

Development and Assessment of AppStay: A Web-Based Room, Dorm and Apartment Reservation System

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Abstract. This study aimed to develop and assess a web-based room, dorm, and apartment reservation system known as AppStay. A developmental research design was utilized, involving 50 respondents, including IT experts, students, and owners of various accommodations in Sumacab Este, Cabanatuan City, Philippines. By employing the modified waterfall model, the researchers successfully developed the system. The assessment of AppStay's technical aspects revealed a high level of acceptability, as indicated by the positive evaluations conducted by IT experts.

Additionally, the study found the system to possess highly favourable qualities in terms of usability. These results demonstrate the suitability of AppStay for use within the local context of the study. However, the researchers provided several recommendations to enhance the system's usability and performance. In conclusion, the development and assessment of AppStay yielded promising results, highlighting its potential as an effective web-based reservation system. Continued efforts to improve its usability and performance will contribute to its long-term success and enhance the overall user experience.

Keywords: Accommodation; AppStay; Developmental Research; Information Technology; Web-based Reservation

INTRODUCTION

Amid the pandemic, the field of information technology plays a significant role in the lives of many individuals, especially in the context of room reservation systems. The importance of information technology in room reservations during the pandemic cannot be overstated. Information systems have been developed to optimize facility reservation processes in higher education institutions, aiming to minimize delays and errors [1]. These contemporary, adaptable, dynamic, efficient, compatible, and reusable information systems incorporating databases have become indispensable for managing room reservations and integrating them with various methods [2]. Furthermore, technology allows for the automation of room reservation procedures, reducing the need for manual intervention and enhancing efficiency [3].

People are increasingly integrating information systems into their daily lives due to their ability to streamline processes and enhance efficiency [4]. Various types of accommodation facilities, including hotels, transient lodgings, and dormitories, have recognized online booking systems' value in engaging existing and potential customers [5]. Compared to traditional manual reservations, online booking is a faster and more effective approach [6].

Before the pandemic, accommodation providers relied on manual booking systems, presenting several drawbacks such as data repetition, time wastage, and data isolation [7]. The outbreak of COVID-19 further exacerbated the situation, leading to widespread disruption in the global accommodation industry. Lockdowns and travel restrictions forced many establishments to close or operate at reduced capacity [8] temporarily.

Amidst the ongoing pandemic, there is a growing demand for temporary housing, particularly among students attending institutions outside major cities. Finding suitable boarding houses for these students has been challenging [9]. Researchers have proposed developing and assessing an online reservation system or a web-based temporary shelter reservation system as a viable solution. This innovative approach aims to simplify the reservation process and provide precise geographical information about available shelters.

The "App-Stay" reservation system offers a web-based dorm registration system designed explicitly for Sumacab Este, Cabanatuan City. The platform provides comprehensive information, including detailed descriptions, photographs, geographical maps, monthly costs, and room capacities. Students can conveniently make reservations at their preferred time and location, receiving immediate confirmation from their chosen accommodation.

This study aimed to develop and assess a web-based application for room, dorm, and apartment reservations called AppStay.

Specifically, the study sought to describe the following:

1. How may the development of AppStay be described in terms of the selected stages of the modified waterfall model, which include Requirements Analysis, System Design, Implementation (including development), and Testing?
2. How may the IT experts assess the system based on the ISO 25010 software standards, which include Functional Suitability, Reliability, Usability, Performance Efficiency, Compatibility, Security, Maintainability, and Portability?
3. How may the end users assess the system based on the selected ISO 25010 standards, which include Functional Suitability, Reliability, and Usability?

METHODS

In this study, a descriptive research design was used. The study employed a developmental research design focused on creating and assessing programs. The research took place in Sumacab Este, Cabanatuan City, Nueva Ecija. Several information technology-based studies have been conducted in the past which used developmental

research design and were able to develop several systems. Thus, the use of such a design has been observed and proven effective to be used [10-16].

The respondents were purposefully selected and comprised 10 IT experts with a background in system development, along with 40 end-users who were students temporarily residing in boarding houses and apartments in Sumacab Este, Cabanatuan City. Additionally, selected house owners and landlords were involved.

