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AN ONLINE BOOKING SYSTEM FOR BATU BURUK DRIVING ACADEMY

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KEYWORDS

Online Booking System
Web Development
Waterfall Model
PHP
MySQL
Driving Academy

ABSTRACT

The Online Booking System for Batu Buruk Driving Academy (BBDA) was developed to replace the existing manual-based booking procedures that relied heavily on paperwork, phone calls, and face-to-face communication, which were inefficient, time-consuming, and prone to errors such as double bookings and inaccurate scheduling. To address these issues, a web-based system was introduced to digitalize the booking process while enhancing accessibility and usability for both users and administrators. The system was designed and developed using PHP as the server-side scripting language, MySQL as the database management system, and supported by Adobe Dreamweaver, Visual Studio Code, and XAMPP for development and testing. The methodology applied was the Waterfall Model, a structured and sequential development approach that covered requirement analysis, design, implementation, testing, deployment, and maintenance. The system includes several modules such as user registration and login, booking management, instructor management, and pricing updates. Testing and user feedback confirmed that the system successfully achieved its objectives by improving efficiency, reducing paperwork, and providing a more user-friendly interface. Overall, the Online Booking System for BBDA demonstrates how a driving academy can leverage information systems to modernize its operations, improve customer satisfaction, and establish a foundation for future enhancements such as online payments and mobile integration.

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1.0 INTRODUCTION

Batu Buruk Driving Academy (BBDA) is a Bumiputera-owned driving institution registered with by the Road Transport Department (JPJ) of Malaysia. Since its establishment in 2011 and the commencement of operations in 2013, BBDA has offered various driving license courses, including motorcycles, cars, lorries, tractors, and public service vehicles. The academy is also actively involved in conducting road safety and fire safety training programs to enhance driver competency and reduce road accidents [1-3].

Despite these contributions, BBDA encountered operational challenges due to its reliance on a fully manual booking system. Driving lesson bookings were managed through phone calls and physical visits, resulting in time-consuming processes, excessive paperwork, and frequent errors such as double bookings or missed training sessions. In addition, bookings were limited to office hours, reducing accessibility and flexibility for users with busy schedules [4-6].

Previous studies have shown that web-based booking systems can improve operational efficiency, reduce human errors, and provide flexible access to services beyond conventional business hours. However, many existing driving academies and service booking systems still rely on semi-manual processes and lack real-time availability, centralized data management, and integrated user-administrator platforms [7-9]. These limitations highlight the need for a comprehensive and automated online booking solution.

To address these issues, this study presents the development of an online booking system for BBDA. The objectives of this project are to analyze system requirements, design an effective system structure, and develop a functional web-based booking platform. The proposed system aims to enhance booking efficiency, improve data accuracy, and provide a user-friendly experience for both users and administrators. One of the key strengths of the proposed system is its flexibility to allow students to choose their preferred instructors based on availability and suitability, thereby improving user satisfaction and learning experience [10-12].

2.0 SIMILAR SYSTEM

This section examines three driving academy systems to identify their key features and areas for improvement. Metro Driving Academy, IMRIAKAR, and Unisex Driving School are reviewed to highlight their functionalities [13–15]. By comparing these systems, we can understand why the new Online Booking System BBDA is needed and how it can provide enhanced features.

Table 1 shows the comparison based on important features such as login, user management, instructor details, slot booking, and instructor selection. Even though these systems have basic functions, most of them still rely on manual methods such as phone calls, emails, or WhatsApp, which are slow and not convenient [16–18]. None of them offer a fully automatic, real-time booking system with complete user and admin features in one platform, and also do not allow users to select instructors based on availability and suitability [19–21].

Table 1: Comparison between similar systems

System / Criteria	Metro Driving Academy	IMRIAKAR	Unisex Driving School
Main Page			
Login	Yes, clear login process.	Yes, straightforward login.	Yes, basic login system.
User Management	Allows user registration but no mention of profile deletion.	Basic user registration management.	Minimal user and instructor management.
Instructor Management	Instructor details are shown.	Limited instructor details.	Minimal or no instructor information.
Fee and Price Management	Prices are competitive and provided upon contact.	Prices are not clearly shown online.	Standard pricing; contact required.
Slot Viewing	Requires direct inquiry.	Limited visibility for slots.	Not clearly available online.
Slot Booking	Booking via manual contact.	The booking process is available.	Requires email or phone booking.
Instructor Selection	Instructor details provided, no selection.	Limited or no instructor choice.	No option to select instructors.
Real-Time Availability	No real-time updates.	Static booking availability.	Manual updates for slots.
Flexible Slot Management	Requires manual adjustments.	Cancellation is unclear.	Limited or no rescheduling option.
Admin Logout	Yes, can log out.	Logout functionality is available.	Logout is functional but basic.

