Jurnal J-Innovation Vol.14, No.2, Desember 2025
P-ISSN 2338-2082
E-ISSN 2808-5620

Design And Implementation of a Web-Based Camping Reservation System: A Case Study at Gayo Camping Ceria

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ABSTRACT

Nature-based tourism is gaining popularity, especially after the COVID-19 pandemic, as it is perceived as safer, healthier, and closer to nature. Camping is one of the most popular activities in this tourism sector. Gayo Camping Ceria, a nature tourism MSME located in Takengon, Central Aceh, provides affordable camping packages and equipment rental services. However, the reservation and rental process is still managed manually via WhatsApp and social media. This manual approach causes several operational issues, including delayed confirmations, data recording errors, difficulties in monitoring equipment availability, and the lack of centralized transaction documentation. To address these issues, this study aims to design and implement a web-based camping reservation and equipment rental system that automates the entire booking process. The system was developed using the Waterfall methodology, which consists of requirements analysis, system design, implementation, testing, and evaluation. System evaluation was conducted through black box testing to assess functional correctness based on predetermined user scenarios for customers and administrators. Test results show that all core system functions, including user authentication, reservation management, equipment rental, payment receipt upload, and administrative verification, operate correctly and meet user needs. The system implementation demonstrated significant improvements in operational efficiency, transaction record accuracy, and reservation process transparency. Furthermore, the system provides greater accessibility and convenience for users while enabling administrators to manage data and inventory more effectively. These findings demonstrate that the proposed system offers a practical and reliable digital solution for nature-based tourism MSMEs and has significant potential for adoption by similar businesses to support sustainable digital transformation in the local tourism sector.

Keywords: *Reservation System, Digital Tourism, MSMEs, Gayo Camping Ceria, Black-Box Testing*

I. INTRODUCTION

Nature-based tourism is gaining increasing public attention, especially following the COVID-19 pandemic. Outdoor activities such as camping, trekking, glamping (glamorous camping), and ecotourism are becoming trends because they are considered safer, more relaxing, and in line with the needs of a healthy and environmentally conscious lifestyle [1].

Takengon, the capital of Central Aceh, has long been known as an attractive tourist destination. This success is due in large part to the large number of tourists who choose to visit Takengon to enjoy a unique holiday experience. Takengon is renowned as a perfect destination for its stunning natural attractions, offering a captivating natural setting, fresh air, and tranquility far from the hustle and bustle of the capital [2].

One highly recommended destination in Takengon is Gayo Camping Ceria. Located on Jalan Putri Pukes Mendale, Danau Laut Tawar, Takengon, Central Aceh, this campsite offers comfortable and convenient camping facilities. Gayo Camping Ceria focuses on tent rentals and camping equipment sales. Public interest in camping is growing, as people seek to get closer to nature and experience sleeping under the stars. Gayo Camping Ceria addresses this need by

DOI: https://doi.org/ 10.55600/jipa.v14i2.355

providing camping equipment and rental services at economical and affordable prices. Gayo Camping Ceria is a tourism business that still relies on manual systems. Reservations and rentals are managed non-digitally, using WhatsApp or booking directly on-site. This presents a number of challenges, including errors in recording, difficulty coordinating equipment inventory, the risk of losing customer data, and limited automation in payment validation. This situation requires technological intervention that can provide 24/7 access, strengthen data security, and streamline the booking process [3].

The development of information and communication technology (ICT) over the past two decades has had a significant impact on various sectors of life, including tourism. The use of web-based information systems has become a key breakthrough in improving service efficiency, ease of access, and user experience. In the tourism industry, these systems are implemented in various forms, such as online reservation systems, e-ticketing, destination information management, and digital-based promotions through social media and mobile applications [4]. By implementing a web-based reservation system, MSMEs like Gayo Camping Ceria can automate many processes that were previously performed manually. This system can include features such as user account registration, camping package selection, equipment rental, payment receipt upload, order status notifications, and an admin dashboard that can be used to monitor transactions and equipment availability in real-time [5], [6]. Furthermore, such a system can be a cheap, scalable, and user-friendly solution, especially when built using open-source technologies such as PHP and MySQL

In previous research, many web-based reservation systems for tourism services have been developed. Hadiansyah & Munir [7], for example, built a Laravel-based tour package reservation system that is capable of handling customer management and transaction recording automatically, with a usability level reaching 91.42% and perfect functionality. Meanwhile, Sukma [8] demonstrated the effectiveness of using the Laravel framework in developing a travel & tour reservation application, which proved to be more effective and efficient than the previous manual system. These findings confirm that the tourism information system not only improves the user experience, but also supports operational productivity and internal data accuracy.