Questionnaires were utilized in the study, consisting of two sets: one for IT experts and another for end-users, both available in English. The questionnaires consisted of closed-ended questions to evaluate the system's quality and technical aspects based on ISO 25010 quality standards.

These questionnaires were adapted to assess the system's usability and technical performance. The evaluation sought feedback from end-users and IT specialists, enabling an assessment of the system's effectiveness and adherence to quality standards.

RESULTS AND DISCUSSION

The Development of AppStay Following the Selected Stages of the Modified Waterfall Model.

Requirements analysis plays a significant role in the modified waterfall model, given its ability to detect and address the weaker aspects of requirements engineering [17]. Inadequate or erroneous requirements engineering can result in costly errors during software development or even project failure [18]. As the foundation of any software project in the modified waterfall model, requirements that contain ambiguity or are poorly defined can lead to significant errors and, ultimately, project failure [19]. Therefore, conducting a thorough requirements analysis is crucial in ensuring the software development process's accuracy, completeness, and success [20].

In this stage, the researchers aimed to create a robust plan for constructing the developed system. They identified the development process, determined the system's scope, and understood its functionality. Through observations and interviews, the researchers devised a plan to ensure that the developed system aligned with the processes encountered by the End Users and IT Experts. A Gantt chart was also created to guide

the researchers in implementing the selected modified waterfall activities for constructing the system. Figure 1 presents the Gantt chart of activities.

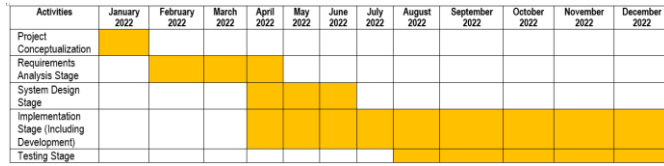


Figure 1 – Gantt Chart

System Design Stage. During the system design stage, the researchers focused on gathering, understanding, and documenting the requirements for developing the AppStay. The main objective was to collect the criteria to guide the system's development.

The researchers created various process diagrams to comprehensively understand the critical activities and processes involved in the system. These diagrams visually represent the flow of information between the system and its environment, including the capture, manipulation, storage, and distribution of data.

Figure 2 presents a data flow diagram (DFD) that illustrates the communication flow between external entities, processes, and data stored within the system.



Figure 2 – Context Diagram

A use-case scenario diagram in the exact figure also depicts the activities and their relationships with each external entity in the system. It provides a high-level overview of the system's functionality, as shown in Figure 3.

Lastly, Figure 4 presents the entity-relationship diagram (ERD), which graphically depicts the relationships between entities in the system's database. The entities include Register, Register Room Details, and Room Details, while the relationships illustrate the connections and associations between these entities.



Figure 3 – Use-Case Diagram

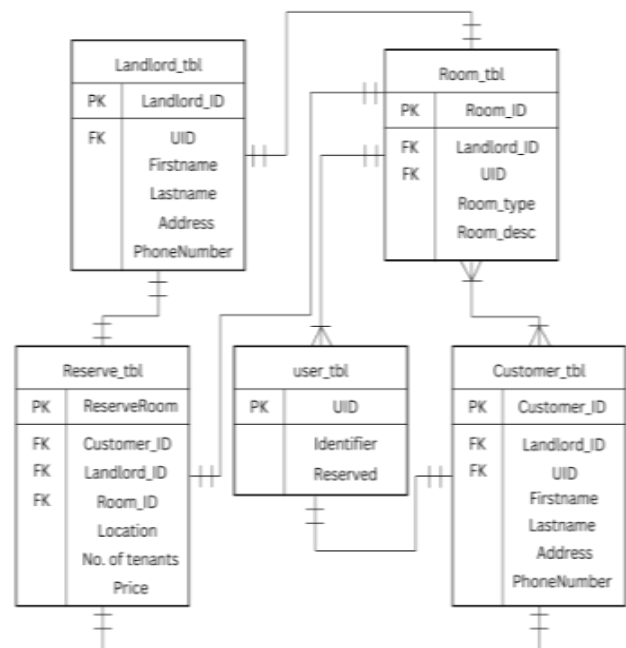


Figure 4 – Entity-Relationship Diagram

In the *implementation stage*, the researchers developed the system based on the outcomes of the preceding steps in the modified waterfall model. They utilized various Integrated Development Environments (IDEs), as shown in Figures 5 and 6, such as Sublime text editor and XAMPP, to create the front-end and back-end of the system.

