-based applications used in field operations. [7]

User interface design focuses not only on aesthetics, but also on ease of navigation, speed of access, and consistency of appearance. Research shows that a good UI can improve user experience and user effectiveness in completing tasks. In

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mobile applications used by field personnel, a simple and responsive UI is crucial to allow users to interact quickly without technical glitches. [8]

To increase the depth of analysis of prototyping methods, this research incorporates prototype evaluation techniques to assess the quality of the developed user interface. Evaluation is carried out through usability testing, where representative users interact directly with the prototype to identify usability issues related to efficiency, ease of use, and clarity of interface elements. This process allows researchers to observe user behavior, task completion times, and interaction errors during use of the system.[9]

User interface quality is evaluated using several usability metrics, including task completion time, error rate, and user satisfaction. User satisfaction was measured using a questionnaire adapted from the System Usability Scale (SUS) to assess user perceptions of ease of use and clarity of the interface. These metrics are used as a basis for an iterative process of improving the prototype so that the developed interface meets user needs and supports operational requirements.

Table 1. Usability Measurement Results using the System Usability Scale (SUS)

No	Value	Description
1.	Number of respondents	15 people
2.	Minimum SUS	Score 68
3.	Maximum SUS	Score 82
5.	Average SUS	Score 74
6.	Categories of usability	Good

The results of the usability evaluation using the System Usability Scale (SUS) involved 15 respondents who were system users. Based on the SUS questionnaire calculations, an average score of 74 was obtained. This value is above the usability threshold (score 68), so that the system interface can be categorized as having a good level of usability (good usability). These results indicate that the interface design developed has been able to support ease of use and efficiency in the activity recapitulation process.

RESULTS AND DISCUSSION

User Flow

User flow is a visual representation that depicts the flow or journey of a user interacting with a system or application, starting from the entry point to achieving a specific goal, such as completing a task or accessing a specific feature. This flow helps interface designers understand user behavior, create an efficient sequence of steps, and ensure each interaction process is logical and intuitive.[10]

This diagram, in the GPS attendance system, depicts the interaction flow between users, administrators, and the system in an integrated manner. This diagram helps explain how each actor plays a role in the attendance process, from

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logging in and recording locations to managing attendance data. Through this design, the relationships between processes can be clearly understood, facilitating the development and evaluation of the overall system.

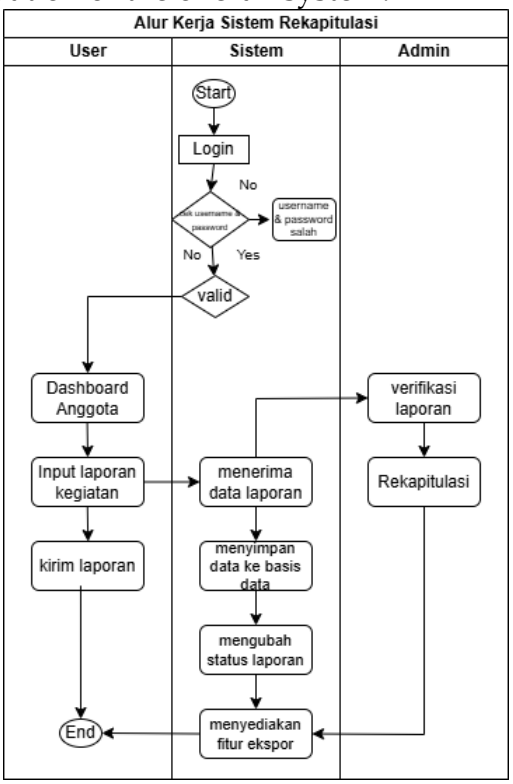

Figure 2. User Flow of the Recapitulation System

Application Interface Design

The application interface design was developed with an emphasis on ease of interaction, uniformity of visual elements, and user comfort during the system's use. Each component is structured to support work efficiency and minimize the potential for errors during reporting and data recapitulation.

