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Web-Based Flight Schedule Reminder Application

Muhammad Rezalhaque Rismansyah[1], Ahmad Musadek[2], Catur Erik Widodo[3], Lady Silk Moonlight[4]
Politeknik Penerbangan Surabaya, Indonesia

Corresponding Author: Lady Silk Moonlight
D3 Aeronautical Communication
Politeknik Penerbangan Surabaya, Indonesia
Email: lady@poltekbangsby.ac.id

Abstract

The rapid development of the aviation industry in Indonesia, especially in recent years, has created a need for digital solutions that can help passengers manage their flight schedules more efficiently. The final project aims to develop a web-based flight schedule reminder application called "EBAND" that can provide real-time notifications, provide clear gate information and improve their comfort and satisfaction during the air travel process. This research method uses a Research and Development (R&D) approach through the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. At the analysis stage, observations are made on the existing system to understand user needs related to flight schedule management and also the availability of aircraft gate information. Based on the results of the analysis, this application was developed with two features such as flight schedule reminders and also information related to aircraft gates. Application testing involves validators of media and management experts, as well as application users to evaluate aspects of functionality, user interface, and user experience. The data obtained was analyzed using the Likert scale to measure the level of satisfaction and effectiveness of the application. The results of the evaluation show that this application successfully helps passengers in better monitoring and managing their flight schedules, as well as providing a positive user experience. Thus, this flight schedule reminder application is expected to be an effective solution in supporting more organized and efficient air travel in Indonesia. The findings of this study are also expected to be the basis for further development for similar applications in the future.

1   INTRODUCTION

The digital era has brought significant transformations to many sectors, including the aviation industry in Indonesia [1]. Airports, as the first gateway passed by air service users, continue to innovate to enhance operational efficiency and user experience. Indonesian airports, such as Soekarno-Hatta in Jakarta, Ngurah Rai in Bali, and Juanda in Surabaya, have implemented various advanced technologies ranging from automatic check-in systems to facial recognition technology aimed at speeding up the security verification process [2]. Additionally, information technology has been utilized to expand service reach to passengers, including apps that provide real-time information about flights, in-airport navigation services, and digital customer services. RFID technology has also been used to improve accuracy in baggage management, which in its role can reduce incidents of lost or mishandled baggage at airports [3]. According to [4], information technology has played a crucial role in improving service quality at airports in Indonesia, providing a positive impact on the efficiency and security of services

provided to passengers. However, despite significant technological advancements, airports in Indonesia still face several crucial challenges affecting passenger experience, particularly in terms of orientation and departure time management. With all these technological advancements, there are still issues such as passenger confusion about departure gates and delays in boarding planes. This phenomenon is not only experienced by infrequent travelers but also by those who frequently use air services [5]. This issue is generally caused by a lack of available information or a lack of clarity in the information provided. A study conducted by [6] found that one of the main causes of passenger delays is difficulty in finding the correct gate, which often occurs due to last-minute changes in gate assignments or inaccurate information conveyed to passengers. Moreover, although many airports now provide signs and digital information, many passengers still have difficulty navigating the complex and extensive airport facilities [7]. This condition is exacerbated by the continuous increase in passenger numbers, making the need for timely and accurate information increasingly critical [8]. To address these issues [9], the author proposes an innovation in the form of a web-based application, EBAND, specifically designed to improve the passenger experience at airports. This application provides a flight schedule reminder feature that will notify passengers before their boarding time and any changes to their flight gates in real-time. This can help reduce passenger confusion in finding their departure gates. [10] The author chose the ADDIE research model because the product being developed is an applicatin, making the ADDIE method suitable for the product development process. [11] The ADDIE method is one type of Research and Development (R&D) method which stands for Analysis, Design, Development, Implementation, Evaluation. The application of this method will later be used by the author for designing the EBAND application. [12] emphasize the importance of applications that provide real-time information and personalization to enhance the efficiency of passenger journeys. The EBAND application has user-friendly features that can assist passengers in using air transportation services [13]. The implementation of EBAND is expected to significantly reduce problems of delays and passenger confusion at airports. With clearer and more accessible information, passengers can manage their time better, reducing the stress that often arises due to ignorance or misinformation Furthermore, this application can also help enhance the operational efficiency of airports. According to [14], technology that provides real-time and accurate information to passengers not only increases user satisfaction but also helps optimize passenger flow at airports, which in turn can reduce congestion and enhance security. In addition, the use of this application can help airports collect passenger behavior data, which is very useful for analysis and strategic decision-making in improving services and facilities in the future. [15]Amidst the rapid development of technology and increasing needs for efficient air services, the EBAND application offers an innovative and appropriate solution to enhance the passenger experience. With a focus on improving the quality of information and ease of access for passengers, EBAND is expected to become an essential tool in navigating modern airports [16]. Therefore, the author addresses the issues existing in transportation service provision in Indonesia through the final project titled "Web-Based Flight Schedule Reminder Application" based on this background, the research questions raised include: whether the "EBAND" flight reminder application is beneficial for passengers, how this application can help passengers avoid flight delays, and whether this application can be a solution to the ongoing issues at airports.

