

BARANGAY INFORMATION MANAGEMENT AND E-SERVICES SYSTEM
FOR BARANGAY LUMBO

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APPROVAL SHEET

The undergraduate capstone project attached here to entitled, "BARANGAY INFORMATION MANAGEMENT AND E-SERVICES SYSTEM FOR BARANGAY LUMBO" (Research no. 22875) prepared and submitted by VERLIE FEA GRACE P. CELLAN, JESSA MAE M. DORMAL, and ALYANNA KRISTINA JEN F. MONTALLA, in partial fulfillment of the requirements for the degree Bachelor of Science in Information Technology, is hereby endorsed.

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PROPOSER'S BIOGRAPHICAL SKETCH



Verlie Fea Grace P. Cellan, born on June 28, 2002, is a driven and accomplished individual with a passion for technology and academic excellence. Her educational journey began at Plantation Elementary School, where she laid the foundation for her future academic pursuits. Moving on to Libona National High School, she excelled academically, earning recognition as an Honor Student and actively participating in various contests. Upon reaching college, She pursued her Bachelor's degree in Information Technology with a specialization in Information Management at Central Mindanao University. During her college years, she distinguished herself as a CHED Tulong-Dunong Scholar, a testament to her commitment to academic success and continuous learning.

She was introduced to business environments at a young age. This exposure instilled in her a strong work ethic and a keen understanding of the dynamics of the business world. Her immersion during Senior High School exposed her to the intricacies of Fire Department jobs, providing her with valuable insights into diverse professional fields. This experience broadened her perspective and added a practical dimension to her academic knowledge.

In the realm of technology, she is a proficient user of Microsoft tools such as Word, Excel, and PowerPoint. Beyond basic applications, she delved into programming languages like Python, Java, JavaScript, and PHP, showcasing her versatility in the rapidly evolving field of information technology.

She is a dedicated scholar and a forward-thinking individual with a comprehensive skill set. Her journey through academic achievements, exposure to various professional domains, and proficiency in technology reflects her commitment to personal and professional growth.



Jessa Mae M. Dormal was born in Manuto, Quezon, Bukidnon, on December 19, 2001. She is strongly dedicated to her field and has a history of academic distinction. Her academic career started at Manuto Elementary School, where she excelled academically and received achievements due to her hard work. She maintained her academic excellence at Quezon National High School and graduated with honors.

During her final year of high school, she received essential practical experience through on-the-job training (OJT) at Mag'z, a multidimensional store offering various services, including printing, net café operations, and others. She was able to use her expertise in practical situations, which stoked her interest in information technology.

She improves her talents in the fast-paced information technology sector by earning a degree in information management with a specialization in Information Management. She knows the basics of several programming languages, including PYTHON, PHP, and Java, as well as front-end web technologies, such as HTML and CSS, and she is skilled in Microsoft Office.

A System Integration Architecture certificate from Greppo attests to her commitment to the field of system integration, in addition to her academic background and technical proficiency. This award recognizes her successful contribution to the Barangay Lumbo Information Management System (BLIMS) integration, demonstrating her practical abilities and capacity to apply her knowledge to challenging projects.

She has demonstrated her dedication and ability through her journey from early schooling to her current academic activities and experience and has made a noteworthy contribution to technical projects. Her ability to combine academic excellence with practical experience positions her as a prospective information technology professional poised to contribute to the field.



Alyanna Kristina Jen F. Montalla, born on August 13, 2002, in Esperanza, Agusan del Sur, is a dedicated and driven individual whose academic journey reflects a profound commitment to excellence. Her commitment to her education, evident in her graduation with honors from Esperanza National High School, reflects her unwavering dedication to academic pursuits. She enrolled at Father Saturnino Urios College of Bayugan, Inc., where she earned her high school diploma. She is actively broadening her horizons while pursuing a bachelor's degree in Information Technology at Central Mindanao University.

She embarked on a practical learning journey during her senior high school years. She was an office clerk during a two-month on-the-job training session at her hometown's Municipal Environment and Natural Resources Office. She then completed her 486-hour internship at the CMU Journal of Science, where she developed and migrated the journal's official website to a new version using Open Journal Systems. This experience showcased her dedication and underlined her commitment to continuous professional growth in Information Technology.

She is adept at utilizing Microsoft Office applications to create comprehensive reports and dynamic presentations. Beyond the basics, her technical expertise extends to programming languages, where she has demonstrated proficiency in Python for data analysis and a strong foundation in PHP programming. Complementing these skills, she has hands-on experience in HTML, CSS, and MySQL. She is notably recognized for her report-writing abilities, consistently delivering professional reports with impactful data visualization and insightful interpretation.

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EXECUTIVE SUMMARY

The Barangay Information Management and E-Services System (BIMES) project is a significant advancement for Barangay Lumbo, addressing technological gaps within the Philippines. This web-based system replaces manual processes in local governance with a digital solution to enhance public service delivery. BIMES simplifies operations, ensures data accuracy, and improves information reliability, benefiting administrators, secretaries, and residents.

Barangay Lumbo's dedication to progress makes it an ideal location for implementing BIMES. The system serves three main user groups: administrators, secretaries, and residents, offering features such as online document requests and feedback mechanisms. However, reliable internet connectivity is essential for the system's effectiveness, and the admin interface is currently optimized for desktop and laptop use.

The significance of BIMES lies in its potential to revolutionize local governance, offering a model for other communities to enhance administrative efficiency and community engagement. In the System Usability Scale (SUS) assessment with 399 respondents, the system achieved an impressive average score of 78.14, indicating an adjective rating of "Good." Among user roles, the secretary reported the highest SUS score at 83.75 (Excellent), followed by the interviewed resident users with 78.75 (Good). The online resident users were at 75.06 (Good), followed lastly by the main administrator with a total SUS Score of 75, indicating an adjective rating of "Good." Although the system has received positive reviews, the results also identify areas that require improvements and revisions.

BIMES is a pioneering effort in digitalizing barangay operations, setting a standard for other barangays to follow towards technological advancement and improved community services.

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CHAPTER I

INTRODUCTION

1. Background of the Project

The Philippines is facing a significant challenge in catching up with the rapid pace of technological innovation. While some Filipinos are adept at using technology to their advantage, a considerable portion of the population remains unfamiliar with the latest advancements. Despite this, many public services, such as those found in hospitals, schools, and local government offices, particularly in a barangay, have begun to incorporate various technological tools, including computers, Wi-Fi, laptops, and printers, to improve the services provided to citizens. Though the country is not leading in technological progress, these advancements are positive steps in modernizing the Philippines and increasing its competitiveness in the global market.

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. (DILG, n.d.) Barangay Lumbo is located in the heart of Valencia City, Bukidnon, and has a population of 18,229 as of 2020. Barangay Lumbo is also known as the '*Barangay of Golden Heart*' in Valencia City for its utmost generosity and service to the residents. The barangay has displayed perseverance, leadership, and harmony and is currently hailed as one of the friendliest barangays in Valencia City. After presenting the initial ideas for developing this project during their first monthly session last March 1, 2023, the Barangay Government of Lumbo, together with their officials and staff, have expressed their utmost support in becoming the main client for this project.

In the Philippines, there are available websites that offer Barangay Information Management Systems (BIMS). One such website, NSMGS

Technologies, provides BIMS services to various local government units nationwide. Their BIMS services include Systemized Barangay Records, Data Security, Monitoring Residents' Information, Automated Inventory, and Administrative Convenience (NSM GS Technologies, 2021). Additionally, other companies offer similar services, such as JGM IT Consultancy. This company provides even more advanced features than similar projects lack, such as the option to choose between online and offline systems, e-payment, and media management (JGM IT Consultancy, 2020).

The Department of Information and Communications Technology (DICT), Luzon Cluster 1, has released a web-based system designed to improve barangay services and the working environment. The Barangay Records Automation & Management System (BRAMS) aims to digitally transform barangays in the management of barangay records through an online web-based management system. This system offers a convenient data processing system and provides primary statistical data as a tool for decision-making in an almost real-time environment (Department of Information and Communications Technology, Luzon Cluster 1, n.d.).

However, despite the existence of these services that can greatly enhance the way the Barangay Government can function, they are still limited to the basic use of today's technology. The current system used by the Barangay Government of Lumbo still involves manual management and storage of data from constituents. Documents are stacked up in a cabinet susceptible to damage and this setup does not facilitate accurate retrieval of important information, resulting in delays in services. Printing out documents is also prone to errors as it is still edited manually, making information vulnerable to misspelled words and other mistakes. The barangay also occasionally posts their upcoming activities and events on Facebook, which can lead to inadequate dissemination to the constituents of Lumbo, making some of them feel left out.

The Barangay Information Management and E-Services System is an innovative platform that helps improve barangay operations. This system

centralizes information and makes it easily accessible to barangay officials and staff. Residents can use the system to file complaints, request services, and receive updates from the barangay. The platform is web-based and provides a convenient way for residents to request documents without physically going to the barangay office. This reduces waiting time and simplifies the application process.

Moreover, the platform can facilitate faster and more effective processing of requests and applications, saving time and effort on administrative activities. The system also aids in managing and storing data digitally, promoting efficient organization and retrieval. Additionally, the platform can share news and updates with residents, enabling better communication between staff, officers, and the community.

2. Statement of the Problem

The fundamental issue that most barangays in the Philippines encounter, particularly in Barangay Lumbo, is the manual updating and recording of data and reliability of information reports, including time-consuming and error-prone documentation processes. This is due to the fact that the barangay is still practicing manual processing and storing of information. Taking into account the aforementioned difficulties on the ground, the proponents of this project made the decision to develop a system that would not only simplify operations but also guarantee data accuracy and reliability. The Barangay Information Management and E-services System helped to achieve effective and efficient public service delivery. The system can store essential residents' data, perform online requests for documents, and display updates or announcements of upcoming events. Specifically, this project sought to answer the following questions:

Problem 1: What system features can be implemented to enhance the efficiency of transaction processing and services in the Barangay?

Problem 2: What measures can be taken to ensure the secure handling of document transactions and resident data?

Problem 3: How will the system generate the required statistics and reports, such as total number of requests and complaints, registered resident list and other data, to serve as baseline for project and policy implementation?

Problem 4: How satisfactory is the system when assessed using inspection techniques and empirical approaches?

3. Objectives of the Project

i. General Objective

The general objective of this project is to develop a web-based Barangay Information Management and E-services System for Barangay Lumbo that assists the barangay officials and staff in processing documents that the residents need from the barangay and reduce the amount of time they spend on processing documents of every resident by going to the barangay hall.

ii. Specific Objectives

This project also seeks to accomplish the following objectives:

Objective 1: To develop system features that enhance the efficiency of transaction processing and services in the Barangay, such as the online request of documents, accessible reports, and feedback and announcement corner.

Objective 2: Develop measures that ensure the secure handling of document transactions and resident data by using local data storage, applying the Data Privacy Act, and protecting the personal data that will be sent into the system.

Objective 3: Develop a reporting module that can produce key statistics and reports, including but not limited to the total number of document requests and reports, population growth, and a

comprehensive list of registered residents, to serve as baseline data for effective project and policy implementation.

Objective 4: To evaluate the system usability using a 5 (five) point Likert scale.

4. Scope and Limitations

The Barangay Information Management and E-Services System will automate the current manual processes and transactions of Barangay Lumbo. This project is capable of processing online document requests and online feedback and reports. The project has (3) three system users: the main administrator, the secretary, and the residents. The system is limited to the following:

- a. The system requires reliable internet connectivity, hardware, and software. In areas with poor connectivity or outdated equipment, the system may not be able to function optimally.
- b. The residents are the only users who can register through the system. Admin accounts for other officials and staff will only be created and approved by the main administrator.
- c. Residents cannot make complaints or request documents if they are not registered in the system's database;
- d. The documents that can be requested are barangay local records such as Barangay Certificates and Barangay Indigency, which will be authenticated by cross-referencing through the system's database.
- e. Payments received online by GCash, Maya, Paypal, and banking will be excluded from the system.
- f. The optimal functionality of the system's admin interface is restricted to wide and larger screens and is only specifically tailored for desktops and laptops (excluding mobile).

