International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 23s, 2025
https://theaspd.com/index.php

Development And Acceptability Of Mobile Application Esarakan: A Boarding House Locator For Ilocos Norte

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ABSTRACT

Finding a boarding house is not easy, especially for new boarders who are not familiar with the area, and it requires a lot of effort, money, and time. Searching for the nearest available boarding house in a certain area and the lack of adequate information is still a problem in Ilocos Norte. To give a solution to the problem, the study intended to develop a mobile application eSarakan a boarding house locator for Ilocos Norte and determine the user's acceptability. In the development of the application, Rapid Application Development was used and Android Studio as the platform for development. Maps and navigation features were incorporated utilizing Mapbox API and Firebase as its real-time database. The application was tested by the end-users and answered the questionnaires based on ISO 25010. The application was accepted by the end-users with an overall mean of 4.29 interpreted as Very Satisfactory. The developed application meets the end-user's requirements in finding available boarding houses near the area. With the application's features, it is easier to search for boarding houses and communicate with the owners. The application is a great help to the community, especially to the boarding house seekers and boarding house owners for their business advertisement.

Keywords: *Mobile Application, Boarding House, Map, Navigation, Boarders, Lessor, Rent*

INTRODUCTION

Finding a boarding house requires a lot of effort, money, and time because the processes are mostly done personally and physically [1]. Searching for an appropriate boarding house is not an easy task to do due to limited information and mobility [2] especially to those who are not familiar in the area that causes more problems [3]. New boarders usually don't know where to find a boarding house provider, where to inquire, and check reliable information about its location in able for them to select the best suitable place to stay [4]. Lack of adequate advertising from boarding houses and rentals that are a little far from schools and business areas are the factors that contribute to this challenge [5]. Searching for the nearest available boarding houses in the workplace or school is still one of the problems for boarders [6]. Therefore, some individuals look for information online but unfortunately, it is insufficient especially for the location data which leads them in using portable map applications like google maps.

In the Philippines, particularly in Sampaloc Manila, an application Board me app has already been developed. The boarding house locator app can provide location search via Global Positioning System (GPS) that generates geographic information on the map which is more useful in searching for the best boarding house for the boarders [7].

In Laoag city, Ilocos Norte, Philippines, most of the citizens are using smartphone for most of their daily activities and transaction. Laoag City it is considered as the epicenter of business and a haven of educational institutions thus making the city attract more people for job and educational opportunities. Due to the growing economic development and population, boarding houses are in demand in the area but it is still a problem in finding a suitable one for a renter.

In the current way of searching available boarding house in Laoag City were through physical search and social media post resulting into lack of information about the boarding house location, cash expensive, time consuming and needs extra effort.

To give solutions to the problem, the study intended to develop a mobile application eSarakan a boarding house locator that can search nearby boarding houses equipped with Map, Routes, 360 Image view, chat message, Navigation, and real-time update of boarding house information and to conduct a user's acceptance test to the developed application using survey questionnaires based from the software characteristics provided by the ISO 25010 [8].

1. RESEARCH METHOD

Descriptive research was used in the study of the current process of searching for a boarding house in Laoag City, Ilocos Norte. To achieve the research objective, the Research and Development (R&D) method was used, and several data gathering and techniques were utilized to collect data to be able to achieve the objectives.

In the Development of the system, developmental research using the Rapid Application Development methodology was used.

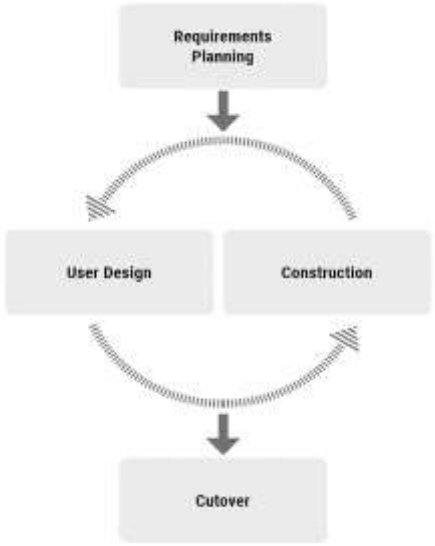

Figure 1: Rapid Application Development (RAD)

Rapid Application Development (RAD) has four phases and it helps ensure that the developer builds what the users really need [9].