2 METHODS

This research employs the Research and Development (R&D) method using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) to develop the EBAND web application, which aims to facilitate airline passengers in managing their flight schedules [17]. The analysis phase was conducted by identifying issues faced by passengers at Soekarno-Hatta Airport, such as delays and confusion in finding gates. Based on this analysis, the application was developed with two main features: flight schedule reminders and accurate gate information [18]. The application's design utilizes Glide, a no-code platform that simplifies web application creation with support for data from spreadsheets. The development process is followed by testing using the Likert scale to measure effectiveness and user experience. Testing is conducted to ensure the application functions well before implementation. After passing through the evaluation and validation stages by experts in management and media, the application is tested by users to ensure it meets passenger needs. Once testing is complete and the application functions as expected, the system will be implemented for general use. Research and design began in January to February 2024 in Lampung, while the execution of the design took place from May to June 2024 at the Surabaya Aviation Polytechnic.

3 RESULTS/FINDINGS/DISCUSSIONS

Based on the execution of the design carried out by the author regarding the development of the "EBAND" web-based Application, the research results and discussions will be detailed at each ADDIE stage.

Results of Analysis

This phase is the initial step of the development research. Analysis serves as a measure of the level of deficiencies and problems occurring in current passenger services.

Analysis of the FIDS System at the Airport

Currently, airports in Indonesia are undergoing development with various infrastructure projects to increase capacity and quality of service [19]. The implementation of the Flight Information Display System (FIDS) has helped many passengers find the latest information related to the flights they are on. However, quite a few air passengers still frequently face problems such as missing flights and confusion related to the aircraft gate. Factors such as unclear information about gate changes, inadequate directional signs, and the limited number of FIDS at some airports often cause confusion and difficulty for passengers in finding the right gate. Additionally, passengers who are not familiar with the airport layout or lack of quick and accurate notifications can cause them to miss their flights. These issues present an opportunity for researchers to develop an innovative system focused on the passenger service aspect by creating a web-based application suitable for implementation in the aviation

industry in Indonesia. A system that can be created with not too high production costs and suitable for the increasing use of smartphones in Indonesia.

Analysis of the New System

The "EBAND" application system is created as an innovation by the nation's children in the Indonesian aviation industry [20]. This application is created as an additional facility for air passengers who can access it through a website and find information related to flight schedule reminders and gate information. This new system is created by researchers based on these frequently occurring problems and due to the rapid development of technology. Also, with the already large number of smartphone users who will later be able to access the application that the researcher has created. Here are the available facilities:

1. Passenger flight schedule reminder.

   With the flight schedule reminder for passengers set 3 hours before their flight schedule.

2. Aircraft gate information

   Gate information that can make it easier for passengers without needing to ask airport flight staff.

Results of Design

The results of the design phase will display the design structure of the EBAND application followed by the system flowchart and the appearance of the development of the EBAND web-based application system. Here is the design diagram of the EBAND application structure [21].
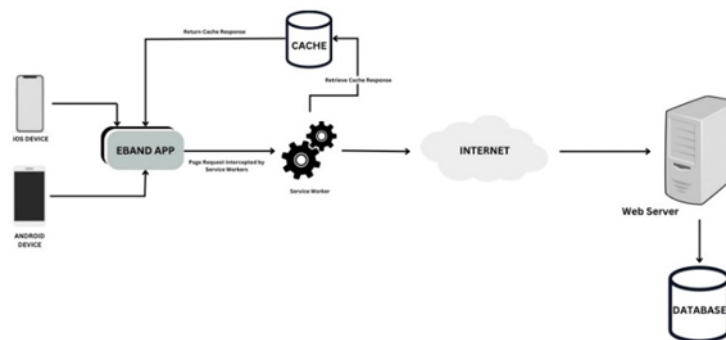