Based on the background above, the purpose of this study is to design and implement a web-based ticket and camping equipment reservation system at Gayo Camping Ceria. This system will be built using the PHP programming language and the Laravel framework for backend development, MySQL as a database management system, and Bootstrap as a responsive user interface framework. In addition, the system will be tested using a black-box testing approach to ensure functionality runs according to user needs. With this system, Gayo Camping Ceria is expected to carry out a digital transformation that supports service improvements, better data management, and increased customer satisfaction. This research is also expected to provide scientific contributions to the development of information systems in the local tourism sector, as well as serve as a reference for similar MSMEs who want to implement a digital reservation system.

II. METHOD

This research is a type of applied research that aims to produce real solutions through the development of web-based information systems. The approach used is software engineering with the Waterfall development model [9]. This model was chosen because it has a structured flow and is easy to implement in medium scale projects, and is suitable for systems whose needs and objectives have been determined from the start. The research process is divided into several stages, namely:

a) System Requirements Analysis

The initial stage in system development is conducting a requirements analysis. The goal is to thoroughly understand the needs of system users, both customers and administrators. The methods used included direct observation at the Gayo Camping Ceria location and interviews with the owner and staff involved in the booking process. The results of the requirements analysis are divided into two categories:

1. Functional requirements, such as: registration and login, camping package booking, equipment rental, shopping

cart management, uploading proof of payment, and order verification by the administrator.

2. Non-functional requirements, which include user data security, a user-friendly interface, responsive design for access across multiple devices, and access speed and data processing efficiency.

b) System Design

The system design in this study uses DFD shown in figures 1

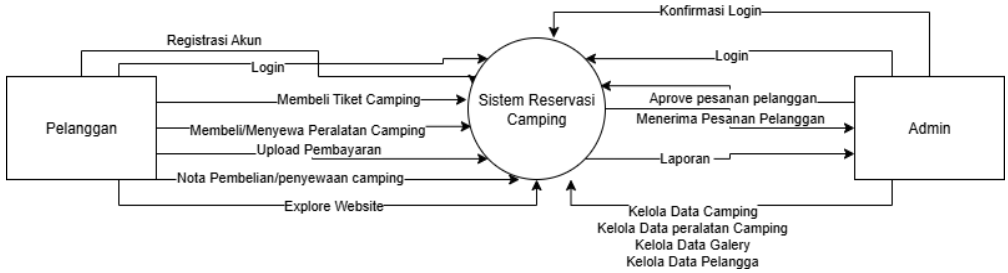

Figure 1. Camping Reservation System Data Flow Diagrams

A Data Flow Diagram (DFD) represents the main processes of a system that interact directly with external entities and illustrates the data flow that occurs. In the Camping Reservation system at Gayo Camping Ceria, the DFD depicts one main process that is the center of activity, namely the process of processing camping equipment sales transactions and digital camping rental services. This main process receives and manages all data flows from two external entities, namely Customers and Admins. Customers are the parties who use the system to make reservations, purchase tickets, rent camping equipment, and upload proof of payment. On the other hand, Admins are the system managers responsible for receiving incoming orders, verifying proof of payment, approving, or rejecting orders, and issuing reports and transaction notes. All these data flows pass through the main process and are directed to entities that correspond to their roles and functions.

c) System Implementation

The implementation phase involves the process of coding the application based on the design. The technologies used include:

1. Laravel, the primary PHP-based framework, was chosen because it supports modular development and strong security.
2. MySQL, a relational database management system, stores all user data, tickets, camping equipment, and booking transactions.
3. Bootstrap is used to accelerate the development process for a responsive and mobile-friendly interface, ensuring the application can be accessed easily on both computers and mobile devices.
4. Visual Studio Code, a source code editor that supports various extensions to speed up the coding and debugging process
5. In this phase, each system module is developed incrementally. Implementation begins with the authentication module, ordering module, shopping cart system, payment receipt upload, and admin management.