1. User/Admin Login Display

   The login page is the main gateway for users to access the web-based Traffic Police activity reporting system. On this page, users are required to enter a username and password according to their access rights, whether as an admin or a member/user.

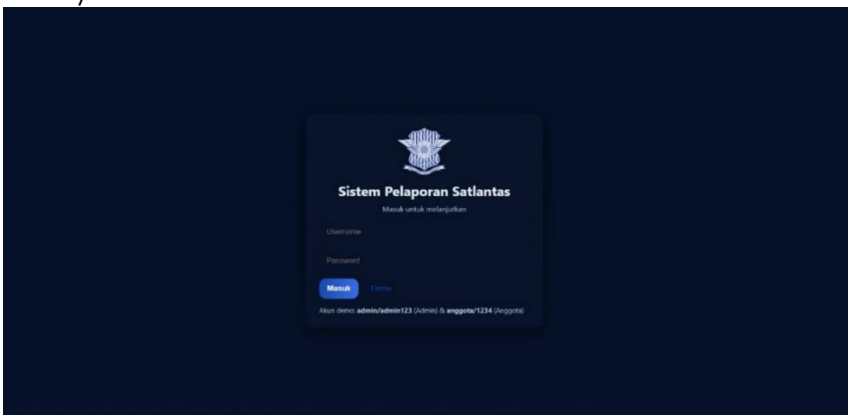

Figure 3. User/Admin Login

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2. Dashboard Display (User)
   The dashboard page in this application is designed to display a concise and informative summary of key information. This display makes it easy for users to monitor report status, view the number of recent reports, and quickly access main menus such as report input, history, and profile.

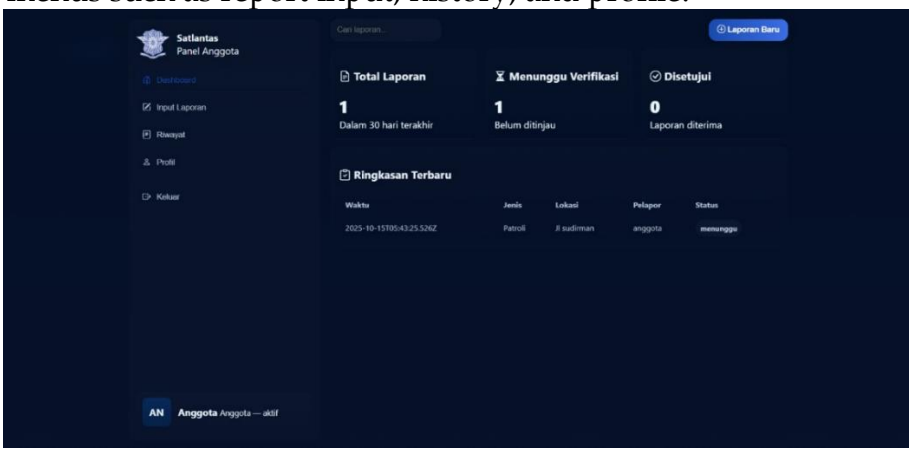

Figure 4. User Dashboard

3. Report Input Display (User)
   The Activity Report Input page is designed to make it easier for members to record activities quickly and in a structured manner. On this page, users can enter important information such as activity type, implementation time, location, and additional descriptions. Additionally, a photo upload feature is available to support data accuracy and report validation in the field.