5. Significance of the Project

The significance of this project is particularly relevant in today's digital age, where technology plays a critical role in society. The system will significantly impact the barangay and its residents, officials, and staff who manage the system. The system's key features include a resident profile module, online document requests, and updates on barangay activities. While online payment has yet to be implemented due to certain prerequisites, the system offers a more convenient way for residents to access information and submit requests from the comfort of their homes using their personal devices and internet connection.

Barangay Officials: The system's implementation will alter the way the barangay currently manages its file-keeping procedures. This will guarantee that every record is current and complete. By requiring authorization before anyone can access the system, the barangay will also be certain that the file will be safe and secure.

Residents: It will help the residents access the barangay information and online request documents and perform reports in the comfort of their homes using their devices, data, or internet connection.

Developer: The project will help the developer through cultivating their coding abilities and interests, it will advance problem-solving expertise while also benefiting society as a whole.

Future Developer: The concepts presented could be referenced when future proponents develop a new system.

CHAPTER II

REVIEW OF RELATED LITERATURE

1. Review of Related Concepts

In several written studies of developing a barangay information management system, the main functionality of their system is almost identical, but the techniques, design and requirements used in managing and navigating the said system always differ. For instance, this Barangay Management System conducted by Carpio (2020) from Basilan State College, the modules written in the system consists of registration module that record barangay resident's demographic profile, documentary request module that enables residents to request documents (barangay certificate and certificate of indigency) online and receive updates on the status of their request via SMS, complaint blotter module that will allow residents to file complaints and report incidents online, attach necessary evidence and receive alerts on the status of their complaints through SMS, report module that will generate significant statistics and reports such as total number of requests and complaints, population growth, master list of residents per purok, and other that can serve as baseline data for project and policy implementation; and create a module that will send predefined replies to complaints. There are only 3 main users in the system; the Barangay Chairman, Barangay Secretary and Barangay Residents. (Carpio, 2020) Which can be difficult to manage, if the system only allows the Barangay Chairman and Barangay Secretary to supervise and manage all of the transactions made in the system because the processing and compiling of the documents does not fall to the job of a Barangay Chairman. Instead of providing an efficient way of doing their jobs, the secretary of the barangay would be burdened with the tedious task all alone.

A barangay information management system should at least consist of a main admin user that can manipulate and add another admin user for the secretary and its staff. For example, in particular, the Simple Barangay Management System admin interface is able to add other admin users and

assign them a specific task and set their roles in the website. (Oretnom23, 2021)

Another study conducted by Flores, R. (2017) stressed the importance of the proper functionality and flexibility of being a public servant. According to this same study, the Barangay government is also given considerable autonomy to manage its own affairs, as well as to explore any possibilities of raising its financial resources and utilizing them according to their own discretion, so long as this will result in the improvement of the welfare of its constituents. But in order to fulfill the barangays' mandates and functions, as contained in the Local Government Code, the barangays must be equipped with the necessary competencies, not only in terms of administrative capabilities but also the focal areas of good governance in terms of delivering public services to the people from different sectors of the society such as Education and Healthcare, Social Protection, Financial Management, Peace and Security, Business Friendliness, Tourism, Environmental Management and Disaster Preparedness. (Flores, 2017) This emphasizes how all barangay officials and staff are highly suggested to adapt to a more efficient and accurate way in serving the residents. Another issue the residents also face is the inability to catch up with the latest news and announcements in the barangay. The usual way of posting these important events to inform the public are through social media pages that completely relies on user engagement. Not all residents interact with the barangay's official social media page that is most of the time barangay posts would not show on the user's newsfeed because of low post interactions and failing page engagements. And according to Ocampo et. al., (2017), The Philippines is a democratic country thus active participation from its stakeholders is important.

At present, promoting effective governance must involve the government unit, non-government organizations (NGO's), residents, and private sectors to engage in collaborative activities and increase participation. Resident involvement plays a vital role in good governance, as the end recipient of law, policies, governance, and services; they are essential contributors to the decision making, policy-making and service implementation given by the

government. The advent of technology paved the way in bridging the gap between the government and its citizens. (Ocampo, et.al, 2017), Involving the residents is essential in the insight, the vision, the knowledge, compassion, growth, and understanding that is common in the community.

In accord with Lim (2016), barangays represent the government at the grass-root level. They are considered the epitome of what the government can offer and are the court of first help of the general populace. The implementation of the Barangay Management System intends to provide some automation and computing service to the barangays in order for them to be able to serve the community better. This is also supported by the Executive Order (EO) of 1993. It is the objective of EO for the official statistics at the municipal level to be harmonized with official statistics at the national level. Further, the EO would be responsive to planning and monitoring requirements at the local level. The EO was created after the Local Government Code (LGC) was ratified on October 10, 1991. The EO ensures that the delivery of basic services devolved at the provincial, municipal and village government units are addressed. The LGC gives the Local Government Units (LGUs) power and responsibilities to implement their development plans, program objectives, and priorities to provide efficient and effective basic services and facilities (Local Government Code: Book 3, 1991). With these devolved powers, the EO stipulates that the production of local-level statistics, the by-products of administrative reporting systems inherent in administering the devolved basic services, shall be continued by the LGUs. The continuation should be consistent with the manner, form, and frequency being adopted by the concerned national line agencies (EO 135 Sec. 3-b). For proper consolidation of the data produced, all LGUs are enjoined to establish their own databases in support of planning and programming activities at the local level. (Maneja et al., 2012)

Some municipalities are now storing data digitally but the barangays are still left behind with these technological changes. The standard storing and managing data should be done electronically, preferably stored in a cloud storage where the retrieval of information will become much easier. With the emergence of technology, the world is expected to follow its course. There are

already several barangays that are implementing BIMS with good feedback from the officials and the residents. In a study conducted by Berdin, J. E. & Samonte, P. S. (2018), the implementation of a Barangay Information Management System (BIMS) greatly improved the efficiency and accuracy of barangay operations, such as issuing permits, managing records, and monitoring barangay activities. Having these advancements is a crucial tool in enhancing the efficiency, accuracy, and transparency of barangay operations. BIMS can aid local government units in decision-making processes, disaster risk reduction and management, citizen participation, and data privacy and security. With its numerous benefits, the implementation of BIMS can greatly improve the quality of life of residents in barangays.

2. Review of Related System

There have been various projects concerning the upgrading of barangay services here in the Philippines. In fact, the most common barangay information management-related service here is the **BIMS** or the *Barangay Information Management System*. The main functionality of this system is to systemize the recording and storing of bulk information in a barangay that can be stored in a long period of time. The information that is being stored in the system are personal to family information and complaints to amicable settlement information (Barangay Justice System). This system can also create daily reports for the barangay. It also offers security, to help the barangay's stored information secure with the use of auto-backup database and system user level security preventing unauthorized personnel from accessing the information.

BIMS are also able to monitor the resident's information, business information and property information status which is essential to the Barangay Officials in decision making to formulate solutions, corresponding recommendations and appropriate positive actions. The system is also suitable for automated inventory that can track location, cost, acquisition date and condition of the property which makes the whole system generate inventory with accuracy and speed. Last but not least, the system offers administrative

convenience. The system facilitates the processing of data which helps employees increase their productivity and allows other important tasks to be devoted to rather than spending their time in manual manipulations of records that is time consuming. The stated BIMS system is accessible only to the staff of Barangay offices and does not cater online requests from barangay residents that other BIMS systems have. There are few online websites that offer BIMS in the Philippines. For example, as mentioned above the NSM GS Technologies provides BIMS and other several government-related systems. They have accumulated positive video testimonials from their clients i.e., San Carlos City Pangasinan, Province of Aurora, Municipality of Nagtipunan, Quirino Province, Candon City, Ilocos Sur, Meycauayan City, Bulacan, Infanta, Quezon Province and others. (NSM GS Technologies, 2021) Their services are proven to be quite effective and efficient as what has been stated in the video testimonies of the said clients.

Similar to this, the Barangay Management and Information System (BAMIS) also offers barangay system related services. They have already partnered with various barangays from Bulacan, Zamboanga, etc. with good reviews for every single one of their projects. They have also been awarded by the DOST (Department of Science and Technology) during their SCAN Program (Smart Cities Adapting the New Normal) and won (3rd Place) a total of 100,000 Philippine peso. The first BAMIS was almost identical with what NSM GS Technologies has to offer but with the latest release of BAMIS 2.0, the users of the said system are now able to choose between offline and online system, with the additional notable features like files and media management, budget and expenses tracking, activities progress tracking, and SMS broadcast. The user residents are also able to send payment online using GCash, Maya, and banking. It also keeps a record of receipts and details of every e-payment transaction.

BAMIS is also capable of displaying demographic summaries provided with tabular data and automated graphs. The user residents of the system will also be able to request documents through the messenger application. (JGM IT Consultancy, 2020) There are few notable features in BAMIS that the other

barangay system services provider does not offer but in terms of functionality, all of these systems have drastically improved the overall performance of the Barangays they have worked with.

The Department of Information and Communications Technology of Luzon Cluster 1 (DICT, LC1) also issued the Barangay Records Automation & Management System (BRAMS) which is a free service barangay information management website under the Digital Government of DICT, LC1 (Luzon Cluster 1). The system intends to digitally transform barangays in the management of barangay records through an online web-based management system. It offers a convenient data processing system and provides basic statistical data as a tool for decision-making in an almost real time environment. The said system can process Issuance of Barangay Certificates and Clearances which enhances the way certificates and clearances are issued as it encourages a unified form for all barangays served by the system but still maintains an official brand that meets the needs of barangay constituents. BRAMS also has a records management feature. The objective of this record management system is to digitize most of its records to complement and support Sec. 394 d. (6) of R.A.7160, THE LOCAL GOVERNMENT CODE OF THE PHILIPPINES by providing a more efficient processing of information for private and public stakeholders. Sensitive records are secured under a semi-cloud base management system for easy retrieval, updating, archiving and classification of data and information. This free system also has automation that is designed to deliver real time information by providing barangay secretaries ease of updating household and family records on a 24/7 basis using desktops, laptops and mobile phones that auto update records for senior citizens, out of school youth, children of desired age and other information that are date driven. Demographic information is also automatically processed that immediately defines real time conditions of a barangay through automated generation of reports. (Department of Information and Communications Technology, Luzon Cluster 1, n.d.) This system can only be used within Luzon Cluster 1 and it provides great services that help their local barangay's performance and service to the citizens.

After analyzing the mentioned concepts and the system, the proponents of this project realized a few things. In order to make the system function harmoniously, the main admin should be able to assign roles to the other staff in the barangay, dividing tasks for a more efficient way of managing the information sent in the system. The web system should be accessible on any kind of device, whether it be Android, iOS, or PC, as long as it is accessed through a web browser.

Additionally, the web system should include an analysis and monthly reports of the barangay displayed in tabular data and automated graphs, as requested by the clients for quick analysis and discussion during their hearings. The system should also evoke a sense of belonging. As a system dedicated to the betterment of the community, it should address the wants and needs of the Barangay Officials, Staff, and residents.

Lastly, this project would not be able to incorporate e-payment transactions for the documents because the Barangay Government of Lumbo currently does not have the capability to accept online payments using GCash and other platforms.

