Development And Usability of a Smart Barangay Appointment System Using Mobile Application

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ABSTRACT

This study aimed to design and evaluate the effectiveness of the Smart Barangay Appointment System, a mobile application designed to provide a more efficient and convenient barangay appointment system. A quantitative descriptive-developmental research design was utilized, and 61 respondents participated in the study. A four-point Likert rating scale was used to gather data. The study yielded a cumulative weighted mean of 3.60, which was interpreted as Strongly Agree and indicated user satisfaction. Suggestions for improvement, feedback, and implementation in a real environment were also recommended to further improve the usability and effectiveness of the system.

Keywords – Smart Barangay Appointment System, mobile application, Human-Centered Design, usability evaluation, appointment scheduling, local government services

INTRODUCTION

Mobile technology has been widely used to improve government service delivery and service accessibility. However, many barangays across the Philippines still used manual appointment systems. These systems created inefficiencies in data management and long waiting times for citizens. To deliver more efficient and accessible services, digital solutions were needed.

This project focused on the design and implementation of a Smart Barangay Appointment System through a mobile application. Residents were expected to be able to request appointments, seek documents, and receive notifications. Meanwhile, barangay officials were expected to be able to manage document and request data. Human-centered design (HCD) techniques were used to evaluate the system in terms of usability, efficiency, effectiveness, and user experience in order to digitally improve services within barangays**.**

REVIEW LITERATURE

Lim (2022) [1], Intal et al. (2026) [1], Intal, et al. (2026) [3], and Jamis et al. (2022) [5] studied the use of digital technology in the delivery and governance of barangay services. Digital technologies (web and mobile) provide individuals with greater access to barangay services and reduce the use of human involvement in transactions and information management. Digital technologies can also enable more efficient and orderly implementation of barangay services.

Boligor et al. (2025) [4], Garcia et al. (2021) [6], and Usharani et al. (2021) [13] studied electronic appointment booking systems in different settings. These systems allowed users to verify available schedules, select time slots, and manage their bookings. Their studies highlighted the benefits of electronic appointment scheduling in improving convenience and efficiency.

When developing mobile applications, it was important to consider functionality [2] [19] [24]. The mobile applications were tested for usability, efficiency, user requirements, satisfaction, and accessibility. However, it was difficult to navigate a convoluted or complicated interface, no matter how good the app may be. The application developed for barangay residents was designed with functionality and user experience in mind.

Shrinewar et al. (2023) [7], Ramadhan et al. (2023) [8], and Nerona et al. (2025) [9] studied the use of digital technology in local government services. The use of digital technology was found to improve accessibility, communication, data management, processing, and information sharing by replacing manual processes. Also, citizens could raise their concerns and access government services more conveniently without the need to visit an office. Overall, digitalization was found to make local government services more accessible and effective.

Rivas (2026) [14], Intal et al. (2026) [3], and Md Ashar et al. (2026) [10] focused on the use of technology to improve interaction between citizens and government. Citizens can interact with barangay officials, view data, and receive notifications through online and mobile apps. Automated notifications also allowed the government to share important messages, which in turn improves interaction between citizens and government as well as the delivery of barangay services.

Ostadmohammadi et al. (2025) [11] studied the satisfaction of users and stakeholders towards an electronic appointment system. Results showed that electronic systems help in appointment processes, but problems related to scheduling, management, and system performance can affect the level of user satisfaction. It was important to design and evaluate the system based on the actual needs of the users.

Lauron et al. (2026) [12] developed a document request and tracking system to improve management and processing of documents. This system also overcame inefficiencies in manual systems, allowed better monitoring of transactions, and improved overall transaction efficiency. This system could also be applied to transactions and appointments in the barangay. This showed how a digital system could aid in the development of efficient mobile solutions.

Designing, implementing, evaluating, and assessing a mobile application requires planning, efficiency, and careful consideration evaluation [15] [16] [18]. Appropriate technologies and tools had to be selected, and the reliability of the system had to be ensured. System evaluation helped identify problems and improve the system before going live. All of these contributed to an accessible, efficient, and reliable barangay appointment system.

Qi et al. (2023) [17] This research focused on the use of Web APIs in mobile applications. It was found that the correct use of APIs could aid an application in achieving its required functionality and, in turn, reduce the amount of effort and time spent during development. This was useful when a mobile application needs different features to work together in one system.

Shehu Yalli et al. (2024) [21] explored the implementation of Internet of Things technologies in smart systems. Kornyshova et al. (2022) [22] explored the role of technology in enhancing services and interactions. Both studies demonstrated that emerging technologies can be leveraged to produce more efficient and effective systems. These findings could serve as the basis for implementing smart technologies in barangay services.