3.0 METHODOLOGY

3.1 Development Model

The development of the system follows the Waterfall model, a widely used software development methodology [22-23]. The Waterfall model is a linear and sequential process where each phase must be completed before moving to the next [23]. This structured approach was chosen because the project requirements and system functionalities were clearly defined during the planning stage. The phases of the Waterfall model applied in this project are as follows:

3.1.1 Requirement Analysis

Gathering and defining the system requirements. For the BBDA project, this included understanding the weaknesses of the manual booking process, identifying functional needs such as booking slots, user registration, instructor management, and documenting non-functional needs like security, availability, and performance [24][25][26].

3.1.2 System Design

Translating requirements into system blueprints, including flowcharts, data flow diagrams (DFD), entity-relationship diagrams (ERD), database structures, and user interface layouts [27][28]. The design ensured a stable foundation for implementation.

3.1.3 Implementation (Development)

Building the system using PHP, MySQL, HTML, CSS, and JavaScript [29][30]. Key modules such as user registration and login, admin dashboard, booking management, and price handling were developed to meet project requirements.

3.1.4 Testing

Verifying the system through unit testing, system testing, and user acceptance testing [31][32]. This ensured that the system was bug-free, prevented double bookings, and performed accurately under real usage conditions.

3.1.5 Deployment

Uploading the system to a live environment, where it became accessible to administrators and users [33]. Documentation and user guides were provided to support the smooth adoption of the system.

3.1.6 Maintenance

Regularly updating the system to fix issues, improve performance, and adapt to BBDA's evolving needs, such as adding new license categories or integrating online price features [34][35][36].

3.2 System Design

3.2.1 Data Flow Diagram

The Level 0 Data Flow Diagram (DFD) for the Online Booking System BBDA illustrates the interaction between users, admins, and the central system. Users provide registration details to create accounts, submit booking details to reserve lesson slots, and view price details to complete transactions, while the system processes these inputs and returns outputs such as booking confirmations, price updates, and profile management. At the same time, admins manage instructor details, including profiles and availability, and update price records to monitor outstanding fees, ensuring accurate financial tracking. The system serves as the central hub that processes and integrates all these activities, enabling seamless user management, lesson bookings, and price management between users and admins. Figure 1 shows the Level 0 Data Flow Diagram (DFD) of the Online Booking System BBDA.

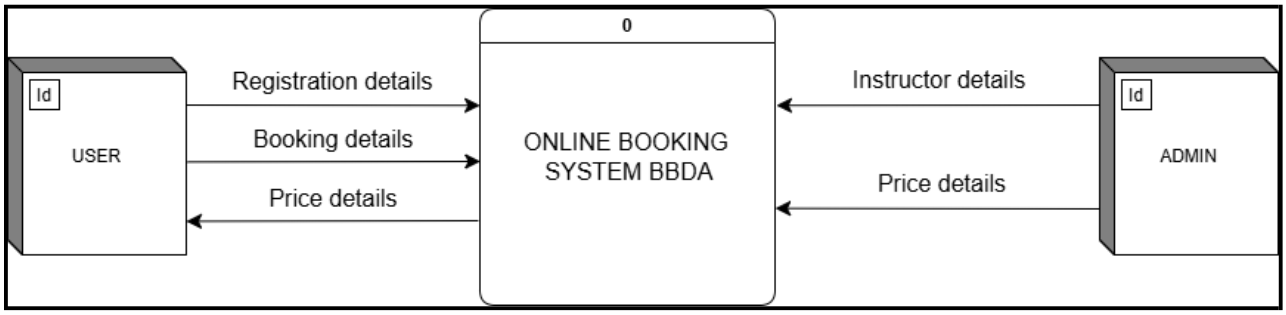

Figure 1: Context Diagram

3.2.2 Entity Relationship Diagram

An Entity Relationship Diagram (ERD) is a visual tool that represents the structure of a database system by showing entities, their attributes, and the relationships between them. For the Online Booking System BBDA, the ERD shown in Figure 2 consists of six main entities: Admin, Users, Instructor, Booking, Pricing, and License Types. These entities store key information such as user details, instructor profiles, booking records, pricing structures, and license categories, while relationships ensure accurate links between them. The ERD provides a solid foundation for efficient data storage, access, and management, ensuring the system operates smoothly and reliably.