CHAPTER III

TECHNICAL BACKGROUND

To ensure accessibility, the proponents have chosen to utilize a web-based system for the Barangay Information Management and E-Services System. Users can access the system from any device with a web browser and stable internet connection. This online platform enables residents of Barangay Lumbo to conveniently process requests for essential documents and receive updates on barangay activities, all overseen by the barangay's own officials and staff. The project will be developed using the following tools:

1. Interface

i. Bootstrap

A web development framework that supports fast, mobile-responsive front-end programming. It provides templated designs for interface features such as buttons, forms, navigation bars and fonts. (Berkeley Extension, n.d.)

ii. CSS

CSS stands for Cascading Style Sheets. It is a simple design language intended to simplify the process of making web pages presentable. (BigCommerce, n.d.)

iii. HTML

A standardized system for tagging text files that creates the structure for pages that use on the web. It adds in page breaks, paragraphs, bold lettering, italics, and more. HTML works to build this structure by using tags that tell browsers what to do with text. (O'Grady, n.d.)

iv. Canva

An online design tool that offers users the opportunity to create professional-looking posters, slideshows, images, event flyers, resumes, cards, certificates, infographics, and other media. (University of Massachusetts Amherst, n.d.)

The web-based system will feature an enhanced and responsive design, utilizing a range of tools to achieve this goal. Bootstrap is a popular front-end framework that provides a wide variety of customizable design elements, such as buttons, forms, menus, and typography. This enabled the proponents to create a visually appealing and responsive user interface. The CSS tool will be used to customize the website's appearance, including font styles, colors, backgrounds, and layout, ensuring a consistent and polished look throughout the website.

HTML will serve as the foundation of the website, providing the basic structure for headings, paragraphs, lists, tables, and forms. With this tool, the proponents can ensure that the website is well-organized, easy to navigate, and accessible to all users. Additionally, we will use Canva for initial website design and to customize buttons, icons, and the logo, ensuring that the website's visual elements are both cohesive and representative of Barangay Lumbo's unique identity.

2. Framework

i. Laravel

An open-source PHP framework, which is robust and easy to understand. It follows a model-view-controller design pattern. Laravel reuses the existing components of different frameworks which helps in creating a web application. The web application thus designed is more structured and pragmatic. (Tutorials Point, n.d.)

To reduce the workload of developing the website and ensure proper functionality, Laravel will be utilized in this project. Laravel is a powerful PHP framework that provides numerous features such as authentication, routing, sessions, and caching. These features are essential for the website's functionality and security.

3. Programming Languages

i. PHP

Also known as Hypertext Preprocessor is a general-purpose scripting language that can be used to develop dynamic and interactive websites. (Mino, n.d.)

ii. JavaScript

A scripting language that enables you to create dynamically updating content, control multimedia, animate images, and others. (MDN, 2023)

PHP and JavaScript are versatile programming languages that can run on different operating systems and web browsers. This is a crucial aspect of the project since it guarantees that users can access the system, irrespective of their preferred platform or browser. Cross-platform compatibility helps in reaching a larger user base and ensures a seamless user experience. Therefore, utilizing PHP and JavaScript for the development of the web-based system will enable the website to operate smoothly on a variety of devices and web browsers.

4. Database Server

i. MySQL

An open-source Relational Database Management System (RDBMS) that enables users to store, manage, and retrieve structured data efficiently. (Hostinger, 2023)

To facilitate the development of this project, MySQL will be utilized due to its robust capabilities in handling complex queries and large datasets. This makes it well-suited for data warehousing and analysis, which will be crucial in processing the information gathered from the residents of Lumbo.

5. Source-Code Editor

i. Sublime Text

A popular source code editor that is known for its speed and ease of use. It offers features such as syntax highlighting, code folding, and multiple selection editing, as well as a wide range of plugins that can be used to customize the editor.

ii. VSCode

An open-source code editor primarily used to correct and repair cloud and web applications coding errors. (Uchendu, 2021)

The source-code editors, Sublime and VSCode, are highly beneficial for the development of this project due to their support for multiple programming languages. They provide the proponents with increased flexibility and a wide range of options while developing web applications. By utilizing these editors, the proponents can easily switch between languages and perform syntax highlighting, auto-completion,

and debugging of the code, which can improve the overall quality of the code and speed up the development process.

6. Hosting Server

i. Hostinger

Hostinger is a popular web hosting provider known for its affordable and user-friendly hosting services. It offers a range of hosting solutions including shared hosting, cloud hosting, virtual private servers (VPS), and domain registration services. Hostinger is characterized by its ease of use, making it a good choice for both beginners and experienced web developers.

Hostinger plays a crucial role by providing a reliable and cost-effective platform for hosting the system. This is particularly important for ensuring that the system is accessible online to all users, including barangay officials and residents. The availability of Hostinger allows for the smooth operation of BIMES, offering essential services such as data storage, bandwidth, and technical support, ensuring that the system remains operational, secure, and accessible at all times.

CHAPTER IV

METHODOLOGY

The system flow, system analysis and development used in this project are presented in this chapter. Each usage strategy is described depending on how it is used and how the system was developed.

1. Conceptual Framework

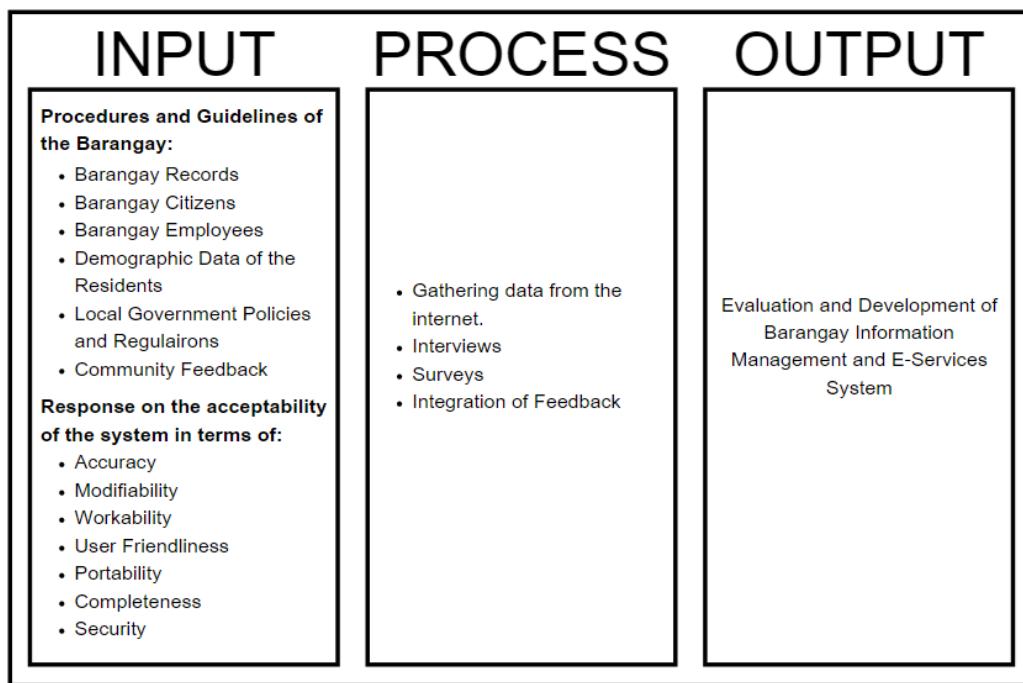


Figure 1. Conceptual Framework

Figure 1 shows the IPO model of the system that serves as a structured framework for crafting and appraising the development and assessment of the Barangay Information Management and E-Services System for Lumbo. Its input component involves identifying and comprehending existing procedures and guidelines within the barangay, along with relevant records, citizens, and employees. In the process component, data will be collected from various sources such as the Internet, surveys, and interviews to ensure that the information gathered is comprehensive and accurate. The output component

aims to assess and enhance the system, using criteria such as accuracy, modifiability, workability, user-friendliness, portability, completeness, and security to guarantee that the system aligns with the expectations and requirements of the barangay official, staff, and residents.

2. Research Approach

In this project, the proponents employed a mixed-methods approach to thoroughly examine the system's potential impact in Barangay Lumbo, with an estimated population of around 20,000 residents. Utilizing Slovin's Formula ($n = \frac{N}{1+N*e^2}$) with a 5% margin of error, the calculated sample size for residents is approximately 392.157, serving as the target for survey questionnaires and semi-structured interviews. The careful selection of these sample sizes is crucial for enhancing statistical power and facilitating the detection of meaningful patterns, contributing valuable insights for successfully implementing the system in Barangay Lumbo.

$$n = \frac{N}{1+N*e^2} \quad n = \frac{20000}{1+20000*0.05^2}$$

$$n = \frac{20000}{1+20000*0.0025} \quad n = \frac{20000}{1+50}$$

$$n = \frac{20000}{51} \quad n = \mathbf{392.157}$$

Figure 2. Slovin's Formula

3. System Development Methodology

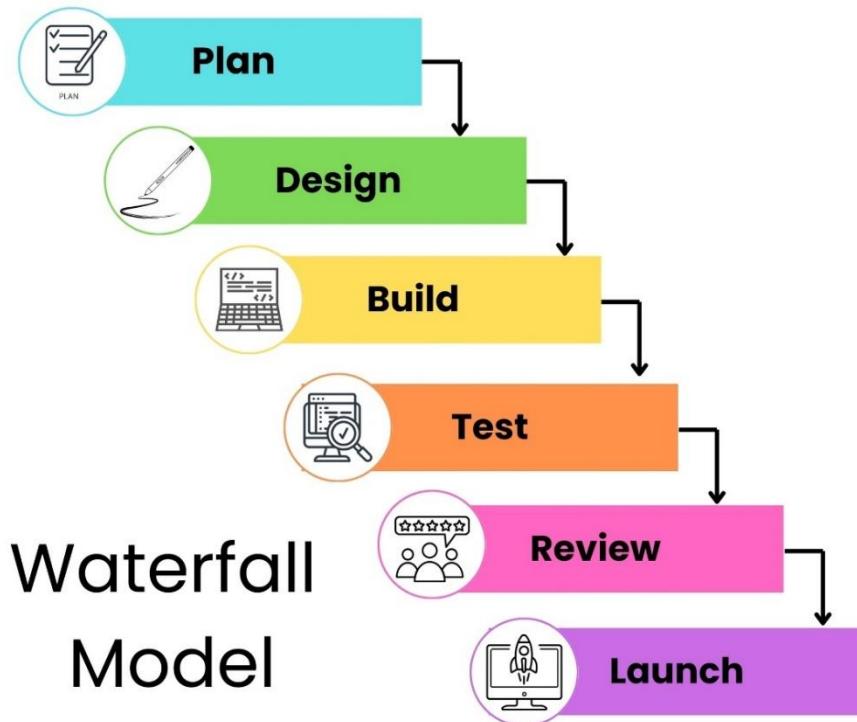


Figure 3. Waterfall Methodology

The Waterfall methodology shown in Figure 3 ensured a structured development process for the Barangay Information Management and E-Services System. Project objectives and system requirements will be identified during the Planning phase. Detailed documentation, such as system specifications and design documents, is created during the Design phase—the Implementation phase concerns coding based on finalized specifications, followed by rigorous testing to ensure functionality. Before entering the Deployment phase for actual use, a formal Review meeting with Barangay Lumbo officials ensures system acceptance. Further updates will be addressed in a separate maintenance process, reflecting the structured, one-time development cycle of the Waterfall approach.

