

BSEMS: BARANGAY SERVICE MANAGEMENT SYSTEM FOR SAN ISIDRO CITY OF CABUYAO LAGUNA

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Abstract— The study proposes to create an Offline web-based Stand-alone barangay service management system that will help with the completion of tasks by Barangay San Isidro officials and staff by generating the certifications that residents want in a shorter amount of time. Additionally, to minimize manual labor, and human errors during the document acquisition process. The Barangay Officials uses manual process of the documents and information of the residents, and this made it difficult to manage. However, barangay officials also use spreadsheets that can manage certain records but it is time-consuming and have possibility of discrepancies for them in recording the resident's information. Descriptive-quantitative research was used by the researchers as the research design for this study. Descriptive method will collect quantifiable information for statistical analysis of the population sample and the collected data will be consolidated by the researcher with the use of statistics to get the result of the study. A total of 7 respondents, including end-users and web experts, participated in the study. The researchers prepared a validated questionnaire to evaluate the proposed system. After administering the questionnaire, the researcher uses the Likert scale to define how much they agree or disagree, and the median to define the average responses. Then the percentage will also be used to determine how many participants gave a particular answer to the system. The researchers came to the conclusion that in order to increase user experience, the suggested system needs to be improved in certain areas.

Keywords— *Offline Web-based Stand-alone, Collected data, Management system, Validated questionnaire*

I. INTRODUCTION

Barangay San Isidro in Cabuyao, Laguna, deals with tough tasks every day because they handle resident documents by hand, and the population is growing fast. This makes their work harder, and they might lose important information or have security problems. To fix this, the researchers suggest using a Barangay Service Management System, which is offline web-based operating system. According to Carpio [1], It essentially aims to streamline existing administrative processes in terms of requesting documents, filing complaints and generating apt and accurate local statistics.

BMIS serves as the barangay's data and information system for situational analysis using accurate, reliable, and easily retrievable data for program planning and implementation. These shall then serve as the basis for the BIDP [2]. With it, officials can do tasks like checking records

or giving permits more easily and accurately. Plus, the system works even if there is no internet. Overall, this plan not only solves the immediate problems in Barangay San Isidro but also helps the barangay achieve its goals of providing better services and helping the community grow.

II. OBJECTIVE OF THE STUDY

The main objective of this study is to develop a system for the Barangay of San Isidro, City of Cabuyao, Laguna.

The provided system, in particular, intends to assist the Barangay Officials by preventing human errors, bulky documents, lessening the processing time to generate certificates, identifying the residents' cases/reports, and providing an improved layout of the certificates and delivering more accurate information to citizens whenever they request certificates, ensuring the safety of the residents' data.

1. What are the problems encountered by the Barangay Officials with regards to:
 - 1.1 manual processing of documentation;
 - 1.2 inaccurate blotter records;
 - 1.3 citizens' personal information that is difficult to manage;
2. How the proposed system will solve the problems encountered by the Barangay Officials?
 - 2.1 speeding up file retrieval from large documents;
 - 2.2 provide accuracy in storing blotter reports;
 - 2.3 manage residents' information easily;

III. REVIEW OF LITERATURE AND STUDIES

According to Section 384 of The Local Government Code of the Philippines [1], as the basic political unit, the Barangay serves as the primary planning and implementing unit of government policies, plans, programs, projects, and activities in the community, and as a forum wherein the collective views of the people may be expressed, crystallized and considered, and where disputes may be amicably settled.

A simple web application provides an automated platform for the barangay's offices to store, manage, and retrieve their records. This will serve as an advantage for every barangay in the city. Also, it will benefit each barangay resident in the study since they are the ones who make transactions and apply for clearance and permits online [3]. The thematic

analysis shows that the transcript of interviews with three local officials showed that filing complaints, requesting documents, sending suggestions, and posting announcements were the core elements of the barangay framework [4].

The Barangay Management System optimizes and speeds up barangay citizen requests. This innovative technology will change how residents engage with barangay staff, saving time and effort. This method will improve the barangay's status as a management innovator. It inspires other barangays by emphasizing convenience and time efficiency. This technology-driven strategy helps locals and makes the barangay a leader in efficient, citizen-oriented governance [5]. Computerized technology helps barangay halls speed up tasks that would take too long to accomplish manually. It can also reduce workplace hassles and give accurate, timely results that barangay hall need [6].

Implementing a Computerized Barangay Information System will improve file storage, retrieval, dependability, accuracy, and tracking. Proposing record-keeping software helps employees with handwritten records and manual barangay clearance and certificate issuance [7]. It will make work easier, reduce the amount of paper used, enable transactions to be done more quickly and reliably, and reduce the amount of paper used. This will alter the way the barangay handles its daily operations [8].