Figure 1. EBAND Application System Design

System Flowchart

The system flowchart consists of a diagram of the work chart arrangement, organized with a flow of activities performed within the system comprehensively, and explains about the sequential procedures found in this application system [22]. The flowchart on the web describes the process flow starting from how to input passenger flight data and the process of accessing aircraft gate information [23].
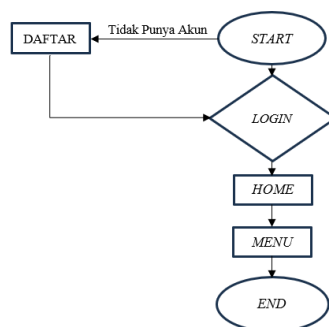

Figure 2. Flight Data Input Process Flowchart

Admin User Interface

Here, the researcher will display the design of the user interface for the admin and the features of each menu or sub-menu option. The design selection is tailored to the needs of the "EBAND" application and the current situation. Below are the menu and sub-menu designs from eband.vercel.app:
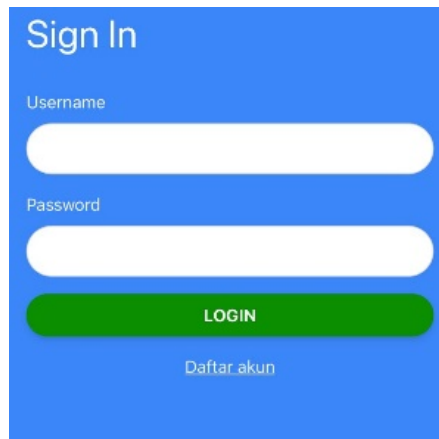
   1.   Login page

Figure 3. Login Page Display

Figure 3 shows the login page of the EBAND application, used to access the main page or the EBAND main interface.

2. Main Page

Figure 4. Main Page Display

Figure 4 presents the main interface of the EBAND application. Three main features of EBAND can be accessed through this page.
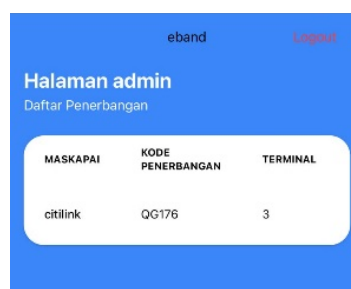
3. Flight Data

Figure 5. Flight Data Display

Figure 5 shows the flight data from several airlines that can be selected according to the passenger's schedule.

Passenger User Interface

The researcher will display the design of the user interface for passengers and the features available in the passenger's application. The design selection is tailored to the needs of the "EBAND" application and the current situation. Below are the menu and sub-menu designs from EBAND.fly:
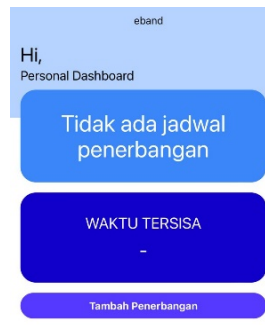
1. Main Page

Figure 6. Main Page Display for Passengers

Figure 6 shows the main page of the EBAND application, displaying information and features of the EBAND application itself.

2. Flight Timer

Figure 7. Flight Timer Page Display for Passengers

Figure 7 shows the flight schedule reminder feature, which passengers can customize according to their needs. Reminders can be set for 6 hours, 3 hours, and 1 hour before the passenger's check-in time.

3. Gate Information

Figure 8. Gate Information Page Display

Figure 8 shows the passenger's flight information and accurate and clearly visible gate information. This feature can save passengers time and effort, preventing confusion in finding the plane's gate.

Development Results

In the development phase of this application, the researcher created an application to be used as a facility medium in passenger services. The development of this application uses a Content Management System (CMS) because using a CMS will facilitate its operation and make it easier to access anytime and anywhere. During the development process, there will be other innovations, such as adding application features and refining the application to improve its quality further. Thus, the application

developed will meet the future needs of the Indonesian aviation industry [24]. The standard operating procedure (SOP) or instructions for use are presented by the author after the appendix section of this final project.