4. System Analysis

i. Flowchart

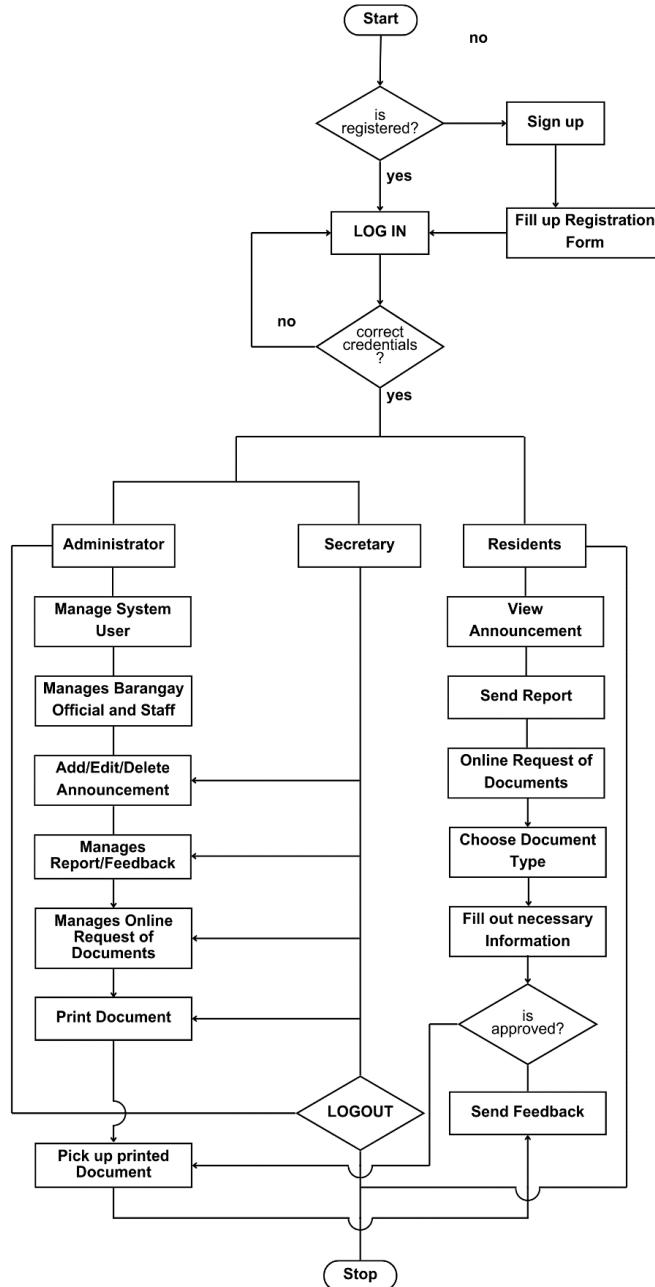


Figure 4. Flow Chart

Figure 4 illustrates the flowchart of the system. It initiates with a verification step where new users are prompted to register while existing users authenticate via the login portal. Once logged in, users are welcomed and directed to interfaces specific to their roles in the system.

The Administrator encompasses comprehensive control, facilitating user oversight and content administration, including publishing announcements and processing feedback. The Secretary's role is pivotal in managing and verifying document requests and ensuring the precision of public announcements. As core users, residents are afforded the functionality to peruse announcements, provide feedback, report issues, and submit document requests, which undergo a systematic approval process. The session concludes with a secure logout, safeguarding user data and maintaining the integrity of the user experience.

ii. System Context Diagram

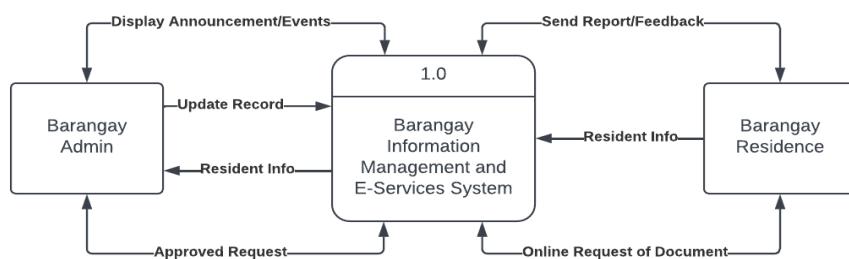


Figure 5. System Context Diagram

The context level data flow diagram depicts the overall system and its input and output. The figure shows the Barangay Information Management and E-Services System context diagram, which consists of two users. The residents' information can be stored in the system's database which only the administrator can view and update. The residents can also request documents and send feedback and complaints to be managed and approved by the administrator. The administrator can update, edit and delete announcements that appear in the system.

iii. System Level 0 DFD

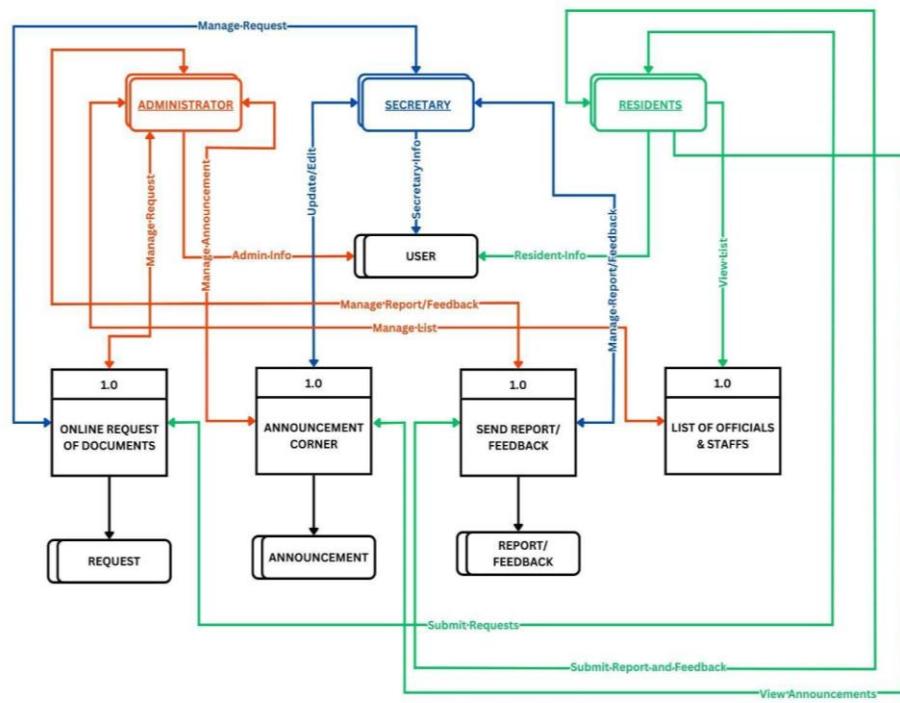


Figure 6. Level 0 DFD

Figure 6 displays the level 0 DFD of the Barangay Information Management and E-Services System, which is a zoom-in process of level 0. The diagram includes three (3) entities, namely the administrator, secretary, and the residents, all of which have different roles in the processes. The first process is an online request for documents, in which the resident can submit a request to the system, and the administrator and secretary will either approve or cancel it. The second process is the announcement corner, which the secretary can update, edit, and delete. This allows the residents to stay informed about the events and announcements of the barangay. The system can also receive reports and feedback from the residents, which can only be managed by the administrator. The fourth process is the list of the officials and staff, which can be viewed by the residents and managed by the administrator.

iv. System Wireframe

The wireframe of the project, meticulously crafted to accommodate the diverse needs of residents and officials (users and administrators) of the Barangay Government of Lumbo, can be found in **Appendix F**. Every aspect, including font choice, size, and placement of visual elements such as photos and buttons, was thoughtfully adjusted to ensure optimal usability, mainly catering to the visual capabilities of older residents and officials in Barangay Lumbo.

In designing the wireframe, special attention was paid to accessibility, recognizing the importance of making the interface intuitive and accessible for all users. Features such as straightforward typography and strategically placed buttons were implemented to enhance user experience and minimize potential confusion. Furthermore, extensive user testing was conducted to gather feedback and refine the wireframe design further. This iterative process allowed for adjustments based on user preferences and usability insights, ensuring that the final product meets the needs and expectations of its intended audience.

Overall, the wireframe design reflects a commitment to inclusivity and user-centered design principles. It aims to empower residents and officials alike with a user-friendly digital platform for accessing essential services and information within the Barangay Government of Lumbo.

v. Use Case Diagram

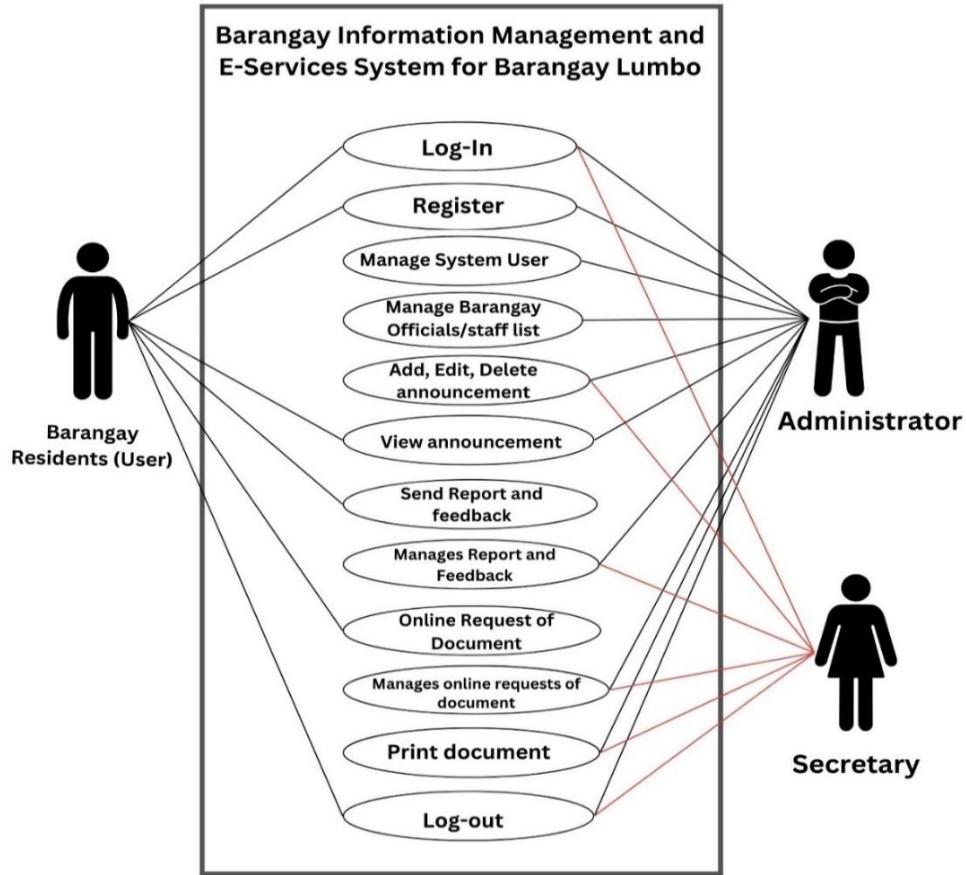


Figure 7. Use Case Diagram (User's Point of View)