In Requirements Planning Phase, Five Boarding house owners, and 20 selected tenants were interviewed focused on the problems and processes in advertising and searching of boarding house in Laoag City, and their perception of having a mobile application to be used for boarding house locator.

In User Design Phase, prototype was drawn base from the problems and the current process gathered and presented to the end-users. The researcher and the end-user work together to refine the prototype to ensure that the user requirements are met.

In Construction Phase, the researcher starts converting the protypes into working model. With the used of android studio as main platform of the development, Maps and navigation features were incorporated with Mapbox API and Firebase as its database.

And finally in Cutover Phase, the researcher discussed how the system works and required the evaluators to test the system several times.

2.1. User's Acceptance Testing

After the pilot testing, the researcher distributed questionnaires to the respondents for the user's acceptance test. The questionnaire was in the form of a checklist and the indicators were based from ISO 25010

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Table 1. User's Acceptance Questionnaire

CRITERIA	INDICATORS
Functional Sustainability	
Functional Completeness	Able to complete its all-specified task
Functional Correctness	Returns an accurate information
Functional Appropriateness	Functions are suitable for Boarding House owners and seekers.
Performance Efficiency	
Time Behavior	Performs every specified task efficiently
Resource Utilization	Able to save and update information dynamically from the database server
Capacity	Able to remain working despite of many users.
Usability	
Appropriateness recognizability	Appropriate for Boarding house owners and tenants.
Learnability	Easy to learn how to use.
Operability	Easy to operate.
User Error Protection	Protects the end user against making errors.
User Interface Aesthetic	The app has a pleasing design.
Accessibility	Accessible to any Boarding house owners' tenants.
Reliability	
Maturity	Reliable in every operation.
Availability	The service is available anytime
Fault Tolerance	Able to work properly despite of hardware and software deficiency.
Recoverability	Able to recover despite any process failure.
Security	
Confidentiality	Provides shared information to

	authorized system users.
Integrity	Prevents unauthorized access
Non-repudiation	Returns information if the service is done.
Accountability	Returns Transaction history information of the system user.
Authenticity	Able to verify authenticity of the system users.
Portability	
Adaptability	Adaptable to any Android devices.
Installability	Easy to install and uninstall
Replaceability	Components can easily replace other software components.

Data gathering and pilot testing were conducted at Laoag City which is the capital of Ilocos Norte. There were three sets of respondents in evaluating the user's acceptance. A total of 40 evaluators were involved, these included 2 IT and non-IT personnel for the Administrator System application, 5 Boarding house owners and 33 Tenants that include students and employees.

The data were collated, tabulated, analyzed, and interpreted by the researcher with the help of a statistician. Statistical tools were used to analyze and interpret the data. The weighted mean was interpreted as follows:

Table 2. Weighted Mean Descriptive Interpretation

Range of Mean Values	**Descriptive Interpretation**
4.51- 5.00	Excellent
3.51- 4.50	Very Satisfactory
2.51- 3.50	Satisfactory
1.51-2.50	Needs Improvement
1.00- 1.50	Poor

3. RESULTS AND DISCUSSION

The discussion below presents the physical diagram of the system, results in the evaluation of the developed application using user's acceptance test and presentation of its features and functions.

3.1. Physical Diagram of the System

In figure 2, it illustrates the physical diagram of the system, the lessor, boarding house seekers, and system admin. Internet is needed to access the database server of the system. The application requires Global Positioning System (GPS) to track current location that serves as a reference for the system to match the nearby search of the seekers with the nearest boarding house available in the area. The application uses a GSM cloud server connection which provides the services in authenticating the

mobile application users and to access the database, and file storage of the system and the system admin uses a web application in managing the data provided by users.

