

Analysis and Design of the Web Base Guesthouse Reservation Information System at Universitas Terbuka Using The Prototype Method

Irpan Kusyadi, Mochamad Bagoes Satria, Hasan Basri

Abstract—Efficient guesthouse reservation management is essential for enhancing the accommodation services at Universitas Terbuka . Currently, the existing system faces limitations in data management and time efficiency, particularly in the reservation, recording, and reporting processes. This study aims to analyze and design a web-based guesthouse reservation information system that is expected to facilitate the reservation process more effectively and transparently. The design approach used is the prototype method, which allows system development based on early user feedback. The research begins with identifying requirements through the stages of communication, planning, modeling, prototyping, and feedback collection. The findings from this analysis serve as the foundation for designing the system model and initial UI/UX. The system prototype is then developed and iteratively evaluated by involving potential users, including guesthouse managers and prospective guests, to ensure that the final design meets user needs.

Index Terms— Reservation Information System, Prototype, Guesthouse, Web Based, Universitas Terbuka

I. INTRODUCTION

The advancement of information technology has had a significant impact on various sectors of life, including the management of public services and administration in higher education institutions. One of the most affected aspects is the accommodation or guesthouse reservation system. In this digital era, speed, accuracy, and efficiency in information delivery are highly prioritized, making the use of information technology a crucial solution to address the challenges of manually managed reservation systems.

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As a large-scale distance learning institution in Indonesia, Universitas Terbuka (UT) faces unique challenges in providing services and facilities for academic and non-academic activities. One of the essential facilities owned by UT is guesthouses used for accommodation by students, lecturers, and other guests.

However, manual guesthouse reservation management at UT often faces several challenges, including data recording errors, slow reservation processes, and limited access to information for prospective guests. These issues not only reduce service quality but also hinder operational efficiency and the management's ability to conduct accurate monitoring and evaluation. To address these challenges, a comprehensive reservation information system is essential to streamline the process and enhance service quality. Effective information management requires well-structured planning methods, supervision procedures, and organizational arrangements that support one another and align with management practices within the company [1].

One proposed solution in this study is the design of a web-based guesthouse reservation information system for Universitas Terbuka. This design is expected to serve as a reference for developers in the future, aiming to create a reservation system that provides faster, more accurate, and real-time accessible services for all users, including students, lecturers, and other guests. With this system, information regarding room availability, reservation processes, and payments can be accessed more easily and transparently.

The system development follows the prototype method, selected for its iterative and user-centered approach. The prototype method allows for intensive interaction between developers and users from the early stages of development. In each iteration, the system prototype will be evaluated and adjusted based on user feedback. This approach enables the system to be more responsive to user needs and expectations, ultimately producing a system that aligns better with real-world conditions. This method is particularly suitable for information systems that involve complex user interactions, such as a guesthouse reservation system,

where user needs may evolve or become apparent as the system develops.

Alternative development methodologies, such as the Waterfall model, employ a linear approach in which each phase must be completed before proceeding to the next. A primary limitation of this method is its rigidity, as it does not readily accommodate changes in user requirements once the development process has commenced. In contrast, the Agile methodology provides greater flexibility through iterative development cycles. However, it often necessitates intensive team coordination and may not be the most efficient choice for small-scale or academic projects [2]. This study analyzes and designs a web-based guesthouse reservation system for Universitas Terbuka to address challenges associated with manual reservation management. By adopting the prototype method, this study is expected not only to produce a system design that meets user requirements but also to enhance the overall experience of managing guesthouse facilities.

II. LITERATURE REVIEW

A. System

A system consists of several components that are gathered together to form a unified whole, operating within a specific environment and constrained by certain limitations [1].

A system is a network of interrelated processes that are unified to achieve a specific goal [3].

Based on expert opinions, it can be concluded that a system is a collection of components or elements that are interconnected to form a unified whole to achieve a specific objective successfully.

B. Information

Information is the result of processed data or data that has been transformed into a useful form to reduce uncertainty in decision-making [4].

Information is the processed result of data and becomes a useful form for the recipient. Information is one of the main resources of an organization, used to control the company in achieving its goals [5].

Based on expert opinions, it can be concluded that information is a collection of processed data that produces something useful, understandable, and beneficial for the recipient as a decision-maker.

C. Information System

An information system is a system within an organization that integrates daily transaction processing requirements, supporting the organization's ability to manage and provide reports needed by specific external parties. The task of an information system is to fulfill the information needs of all parts of the company or its subunits [6].