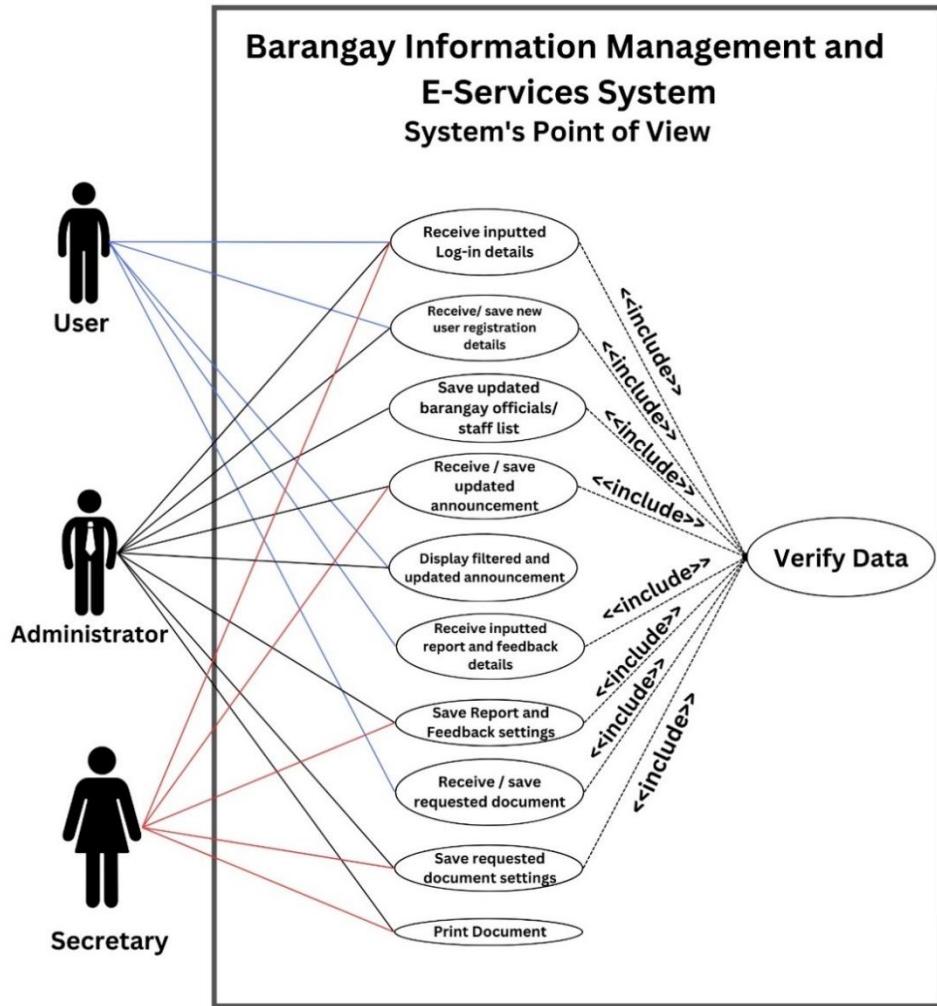


Figure 8. Use Case Diagram (System's Point of View)

The use case (Figure 7 & Figure 8) diagram visually represents how users and systems interact with the systems. The visual shows that actors have different privileges. The Administrator can fully access the system from logging in and managing the system's account up to log-out. The secretary has limited privileges in the system; he can manage documents up to printing requested documents, and the secretary also has the privilege of adding, editing, and deleting the announcement. Residents of Barangay (users) can log in to the system if they are registered and verified. Registered users can request documents, send reports, give feedback, and log out anytime.

vi. System Database

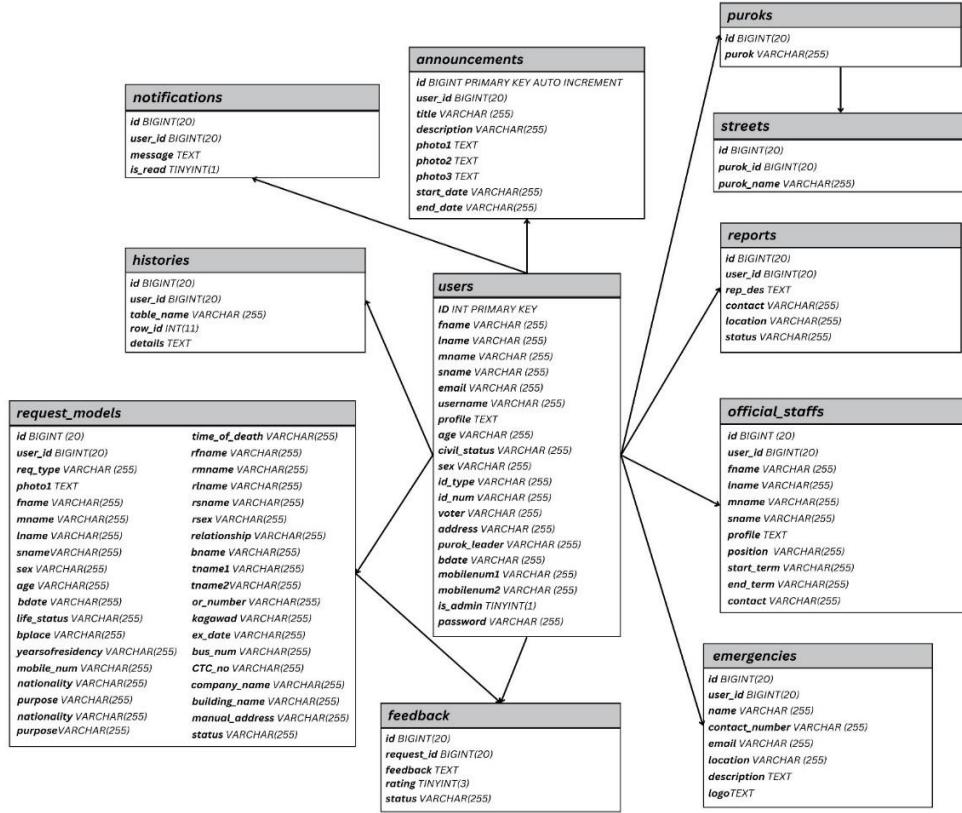


Figure 9. System Database

Figure 9 displays the Entity-Relationship Diagram (ERD), which outlines the database that is designed to organize and manage data for the system. The users table stores detailed information about each user within the barangay. This central table is linked to several others, such as notifications, histories, request_models, reports, announcements, and emergencies, each capturing different types of interactions a person may have in the system. For instance, a user might get several alerts (notifications), have a log of activities (histories), make requests (request_models), submit incident reports (reports), announce events (announcements), or report urgent situations (emergencies). This arrangement of tables and relationships in the ERD simplifies data organization, ensuring the system can manage information effectively and support the system's operations.

5. System Requirements Specification

i. Functional Requirements

- **Registration Page** – a user-friendly and secure registration system that allows residents to register and access the system's features and services.
- **Online Document Request** – allows residents to submit various forms and request documents in the barangay. (e.g. barangay clearance, barangay ID, permits etc.)
- **Admin Dashboard** – serves as the centralized control hub in the system, providing efficient management and oversight of community data and electronic services.
- **Announcement Corner** – serves as a centralized platform for disseminating important information, updates, and events to the barangay residents.
- **Online Report and Ratings** – allows the user to report issues and provide suggestions to the barangay officials.
- **History Module** – stores the list of finished transactions of approved documents requested.
- **View Documents Request Module** – view the list of new, pending, and processed requests.
- **View Report and Rating Module** – view list and details of reports and feedback from the residents.
- **Barangay Official Modules** – allows the users to search for information on barangay officials, such as position, name of the officer, contact number, address, and others.
- **Staff Account Module** – allows the administrator to create/add an account for staff.

ii. Non-Functional Requirements

- **Security** – the system must be designed to ensure the Security and confidentiality of sensitive information, such as personal information of residents and other vital data.
- **Usability** – the system should be user-friendly and easy to navigate, with clear and concise instructions for accessing and using various features and functions for the sake of senior residents and of the barangay.
- **Performance** – the system should be able to handle a large volume of data and user traffic without slowing down or crashing, and response times should be kept to a minimum.
- **Reliability** – the system should be reliable and available at all times, with minimal downtime and quick recovery from errors or system failures.
- **Scalability** – the system should be able to adapt to changing needs and requirements and should be able to accommodate growth and expansion as the population of the barangay increases.
- **Accessibility** – the system should be accessible to all residents, including those with disabilities, and in multiple languages to cater to the diverse community.
- **Compliance** – the system should comply with relevant laws, regulations, and industry standards, such as data privacy laws and information security standards.
- **Support and Maintenance** – the system should be well-supported and maintained, with regular updates and bug fixes. A helpdesk or support team should be available to assist users with any issues or concerns.

6. Project Management

i. Gantt Chart

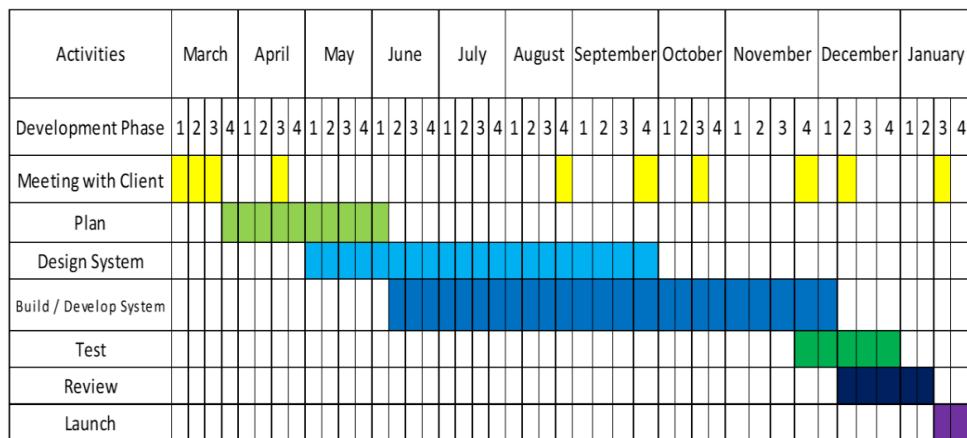


Figure 10. Gantt Chart

Figure 11 displays the BIMES Gantt Chart, which the proponents will use to develop and accomplish the project. The Gantt chart contains a schedule of future activities based on the systems' waterfall methodology to attain the system's target date of implementation and deployment.

7. Testing Methodology

To test the system's usability during its developing stage, the proponents implemented the System Usability Scale (SUS) to track the system's performance on each test. The system's users, including the main administrator, secretary, and resident users, were able to test the system and give feedback and recommendations about the project's current progress.

To measure the system's usability, the proponents used the 5-point Likert scale to determine the system's performance accurately. The primary users of the system will be asked to rate their level of agreement with statements using a scale ranging from 1 to 5, with "Strongly Disagree" being 1 point and "Strongly Agree" being 5 points. The scale also includes "Disagree"

for 2 points, "Neutral" for 3 points, and "Agree" for 4 points, providing a comprehensive range of options for respondents to choose from.

SUS Score	Grade	Adjective Rating
> 80.3	A	Excellent
68 – 80.3	B	Good
68	C	Okay
51 – 68	D	Poor
< 51	F	Awful

Figure 11. SUS Interpretation

According to conventional SUS score interpretation, scores above 80.3 are classified as "Excellent," while those between 68 and 80.3 are "Good." Scores of exactly 68 are termed "Okay," while ratings falling between 51 and 68 are "Poor," and those below 51 are "Awful." This framework systematically evaluates usability across effectiveness, efficiency, and overall ease of use. The SUS score is computed using the formula: $SUS = ((X + Y) \times 2.5)$.

Where X represents the sum of points for all odd-numbered questions minus 5, and Y represents 25 minus the sum of points for all even-numbered questions. This intuitive calculation ensures a range from 0 to 100, with each question weighing 10 points. Odd-numbered questions, in a positive tone, range from strongly disagree to strongly agree, while even-numbered questions, in a negative tone, range inversely. Multiplying by 2.5 standardizes the scale for each question. (T, 2016)

i. BIMES System Usability Scale

Table 1. BIMES Questionnaire (Likert Scale)

Questions	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
The system is fast and responsive.					
It's difficult to find what I need in the system.					
The system consistently provides correct information.					
Overall, the system is cumbersome to use.					
I find the system's layout easy to understand.					
Using the system is more time-consuming compared to manual methods.					
Finding information in the system is straightforward.					
Technical support is lacking when needed.					
The system makes barangay services more accessible.					
I wouldn't recommend the system to others.					
I feel confident using my personal information in the system.					
The system's security features are unclear.					