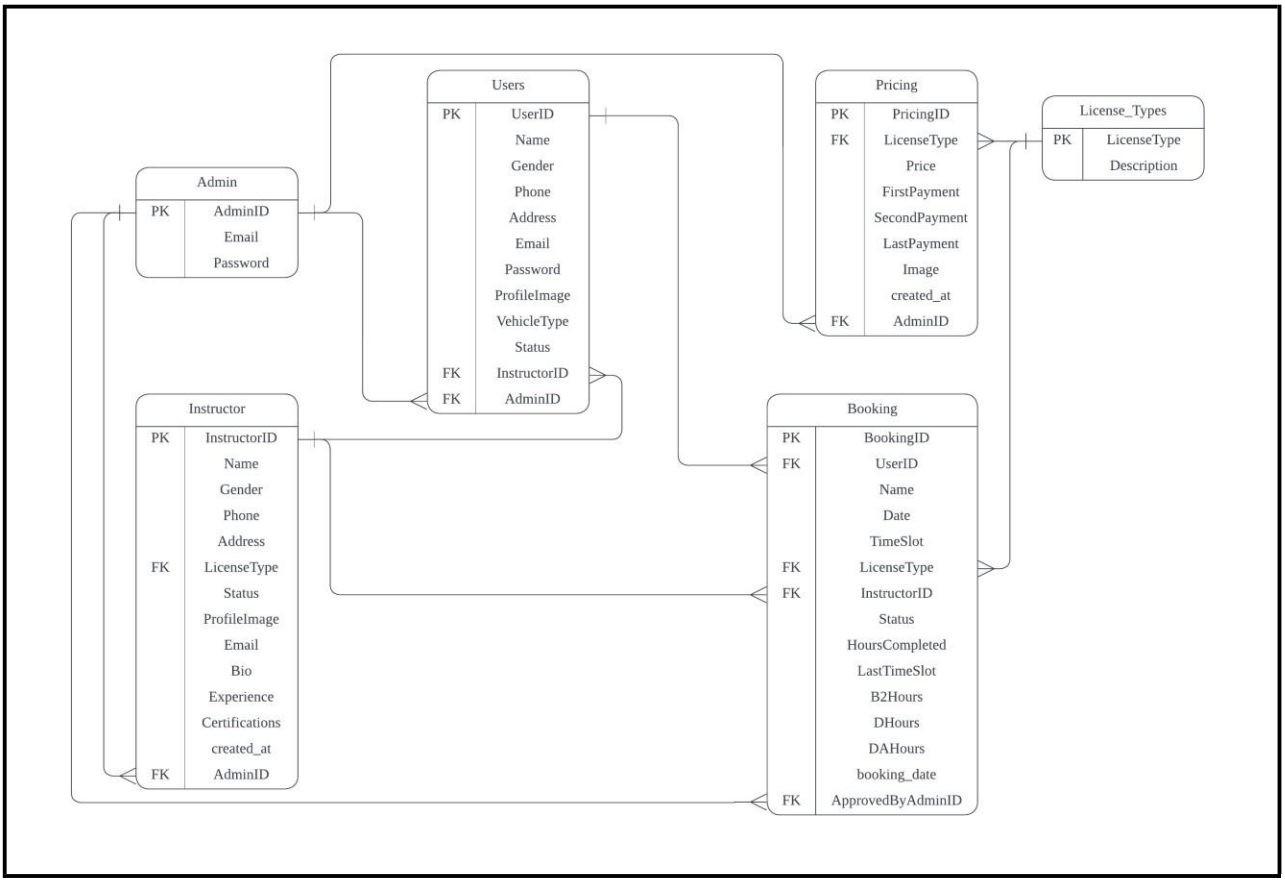

Figure 2: Entity Relationship Diagram (ERD)

3.3 Implementation

The implementation of the system focuses on the lesson booking workflow, which represents the core functionality of the system. As illustrated in Figures 3 to 6, users begin by selecting an instructor, date, and time through the Booking interface. Once a booking is submitted, the system validates availability to prevent schedule conflicts and double bookings.