Desmal et al. (2022) [23] examined factors that influence user satisfaction towards mobile government services. Usability, accessibility, information quality, interaction, privacy, and security were found to be significant factors. These factors further underscored the value of accessible, secure, and user-friendly digital government services in promoting digital adoption and served as a guide in the development and evaluation of the barangay appointment system.

A study by Ala and Chen (2022) [20] surveyed research on health care appointment scheduling and concluded that efficient appointment scheduling could enhance health care productivity. T et al. (2025) [25] researched an intelligent appointment scheduling system that enables real-time communication and appointment scheduling between patients and health care providers. While the research pertains to health care, the issues of availability, communication, and scheduling are relevant to the availability and scheduling efficiency of barangay appointments.

A. Research Gap

Existing studies have examined digital barangay management, mobile-government applications, document

requests, complaint handling, and appointment systems. However, the reviewed work provides limited specific attention to a barangay appointment application that combines appointment scheduling with a usability evaluation centered on residents' and personnel's needs. This study addressed that focus by developing a Smart Barangay Appointment System mobile prototype and assessing respondents' perceptions of its usability, efficiency and functionality, user-friendliness, effectiveness, and satisfaction.

METHODOLOGY

This chapter detailed the methods used in the development and evaluation of the usability of the prototype of the Smart Barangay Appointment System. These included the research design, research subjects and context, tools used, data collection procedures, data analysis, and ethical issues.

A. Research Design

The study used a quantitative descriptive-developmental research approach guided by Human-Centered Design (HCD). The developmental component involved designing a mobile application prototype, while the descriptive component assessed respondents' perceptions of the proposed prototype. This approach was appropriate because the study aimed both to produce a mobile application prototype for barangay appointments and to evaluate users' responses to it.

B. Research Locale and Participants

This study was conducted in a barangay in the Philippines with a total of 61 participants. 52 were local residents (85.2%), 5 were information technology professionals (8.2%), and 4 were teachers (6.6%). Participants were selected based on their relevance to the evaluation of the system. Consent was obtained before participation and all responses and personal data were kept confidential and used only for research purposes.

C. Sampling Design

The study used purposive sampling in selecting the respondents. The researcher selected participants who meet the criteria as Barangay residents, as they represent the target users of the proposed prototype Smart Barangay Appointment System. This sampling design enabled the selected participants to interact with the prototype and evaluate its usability and functionality.

D. Research Instrument

In this study, the researchers used the Smart Barangay Appointment System and administered a researcher-designed usability evaluation questionnaire divided into four parts.

The survey consisted of four parts. These included user demographics, usability of the application, features and perceived performance and finally usability, effectiveness and user satisfaction. All responses were rated using a Likert scale.

Table 3.1 Likert Rating Scale

Rating	Description
4	Strongly Agree
3	Agree
2	Disagree
1	Strongly Disagree

The proposed mobile application was designed to demonstrate how residents could book barangay appointments and receive alerts and reminders about their appointments.

Prior to dissemination to the participants, the questionnaire was reviewed and validated by the research advisor and/or qualified evaluators.

E. Data Gathering Procedure

The data gathering procedure was segmented into three primary phases:

Stage One: Needs Assessment and Planning

The researchers identified residents' challenges and needs regarding barangay appointments.

Stage Two: Application Development and Human-Centered Design

The researchers developed a prototype based on the respondents' needs.

Stage Three: Usability Evaluation and Testing

After interacting with the prototype, the participants completed the usability assessment questionnaire. The responses were then organized and prepared for statistical analysis.

F. Data Analysis

Quantitative descriptive statistics were used to analyze data gathered from the usability assessment of the Smart Barangay Appointment System.

Weighted Mean

The weighted mean was used to summarize respondents' overall evaluations of the mobile application in terms of ease of use, efficiency, effectiveness, and user satisfaction.

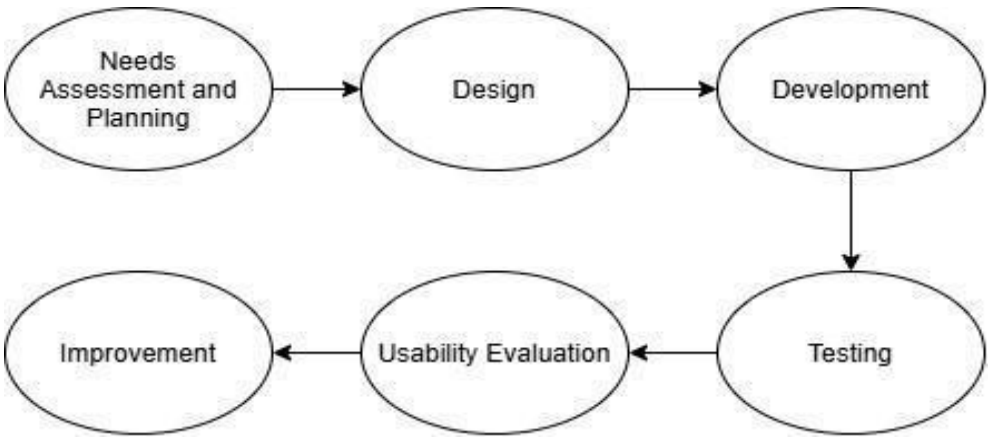
Frequency and Percentage

These measures were used to describe the participants' demographic characteristics and summarize the distribution of their responses in the usability assessment.