The system effectively protects against cyber threats.					
I'm not promptly informed about any security issues.					
I'm likely to continue using the system because of its features.					

CHAPTER V

RESULTS AND DISCUSSION

The Barangay Information Management and E-Services System for Barangay Lumbo, Valencia City, Bukidnon, comprises multiple elements and forms crafted to shape the overall interface of the system. Displayed below are graphical user interfaces (GUI) created to execute the desired functions of the system:

1. BIMES Lumbo General Interface

i. BIMES Landing Page

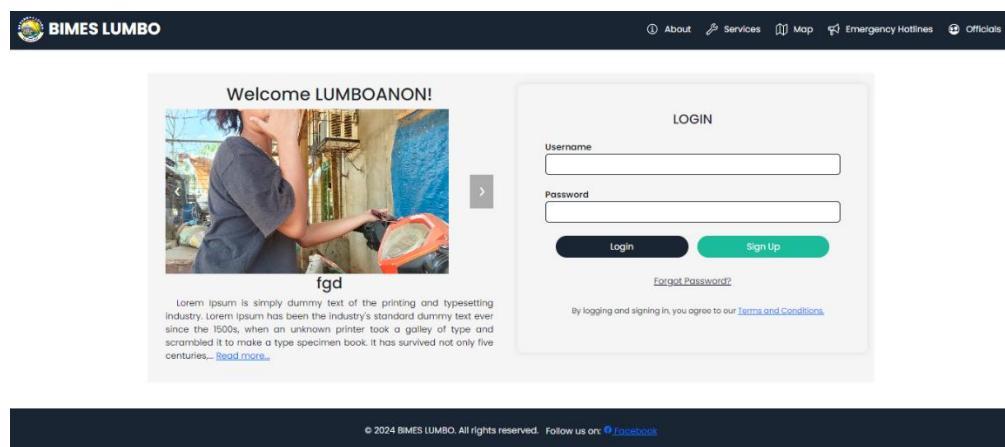


Figure 12. Landing Page

The login page is the entry point for system administrators and residents, requiring valid account information for access. To achieve Objective 3 (Figure 11), as a measure of security, the proponents of the project incorporated a basic forgot password feature that lets the resident users change their password by sending a personal email to the barangay's official email or by going to the barangay office and have the Main Administrator give them their passwords. Additionally, implementing the Data Privacy Act within the system's framework ensures that users' data is processed in compliance with legal standards, reflecting a commitment to protecting user privacy and enhancing trust in the digital platform.

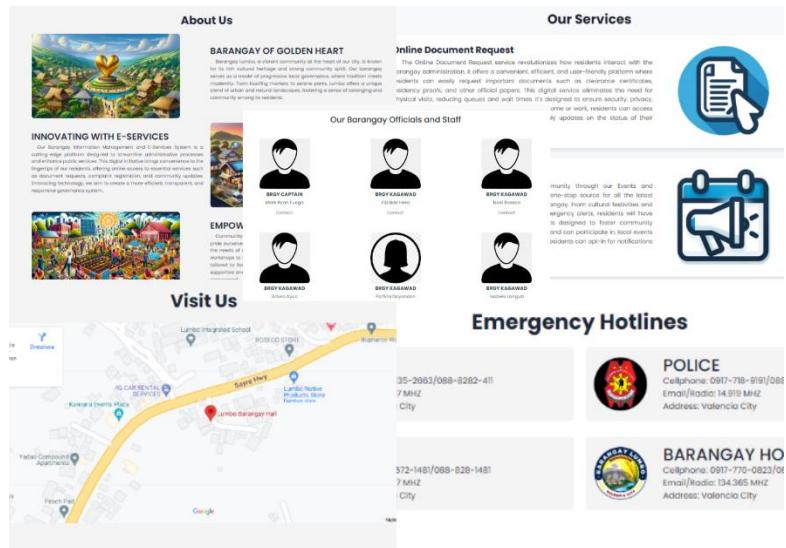


Figure 13. Header Pages

Additional features such as About, Services, Map, Emergency Hotlines, and the Officials List are incorporated to offer detailed information, add navigation, and provide quick access to barangay services, locations, and emergency contacts.

ii. BIMES Registration

The registration form is titled 'Registration'. It is organized into several sections:

- Personal Details:** Fields for Username, First Name, Middle Name, Last Name, Suffix, Birthdate (mm/dd/yyyy), Sex (Select Sex dropdown), and Civil Status (Select Civil Status dropdown).
- Contact Details:** Fields for Contact Number, Contact Number 2, and Email.
- Identity Details:** Fields for ID Type (Select ID Type dropdown), ID Number, and Are a registered voter? (Select answer dropdown).
- Address Details:** Fields for Address and Purok Leader.

Figure 14. Registration

The registration form fields directly reflect the 'users' table within the system database, ensuring that the data input by the users during

registration corresponds accurately to the backend storage. Consequently, the design and implementation of the registration process are also greatly influenced by the structure of the system database and the interactions defined in the use case diagram, facilitating a seamless user experience and efficient data management.

2. BIMES Lumbo Resident User Interface

i. BIMES Resident User Welcome Page



Figure 15. Resident User Welcome Page 1

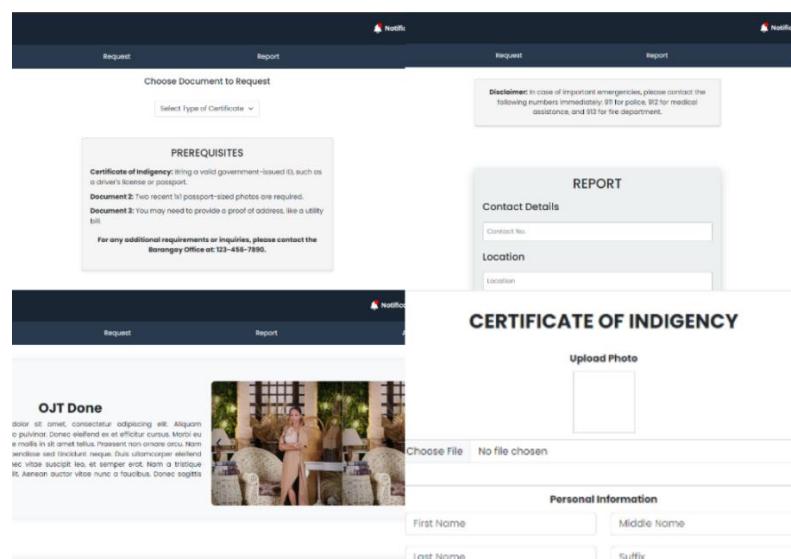


Figure 16. Resident User Welcome Page 2

The User Welcome Pages, as shown in Figures 14 and 15, are meticulously designed to achieve Objective 1 of the project. The key

features aligning with this goal include an online document request system, allowing residents to apply for barangay certificates and other documents easily. There is also a report page dedicated to logging accidents and emergencies, facilitating prompt response and action from barangay officials. Lastly, an announcement corner is a hub for the latest news and events, keeping resident users informed and engaged with community activities. Each feature directly translates the system's use case and database design into a user-friendly interface that streamlines residents' interactions with barangay services.

ii. BIMES Resident User Dropdown Page

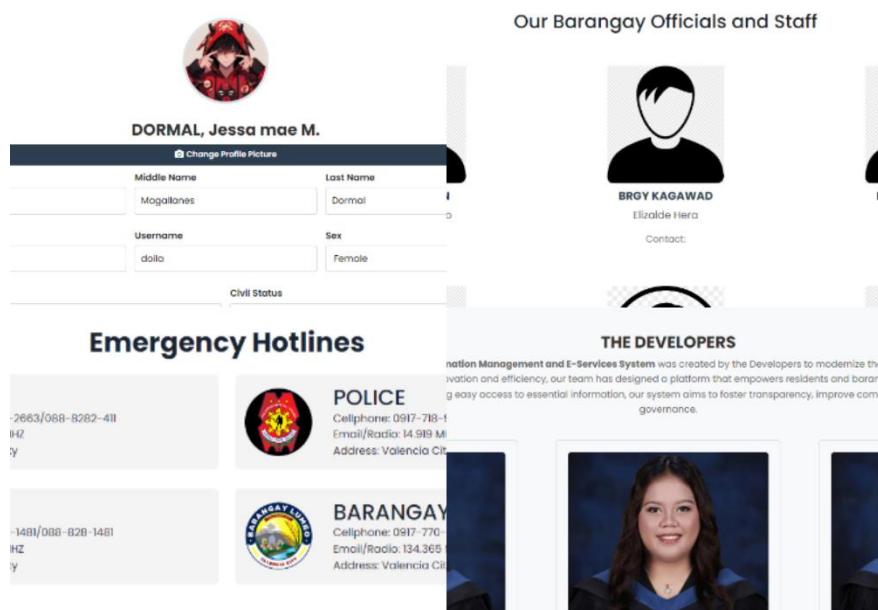


Figure 17. Resident User Dropdown

The interface features a dropdown menu that offers resident users quick access to key sections such as their profile, a directory of barangay officials and staff, emergency hotline contact details, information about the barangay and the developers, and a logout option. This design ensures efficient navigation and user-friendly access to important resources within the system.

iii. BIMES Resident User Document Request Page

The figure displays four online document request forms side-by-side:

- CERTIFICATE OF INDIGENCE**: A form for requesting a certificate of indigency. It includes a placeholder for an uploaded photo and fields for First Name, Middle Name, Last Name, and Suffix.
- BARANGAY CONSTRUCTION**: A form for requesting a barangay construction certificate. It includes a placeholder for an uploaded photo and fields for First Name, Middle Name, Last Name, and Suffix.
- BARANGAY GOOD MORAL**: A form for requesting a barangay good moral certificate. It includes a placeholder for an uploaded photo and fields for First Name, Middle Name, Last Name, and Suffix.
- CERTIFICATE OF DEATH**: A form for requesting a certificate of death. It includes fields for Date of birth (mm/dd/yyyy), Date and Time of Death (mm/dd/yyyy --::--), Nationality, and Sex.

Figure 18. Resident User Document Request

Figure 18, displayed above, highlights one of the system's key features: the online request of documents. It facilitates the acquisition of official papers from the barangay, such as Certificates of Indigency, Death, Residency, Construction, Barangay Clearance, and Good Moral Character. The data submitted through these requests are consolidated into a single table in the system database, making the process faster by efficiently storing all necessary information for document processing. In the use case diagram, this functionality enables resident users to request documents online, which the system then processes, ultimately improving service delivery and administrative efficiency within the barangay.

iv. BIMES Resident User Document Feedback Page

The screenshot displays the BIMES LUMBO resident user interface. At the top, there's a navigation bar with links for Home, Request, Report, and Announcement. On the right side of the header, there are notifications and a user profile for Jessa Mae Dormal. Below the header, a central box is titled 'Feedback'. It shows a rating of 3.5 out of 5 stars. A text input field contains the placeholder 'Share us your experience!' and the user's comment 'What a great service!!'. A 'Submit' button is located at the bottom of the feedback box.

Figure 19. Resident User Feedback

The feedback feature is also one of the key features in the system, as mentioned in Objective 1. It enables resident users to provide ratings and comments on the service they received after completing their document request. The feedback can only be submitted once the requested document's status is marked as "Completed" by the admin or secretary accounts. This function ensures that the barangay receives timely evaluations of its services, allowing for continuous improvement and accountability within the system's operations.