These tools were essential for the efficient development of the system. Meanwhile, Figure 7 shows the sample developed user interfaces of the AppStay.



Figure 5 – Sublime Text Editor

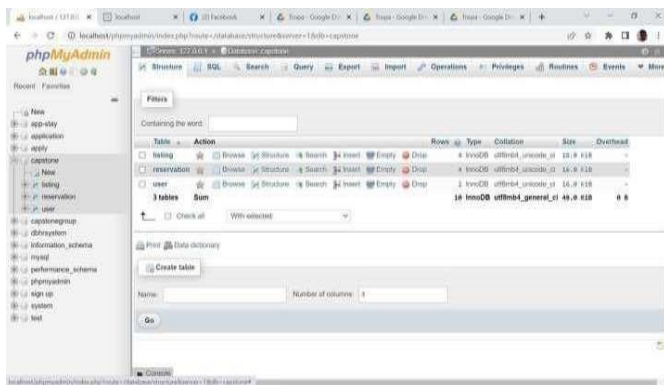


Figure 6 – XAMPP Interface

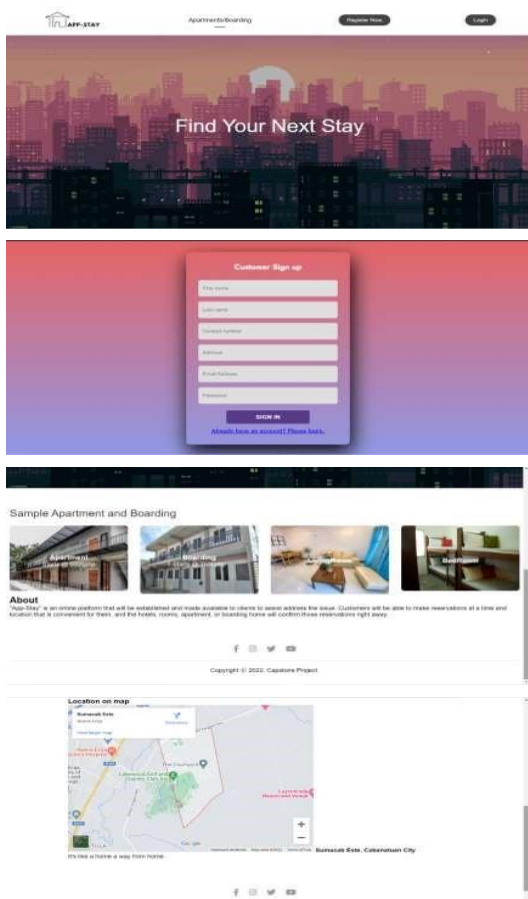


Figure 7 – Sample User Interface of AppStay

Assessment of the Technical Aspects of AppStay by IT Experts. Table 1 shows the result of the evaluation made by the IT Experts on the technical features of AppStay. It covered the different software standards of the ISO 25010.

Table 1 – Assessment Result on the Technical Aspects of AppStay

Criteria	Mean	Verbal Interpretation
Functional Suitability	3.40	Highly Functional
Reliability	3.50	Highly Reliable
Usability	3.55	Highly Usable
Performance Efficiency	3.50	Highly Efficient
Compatibility	3.50	Highly Compatible
Security	3.57	Highly Secured
Maintainability	3.40	Highly Maintainable
Portability	3.37	Highly Portable
Overall Grand Mean	3.29	
Overall Verbal Interpretation	Highly Acceptable Technical Features	

Table 1 shows the results of the technical evaluation of AppStay. The table comprises many evaluation criteria, their mean scores, and the verbal interpretation of each criterion's outcome.