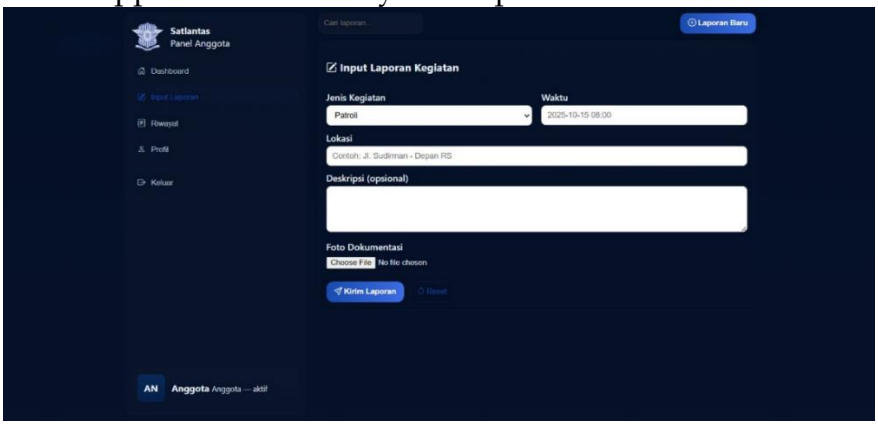

Figure 5. Report Input

4. History View (User)
   The Report History page displays a list of all activities reported by members. On this page, users can view detailed information such as the time of implementation, activity type, location, and report verification status. Additionally, there is a photo column for documentation and an action button for further details.

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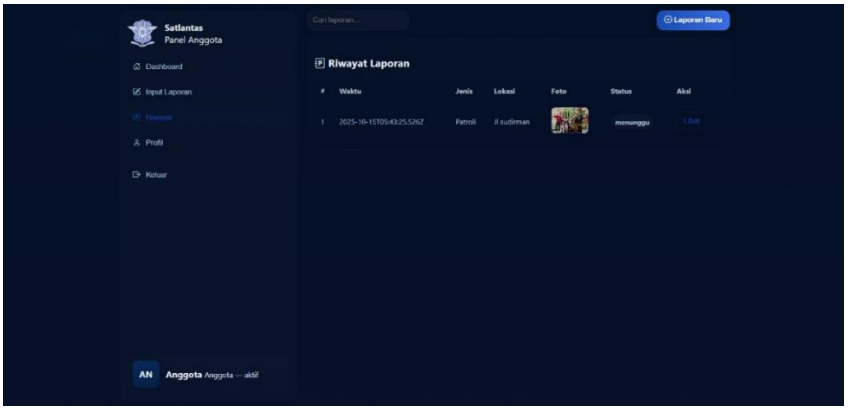

Figure 6. History

5. Profile View (User)

   The Account Profile page is designed to allow users to manage their personal data within the system. On this page, members can view and update information such as their name and username, and change their password if necessary.

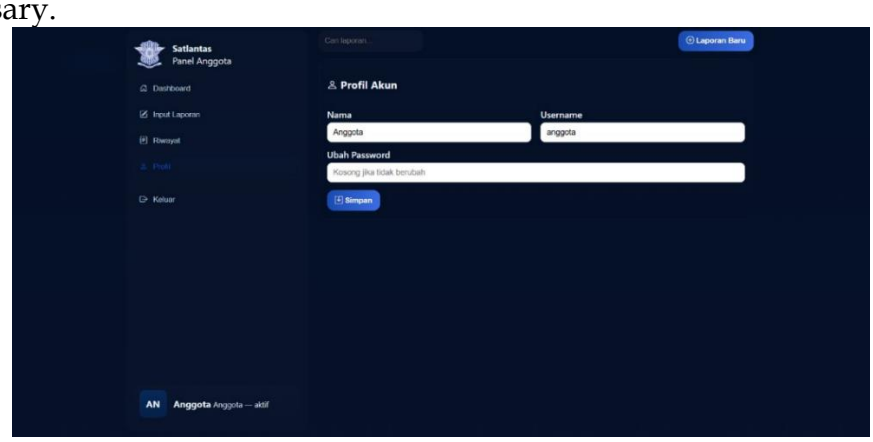

Figure 7. User Profile

6. Dashboard View (Admin)

   The Admin Dashboard page serves as the main control center for system managers to monitor member reporting activity. This view presents important information such as the total number of reports, reports awaiting verification, and active member data. Through a concise and informative interface, admins can easily monitor reports, validate reports, and download data in CSV format for recapitulation and archiving purposes.