3. BIMES Lumbo Admin User Interface

i. BIMES Admin Welcome Page



Figure 20. Admin Welcome Page

This interface is the admin account's welcome page. It displays a sidebar and a dashboard for easy access to barangay information. The page header includes a Notifications feature that alerts the admin to new document requests and other significant updates and a user profile section for managing account details. The interface is designed to provide a centralized dashboard, allowing the admin to oversee and interact with various system functions efficiently.

iii. BIMES Admin Dashboard

Ref no.	Document type	Status	Action
4	Barangay Clearance	Finished ▾	View Delete
4	Construction Certificate	Finished ▾	View Delete
4	Barangay Clearance	Ready ▾	View Delete
4	Barangay Good Moral	Pending ▾	View Delete
3	Construction Certificate	Pending ▾	View Delete
2	Barangay Board Meeting	Pending ▾	View Delete

Title	Start Date	End Date	Action
tgtd			View Delete
tgtds			View Delete
Q1t Done	2024-04-10	2024-05-10	View Delete
Dance Contest Registration	2024-01-10	2024-01-30	View Delete
Libreng Bakuna para sa Kaspa	2024-01-10	2024-01-30	View Delete

Figure 21. Admin Dashboard

The admin dashboard is the core interface for administrators within the system, pivotal for achieving Objective 1. It provides structured navigation with distinct sections for managing document requests, announcements, galleries, reports, resident feedback, and emergency contacts. Each section is tailored to support administrative duties, with the Administrator and Secretary having respective system privileges to perform their roles and enhance service delivery efficiently.

iv. BIMES Admin Sidebar

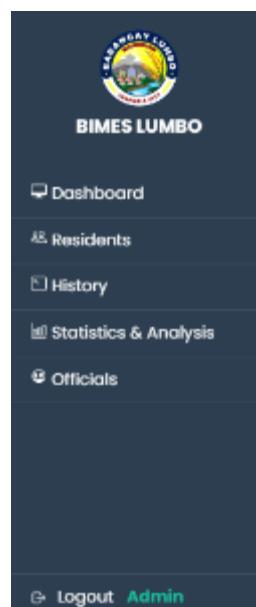


Figure 22. Admin Sidebar

The admin sidebar shown in the figure above is a crucial element of the Barangay Information Management and E-Services System, designed to assist in achieving Objective 3. This objective likely focuses on enhancing the oversight and management capabilities within the barangay's administration. The sidebar facilitates easy access to various system sections, such as Residents, History, Statistics and analysis, and Officials, each providing administrators with the tools to efficiently manage information, track historical data, analyze demographic and civic statistics, and oversee barangay staff.

v. BIMES Admin Residents Page

REGISTERED RESIDENTS						
ID	Name	Address	Age	Sex	Civil Status	Action
1	Admin A Barangay	Purok 5A Boundary	24	Male	married	View Edit Delete
2	Jhon Lawrence P.B.	Purok 9 Sugarland ..	28	Male	married	View Edit Delete
3	Jessa Mae M Dorm..	Purok 11 Tulay	35	Female	married	View Edit Delete
4	Elizabeth M Dormal	Purok 2A Tagostos	0	Female	single	View Edit Delete

[Add](#) [Print](#) [Return](#)

Figure 23. Admin Residents

The figure shown above is designed to manage resident information supporting Objective 3. It features functionalities for adding and updating resident details and a table for viewing registered residents in the system. The 'View,' 'Edit,' and 'Delete' buttons enable efficient data management. At the same time, the 'Add,' 'Print,' and 'Return' options allow for the easy input of new data, hardcopy generation, and smooth navigation, streamlining administrative tasks and data accuracy.

vi. BIMES Admin History Page

HISTORY					
ID	User ID	Table Name	Row ID	Details	Action
1	3	Report	1	Report was created by ...	View Delete
2	1	Announcement	4	Announcement OUT Do...	View Delete
3	1	Announcement	4	Announcement OUT Do...	View Delete
4	1	Announcement	4	Announcement OUT Do...	View Delete
5	4	Report	2	Report was created by ...	View Delete
6	4	Report	3	Report was created by ...	View Delete

« [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) »

Figure 24. Admin History

This feature serves as an audit trail, recording all significant actions taken within the system. It lists entries like announcements and requests, each annotated with details such as the user's ID who acted, the type of table affected, and a brief description of the change. The 'View' and 'Delete' buttons allow administrators to inspect the details of each historical entry or remove them if necessary. This feature is essential for maintaining transparency, oversight, and accountability within the system's operations and achieving Objective 3.

vii. BIMES Admin Statistics and Analysis Page



Figure 25. Admin Statistics and Analysis

This feature in the figure above provides graphical data representations such as Population, Voter, Document Statistics, and Monthly Reports. These visualizations offer actionable insights into the barangay's demographic trends, citizen engagement, and administrative activities. Features like 'Print' and 'Download CSV' enhance data accessibility, allowing for detailed reviews and reporting. Integrating these statistics into the system ensures that barangay officials can monitor, analyze, and respond to the community's needs effectively, aligning with Objective 3's aims of improving operational efficiency and community service.

viii. BIMES Admin Officials and Staff Page

BARANGAY LUMBO OFFICIALS & STAFF				
Photo	Name	Title	Contact No.	Action
	Jessa Mae Magallanes Dor..	BRGY CAPTAIN	09355193118	View Edit Delete
	Mark Ryan H Fuggo	BRGY CAPTAIN		View Edit Delete
1 2 3 4 >				

Figure 26. Admin Barangay Officials and Staff List

Figure 26, as shown in the figure above, this feature is dedicated to managing barangay officials and staff. It features an interface for viewing and updating the details of officials, such as name, position, and term duration, which corresponds to the 'official_staffs' table in the system database. The 'View,' 'Edit,' and 'Delete' options allow for easy staff information modification or removal. This part of the system helps maintain accurate records of barangay personnel, which is crucial for administrative transparency and efficiency.

4. Evaluation Tool, Test Documents, and Test Results

i. Evaluation Tool

The proponents employed a multifaceted approach to assess the system's effectiveness and user satisfaction. Leveraging both online surveys and face-to-face interviews with Barangay Lumbo residents and in-person surveys with administrative personnel, the proponents aimed to capture user feedback and insights comprehensively. Through this combination of methods, the proponents sought to gather quantitative and qualitative data on user satisfaction, system functionality, and areas for improvement, ensuring a holistic understanding of the system's performance and informing future development endeavors.

ii. Test Documents

The test documents, found in **Appendix A**, consisted of the SUS questionnaire administered to participants from various user roles in Barangay Lumbo. These documents included clear instructions for completing the questionnaire and guidelines for score interpretation. They facilitated a systematic evaluation of the system's usability across different user roles, offering valuable insights into user perceptions and experiences. Two data collection approaches were employed: an online survey distributed to residents via Google Forms and face-to-face interviews conducted with a subset of participants for more in-depth feedback.

iii. Test Results

Table 2. SUS Result

Participants	No. of Participants	Score	Adjective Rating
Main Administrator	1	75	Good
Secretary	6	83.75	Excellent
Resident Users (Interview)	126	78.75	Good
Resident Users (Online)	266	75.06	Good
TOTAL	399	78.14	Good

Legend: Excellent: 100-80.4; Good: 80.3-68; Okay: 68; Poor: 67-51; Awful: 50-0

Table 2 presents the SUS scores for the Barangay Lumbo Information Management and E-Services System, reflecting the usability assessment across different user roles. The Main Administrator's usability rating falls within the "Good" category, while the Secretary's score indicates an "Excellent" usability experience. Resident Users from interview sessions and online interactions report SUS scores classified as "Good," suggesting satisfactory usability levels. These results underscore positive perceptions of the system's usability among various user groups, highlighting its effectiveness in meeting user needs. These findings provide valuable insights into the system's performance and user experience, guiding further enhancements and optimizations for improved usability and user satisfaction.

ii. Average Scores by Participant

Table 3. Average Scores by Participant

Participant	No. of Participants	Overall
Main Administrator	1	3.9
Secretary	6	4.2
Resident Users (Interview)	126	3.6
Resident Users (Online)	266	3.85

Table 3 reveals the average scores of different participants using the system, where the Main Administrator scored 3.9, the Secretary scored 4.2, the Resident Users interviewed scored 3.6, and the Resident Users online scored 3.85 on an unspecified scale. The Secretary, with six participants, had the highest score, indicating the best user experience among the groups.

5. Survey Results

i. Question 1

Table 4. Question 1 Results

Participant	No. of Participants	QUESTION 1					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Main Administrator	1	0	0	0	0	1	
Secretary	6	0	0	0	3	3	
User Resident (Interview)	126	0	27	34	33	32	
User Resident (Online)	266	2	17	79	115	53	
TOTAL	399	2	44	113	151	89	

ii. Question 2

Table 5. Question 2 Results

Participant	No. of Participants	QUESTION 2				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	1	0	0	0	0
Secretary	6	3	3	0	0	0
User Resident (Interview)	126	35	36	29	26	0
User Resident (Online)	266	53	127	77	8	1
TOTAL	399	92	166	106	34	1

iii. Question 3

Table 6. Question 3 Results

Participant	No. of Participant	QUESTION 3				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	0	1	0
Secretary	6	0	0	0	4	2
User Resident (Interview)	126	0	31	36	27	32
User Resident (Online)	266	1	9	78	143	35
TOTAL	399	1	40	114	175	69

iv. Question 4

Table 7. Question 4 Results

Participant	No. of Participants	QUESTION 4				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	1	0	0	0
Secretary	6	3	3	0	0	0
User Resident (Interview)	126	43	30	29	24	0
User Resident (Online)	266	56	128	75	5	2
TOTAL	399	102	162	104	29	2

v. Question 5

Table 8. Question 5 Results

Participant	No. of Participants	QUESTION 5				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	0	0	1
Secretary	6	0	0	0	2	4
User Resident (Interview)	126	0	21	30	37	38
User Resident (Online)	266	1	3	58	117	87
TOTAL	399	1	24	88	156	130

vi. Question 6

Table 9. Question 6 Results

Participant	No. of Participants	QUESTION 6				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	1	0	0	0	0
Secretary	6	3	3	0	0	0
User Resident (Interview)	126	36	27	31	32	0
User Resident (Online)	266	56	135	66	6	3
TOTAL	399	96	156	97	38	3

vii. Question 7

Table 10. Question 7 Results

Participant	No. of Participants	QUESTION 7				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	0	0	1
Secretary	6	0	0	0	3	3
User Resident (Interview)	126	0	19	37	35	35
User Resident (Online)	266	2	3	64	146	51
TOTAL	399	2	22	101	181	90

viii. Question 8

Table 11. Question 8 Results

Participant	No. of Participants	QUESTION 8				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	1	0	0	0
Secretary	6	1	5	0	0	0
User Resident (Interview)	126	40	36	25	25	0
User Resident (Online)	266	52	117	84	11	2
TOTAL	399	93	159	109	36	2

ix. Question 9

Table 12. Question 9 Results

Participant	No. of Participants	QUESTION 9				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	0	1	0
Secretary	6	0	0	0	5	1
User Resident (Interview)	126	0	18	43	29	36
User Resident (Online)	266	2	10	54	126	74
TOTAL	399	2	28	97	161	111

x. Question 10

Table 13. Question 10 Results

Participant	No. of Participants	QUESTION 10				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	1	0	0	0	0
Secretary	6	3	3	0	0	0
User Resident (Interview)	126	37	35	33	21	0
User Resident (Online)	266	85	105	68	5	3
TOTAL	399	126	143	101	26	3

xi. Question 11

Table 14. Question 11 Results

Participant	No. of Participants	QUESTION 11				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	1	0	0
Secretary	6	0	0	2	4	0
User Resident (Interview)	126	0	36	29	29	32
User Resident (Online)	266	2	9	85	130	40
TOTAL	399	2	45	117	163	72

xii. Question 12

Table 15. Question 12 Results

Participant	No. of Participants	QUESTION 12				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	1	0	0
Secretary	6	0	5	1	0	0
User Resident (Interview)	126	22	39	40	25	0
User Resident (Online)	266	47	132	78	8	1
TOTAL	399	69	176	140	33	1

