Transformation of *Binjai* Police Presence Application: UI/UX Design with Design Thinking Method to Improve Efficiency and User Experience

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Abstract:

Attendance systems have become integral to attendance management and employee supervision in various organizations. *Binjai* Resort Police, as a law enforcement agency in the region, is now using an access control system for all its employees. The system is expected to be a new solution for attendance management in the agency, providing efficiency and accuracy in monitoring employee attendance. In today's digital era, attention to user interface (UI/UX) is essential in product development, especially mobile applications. The ultimate goal of this study is to create an attendance mobile application prototype that meets the company's needs. Design Thinking methodology was used to focus on problem-solving by prioritizing end-user needs. The design process consists of five steps: Empathize, Define, Ideate, Prototype and Testing, and Testing. The test results show that the design is already running well, following the needs, and has the potential for further development.

Keywords: UI/UX, Design Thinking, Attendance, Monitoring, Access Control

1. INTRODUCTION

In the era of globalization, *Binjai* Resort Police has become increasingly crucial in facing the challenges that develop amid the dynamics of an increasingly globally connected society. Globalization significantly impacts various aspects of life, including changes in crime patterns, individual mobility, and the rapid flow of information. *Binjai* Resort Police must adapt to these changes to maintain order and security effectively [1]. The application of technology, including attendance and access control systems, is crucial in addressing the dynamics of globalization. These systems not only improve operational efficiency but also help *Binjai* Resort Police be at the forefront of fighting increasingly complex and globally connected crimes. In facing transnational challenges such as drug trafficking, cybercrime, and cross-border terrorism, *Binjai* Resort Police needs to adopt advanced and information-based technologies.

In addition, in managing attendance and supervising employee activities, *Binjai* Resort Police can utilize global communication technology to facilitate cooperation with international law enforcement agencies and strengthen the exchange of intelligence

information. Thus, *Binjai* Resort Police will function as a local entity and as part of a global network working together to maintain security and law enforcement."[2]

2. METHOD

This research utilizes a Design Thinking approach that involves a valued critical thinking process and focuses on creating solutions based on an initial understanding of specific human needs. This approach emphasizes empathy as a starting point to generate more relevant and appropriate solutions to users' needs. This research process consists of five steps: Empathizing, Defining, imagining, prototyping, and testing. (6). Moreover, the Design Thinking process intends to improve the final product's appearance to make it more appealing to consumers. From a User Experience (UX) perspective [13-20], the goal is to enhance the visual aspects of the application by improving performance and simplifying the interface."[5]
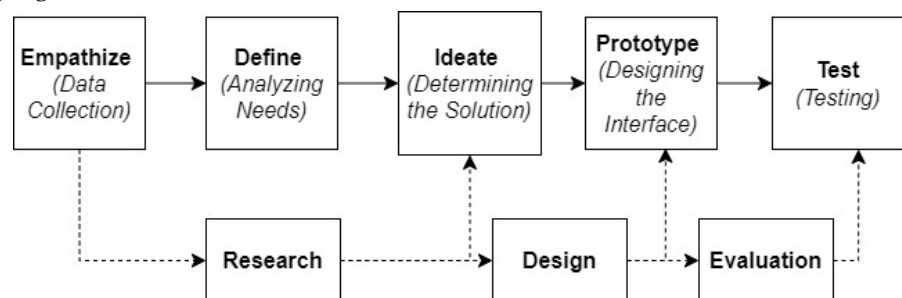

Fig.1 Design Thinking Method

2.1 Empathize

The first step in the human-centered design method is "Empathize," which prioritizes understanding the user's feelings. Observations, interviews, and hybrid approaches that combine the two are used in this method to go deeper into the user's perspective concerning the proposed product. For example, observation can involve direct observation of how users interact with the product, while interviews can include candid conversations with users to understand their needs, expectations, and experiences. This combination approach helps create a deeper understanding of the user's perspective on the designed product [7].

2.2 Define

In the second step, researchers try to generate ideas and solutions to overcome the difficulties faced by users. This is done by analyzing and understanding all the data and information collected in the empathy stage." [5]

2.3 Ideate

In this stage, researchers are trying to design strategies to respond to the concerns expressed by users."[4]

2.4 Prototype

Before entering mass production, this is the step where a product or service is tested to ensure it performs as expected. The interaction network is designed with the user flow

in mind and adapted to the application framework established in the ideation phase. Prototypes, often referred to as archetypes, are early forms that are used as examples or standards in design. Before a product is mass-produced, a prototype is created for testing and development [11].