An information system is a collection of components involved in the process of creating and communicating information within a company or organization [7].

Based on expert opinions, it can be concluded that an

information system is a combination of technology, tools, procedures, and resources that work in an organized manner to achieve a specific goal.

D. Reservation

Reservation is a booking made in advance before arriving at a resort or hotel. Reservations are made to ensure that guests have a guaranteed place upon arrival at the hotel [8].

Currently, reservations can be made through letters, telex, telegram, telephone, direct visits, websites, email, and SMS. Meanwhile, room reservation statuses can be categorized as follows:

1. Confirmed – The reserved room is available and can be provided.
2. Tentative – A booking made by a guest who has provided their address and identity but has not given any guarantee. The guest's arrival and departure dates are still undetermined.
3. Waiting list – A situation where all hotel rooms are fully booked, but additional reservations are still being made.

The reservation process always begins with an activity to search for room information. The desired room details typically include price and facilities, such as the number of beds, air conditioning, and other features.

E. Literature Review

Various studies have developed reservation systems to enhance accommodation management efficiency. At Hotel Mitra Muara Enim, a web-based system using the Prototype method was implemented to streamline booking, check-in, room service, and checkout [9]. A similar system using UML and PHP MySQL was developed at PPSDM Migas Cepu, though further improvements are needed in usability and security [10]. Wisma Athlete adopted an Android-based system with the Waterfall method and Vue JS 2.0 to optimize reservations and management [11], while LPMP Jambi transitioned to an online system to replace manual bookings and support non-tax state revenue (PNBP) [12]. Meanwhile, Penginapan A2Hay implemented a desktop-based system using Visual Basic and Microsoft Access for reservations, payroll, and reporting [13]. Lastly, a study on Kos Wisma Cirebon introduced a prototype-based digital reservation system using OOP and UML to enhance efficiency and reporting accuracy [14].

III. RESEARCH METHOD

A. Data Collection



Figure 1. Data Collection Method

1. Interview

Interviews are conducted with management, employees, and users of the Universitas Terbuka Guesthouse to gather insights on business processes, administrative needs, and user requirements for the digital reservation system. This ensures the system is user-friendly and meets stakeholder expectations. The interviews are carried out through Focus Group Discussions (FGD) for a comprehensive understanding.

2. Observation

This is conducted through direct observation of the current system in operation. During the observation, validation of the information obtained from interviews can also be carried out. In addition to understanding the ongoing business processes, data collection is also performed by gathering relevant documents used in the existing system, such as manual reservation documents.

3. Literature Review

Data collection is carried out directly from various sources, such as journals, guideline books related to this research, and knowledge gained from the researcher's own experience or previous studies conducted by other researchers.

B. Prototype Method

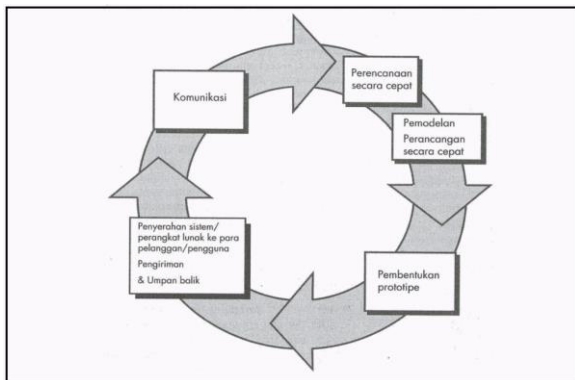


Figure 2. Prototype Method

1. Communication

The initial stage of the prototype method aims to identify existing problems in the current system and gather necessary information to develop the software.

2. Planning

This stage involves determining resources and specifying functional and non-functional requirements based on the communication results to ensure the development aligns with expectations.

3. Modelling

This stage represents or visualizes the system to be developed, such as using Unified Modeling Language (UML) for design. Models created in this phase may include Use Case Diagrams, which help identify the system's main functions, and Activity Diagrams, which visualize business processes or workflows. Additionally, database

design modeling is also conducted. At this stage, the prototype is built as a temporary design and evaluated by customers to determine whether it meets their expectations or needs further refinement

4. Prototype Development

This stage involves building a prototype that aligns with the previously designed model. The prototype can take the form of wireframes or mockups resembling the actual application, created using specialized prototype development software.