G. System Development Methods

The researcher used Human-Centered Design (HCD) in developing the Smart Barangay Appointment System because it incorporates users' needs and experiences. This method is very helpful for developing a simple, user-friendly application for barangay residents.

Figure 3.1: System Development Method



Storyboard of the Proposed System (User Interface Prototype)

The Smart Barangay mobile application was designed and prototyped using Figma. The following figures presented the main user flow of the application, from signing in to accessing the dashboard and completing an appointment.

3.2 Sign-In Interface 3.3 Home Dashboard Interface 3.4 Appointment Confirmation Interface

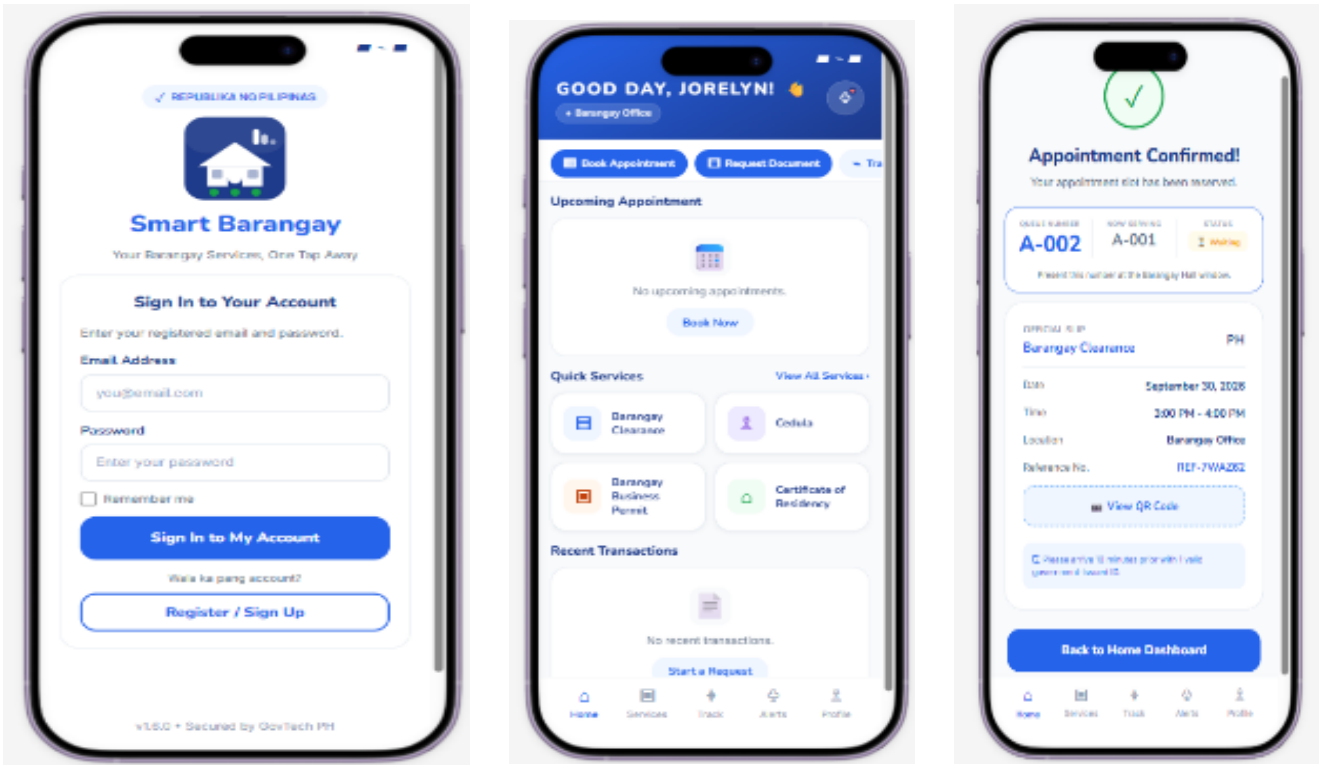


Figure 3.2 Sign-In Interface the resident could log in to the Smart Barangay application using their registered email and password. New users could also create an account.

Figure 3.3 Home Dashboard Interface the resident was taken to the Home Dashboard after a successful sign-in. The dashboard provided easy access to the barangay services, appointments, document requests, notifications, and other features.

Figure 3.4 Appointment Confirmation Interface the resident chose a service, availability date and time, and confirmed the appointment. Successful booking confirmation displayed the queue number, appointment details, and reference number.