2.5 Test

Testing is a critical phase after prototype design, aiming to assess how the design can meet the desired goals and needs. In this stage, the developers thoroughly evaluate the prototype's functionality, interface, and general performance. This process involves technical testing and collecting feedback from users that can provide valuable insights into user experience and potential improvements. The information gained from these trials forms the basis for making necessary adjustments and improvements before the product goes into mass production [3]. Moreover, the feedback from prototype trials helps improve technical aspects and formulate future product development directions. Each response from users provides valuable insights into understanding preferences, needs, and expectations that may not have been met. Therefore, the pilot stage is the final step in product development and a stepping stone to continuously improve and refine the design to accommodate future users' better needs [6].

3. RESULT AND DISCUSSION

3.1 Empathize

In this step, an interview was conducted with the Section Head of the Information and Communication Technology (ICT) Division of *Binjai* Resort Police to gain new insights and additional information related to relevant topics. The interview data is presented in Table 1, and the interview documentation can be accessed in Figure 2. This interview process was designed to gain a more in-depth understanding of the management perspective on the issue under discussion. It is hoped that the results of these interviews can significantly contribute to developing the project or research being conducted.

Table 1. Interview Results

No	Questions	Answers
1.	What system do you want to build or develop?	At Binjai Police, there is an ACS system that records all personnel at the police station; in the future, this ACS will be innovated into an attendance system; therefore, it is necessary to develop the old attendance system.
2.	What does the system look like?	The system is an attendance application and includes monitoring, reports, and a history of the personnel's working days.
3.	What are the types of features that will be provided?	Each platform has daily and monthly records that can be printed as attendance confirmation reports.

No	Questions	Answers
4.	For the employee platform, how will the system work?	The employee platform has a daily record and monthly record menu that can be used as a file or printed to confirm superiors' attendance.

Fig.2 Interview with Binjai Police Personnel

3.2 Define

After conducting interviews to identify problems in the attendance mobile application that is being developed, it was found that each feature in the application is able to produce output in the form of soft files and hard files. This output is expected to be helpful information for *Binjai* Resort Police. Based on the results of problem identification, the next step is to create a use case diagram, Activity Diagram, and ERD that can explain the features of each platform in the attendance application system [10].
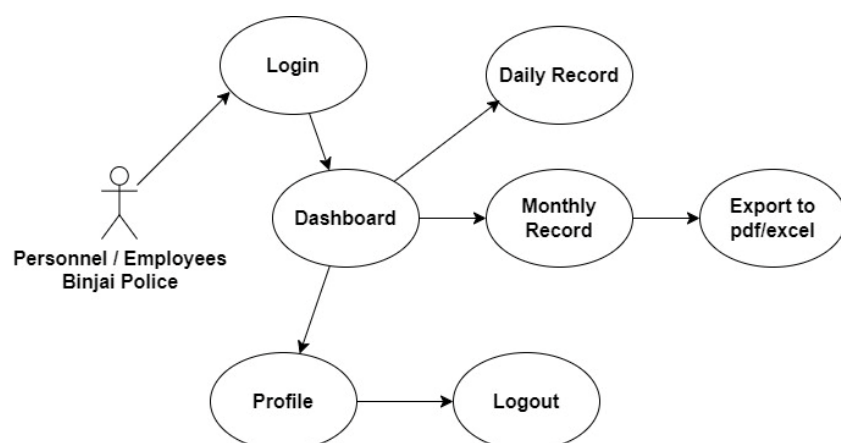