5. Delivery and Feedback

Once the prototype is completed, it is handed over to users, who then provide feedback for further refinement.

IV. RESULT AND DISCUSSION

A. Use case Diagram

A Use Case represents a specific interaction between a user (actor) and a system to achieve a particular goal. It defines how a system responds to user actions by outlining the steps involved in a process. Use cases are typically visualized using Use Case Diagrams in Unified Modeling Language (UML), which show the relationship between actors and the system's functionalities. They help in understanding system requirements, improving design clarity, and ensuring all user needs are addressed.

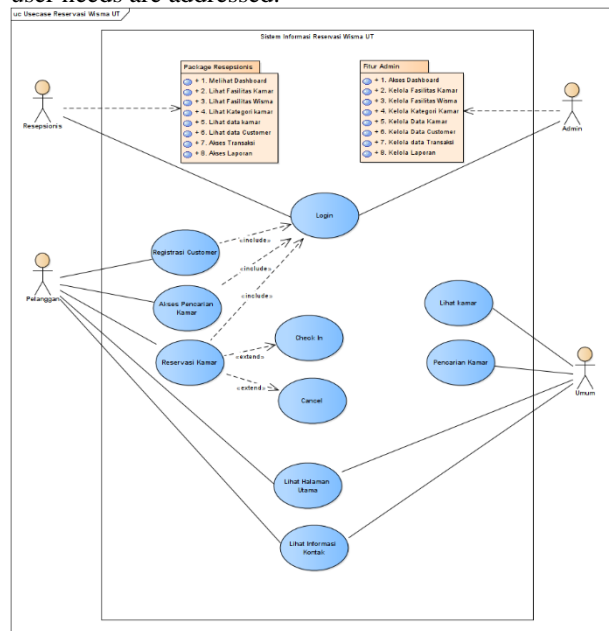


Figure 3. Use case Diagram

The image above is a Use Case Diagram designed for the Universitas Terbuka guesthouse reservation system. The description of each use case can be seen in the following table.

Table 1. Use case descriptions

No	Actor	Description
1	Admin	Has access to manage data at a higher level, including access to the dashboard, room management, facilities, categories, and customer data. The admin also

		manages transactions and reports related to the system.
2	Receptionist	Responsible for daily operational functions such as viewing the dashboard, managing room facilities, accessing reports, and handling transactions and customer data.
3	Customer	Can register, search for rooms, make reservations, and access the homepage and contact information. After making a reservation, the customer can check in and cancel the reservation if needed.
4	General	This actor accesses basic features such as viewing room listings and searching for rooms without requiring authentication in the system.

B. Activity Diagram

An activity diagram is a visual representation of workflows or processes within a system. It depicts the flow of activities, decisions, and parallel processes, making it useful for understanding business processes, system behavior, or software functionalities. Activity diagrams use elements such as start and end nodes, actions, decision points, and transitions to illustrate the sequence of operations. They are commonly used in Unified Modeling Language (UML) to model use cases, business workflows, and software logic.

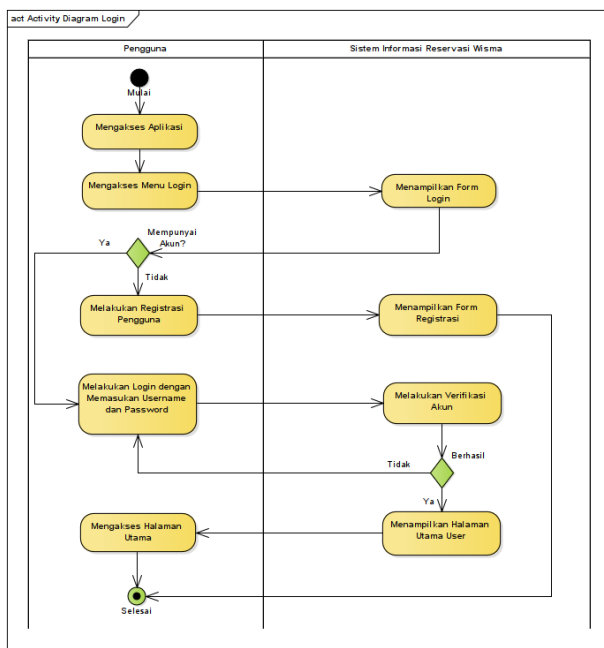


Figure 4. Login Activity Diagram

The activity diagram represents the user login process in the guesthouse reservation System. It is divided into two swim lanes: User and System Information. The process starts when the user opens the application and selects the login menu. The system then displays the login form. If the user already has an account, they proceed by entering their username and password. If they do not have an account, they must complete the registration process. After registration, the system prompts for account verification. If the verification fails, the user cannot proceed. However, if it is successful, the system grants access to the main user page. Once logged in, the

user can access the main interface, and the process concludes. This diagram effectively represents the sequential steps of user authentication, ensuring that only verified users can access the system.