According to Kinyanjui [9] (2019), certain obstacles found to the incorporation of educational technology into higher education included weak technology infrastructure, lack of appropriate institutional policies on ICT usage and low technical skills, high costs of ICT usage, technology, and poor leadership decisions. Trust in traditional political processes is at historic lows, and this represents a threat to the credibility of liberal democracies (Van der Meer, 2017).

Conforming to Intud [10] study, he stated that there were a number of problems associated with the current adopted laborious manual methods on a day-to-day basis such as, retrieving vast numbers of file Folders of their Constituents' Data, and this causes delay in the delivery of services and had some inaccuracies in the completion of tasks and so on. On the other hand, this kind of problem can be prone to human error, affect the quality of production, and it will be inefficient for providing satisfying service to the residents. This will be the way that researchers must focus and think of something or a system that can fix this kind of issues in a barangay.

For the findings revealed in Bona [11] study, the respondents were competent enough to handle their job well however, they listed that "personal knowledge or experience is still insufficient to use digital gadgets and equipment". The support from the Local Government Unit (LGU) was found out that most of the respondents are still on the intermediate level in terms of digital literacy [11]. Some barangay officials must have to attend training seminars that is related to basic computer program skills to gain knowledge about fundamental functions and usage of computers. This will be a big improvement and accomplishment for the barangay officials to their roles not only inside the barangay but also in the community and society.

IV. METHODS AND PROCEDURES

A. Research Design

The researchers in this study used applied research to solve a specific problem and provide innovative solutions. Descriptive-quantitative research was chosen by the researchers for the research methodology. For the technique of collecting data, the researchers will conduct interviews and provide survey questionnaires to gather information regarding the topic. For the rating scale of the survey questionnaires, the Likert Scale will be the used by the researchers. The researchers used median as the statistical tool that analyzed gathered data.

B. Respondents of the Study

The researchers used simple voluntary sampling method wherein the participants voluntarily choose to take part in a study that provides opinions and outcomes upon answering the survey.

TABLE I. RESPONDENTS OF THE STUDY

Category	Number of Respondents
End Users	4
Web Experts	3
Total	7

Table 1 shows the category, population, and total of respondents in the study. The category respondents are the Residents and Barangay officials of San Isidro. Also, the respondent of the survey includes four (4) Barangay Official and three (3) Web Experts, with an overall seven (7) respondents.

V. RESULTS AND DISCUSSION

The Barangay Officials of the Barangay Hall of San Isidro is the one who facilitates and provides barangay activities and services to the residents. Every level of management activities within the Barangay includes gathering basic information that entails the residents' profile, record of blotter reports, and generating an automated clearance, permits, and certificates.

As for the processes performed by the admin and staff in the barangay, the Barangay Officials were struggling to handle in a manual process all the request, data, and information of the residents. This kind of process was made it difficult for them to manage weekly. Having manual processing of data will lead to time consumption for the Barangay Officials. Also, they were experiencing lose of important files and documents of residents due to unsecured storage, lack of security, inconsistency in data entry and mistyping of information. The residents are also experiencing a hard time acquiring certificates they need due to delayed response from the barangay.

Given this problem encountered by the Barangay officials, we the researchers wanted to provide/develop a system that will be convenient and easy for them to be used in the Barangay Isidro for the workflow improvement of the Barangay Hall.

The purpose of the study is to develop a Barangay Service Management System for Barangay San Isidro that aims to minimize manual labor and human errors during the document acquisition process of the Barangay Officials. This

part shows the feature of the developed system that can help the Barangay Officials to resolved the problems encountered in the Barangay Hall of San Isidro. The researchers applied MySQL workbench as the system's database. The researchers also used Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Bootstrap, for the functionalities and overall design, and lastly the back-end PHP is used for the coding of the system.

A. Assessments of Target Users and Web-Experts Regarding the Proposed Barangay Service Management System

The assessment of the users shows the responses of the users and web-experts to the proposed system and provides feedback in percentages and medians regarding the Functional Suitability, Reliability, Efficiency, Usability, and Security of the proposed system.

TABLE II. END USERS' AND IT EXPERTS' ASSESSMENT IN TERMS OF FUNCTIONAL SUITABILITY

Functional Suitability	End Users	IT Experts
Q1	Strongly Agree	Strongly Agree
Q2	Strongly Agree	Strongly Agree
Q3	Strongly Agree	Strongly Agree

Table 2 showed that Q1 in the end users strongly agreed that the system covers all the activities and services provided by the barangay, while Q1 in the web experts and Q3 in the end users strongly agreed that the system delivers fast documentation. In Q2, end users and web experts strongly agreed that the system functions to facilitate the accomplishment of specified tasks and activities. In Q3, web experts strongly agreed that the system can give precise and complete information. Overall, it appears that both end users and web experts strongly agree that the system ensures and performs its intended tasks accurately and effectively.