When interpreted, the results demonstrate that AppStay works well in various technical areas. The mean scores for functional suitability, reliability, usability, performance efficiency, compatibility, security, maintainability, and portability ranged from 3.37 to 3.57. AppStay is highly practical, dependable, usable, efficient, compatible, secure, maintainable, and portable, as seen by its rating. Using the overall grand mean of 3.29, it is possible to infer that AppStay's technological characteristics are highly satisfactory. These results indicate that the system was built and developed with functionality, dependability, usability, performance, interoperability, security, maintainability, and portability in mind. When using the AppStay reservation system, users can expect a high-quality and satisfying experience.

This evaluation provides valuable information on the technical elements of AppStay. The system's high mean scores across multiple areas imply it is robust, user-friendly, efficient, and secure. The overall good rating indicates that AppStay is well-designed and capable of meeting users' expectations and demands. These results validate the development efforts and demonstrate

AppStay's ability to deliver a dependable and effective reservation system for users.

Assessment of the Quality of Use Aspect of AppStay. Table 2 displays the results of the end-users evaluations of the AppStay's usability. It covered the ISO 25010 software standards that were chosen.

Table 2 – Assessment Result on the Quality of Use Aspect of AppStay

Criteria	Mean	Verbal Interpretation
Functional Suitability	3.26	Highly Functional
Reliability	3.26	Highly Reliable
Usability	3.40	Highly Usable
Overall Grand Mean	3.31	
Overall Verbal Interpretation	Highly Acceptable Quality of Use Features	

Table 2 shows the evaluation findings for the AppStay system's quality of use. The table comprises various criteria, their mean scores, and a verbal interpretation of each criterion.

According to the first criterion, Functional Suitability, the system is highly functional, with a mean score of 3.26. This indicates that the AppStay system effectively achieves its intended functions and meets the applicable standards established for it. The second criterion, reliability, also received a score of 3.26, indicating that the system is highly reliable. This means that the AppStay system constantly performs its operations effectively and without faults, offering a dependable user experience. Usability obtained a mean score of 3.40, suggesting the design is quite useable. This indicates that the AppStay system is user-friendly, intuitive, and simple, improving the user's experience and happiness. Given the overall grand mean of 3.31, it is safe to say that the AppStay system's usability characteristics are of good quality. This means the system successfully provides a high-quality user experience by balancing functional appropriateness, dependability, and usability to fulfil user expectations and requirements.

These findings indicate that the AppStay system was designed to offer a highly functional, dependable, and user-friendly experience in mind. Users can expect a system that effectively achieves its intended functions, is error-free, and is simple to use. This evaluation gives valuable insights into the AppStay system's good quality of use features, showing that it is well-suited for

its intended customers and is likely to be well-received.

CONCLUSIONS

The stages of requirements analysis, system design, and implementation, including coding and testing, were all included in the development of AppStay, which was done using a modified waterfall methodology. This systematic approach ensured a thorough and organized development process. Furthermore, AppStay's evaluation found significant benefits for landlords and students in Sumacab Este, Cabanatuan City. The system met the technical and usability standards, ensuring its dependability, functionality, and usability. AppStay proved especially useful for students looking for low-cost, high-quality accommodations. Given the ongoing pandemic, the system's smartphone accessibility allowed customers to navigate and discover suitable rooms, giving a convenient and efficient answer to their housing needs. AppStay helped connect users with practical and economical living arrangements during these difficult times.

Based on the conclusions drawn from the information provided, the following recommendations can be made:

1. **Continuous Improvement.** Although the AppStay system has proven effective and beneficial, it is essential to implement an ongoing improvement process. Regular updates and enhancements should be made to enhance further the system's functionality, usability, and overall user experience. This can be achieved by gathering user feedback and incorporating suggestions to address potential issues or limitations.
2. **Expansion and Marketing.** Expanding its coverage to include other areas beyond Sumacab Este and Cabanatuan City is recommended. This would allow a broader range of landlords and students to benefit from the system's features. Additionally, a targeted marketing strategy should be developed to increase awareness and promote the advantages of using AppStay to landlords and potential tenants.
3. **Collaborations and Partnerships.** Establishing collaborations and partnerships with educational institutions, local businesses, and relevant stakeholders can further enhance the success and growth of AppStay. These partnerships can help promote the system, acquire more users, and es-

establish a strong network of accommodations available through the platform. Additionally, partnerships with technology providers or ser-

vice providers can ensure the smooth functioning and maintenance of the system.

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