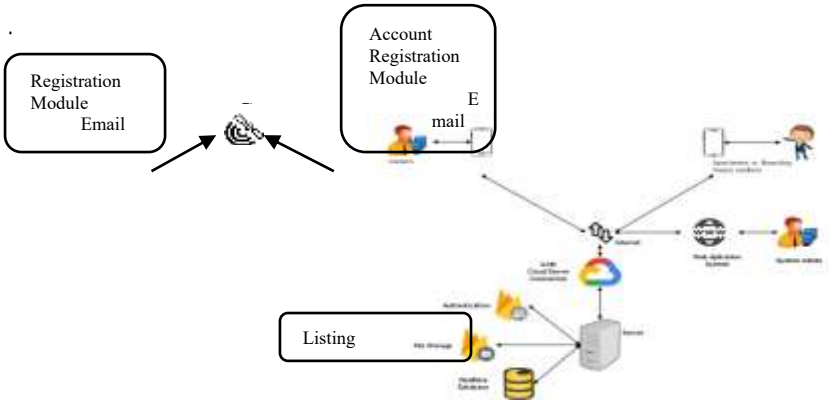

Figure 2: Physical Diagram of the System

3.2. Boarding House Seekers / Tenants Activity

The application provides a sign up and sign in using google account of the user to gain access in the application, able to search available boarding house in the area, is able to view the details of the boarding house upon clicking the pins in the map. It has options to make a call, send a chat message to the boarding house owner and check the route, with an option for navigation view a 360 image of the boarding house as shown in figure 3.

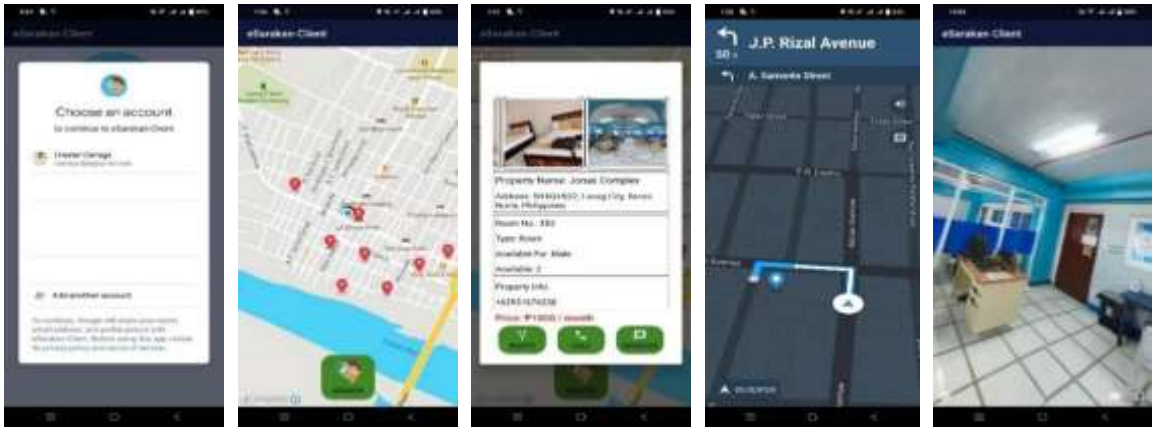

Figure 3: Screenshots of the Boarding House Seekers / Tenants mobile app

3.3. Boarding House owners Activity

The application requires the lessor to verify their contact number via One Time Password (OTP) sent via short messages service (SMS). The Boarding house owners or Lessor is able to add boarding house listing by encoding the detailed information of the boarding house, upload image of the boarding house and its business permit, and a custom real-time chat message feature for communication as shown in figure 4.

Figure 4: Screen shots of the **Boarding House** owner's mobile app

3.4. System Administrator Activity

The System Administrator will be the one responsible for accepting and verify the boarding house listing as shown in figure 5.

Figure 5: Boarding House Verification Module

3.5. Users Acceptance Testing Results

The developed application was assessed for the following characteristics: Functional Sustainability, Performance Efficiency, Usability, Reliability, Security and Portability to determine its software quality. The result of the user's acceptance testing of the eSarakan mobile application is shown in the following demographic figures. The evaluators are composed of 2 IT and non-IT personnel for the System Administrator, 5 Boarding house owners, and 33 tenants that include students and employees with a total of 40 evaluators.

For the functional sustainability characteristic evaluation result in which the application should provide functions that need or meet the end-user's requirements are shown in figure 6 where the functional appropriateness has a mean of 4.45 (Very Satisfactory), functional correctness with a mean of 4.16 (Very Satisfactory) and functional completeness with the mean of 4.34 (Very Satisfactory). These results imply that the application is functionally sustainable in which the application is able to completely do its specified tasks with appropriate and accurate information especially in locating the nearest available boarding houses in the area justified by the composite mean of 4.32 a very satisfactory response from the evaluators.