d) System Testing

After implementation was complete, comprehensive system testing was conducted. Testing was conducted using the black box testing method, which verifies that each application feature functions according to user requirements without directly viewing the program code. The goal was to ensure that all features function according to user requirements and that the results meet expectations. Testing was conducted across the entire flow, from registration and login, ticket and camping equipment selection, the ordering process, uploading proof of payment, and order confirmation by the admin. Each scenario was tested and recorded to determine whether the actual results matched expectations. Compatibility testing was also conducted on various devices and

browsers to ensure the application could be accessed effectively by users across various platforms. Feedback from early users (user acceptance testing) was also collected to determine satisfaction levels and identify potential improvements.

e) Evaluation and Documentation

The final stage is the evaluation of the test results and documentation of the entire development process. The evaluation was conducted by comparing the new system with the manual process previously used at Gayo Camping Ceria. Evaluation parameters included booking time efficiency, transaction data accuracy, ease of use, and user satisfaction with the system's appearance and flow. This evaluation was strengthened by collecting feedback from early system users and management. The entire development, testing, and evaluation process was systematically documented for scientific reporting purposes and as a reference for further development. The documentation also included the project directory structure, system diagrams, and application usage instructions.

III. RESULTS AND DISCUSSION

The design and development of a web-based camping reservation system for Gayo Camping Ceria demonstrates that the system has been successfully implemented in accordance with user needs. The interface is designed with two main access types: users and administrators (admins). Users can view various camping packages, rent camping equipment, add items to the cart, make payments, and upload proof of payment. On the other hand, admins have access to all data management including user data, orders, media galleries, and site content settings.

A. Front-End Menu

a) Home Menu

The user homepage is designed to be intuitive and easy to use, aiming to provide a positive user experience and make it easier for users to access information or complete certain transactions. Here are some of the key features that have been successfully implemented:

1. Homepage to display package promotions and destination galleries.
2. Camping Package Booking: Users can choose from a variety of camping packages, including regular packages, special packages for two, and family packages.
3. Camping equipment rentals, tents, mattresses, and other equipment can be rented separately from the package.
4. Shopping Cart & Payment: Users can manage orders and upload proof of payment.
5. Admin Panel to manage customer data, orders, camping equipment, packages, and gallery content

b) Camping Package Menu

This camping package menu is designed to make it easier for people who may not have all the necessary equipment or experience to enjoy camping more comfortably and safely. Each package offers different amenities, tailored to its price. The menu includes five camping packages: a general four-person package ranging from Package 1 to Package 3, a two-person package specifically for married couples, and a family package

c) Camping Equipment Menu

In addition to the facilities provided in the camping package, users can also rent or purchase other camping equipment provided in this storefront. The Camping Equipment menu is one of the core features in the reservation system that allows users to rent or purchase camping equipment separately from the tour package. This feature is designed to provide flexibility for users who only need specific equipment according to their needs. In this menu, users can view a list of available camping equipment. Users can select the type and quantity of equipment they wish to rent, then add it to the to the cart for further processing at the checkout stage. The system will automatically reduce stock when the order is confirmed by the admin and update the available quantity in real-time. This menu is also connected to the admin dashboard to facilitate the process of monitoring item

availability and recording rental transactions

Figure 2. Home Menu

Figure 3. Camping Package Menu

Figure 4. Camping Equipment Menu

Figure 5. Camping Equipment Details Menu

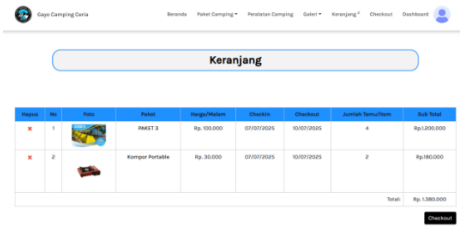

Figure 6. Cart Menu

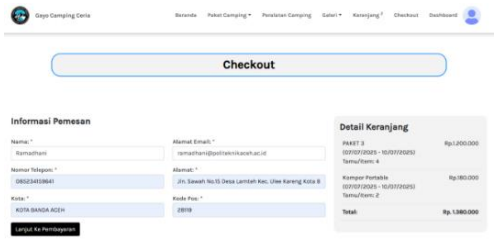

Figure 7. Checkout Menu

d) Cart and Check-Out Menu

The Cart menu serves as a temporary storage area for items selected by the user, whether camping packages or additional camping equipment they wish to rent. After

the user selects one or more items from the service catalog, the system automatically adds them to the cart. This menu allows users to review all selected items. Furthermore, users are given the freedom to add or reduce the number of items, as well as remove certain items from the order list before proceeding to the payment stage. This menu is designed to allow users to thoroughly review their order details, thereby minimizing data and item input errors.