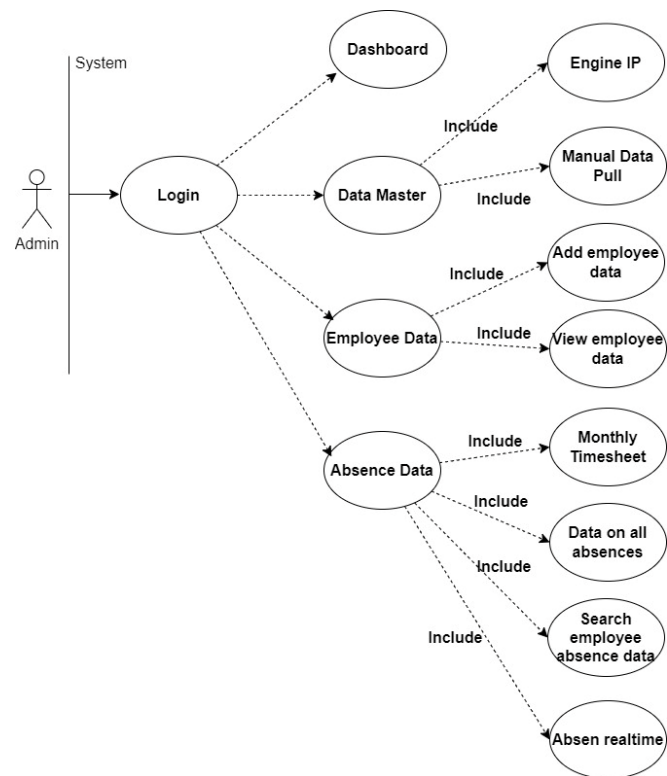**Fig.3** Use Case Diagram of Personnel/Employees
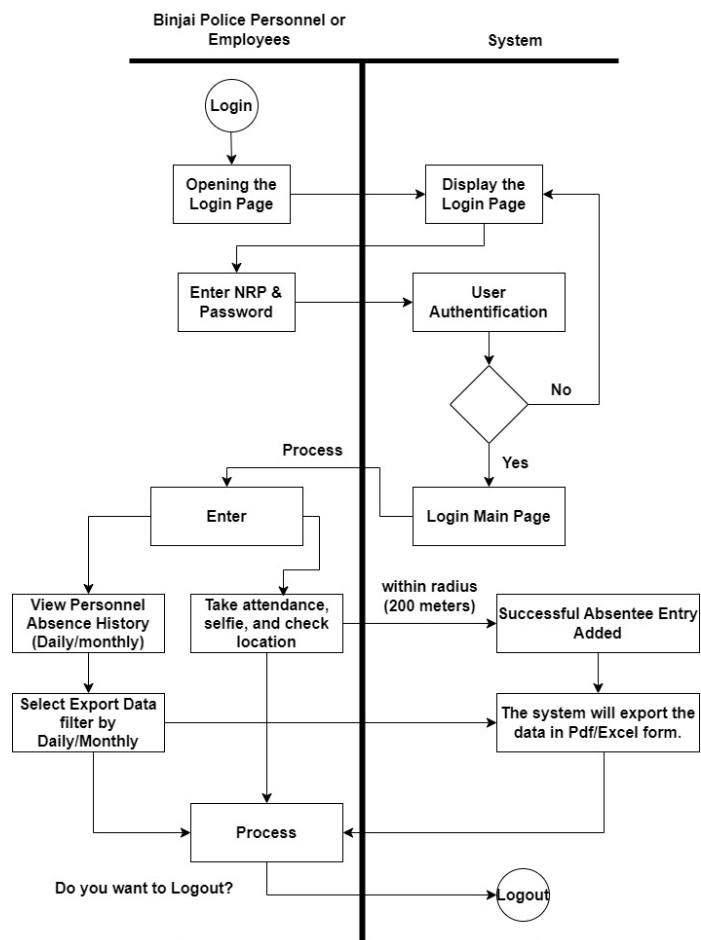
Fig 4. Use Case Diagram Admin

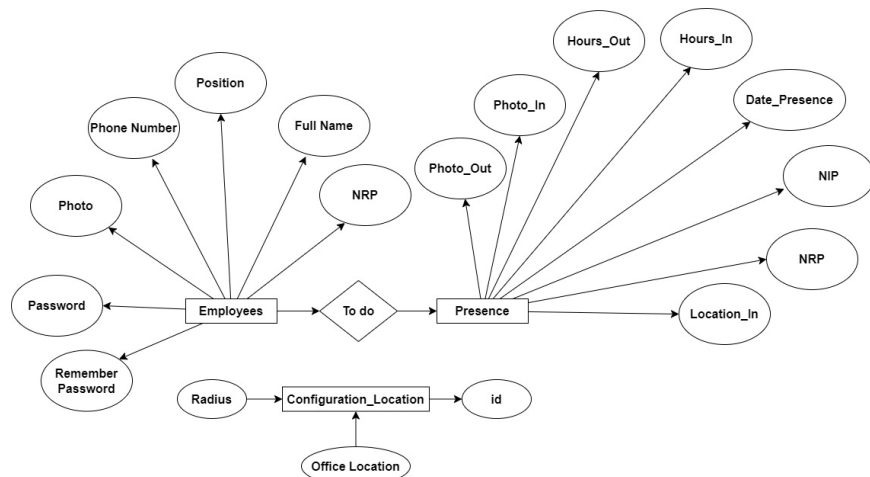**Fig 5.** Activity Diagram of Personnel or Employees