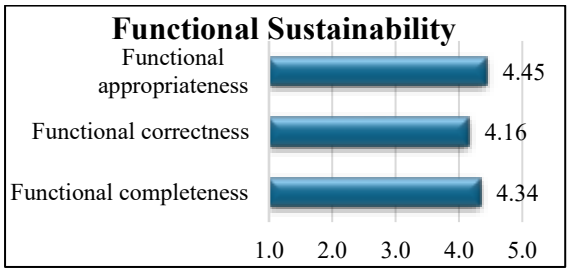

Figure 6: Functional Sustainability

For the performance efficiency characteristic evaluation result in which the application should perform its specified task properly with a high possible response time are shown in figure 7 where the sub-characteristics capacity with a mean of 4.16 (Very Satisfactory), resource utilization with a mean of 4.37 (Very Satisfactory) and Time-behavior with a mean of 4.16 (Very Satisfactory). The results indicate that the application is efficient for its performance in which it can update information in real-time with a stable data connection and smoothly working without any bugs or errors despite of multiple end-users that are concurrently using the application justified with the composite mean of 4.23 a very satisfactory response from the evaluators.

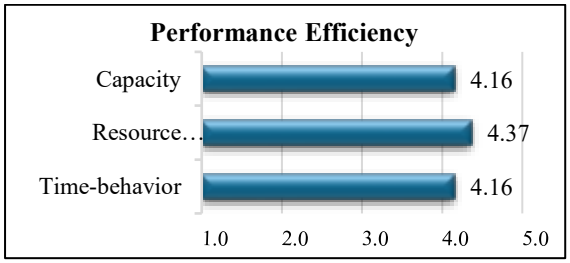

Figure 7: Performance Efficiency

For the usability characteristic evaluation result in which the end-users should able to use the application with effectiveness, efficiency and satisfaction are shown in figure 8 where the accessibility has a mean of 4.34 (Very Satisfactory), user interface aesthetic has a mean of 4.29 (Very Satisfactory), user error protection has a mean of 4.08 (Very Satisfactory), operability has a mean of 4.53 (Excellent), learnability has a mean of 4.55 (Excellent) and appropriateness recognizability has a mean of 4.42 (Very Satisfactory). The results indicate that the application is easy to navigate within its simple design which prevents the end-users from committing errors, accessible and designed for boarders and lessors justified with the composite mean of 4.36 a very satisfactory response from the evaluators.

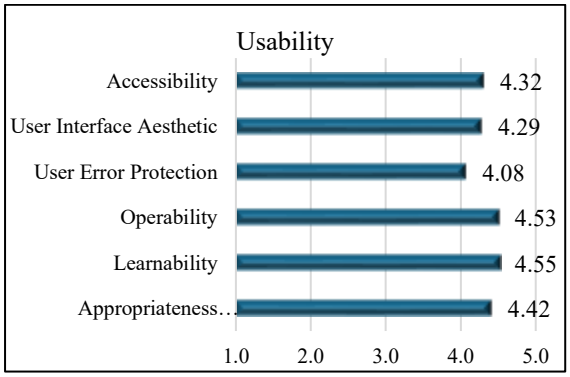

Figure 8: Usability

For the reliability characteristic evaluation result in which the application should be able to perform its functions in specified time are shown in figure 9 where the recoverability has a mean of 4.04 (Very Satisfactory), fault tolerance has a mean of 4.24 (Very Satisfactory), availability has a mean of 4.24 (Very Satisfactory), and maturity has a mean of 4.21 (Very Satisfactory). These results imply that the application is able to recover in minimal failure due to hardware and software deficiency and is still reliable in its operation justified by the composite mean of 4.18 a very satisfactory response from the evaluators.

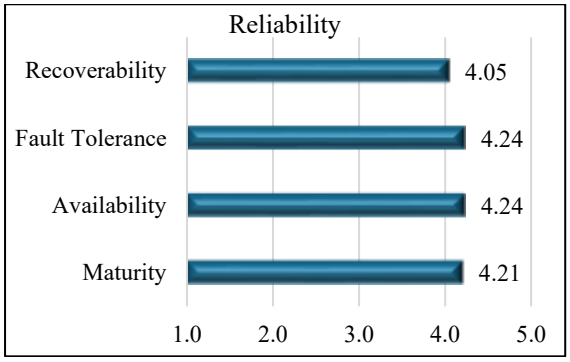

Figure 9: Reliability

For the security characteristic evaluation result in which the end-users have their different level of accessibility or authorization in the system are shown in figure 10 where the authenticity has a mean of 4.55 (Excellent), accountability has a mean of 4.29 (Very Satisfactory), non-repudiation has a mean of 4.26 (Very Satisfactory), integrity has a mean of 4.18 (Very Satisfactory) and confidentiality has a mean of 4.24 (Very Satisfactory). These results imply that the application is secured and only gives access to those users who have signed up for an account in which every account type has a different level of accessibility justified by the composite mean of 4.31 a very satisfactory response from the evaluators.