Users can then monitor their booking details and progress through the Status page. If changes are required, the Edit Booking interface allows users to modify booking information, subject to availability constraints. In cases where a lesson needs to be cancelled, the Booking Cancellation page ensures that users explicitly confirm the action before the booking is removed from the system. This workflow ensures accurate scheduling, improves user control, and enhances overall system reliability.

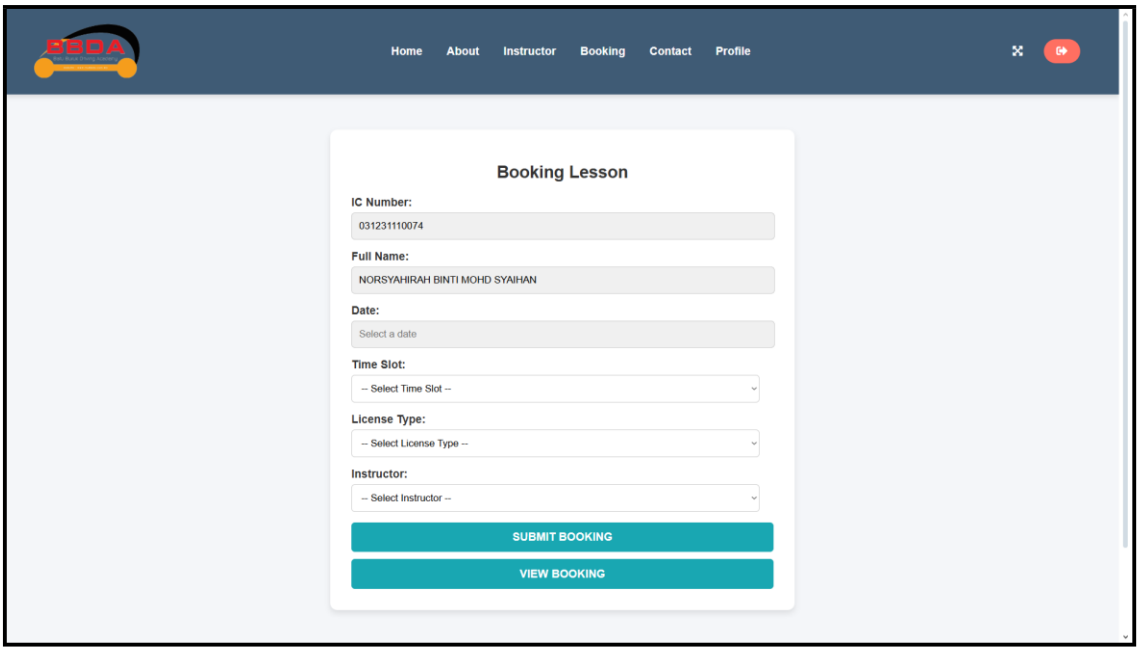

Figure 3: Booking Page

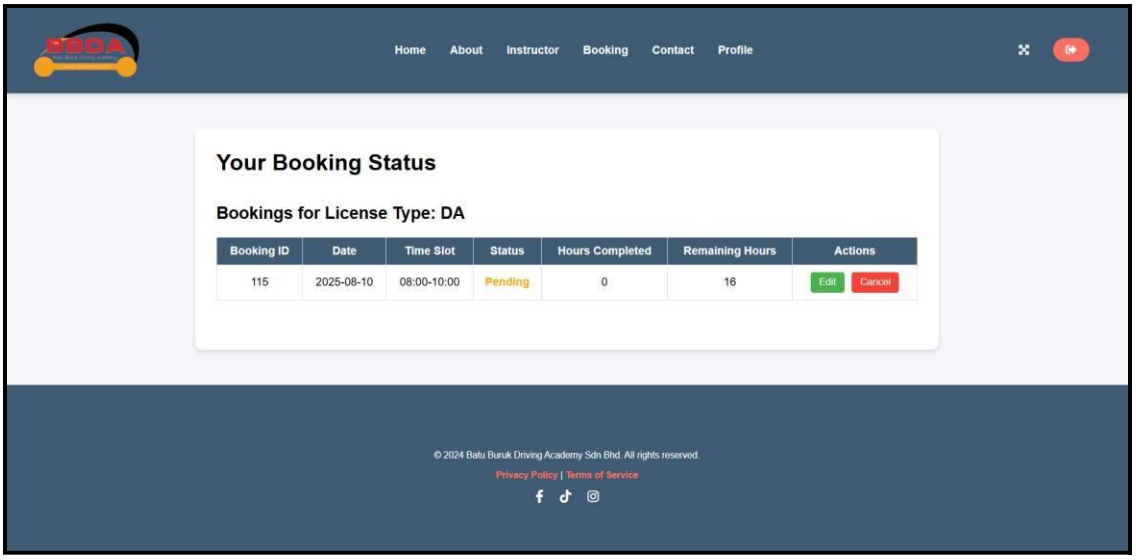

Figure 4: Status Page

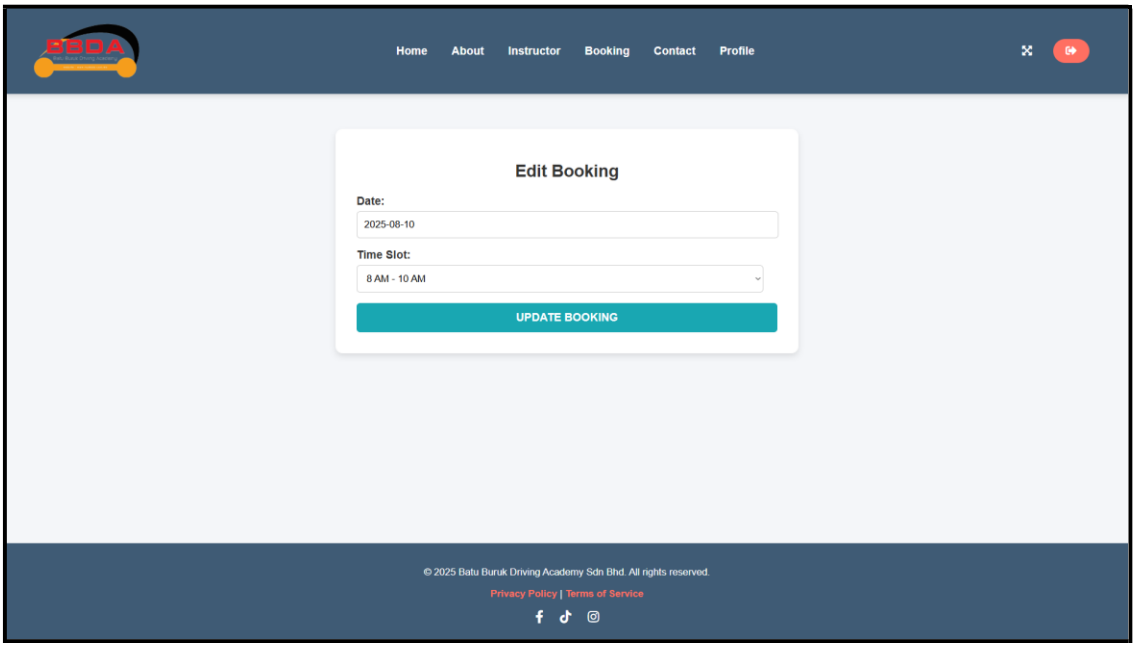

Figure 5: Edit Page

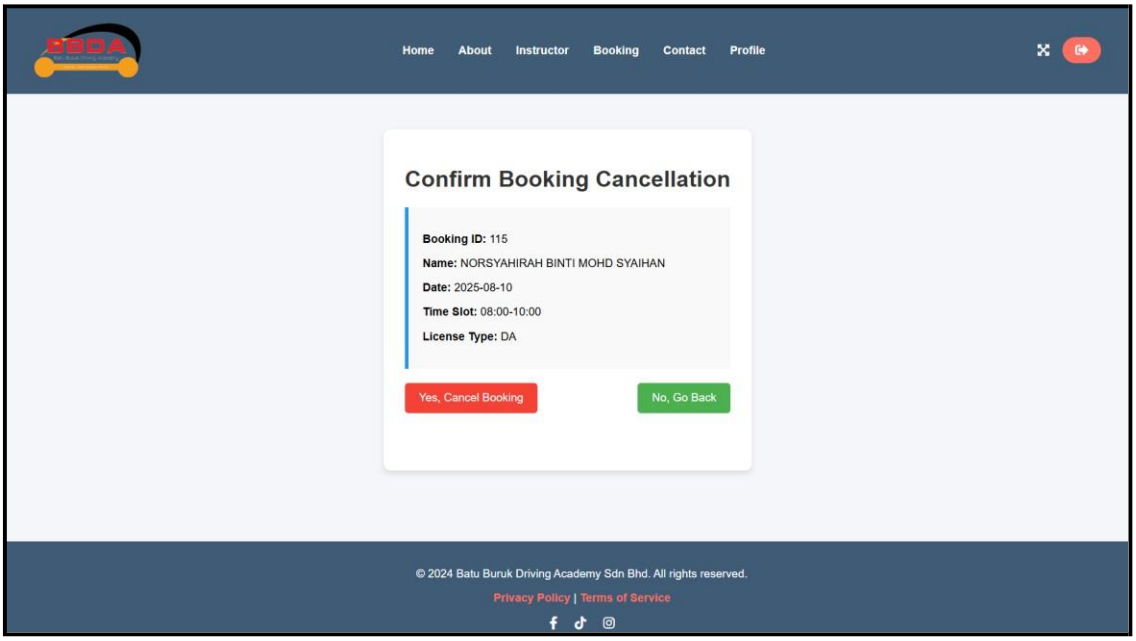

Figure 6: Booking Cancellation Page