Fig 6. Entity-Relationship Diagram (ERD)

3.3 Ideate

After the concept and process steps of the attendance website system have been developed, the next stage involves creating a wireframe design. Wireframe is a design technique that helps develop a framework for the interface's design components, structure, and layout. This is done to facilitate the preparation of design elements and validate the structure of the elements built into the interface design [8].
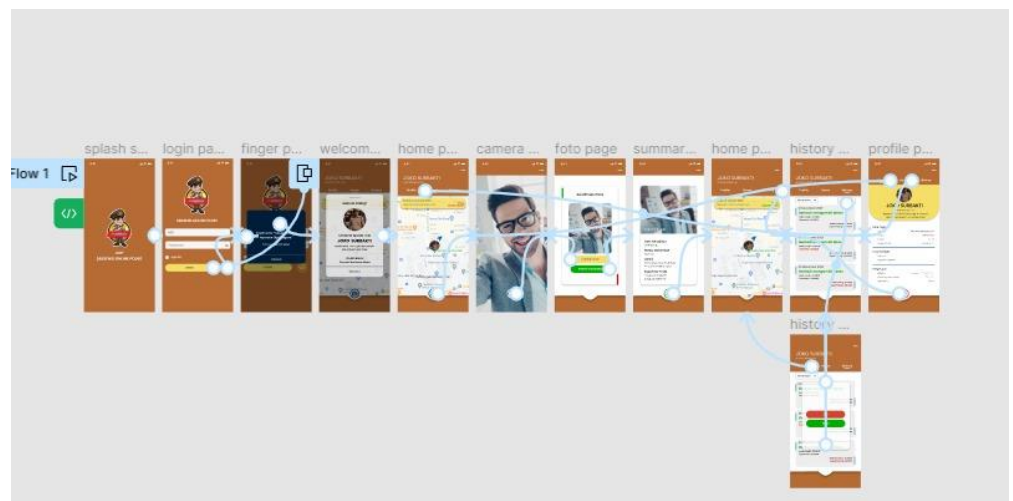

Fig.7 Wireframe

3.4 Prototype

The next step after designing the concept is prototyping to test the reception of the idea. Prototyping aims to evaluate how users respond to the attendance website's user interface (UI/UX). This evaluation helps understand the extent to which the interface meets the needs and expectations of the target users so adjustments can be made to ensure user satisfaction. [9]

At this stage, a design tool called Figma is used. Figma is a design tool used to create the appearance of mobile applications, desktops, websites, and others. Figma can be accessed through an internet connection and is compatible with Windows, Linux, and Mac operating systems. The primary users of Figma usually consist of professionals in the fields of UI/UX, website interface design, and related disciplines [12].
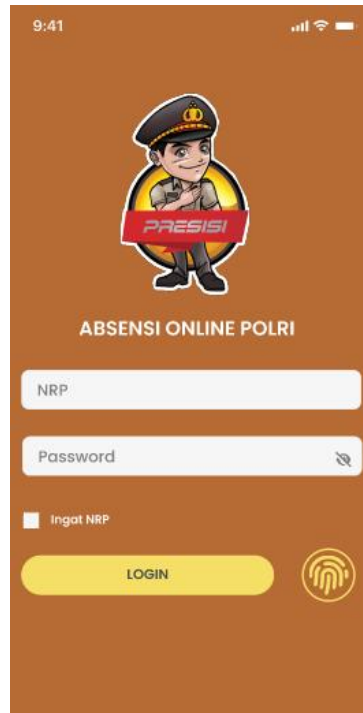
Fig.8 Login View

Moreover, Figure 8 shows the login interface, where there are fields for entering the Principal Registration Number (NRP) and password (Password). Furthermore, Figure 9 shows the beginning after logging in with our NRP and Password, where there is a Personnel or Employee Profile and the rank and position.
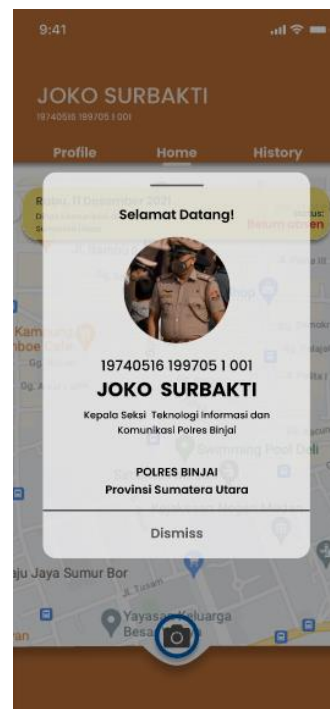