The Checkout menu is the final stage of the ordering process, where users complete the transaction by entering their personal data and uploading proof of payment. After checking the cart contents, users will be directed to the checkout page, which displays a complete order summary. In this menu, users are asked to fill in their order information. Next, users can upload proof of payment. Once all the data is complete, users can press the confirm button to complete the order. Data submitted through the checkout menu will be recorded in the system and directly entered the admin panel with the status "Waiting for Confirmation." The admin will then verify the proof of payment and can change the order status to "Confirmed" or "Rejected" depending on the results of the inspection.

e) User Menu

The user panel in Gayo Camping Ceria's web-based camping reservation system is designed with a simple and user-friendly interface. After logging in, users are directed to the Dashboard page, which displays a real-time summary of their reservation status. Available information includes the number of completed and pending orders. This interface makes it easy for users to monitor the progress of their reservation without having to communicate directly with the management. The main menu in the user panel consists of three sections: Dashboard, Orders, and Canceled Orders. The Orders menu displays a complete list of orders the user has placed, organized in an informative table. Each row of data in the table includes important information such as the invoice number, total payment, bank account number, uploaded proof of payment, and payment date. The table also provides action buttons to cancel an order if necessary, or simply view the order's progress. This gives users the flexibility to manage their transactions independently.

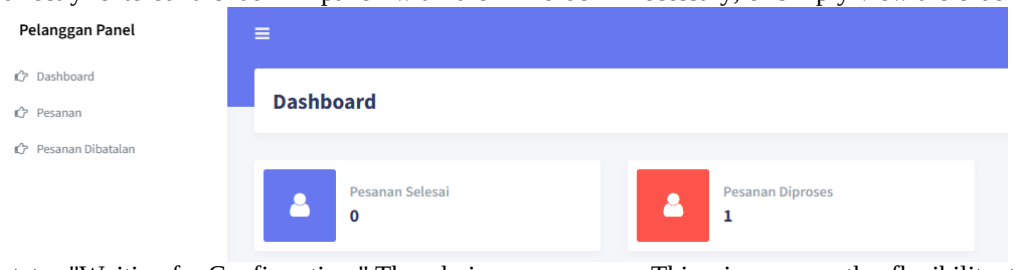

Figure 8. User Dashboard

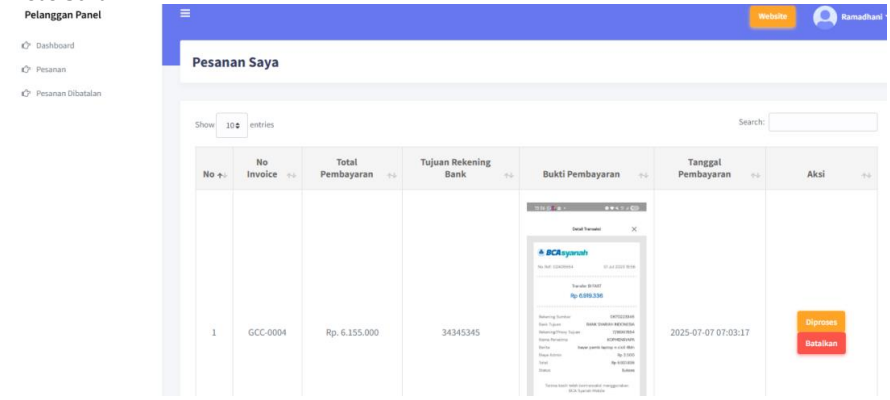

Figure 9. Order Menu

A. Back-End Menu

The back-end menu on the Gayo Camping Ceria reservation system's admin panel is designed to give managers complete control over operational activities digitally. The dashboard displays a summary of key information such as the number of completed orders, pending orders, active customers, total camping packages, and available equipment. This view helps admins quickly and comprehensively monitor service conditions. On the left side, there are various submenus such as Settings, Orders, Canceled Orders, and Rental Data, which facilitate transaction management, payment confirmation, and tracking of camping equipment rental status. In addition, the system is equipped with supporting features such as Pages for managing static information content, Customers for managing user data, and Bank Accounts for displaying payment information. Visual modules such as Slides, Features, and Posts help strengthen user appeal by displaying promotional banners and articles about services. The Photo Gallery and Video Gallery menus serve as visual documentation of activities, essential for promotional strategies. With a comprehensive menu structure and intuitive interface, this system is considered capable of supporting the operations of tourism MSMEs efficiently, professionally, and adapting to the digital era