4.0 RESULTS AND DISCUSSION

The Online Booking System for BBDA was developed to digitalize the driving lesson booking process at Batu Buruk Driving Academy. Key features include user registration, login/logout, profile management, lesson booking, and package viewing. Administrators can efficiently manage users, instructors, packages, and booking data through a centralized dashboard.

4.1 Testing

The system was evaluated using black-box testing and user acceptance testing (UAT). Black-box testing verified core functions such as user login, registration, lesson booking, booking modification, and cancellation. UAT involved 30 participants from different user groups, including general users, academic representatives, and the BBDA owner. These participants were categorized into five respondent groups, as illustrated in Figure 7, to evaluate system usability, functionality, and reliability. All test cases were successfully executed, and no critical bugs or functional errors were identified.

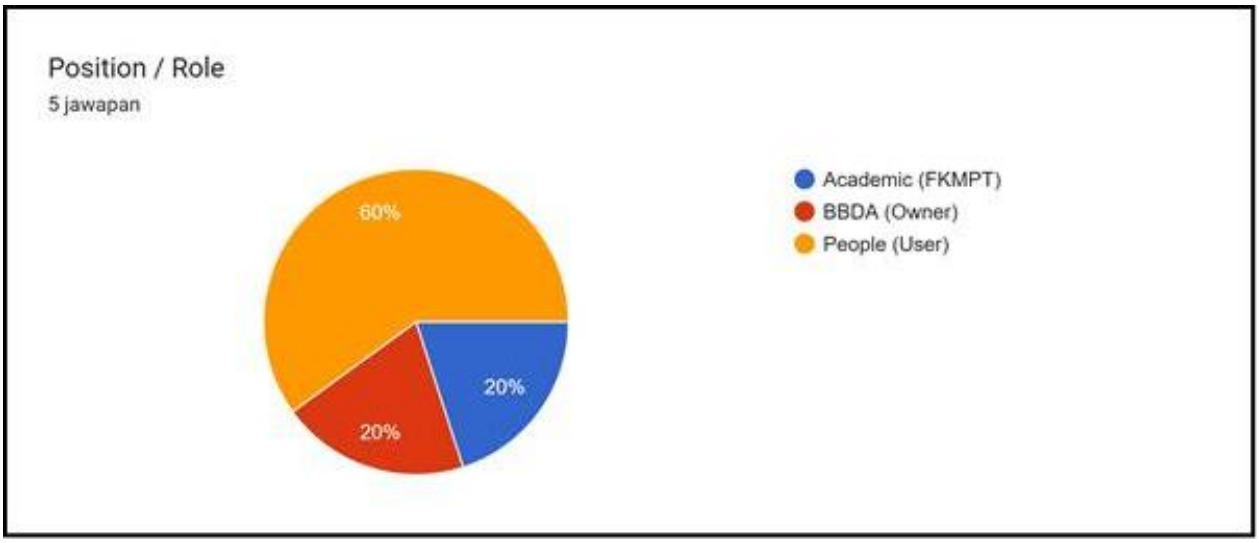

Figure 7: Respondents by Position

4.2 Results and Discussion

The evaluation results indicate that the system functions as intended and improves the booking process compared to traditional manual methods. Users reported satisfaction with system usability, booking workflow, profile management, and accessibility from home. The centralized administrative dashboard also enhanced operational efficiency by streamlining management of users, instructors, packages, and bookings.