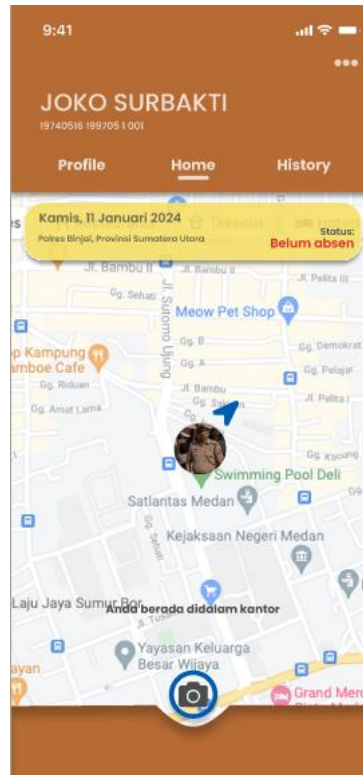**Fig.9** Our initial view after login

Fig.10 Homepage view

Figure 10 displays the homepage of the attendance application for *Binjai* Resort Police. There, we can see the status of users who have not taken attendance. Two exciting features are included: the camera and GPS mapping, which help the attendance process. The homepage focuses on the status of users who have not been absent, providing a visual reminder of their obligations. The camera feature allows users to take pictures or selfies as proof of attendance, giving a personal touch to the process.

In addition, there is also a GPS mapping feature that shows the location where the user has taken attendance. This not only adds a level of security but also ensures attendance is taken from the location it is supposed to be. The combination of the camera and GPS mapping feature increases the effectiveness of the attendance process and provides a comprehensive user experience. Users are not only reminded to clock in but are also given advanced tools to complete the task.

The result of the attendance is immediately visible on the homepage, giving users visual satisfaction. The overall appearance of the homepage creates a user-friendly environment, ensuring that users feel supported in carrying out their daily tasks at *Binjai* Resort Police. Furthermore, The next feature is a selfie or real-time photo taking, the innovative selfie feature in the *Binjai* Resort Police application for the attendance process. Users are invited to take a picture of themselves to authenticate attendance. This selfie feature is more than just an attendance reminder; users actively engage in personalized attendance confirmation using the device's camera. This feature verifies the user's identity in real-time through camera technology. The advantage of the selfie feature lies in the user's direct involvement in attendance validation, ensuring a strong correlation between attendance and the individual. Using selfies as an authentication tool reduces the risk of

misuse or fraud. Taking photos is part of a modern user experience, reflecting *Binjai* Resort Police's commitment to the latest technology in their daily tasks. This selfie feature creates an atmosphere of security and accuracy, supporting the integrity of attendance data for law enforcement purposes at *Binjai* Resort Police. Figure 11 shows the status change after selfies, now "Attended," and displays the real-time location. This change provides immediate visual confirmation and location information, ensuring successful attendance and improving attendance data security. The overall look creates a satisfying and efficient user experience in the *Binjai* Resort Police app.
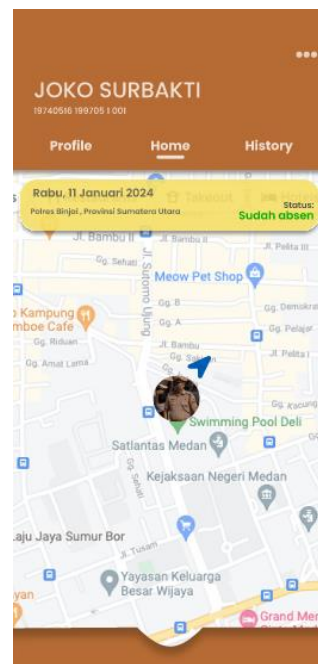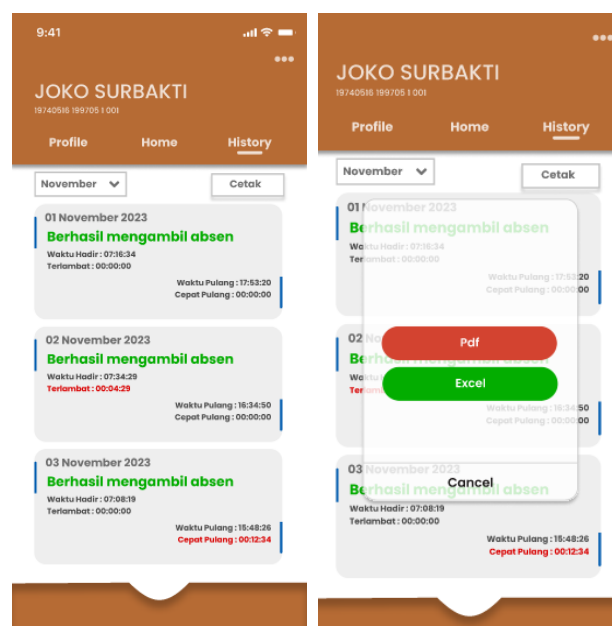