TABLE III. END USERS' AND IT EXPERTS' ASSESSMENT IN TERMS OF RELIABILITY

Functional Suitability	End Users	IT Experts
Q1	Strongly Agree	Strongly Agree
Q2	Strongly Agree	Strongly Agree
Q3	Strongly Agree	Strongly Agree

Table 3 showed that in Q1, both end users and web experts strongly agreed that the system can provide accurate information and output. Also, in Q2, both end users and web experts strongly agreed that the system can easily generate certificates. And in Q3, the end users and web experts also strongly agreed that the system performs its purpose as intended. Overall, the responses of both end users and web experts give a positive view of the reliability of the system.

TABLE IV. END USERS' AND IT EXPERTS' ASSESSMENT IN TERMS OF EFFICIENCY

Functional Suitability	End Users	IT Experts
Q1	Strongly Agree	Agree
Q2	Strongly Agree	Agree
Q3	Strongly Agree	Strongly Agree

Table 4 showed that in Q1, the end users strongly agreed that the system can store resident data without manual storage and avoid bulk document papers inside the office, while web experts simply agreed that the system gives the same output

of input data is plotted correctly. In Q2, end users and Q3 web experts both strongly agreed that the system can reduce the time process in generating the requested document. In Q3 for end users and Q2 for web experts strongly agreed that the system can respond to user interactions immediately, while the web experts simply agreed. Overall, it appears that both groups have a positive view in terms of efficiency, but the end users seem to be more impressed than the web experts in terms of efficiency.

TABLE V. END USERS' AND IT EXPERTS' ASSESSMENT IN TERMS OF USABILITY

Functional Suitability	End Users	IT Experts
Q1	Strongly Agree	Strongly Agree
Q2	Strongly Agree	Strongly Agree
Q3	Strongly Agree	Agree

Table 5 showed that in Q1, both end users and web experts strongly agreed that the layout of the system interface is consistent. In Q2, both end users and web experts strongly agreed that the system uses simple words to make it easy to understand. This indicates that both groups believed that the consistency of the interface and the words that the system uses are easy to understand, which means it is effective for the users. In Q3, the end users strongly agreed that the user can easily determine the total count of each category (voters, genders, PWD, etc.), while the web experts simply agreed. Overall, it appears that both end users and web experts found that the system's usability got positive ratings, but the end users seem to be more impressed than the web experts in Q3, which easily determines the total count for each category.

TABLE VI. END USERS' AND IT EXPERTS' ASSESSMENT IN TERMS OF SECURITY

Functional Suitability	End Users	IT Experts
Q1	Strongly Agree	Strongly Agree
Q2	Strongly Agree	Strongly Agree
Q3	Strongly Agree	Strongly Agree

Table 6 showed that in Q1, end users strongly agreed that the system is secured to prevent a data leak, while web experts simply agreed. In Q2, both end users and web experts strongly agreed that the system has limited access between the super admin, admin, and staff. In Q3, both end users and web experts strongly agreed that system provides a history log that shows the user's activities. Overall, it appears that both end users and web experts strongly agree that the system is secure. But end users seem to be more impressed than web experts with the security of the system to prevent data leaks.

VI. CONCLUSIONS

The researchers concluded that the system "Barangay Service Management System for San Isidro, City of Cabuyao, Laguna" was capable of providing working software in the office of Barangay San Isidro. Based on the survey data gathered by the researchers, the evaluators expressed satisfaction with Functional Suitability, Reliability, Efficiency, Usability, and Security of the proposed system regarding the convenience and objective of enhancing manual recording, storing, and retrieving documents to a more efficient and productive system was agreeable. Based on the results gathered in the evaluation, the features of the

system were all useful in managing the documents and information of the residents in the barangay San Isidro.

Based on the summary of findings, the following were concluded:

1. While a resident requests a certificate, the administration of Barangay San Isidro normally uses Excel to complete it as well as organize data. This procedure costs them the effort and time spent in processing the documents, and it also increases the possibility of human errors due to manual data entry.
2. The system includes features that can help the user obtain history records that will help them keep track of user activities.
3. Given that the system met the requirements and satisfied the user's desires, it was able to perform its function effectively.
4. The Acceptance of the users and web-experts show that user's evaluations fell into Agree Category.