Feedback from participants highlighted potential future improvements, such as integrating online payments, adding real-time chat or chatbot support, enhancing mobile responsiveness, and providing lesson progress tracking. These suggestions provide guidance for future system enhancement, ensuring a more comprehensive and user-friendly experience. Figure 8 summarizes the suggested improvements provided by users.

Overall, the Online Booking System for BBDA demonstrates the effectiveness of web-based solutions in modernizing driving academy operations and enhancing user satisfaction.

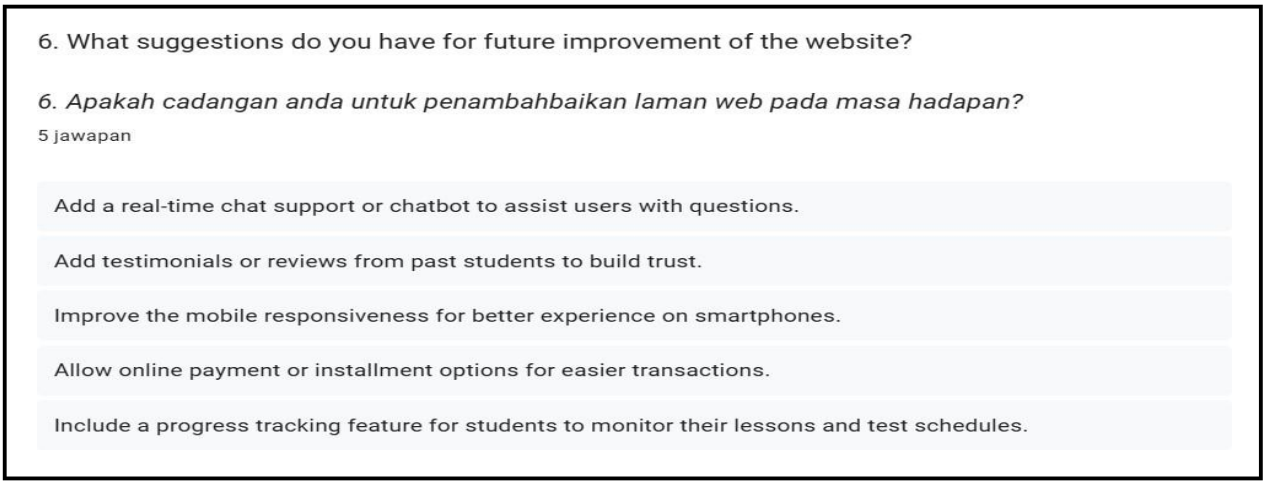

Figure 8: Suggested Improvement of the System

5.0 CONCLUSION

The development of the Online Booking System for BBDA successfully addressed the challenges faced by Batu Buruk Driving Academy due to its previous fully manual booking process, which was time- consuming, error-prone, and limited to office hours. The system achieved its main objectives by providing a digital platform that enables users and administrators to manage lesson bookings efficiently, access instructor information, view lesson prices, and update user profiles in real time. One of the key strengths of the system is its flexibility, allowing students to select preferred instructors based on availability, thereby improving user satisfaction and enhancing the overall learning experience.

User testing involved 30 participants, including BBDA clients, general users, academy staff, and administrators, ensuring that feedback represented a wide range of stakeholders. The results confirmed that the system is functional, user-friendly, and reliable, with all participants successfully completing essential tasks such as registration, lesson booking, booking modification, and profile updates without encountering major issues. The system effectively reduced manual errors, improved operational efficiency, and increased overall user satisfaction.

Overall, the system demonstrates that a web-based platform can effectively modernize driving academy operations, streamline booking management, and serve as a solid foundation for future enhancements such as online payment integration, real-time notifications, and mobile accessibility, ensuring a more convenient, efficient, and professional experience for all users.

Author Contribution

Syahrul Fahmy: Conceptualization, methodology, visualisation and editing. Zainudin: Investigation, writing, testing and editing. Norsyahirah: Writing, coding and editing.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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