Fig.11 Change After Attendance

Fig.12 Daily and Monthly Record of Attendance

Fig.13 Profile Page

Figure 12 displays daily and monthly attendance records that can be printed in PDF or Excel format. This feature allows users to access, save, or share their attendance records as needed. The flexibility of printing in various formats increases the readability and efficiency of using the *Binjai* Resort Police application in attendance management.

Moreover, Figure 13 shows the user profile page and the log-out feature. In this view, users can access and manage their personal profile information. In addition, there is an option to log out of the application. This feature makes it easy for users to manage and update their profile information. The log-out option gives the user complete control to exit the application session, enhancing security and privacy.

With the intuitive design in Figure 13, users can easily access and manage their profiles and log out of the app quickly and efficiently. This overall look creates an integrated and friendly user experience, ensuring good accessibility and control when using the *Binjai* Resort Police app.

3.5 Test

After prototyping, the next step is to enter the testing stage. The primary purpose of this testing stage is to get feedback from actual users regarding the prototype that has been developed. This aims to assess the extent to which the prototype meets the needs and expectations of users, as well as to identify areas that still need improvement.

Fig.14. Testing and Photo with ICT Police Members of *Binjai* Resort Police

The testing process involved usability testing using prepared User scenarios given to respondents via the Figma link to test the prototype. The results of the usability testing showed a success rate of 100%, where the respondents completed all scenarios. In addition, the user interface design is also considered to be following the needs of *Binjai* Resort Police.

With these positive results, it can be concluded that the research objectives have been achieved. The UI/UX design of the mobile attendance application produced follows the needs set by *Binjai* Resort Police. Users responded well to the prototype, completed the scenarios successfully, and judged that the user interface met their expectations. This confirms the success in achieving the research objectives and provides a solid foundation to continue the application development with the confidence that its design has met the standards and requirements desired by *Binjai* Resort Police.

4.   CONCLUSION AND SUGGESTION

The UI/UX design produced through research using design thinking methods resulted in a mobile attendance application in the form of a high-fidelity prototype. The response to the prototype was very positive, and the suggestions were constructive, positively impacting future product development. The Design Thinking method proved effective in helping application designers and developers by profoundly understanding user needs.

The importance of usability was seen in the success of this prototype, where not only aesthetic aspects but also comfort in using the app were assessed. Design Thinking helps identify the target user's behavior, ensuring that the app is aesthetically pleasing and suits the user's habits and preferences. Thus, the app is more readily accepted by users as it is designed to understand their needs and habits. This product helps participants or users

feel that this application meets their needs in monitoring and reporting attendance. Overall, the Design Thinking method has proven to be an effective approach in designing an app that is visually appealing and pays deep attention to user comfort and needs.

Recommendations for future research involve the continued development of the Attendance Mobile App system from a prototype to a fully functional application. The leading research will focus on system performance optimization and responsive interface design to ensure a seamless user experience across multiple devices. The exhibition range of the application can be expanded along with the development of more comprehensive business procedures, with the integration of additional features that can enrich the application's functionality.

Extensive user testing will be key in getting in-depth feedback from potential users. In addition, more in-depth security research is expected to ensure an optimal level of data protection following applicable security standards to keep up with dynamic user needs; future research could explore more intensive engagement with relevant parties and design practical user training and support programs.

Overall, this future research aims to achieve a higher level of maturity in the development of the Mobile Absence Application, providing an optimal solution in accordance with the evolving needs and organizational development of *Binjai* Resort Police.

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AUTHOR CONTRIBUTIONS

All Authors are responsible for building Conceptualization, Methodology, analysis, investigation, data curation, writing—original draft preparation, writing—review and editing, visualization, supervision of project administration, funding acquisition, and have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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