Implementation Results

The implementation phase is where the researcher applies the results from the development phase to the target audience of this application product. The "EBAND" application can be accessed online by air passengers by visiting the website eband [25].vercel.app. A validity test is conducted to determine the extent to which an instrument can be used to measure what it is intended to measure. The validity test in this study was conducted with 20 cadet respondents, using a significance level (α) of 5% or 0.05. To obtain the r-table value, the degrees of freedom (Df) are calculated as Df = N-2 = 20 – 2 = 18, resulting in an r-table value of 0.444. The data is considered valid if the calculated r-value > r-table and the significance value < 0.05. The testing tool used is Pearson's product-moment correlation formula, utilizing the IBM SPSS Statistics 26 application. Below are the results of the questionnaire from 20 cadets of the Surabaya Aviation Polytechnic to test whether the "EBAND" flight reminder application is valid or not [26].

Table 1. Validity Test Results All Variables

No. Item	R Hitung	R Tabel	Keterangan
P1	0.864	0.444	Valid
P2	0.781	0.444	Valid
P3	0.881	0.444	Valid
P4	0.510	0.444	Valid
P5	0.791	0.444	Valid
P6	0.924	0.444	Valid
P7	0.814	0.444	Valid
P8	0.764	0.444	Valid
P9	0.823	0.444	Valid
P10	0.848	0.444	Valid

Based on Table 1, it shows that all items are declared valid because the resulting coefficients are greater than 0.444. Therefore, there is no need to replace or delete any statements.

Evaluation Results

Evaluation is the final step in the ADDIE system development model. The data in the evaluation phase comes from two types of subjects: expert validation and passenger respondents. The opinions and suggestions of airline passengers from application testing are based on the implementation that has been carried out.

The data for expert validation comes from lecturers at the Surabaya Aviation Polytechnic who serve as validators for the "EBAND" application developed by the researcher, namely:

1. Mr. Ahmad Musadek, S.T., M.MT.

2. Mr. Catur Erik Widodo, S.Pd., M.Pd.

In this testing, the validators provide suggestions and opinions for the future development of the system. The results of the expert validation can be seen in the following figure:

Table 2. Expert Validator Result

No	Validator	Conclusion	Suggestions
1	Ahmad Musadek, S.T., M.MT. (Management Expert)	Suitable for use without revision.	-
2	Catur Erik Widodo, S.Pd., M.Pd. (Media Expert)	Suitable for use without revision.	-

Research Discussion

The purpose of this testing discussion is to serve as a tool to assess whether the application is functioning properly or still needs improvements. System testing involves running the software system to determine the compatibility of the application developed by the researcher with the initial design and whether it is deemed appropriate by the researcher. The discussion is conducted by checking each element within the application and identifying any malfunctions at each stage of the developed application. After receiving feedback from passengers, the researcher found that the EBAND application still requires several technical enhancements as the number of users of the EBAND flight schedule reminder application increases, including:

1. The occurrence of bugs/errors in the application.

2. The web-based application is less flexible compared to mobile-based applications. This could ease access for passengers who face internet connectivity issues.

The two main features of the EBAND application are functioning smoothly and can be used effectively as per the designed plan. The EBAND application operates as intended based on the design previously created by the researcher.

CONCLUSION AND RECOMMENDATIONS

The web-based EBAND application with Artificial Intelligence integration is a system created by the researcher in response to various problems frequently occurring at airports in Indonesia. The researcher recognizes that many passengers, especially

those flying for the first time, experience difficulties at airports. Therefore, the EBAND system and interface are designed to be as simple as possible, allowing all passenger groups to access and enjoy it, whether via mobile phones or computers. To implement this application effectively in the aviation industry in Indonesia, a start-up or company with a legal foundation is needed to oversee the production of this system. Additionally, the implementation of this system requires an agreement or MoU between departure and arrival airports and cooperation with airlines interested in using this innovative technology. Such agreements are crucial for optimal implementation with clear legal support.

The EBAND application system still has potential for further development with the addition of more beneficial features for passengers. With additional features tailored to passenger needs, the application can attract more people to choose air transportation due to the convenience and memorable experience it offers. Some feature innovations that can be added include navigation to the aircraft gate, which will help passengers easily find their gate and support the silent airport program to create a more conducive airport atmosphere. Additionally, an AI-based Customer Service feature can facilitate passengers in obtaining information and assistance in real-time, especially during peak passenger volumes. Finally, integration with flight ticket booking will make the EBAND application an all-in-one app, allowing passengers to conveniently use all the necessary features during their time at the airport.

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