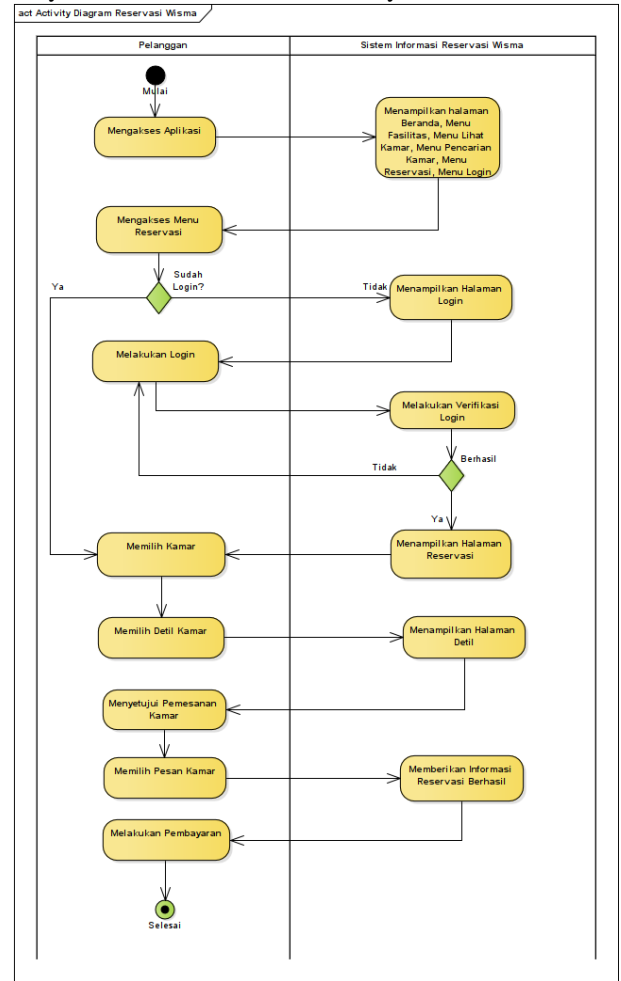


Figure 5. Reservation Activity Diagram

The activity diagram illustrates the room reservation process in the Guesthouse Reservation Information System. It is divided into two swim lanes: Customer and System Information. The process begins when the customer accesses the application, where the system displays the homepage with various menu options, including facilities, room search, and reservations. If the customer selects the reservation menu, the system checks whether they are logged in. If not, they are directed to the login page for verification. Upon successful login, the customer proceeds to select a room, view room details, and confirm the reservation. After selecting the booking option, the system provides confirmation of a successful reservation. Finally, the customer proceeds with payment, completing the reservation process. This diagram effectively outlines the sequential steps required for customers to book a room in the system.

C. Mock up Design

A mockup design is a visual representation of an application or website interface that showcases the layout, design elements, and aesthetics in a static format. Mockups provide a clearer picture of the final

appearance of a product before it is developed functionally. Typically, mockups include colors, typography, icons, and detailed graphic elements compared to wireframes, but they do not yet have interactivity like prototypes.

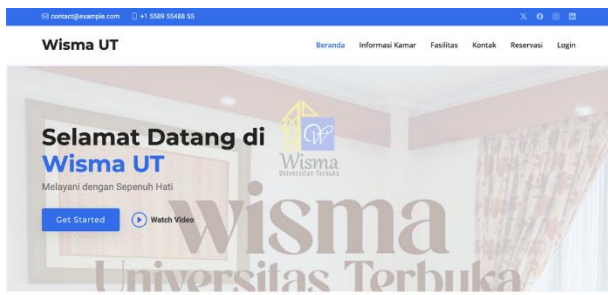


Figure 6. Home Design

The image shows a mockup design of a homepage for "Wisma UT," a lodging service affiliated with Universitas Terbuka. The interface has a clean and modern design with a blue and white color scheme. The top navigation bar includes menu options such as "Home," "Room Information," "Facilities," "Contact," "Reservation," and "Login." The main section features a welcome message, a "Get Started" button, and a "Watch Video" option, along with a background image of a hotel room. The design emphasizes user-friendliness and accessibility for potential customers.