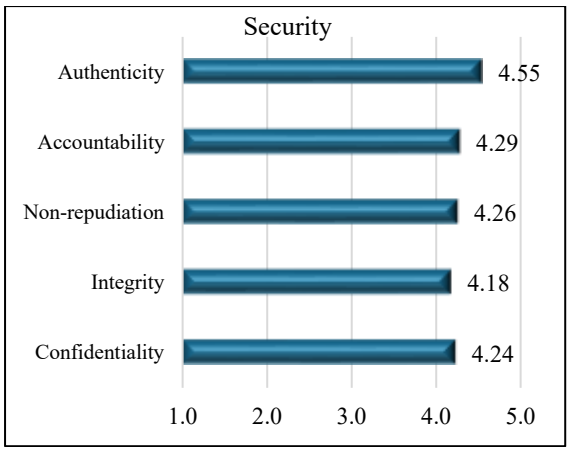

Figure 10: Security

And lastly, for the portability characteristic evaluation result in which the application is still be able to perform task into evolving device hardware and software of android systems are shown in figure 11 where the replaceability has a mean of 4.34 (Very Satisfactory), Installability has a mean of 4.63 (Excellent) and adaptability has a mean of 4.21 (Very Satisfactory). These results imply that the

application is easy to install and compatible into different android devices justified by the composite mean of 4.39, a very satisfactory response from the evaluators.

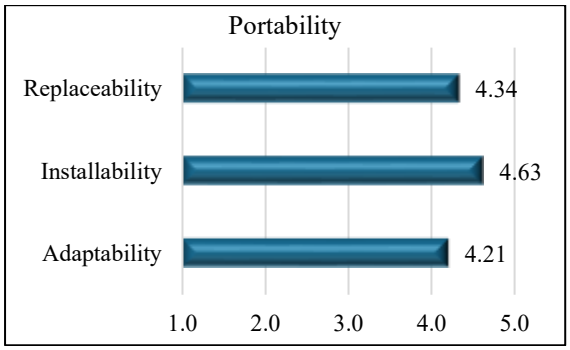

Figure 11: Portability

Based on the overall result shown in table no. 3, the application has a very satisfactory rating and accepted by the different evaluators in the conducted user's acceptance testing in terms of software quality characteristics of ISO 25010 with an overall mean of 4.29 a very satisfactory verbal interpretation and implies that the application is a great help for the boarding house owners and boarders in the province.

Table 3. Users Acceptance Testing Results

Criteria	**Mean**	**Interpretation**
Functional Sustainability	4.32	Very Satisfactory
Performance Efficiency	4.23	Very Satisfactory
Usability	4.36	Very Satisfactory
Reliability	4.18	Very Satisfactory
Security	4.31	Very Satisfactory
Portability	4.39	Very Satisfactory
General Weighted Mean	**4.29**	**Very Satisfactory**

4. CONCLUSION

The features and functions of the application meets the end-users need in finding available boarding house in the area. The acceptance results of the system are all interpreted as very satisfactory and accepted by the evaluators. With the use of Maps, Navigation and Global Positioning system (GPS), it is easier to search boarding house in the current location of the user, it has also a real-time navigation feature that will guide the user all the way to the boarding house exact location, chat message and call feature for communication, and 360 image view of the boarding house. On the part of the boarding house owners or lessors, uploading default image of the boarding house and business permit is required in adding new boarding house listing for verification. The app is useful for advertisement in the part of

lessors. And lastly, for the system administrator is the one accountable for the verification of boarding house and to be displayed in the system.
The developed application is a great help not only for the boarders but also for the boarding house owners because it is easier to locate boarding houses and it will be a tool for advertisement of boarding houses in the province.

ACKNOWLEDGEMENTS
The researcher would like to extend its deepest gratitude to all the people who helped in the completion of this study especially to Dr. Thelma D. Palaoag as the research adviser.
To the respondents and evaluators for taking their time to answer the queries and for their answers in the testing of the application. This study was never possible without them.
Most of all, to the Almighty God, who created us, loved us, saved us, and who gives us strength and wisdom to face the challenges that we encounter in our everyday lives.

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