RESULTS AND DISCUSSION

This chapter presents, analyses, and interprets the data gathered from the survey that was conducted for the proposed Smart Barangay Appointment System Using the Mobile Application. The number of respondents in the study was 61.

The results were presented according to the respondents' characteristics and their evaluations of the system's attributes, including usability, effectiveness, efficiency, functionality, user-friendliness, and satisfaction. The questionnaire employed a 4-point Likert scale with 4 strongly agree, 3 agree, 2 disagree and 1 strongly disagree.

Evaluation Results

Table 4.1 presents the distribution of the characteristics of the participants in the study. Over 85% of the participants were barangay residents, with 52 participants. This indicated that most participants belonged to the intended user group of the proposed system.

Table 4.1 Demographic Distribution of Respondents

Roles	Frequency	Percentage
IT Professional / Expert	5	8.2%
Faculty	4	6.6%
Barangay Resident	52	85.2%
Total	**61**	**100%**

Table 4.2 showed the demographic data for the sample. 60.7% (37) of the sample were male, 37.7% (23) were female and 1.6% (1) chose to not state their gender. Most participants were in the 18-25 age category with 47 participants (73.8%) in this group. This indicated a majority in the young adult population.

Table 4.2 Profile of Respondents

Gender	Frequency	Age	Frequency
Male	37 (60.7%)	Below 18	4 (6.6%)
Female	23 (37.7%)	18 – 25	47 (73.8%)
Prefer not to Say	1 (1.6%)	26 – 35	4 (6.6%)
		36 – 45	4 (6.6%)
		46 – 55	2 (3.3%)
		56 and above	2 (3.3%)
Total	**61 (100%)**	**Total**	**61 (100%)**

Frequency of Barangay Visiting of the Respondents Engaged in the Study. The largest group of respondents visited the barangay sometimes (31 respondents, or 50.8%). This was followed by respondents who rarely visited the barangay (14 respondents, or 23.0%).

Table 4.3 Profile of Respondents

Frequency	Frequency (f)	Percentage
Rarely	14	23.0%
Sometimes	31	50.8%
Often	7	11.5%
Very Often	9	14.8%
Total	**61**	**100%**

Table 4.4 shows the overall evaluation result of the proposed Smart Barangay Appointment System. The results indicated that User-Friendliness had the highest overall weighted mean of 3.65 followed by User Satisfaction with 3.63, Effectiveness at 3.61, Usability with a score of 3.59 and Efficiency and Functionality recorded at 3.58.

The overall weighted mean of 3.60 once again indicated that the respondents generally provided positive ratings regarding the proposed system. The findings provided some very important and valuable feedback regarding how the proposed application was seen in terms of usability, functionality, convenience, effectiveness and satisfaction.

Table 4.4. Overall Evaluation Result

Evaluation Criteria	Overall Weighted Mean	Interpretation
Usability	3.59	Strongly Agree
Efficiency and Functionality	3.58	Strongly Agree
User-Friendliness	3.65	Strongly Agree
Effectiveness	3.61	Strongly Agree

User Satisfaction	3.63	Strongly Agree
Overall Mean	**3.60**	**Strongly Agree**

DISCUSSION

Based on the results of the survey, the following ratings were obtained for the Smart Barangay Appointment System in 5 criteria. User-friendliness received the highest rating at 3.65 on the weighted average, followed by user satisfaction at 3.63 and effectiveness at 3.61.

Usability also received a score of 3.59**,** while efficiency and functionality received a score of 3.58 on the weighted average. The results showed that the users found the system to be easy to use, convenient**,** and effective in appointment scheduling.

The results also showed the perception of the users on the proposed system and did not measure of the actual implementation of the system in an actual barangay.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

The Smart Barangay Appointment System was rated positively by 61 users. The overall weighted mean score was 3.60 (Strongly Agree). The highest score was rated for ease of use (3.65), followed by user satisfaction (3.63), effectiveness (3.61), usability (3.59) and functionality and efficiency (3.58). Based on the results, the users perceived the Smart Barangay Appointment System to be useful in handling barangay appointments.

Conclusions

The proposed Smart Barangay Appointment System received a positive overall rating based on the respondents' evaluation with a weighted mean score of 3.60. The system was also found to be efficient, practical, beneficial and accessible in managing barangay appointments. The system had the potential to save time, improve access and organize processes, leading to a smoother experience in utilizing barangay services. Further development and evaluation of the system could make it a useful tool in delivering barangay services.

Recommendations

The Smart Barangay Appointment System could be improved based on user inputs. Further testing could also be conducted to increase the performance, efficiency, and usability of the system. Other researchers could also implement the system in an actual barangay and involve a larger and more diverse test group to improve testing of the system in terms of usability and implementation of appointment services in a barangay.

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