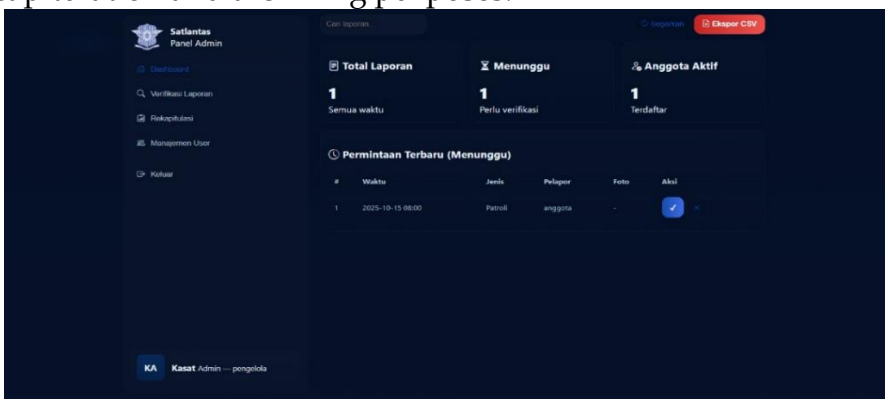

Figure 8. Admin Dashboard

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7. Report Verification View (Admin)
   The Report Verification page is designed to assist admins in reviewing and validating activity reports submitted by members. Through this view, admins can view report details such as time, activity type, reporting party, and attached photographic evidence. The verification process is carried out by assigning an "approved" or "rejected" status based on the results of the field inspection. This feature ensures that every report stored in the system is verified for authenticity before proceeding to the recapitulation stage.

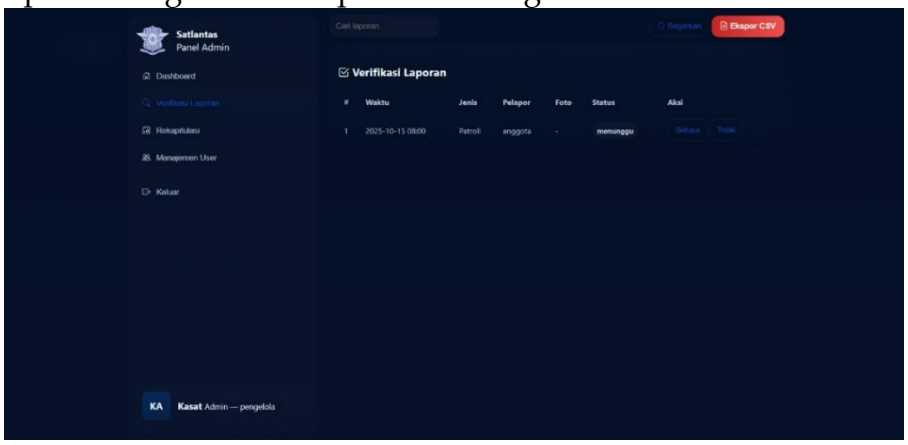

Figure 9. Report Verification

8. Summary View (Admin)
   The Summary page provides a feature for displaying a summary of report data based on a specific time period. Admins can specify the start and end date ranges, as well as select the type of report they wish to display. Once the criteria are set, the system will display the report data according to the selected filters. Additionally, a CSV export feature is available to facilitate downloading and archiving data in spreadsheet format.