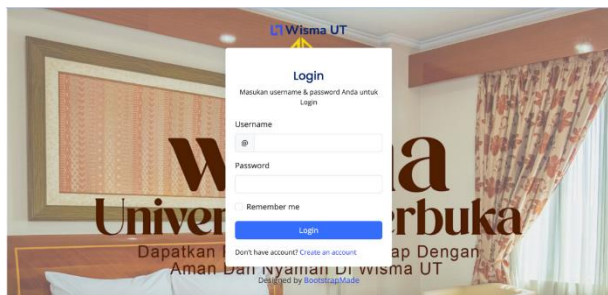


Figure 7. Login Design

The image above shows the login page of the Wisma Universitas Terbuka reservation information system. On this page, customers who already have an account in the system will enter their username and password. However, if a customer does not have an account, they are required to register first in order to access the Wisma reservation menu.

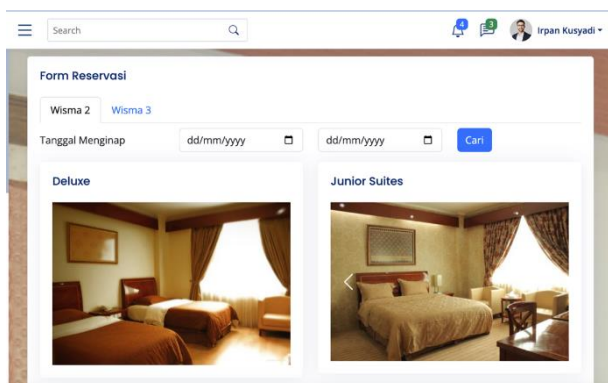


Figure 8. Reservation Design

The image above displays the reservation form page of the Wisma Universitas Terbuka reservation system. On this page, users can select a specific Wisma location, enter check-in and check-out dates, and search for available rooms. The page features different room types, such as "Deluxe" and "Junior Suites," each accompanied by an image. Users can browse and choose their preferred accommodation before proceeding with the reservation process.

D. Validation Testing

Validation testing was conducted to ensure that the web-based guesthouse reservation system design at Universitas Terbuka meets user requirements. This validation process involved two experts who evaluated four key aspects: real-time data accuracy, ease of the reservation process, system features' suitability to user needs, and a user-friendly UI/UX design.

The system validation process was conducted by evaluating four key aspects that focus on the accuracy and performance of the system in supporting the guesthouse reservation process. The first aspect is the system's ability to display reservation information in real-time and accurately, ensuring that the presented data is always up-to-date and reflects the actual conditions. Second, an evaluation was carried out to assess the smoothness of the reservation process to identify potential errors or disruptions that could hinder users in making bookings. Furthermore, validation also includes an assessment of the system's reports and features to ensure they align with user needs, thereby optimizing the guesthouse management operations. Lastly, the UI/UX aspect was tested to ensure that the system's interface and interactions are easy to understand, providing users with a seamless and efficient experience.

Table 2. Validation Result

No	Validation Aspect	Validator 1	Validator 2	Feedback
1	Real-time Data Accuracy	✓ Yes	✓ Yes	Data is always updated and accurate
2	Reservation Process Smoothness	✓ Yes	✓ Yes	Reservations run smoothly without errors
3	System Features Suitability	✓ Yes	✓ Yes	Features and reports meet user needs
4	UI/UX User-Friendliness	✗ No	✓ Yes	Validator 1: The color contrast needs improvement

The validation results indicate that most aspects meet the standards, although some improvements are recommended, particularly in the UI/UX aspect based on feedback from one of the validators.

V. CONCLUSIONS

A. Conclusions

This study concludes that implementing the prototype method in developing a web-based guesthouse reservation system at Universitas Terbuka enhances efficiency, accuracy and transparency. The iterative design process, incorporating user feedback, minimizes errors and inefficiencies in manual reservations. The system enables faster, real-time access for students, lecturers, and guests, while also streamlining administrative tasks. Visual tools like use case and activity diagrams enhance clarity in system development. This study lays the groundwork for further optimization of similar reservation systems.

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