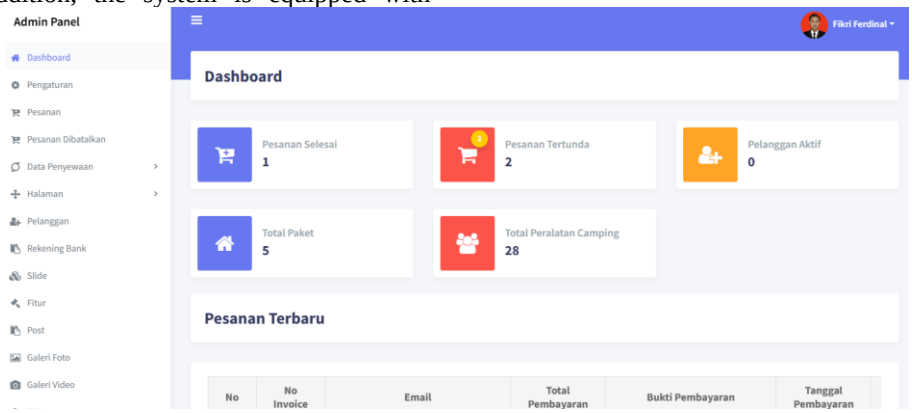

Figure 10. Admin Dashboard Back-end Menu

B. System Testing Results

Based on the results of blackbox testing conducted on all key features in the system, it can be concluded that all system functionality runs according to user requirements. The system successfully handles input and output according to the designed business process flow, both for the user (customer) and admin (manager) roles. Thus, this web-based camping reservation system has met quality standards in terms of functionality and is suitable for use in Gayo Camping Ceria's operations to support the efficiency of digital services. A summary of the system testing

results can be seen in Table 1 below.

Table 1. System Test Results

No	Tested Features	Testing Scenarios	Expected results	Actual Results	Status
1	Admin & User Login	User enters valid username and password	The system successfull y redirects to the dashboard according to the role.	In accordance	Passed
2	Camping Package Orders	The user selects the package and date, then makes a booking.	The order is saved and appears in the "My Orders" menu	In accordance	Passed
3	Camping Equipme nt Rental	User selects tool, adds to cart, and confirms	Rental data is entered into the system and can be checked by the admin.	In accordance	Passed
4	Upload Proof of Payment	User uploads proof of transfer according to the nominal amount	File uploaded and order status changes to "processin g"	In accordance	Passed
5	Admin Verificat ion	Admin opens order details and changes status to "complete d"	Status changed and visible to user	In accordance	Passed
6	Cancel Order (User)	User cancels order before verificatio n	The order moves to the "Order Canceled" menu.	In accordance	Passed
7	Package Manage ment and Tools (Admin)	Admin adds, edits, and deletes package and tool data.	Changes appear immediatel y on the user page.	In accordance	Passed
8	Reports and Statistics on Dashboa rd	Admin sees total orders, equipment, and customers	Data displays correctly	In accordance	Passed

IV. CONCLUSION

This research successfully designed and implemented a web-based camping reservation and equipment rental system for Gayo Camping Ceria, which addressed key issues encountered in the previous manual booking process, such as recording errors, inefficient reservation management, limited inventory monitoring, and a lack of centralized transaction documentation. The system was developed using the Waterfall model and implemented with the Laravel framework, MySQL database, and Bootstrap interface, resulting in an integrated platform that supports online reservations, camping equipment rentals, payment receipt uploads, and administrative verification. Black box testing results confirmed that all system functions operated correctly and met user requirements for both customers and administrators, indicating improvements in operational efficiency, data accuracy, and service transparency. In addition to its practical contribution in supporting the digital transformation of nature-based tourism MSMEs, the system also offers academic value as a concrete implementation of an integrated tourism information system. For future development, the system can be enhanced by integrating an online payment gateway to automate transactions, adding real-time notification features to improve user-admin communication, and developing a mobile app version to enhance accessibility.

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