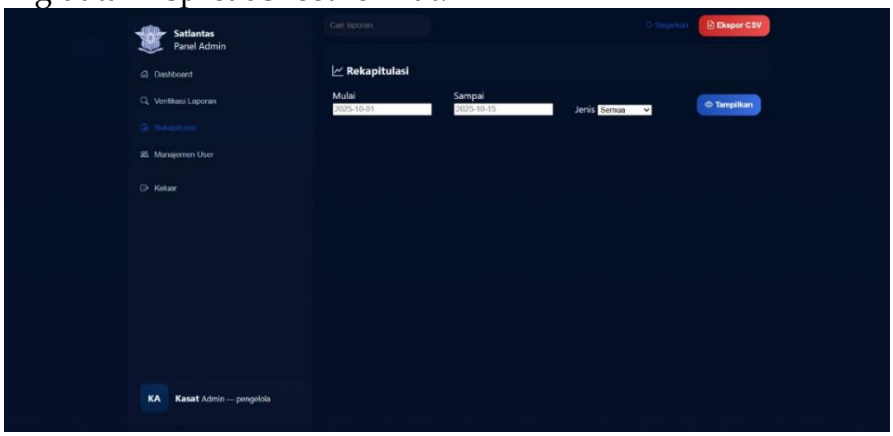

Figure 10. Admin Summary

9. User Management (Admin) Display
   The User Management page is used to manage system user data, such as members and admins. Through this page, admins can add new users by entering their name and email address, and assigning them roles as needed. Furthermore, a list of registered users is displayed in a structured manner, including name, username, status, and access rights. Action features are also

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provided to facilitate management, such as editing or deleting user data. A CSV export option is also available to save user data in spreadsheet format for documentation or reporting purposes.

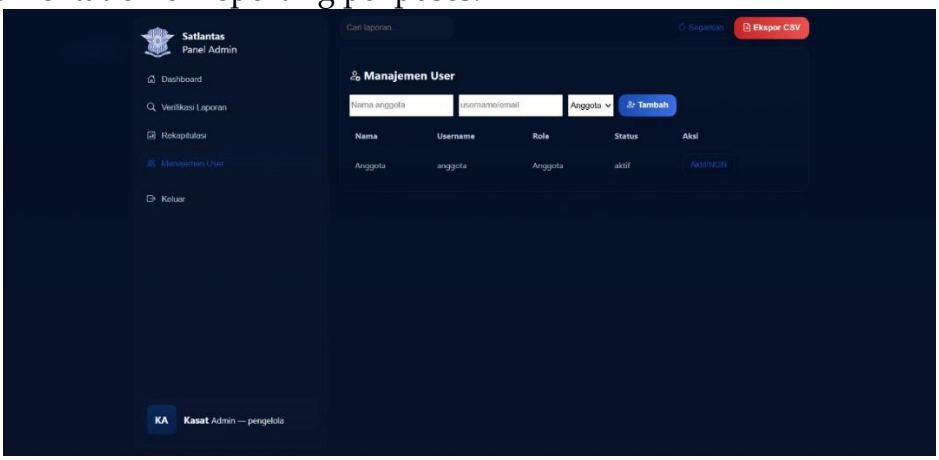

Figure 10. User Management

CONCLUSION

This study shows that implementing a mobile-based activity recapitulation system with a simple and interactive User Interface (UI) design can improve reporting effectiveness and data accuracy within the traffic unit. The responsive UI design makes it easier for personnel to input reports directly in the field without going through time-consuming manual administrative processes. The design results also demonstrate that collaboration between user needs and a prototyping-based design approach can produce an interface that is more appropriate to the operational context of the police force.

Furthermore, this system supports the acceleration of the recapitulation and report validation process through a data verification feature by the admin, thereby reducing the risk of duplication and late reporting. Thus, the mobile-based activity recapitulation system not only functions as a means of digitizing administration but also as a strategic step in supporting the National Police's digital transformation towards transparent, efficient, and accountable services.

As a further development, the designed system can be improved through integration with other information systems that are already used in the police environment, such as internal reporting systems or operational databases, so that data exchange can be carried out in an integrated and real-time manner. In addition, the application of machine learning technology has the potential to be used to analyze activity patterns, identify operational trends, and support more accurate, data-based decision making.

It is hoped that this research can contribute to the development of science and technology in the field of software engineering, especially in user interface design and system development based on user needs. Apart from that, the results of this research can be a reference for other police organizations that wish to digitalize their administrative systems and recapitulation of activities in order to increase efficiency, transparency and accountability of public services.

This research has limitations because it was conducted on one case study, namely the Garut Police Traffic Unit, so the research results and findings cannot be widely generalized. In addition, system evaluation is still limited to the prototype stage and does not include long-term use testing.

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