VII. RECOMMENDATIONS

Based on the results of the study, the researchers highly recommended the implementation of the Barangay Service Management System for Brgy. San Isidro, City of Cabuyao. The system's implementation is highly recommended since it enables barangay officials to generate and keep records, reports, barangay activities and services electronically. The system will shorten the time it takes the on-duty barangay officials to respond to resident needs and requirements. The researchers encourage the target users to become familiar with the system's features and function in order to use it correctly and properly.

The researchers specifically recommended the following:

1. Barangay officials and the admin should be trained of using the computer and to the software for them to be familiar about the use of the systems function.
2. The system should have a monthly maintenance to prevent larger problems from occurring and keep it performing on its best.
3. Former officials should hand over the system to the newly elected officials by endorsing and familiarizing the functions and features of the system.
4. Practice preventive measure to minimize human errors.
5. The officials should provide cloud back up for the system's storage, to prevent loss of important data.
6. The system should have a feature that allows the users to upload the list that contains all the voters of the barangay therefore the information is easy to navigate.

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REFERENCES

- [1] C. O. Carpio, "Barangay Management System," International Journal of Multidisciplinary Research and Publications, Jul. 24, 2020. [Online] Available: <http://ijmrmap.com/wp-content/uploads/2020/07/IJMRAP-V3N1P78Y20.pdf>. [Accessed on: 29-Sep-2023]
- [2] "Barangay Information Management System," Bidani Network Program, 01-Sep-2021. [Online] Available: <https://bidani.uplb.edu.ph/bidani-strategy/bmis/>. [Accessed on: Sep. 29, 2023]
- [3] C. Montero, "Simple Barangay Management System in PHP and SQLite Free Source Code," Sourcecodester, October 14, 2021. Accessed on: Sep. 29, 2023. [Online] Available: <https://www.sourcecodester.com/php/14990/simple-barangay-management-system-php-and-sqlite-free-source-code.html>
- [4] R. P. Bringula et al., "E-Barangay: A Framework for a Web-Based System for Local Communities and Its Usability," International Journal of Electronic Government Research (IJEGR), Oct. 18, 2022. Accessed on: Sep. 29, 2023. [Online] Available: <https://www.igi-global.com/article/e-barangay/288071>
- [5] M. F. Lapiz, et al., "Online Barangay Services Management System," Scribd, Jul. 2021. Accessed on: Sep. 29, 2023. [Online] Available: <https://www.scribd.com/document/559338319/Online-Barangay-Services-Management-System>
- [6] C. McGuire, "Barangay Hall Information System," StudyMoose, August 20, 2016. Accessed on: May 2, 2022. [Online] Available: <https://studymoose.com/barangay-hall-information-system-essay>.
- [7] M. J. P. Lado, "Computerized Information System in Barangay Poblacion, Danao City, Cebu," Slide Share Scribd Company, July 26, 2017. Accessed on: May 2, 2022. [Online] Available: <https://www.slideshare.net/MarkJohnPerezLado/computerized-information-system-in-barangay-poblacion-danao-city-cebu>
- [8] A. Evangelista, "Barangay Management System Project in PHP with Source Code," IT Source Code, October 22, 2021. Accessed on: May 2, 2022. [Online] Available: <https://itsourcecode.com/free-projects/php-project/barangay-management-system-project-in-php-with-source-code/>
- [9] C. S. Santiago Jr., M. L. P. Ulanday, Z. J. R. Centeno, & M. C. Bayla, "Access, Skills and Constraints of Barangay Officials towards the Use of Information and Communications Technology (ICT)," International Journal of Knowledge Content Development and Technology, July 2021. Accessed on: Sep. 29, 2023. [Online] Available: https://www.researchgate.net/profile/Cereneo-Santiago-Jr/publication/352899504_Access_Skills_and_Constraints_of_Barangay_Officials_towards_the_Use_of_Information_and_Communication_s_Technology_ICT/links/60de8aa792851ca9449ef516/Access-Skills-and-Constraints-of-Barangay-Officials-towards-the-Use-of-Information-and-Communications-Technology-ICT.pdf
- [10] R. B. Intud, "Design and Implementation of a Hybrid Barangay Information Management System," International Journal of Computer Science and Mobile Computing, May 19, 2021. Accessed on: Sep. 29, 2023. [Online] Available: <https://ijcsmc.com/docs/papers/May2021/V10I5202111.pdf>
- [11] J. T. Bona and J. S. Camara, "Digital Literacy among Elected Barangay Officials as an Input to a Community Extension Program," Southeast Asian Journal of Science and Technology, Oct. 21, 2021. Accessed on: Sep. 29, 2023. [Online] Available: <https://sajst.org/online/index.php/sajst/article/view/160/95>