xiii. Question 13

Table 16. Question 13 Results

Participant	No. of Participants	QUESTION 13				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	1	0	0	0
Secretary	6	0	0	3	3	0
User Resident (Interview)	126	0	25	38	27	36
User Resident (Online)	266	3	11	73	129	50
TOTAL	399	3	37	114	159	86

xiv. Question 14

Table 17. Question 14 Results

Participant	No. of Participants	QUESTION 14				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	0	1	0
Secretary	6	1	2	3	0	0
User Resident (Interview)	126	21	33	45	27	0
User Resident (Online)	266	50	121	78	12	5
TOTAL	399	72	156	126	40	5

xv. Question 15

Table 18. Question 15 Results

Participant	No. of Participants	QUESTION 15				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Main Administrator	1	0	0	1	0	0
Secretary	6	0	0	0	5	1
User Resident (Interview)	126	0	28	38	34	26
User Resident (Online)	266	4	7	67	89	99
TOTAL	399	4	35	106	128	126

xvi. Likert Scale Analysis of Results

Table 19. Likert Scale Analysis through Mean Scoring

Statement	Total Score	Mean Score	Interpretation
1	1478	3.70	Agree
2	883	2.21	Disagree
3	1468	3.67	Agree
4	864	2.16	Disagree
5	1587	3.97	Agree
6	872	2.18	Disagree
7	1523	3.81	Agree
8	892	2.23	Disagree
9	1548	3.87	Agree
10	834	2.09	Disagree
11	1455	3.64	Agree
12	978	2.45	Disagree
13	1485	3.72	Agree
14	947	2.37	Disagree
15	1534	3.84	Agree
OVERALL MEAN SCORE		3.06	Neutral

Legend: Strongly Disagree: 1.00-1.80; Disagree: 1.81-2.60; Neutral: 2.61-3.40;
Agree: 3.41-4.20; Strongly Agree: 4.21-5.00

The Likert scale analysis uncovers a nuanced understanding of user perceptions toward the system, with an overall mean score falling within the "Neutral" range. Statements 1, 3, 5, 7, 9, 11, 13, and 15 received mean scores ranging from 3.64 to 3.97, placing them in the "Agree" category. This indicates that respondents generally have a favorable view of these aspects of the system, suggesting satisfaction and positive experiences with these features or functionalities.

Although statements 2, 4, 6, 8, 10, 12, and 14 received mean scores ranging from 2.09 to 2.45, categorizing them as "Disagree," as per the SUS questionnaire design, these statements indicate that they perceive the system as being user-friendly and efficient. Leveraging this insight, it becomes crucial to identify and capitalize on these positive perceptions to further enhance the user experience.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

1. Conclusion

Concluding this capstone project, the proponents have meticulously analyzed the performance of the Barangay Information Management and E-Services System (BIMES), and the findings reveal a system that stands as a testament to innovative community service solutions. The System Usability Scale (SUS) results underscore the system's robustness in efficiency and effectiveness, with the Secretary's role showcasing the pinnacle of user satisfaction with a total score of 83.75, interpreted as "Excellent" in performance testing, followed by the Resident Users with scores 78.85 (interview) and 75.06 (online) with total average SUS score of 76.955 with an adjective indication "Good." Lastly, the Main Administrator had a total score of 75, indicating "Good" performance. Notably, these usability scores across the board indicate a system that facilitates tasks with remarkable competency.

However, several aspects of the system need improvement, especially to the security of the system. Overall, the system scored a total of 78.14, which means that the system performed "Good." This level of performance suggests that the system is effective and meets or exceeds expectations, showcasing a commendable level of functionality and reliability.

The experience with the implementation of BIMES has taught the proponents a lot of technological knowledge, patience, and dedication. Acknowledging the community's reliance on the system for its information management needs and how this necessitates a commitment to continuous improvement is imperative. To this end, the SUS feedback has been invaluable, guiding the proponents towards enhancing user engagement and system security. As such, this project has functioned as a developmental exercise and an important learning journey, providing deep insights into the multifaceted relationship between technology, user experience, and community service.

2. Recommendations

Based on the insights and findings of the capstone project on the Barangay Information Management and E-Services System (BIMES), the proponents propose several key recommendations to enhance its functionality and user experience. Firstly, the proponents acknowledge the needed improvements for the system's security. This could involve implementing more robust authentication protocols, enhancing data encryption, and regularly updating the system to safeguard against emerging cyber threats. These improvements will protect sensitive information and build trust among the users, reinforcing their confidence in the system's reliability.

Secondly, making the administrative interface responsive to smaller screen sizes is highly recommended. This adaptation is crucial to ensure accessibility and ease of use across various devices, particularly smartphones and tablets, increasingly becoming the primary means of digital interaction in the Barangay Lumbo community. By optimizing the interface for smaller screens, the proponents can significantly enhance the system's usability and reach, making it more adaptable to the varying technological resources of our users.

Furthermore, adding the full functionality 'Forgot Password' is essential. This feature will enable users to quickly recover their accounts in case of forgotten login credentials, thereby preventing potential access issues and enhancing user convenience. A streamlined and secure password recovery process is fundamental to modern digital platforms and will provide a more user-friendly experience.

Lastly, adding a pre-registered master list of residents to the system will fasten registration, improve data management efficiency, and add the list of the previous Barangay Officials in Lumbo. This proactive approach will facilitate quicker user onboarding and more accurate data collection, aiding in better community decision-making.

CHAPTER VII

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APPENDICES

APPENDIX A
APPROVED COMMUNICATION LETTER

March 09, 2023

HON. RUSTOM C. DURAN, Sr.
Punong Barangay
Barangay Government of Lumbo
Valencia City Bukidnon

Dear Sir:

Warmest Greetings!

We, the third-year Information Technology students from the College of Information Sciences and Computing, majoring in Information Management from Central Mindanao University, are currently taking our IT CAPSTONE project as one of the requirements to be able to graduate from our program. We have proposed the project entitled: **“Barangay Information and E-Services System for Barangay Lumbo”**.

In line with this, we are in the process of finalizing our project's title by approaching our target clientele to gather data to be able to come up with possible solutions and features that would help ease the working load of the barangay staff as well as improve the services they offer to the citizens. Thus, we would like to reach out to your good office to be our client for the said project. We would like to have an interview with you and/or any of the staff from your office at your most convenient time. The said interview will only take a maximum of 30 minutes, as we have already prepared our questions. Your participation and support for our project will be greatly appreciated. The interview will be exclusive and private. You can rest assured that all information we have gathered during the interview will be kept confidential and will be solely used for this project.

You may contact us through this number 09383935236 or through email at dormaljessa19@gmail.com to inform us about your feedback. Thank you very much, we are looking forward to meeting you.

Sincerely yours,

CELLAN, VERLIE FEA GRACE
Researcher

DORMAL, JESSA MAE
Researcher

MONTALLA, ALYANNA KRISTINA JEN
Researcher

Noted by:

GLYRHIZ MARHIEL A. TABAMO
Capstone Project Adviser

APPENDIX B
GRAMMARIAN CERTIFICATE

CERTIFICATE OF PROOFREADING

This is to certify that the research: Barangay Information Management and E-Services System for Barangay Lumbo by **Verlie Fea Grace Pandi Cellan, Jessa Mae Magallanes Dormal, and Alyanna Kristina Jen Fuertes Montalla** has been proofread and edited. The undersigned affirms that no modifications were made to the research content or the authors' original intentions during the editing process.

Given this **18th** day of **May 2024**, in the municipality of Manolo Fortich, Bukidnon upon the request of the aforementioned names for whatever legal purpose it may serve them best.



JOHN MICHAEL NARVASA GANZAN

Licensed Professional Teacher
Major in English
PRC License No. 2071378

APPENDIX C
SAMPLE ANSWERED USER TESTING FORM

1. Google Form Survey

i. Google Form Consent



Barangay Lumbo Information Management System

INFORMED CONSENT

Dear Lumboanons,

Good day!

We, the proponents from the College of Information Sciences and Computing in Central Mindanao University, would like to invite you to participate in our survey for our capstone project titled "**Barangay Information Management System and E-Services for Barangay Lumbo**". We value your time and input, as they are crucial in helping us gather valuable information for the development of our Capstone project. **Your participation is entirely voluntary** which means you can choose whether or not to continue with the survey.

PURPOSE:

The primary aim of this survey is to critically **assess the efficiency, effectiveness and security** of the System. We aim to gather insightful feedback from the Residents and Service Users. This feedback is crucial for Assessing User Satisfaction, Identifying Areas for Improvement and Supporting Data-Driven Decision Making. Your participation is invaluable in our journey towards a more digitally inclusive and efficient Barangay.

DATA PRIVACY:

We, Verlie P. Cellan, Jessa M. Dormal, and Alyanna Kristina Jen F. Montalla complies with the mandate of National Privacy Commission and acts in accordance to the Data Privacy Act of 2012. Your responses will be **kept confidential**, and your identity **will not be disclosed to public** resulting from this survey. The data collected will be securely stored and used solely for research purposes.

CONTENT:

Part 1: Agreement

Figure 27. Form Consent

ii. Survey Agreement

AGREEMENT *

By clicking next, you signify that you understand the informed consent and data privacy statement; that you are giving your consent to use your responses based on the abovementioned statement; and that you agree to proceed with the survey.

I Agree.

Figure 28. Form Agreement

iii. User Manual

Manual for User

Visit This Link if you want to further explore the System: <https://bimes-lumbo.online/>

How to Create Account?

1. Click "Sign Up" button
2. Fill-out necessary information and your done

How to Login?

1. Simply input your **username** and **Password**
2. Click "Login" button and your good to go

PS: Please read **Terms and Conditions**

The screenshot shows the 'Manual for User' section of the BIMES LUMBO website. It includes instructions for account creation and login, and a note to read the Terms and Conditions. Below this is a screenshot of the BIMES LUMBO login page. The login page features a 'LOGIN' header, 'Username' and 'Password' input fields, a 'Login' button, and a 'Sign Up' button which is highlighted with a red border. A small note at the bottom of the login form states: 'By logging and signing in, you agree to our [Terms and Conditions](#)'.

Figure 29. Form User Manual 1

How to Request a Document?

1. Click "**Request**"
2. Select the document you want to Request.
3. Click "**Submit**" button.
4. Fill-out the information needed.

Please make sure it is correct; otherwise, your document will not be processed. Filling out false information is subject to falsification under Revised Penal Code (Act No. 3815) /Civil Liability/ Sanctions or Penalties.

The screenshot shows the BIMES LUMBO website's user interface. At the top, there is a navigation bar with links for Home, Request, Report, Hotlines, and Announcement. The 'Request' link is highlighted with a red box and the number '1'. Below the navigation bar, there is a section titled 'Choose Document to Request'. In this section, there is a dropdown menu labeled 'Select Type of Certificate' with a red box and the number '2'. At the bottom of this section is a 'Submit' button with a red box and the number '3'. To the right of this section, there is a box titled 'PREREQUISITES' containing the following text:
Certificate of Indigency: Bring a valid government-issued ID, such as a driver's license or passport.
Document 2: Two recent 1x1 passport-sized photos are required.
Document 3: You may need to provide a proof of address, like a utility bill.
For any additional requirements or inquiries, please contact the Barangay Office at 123-456-7890.

Figure 30. Form User Manual 2

Notifications

Please **check your notification** after submitting a document.

1. You have successfully submitted the document.
2. Your document is ready for pickup. Please claim it at the barangay office and ensure you bring the necessary identification or documents.
3. After receiving your document, you can **provide feedback** by clicking the blue, underlined "**here**".

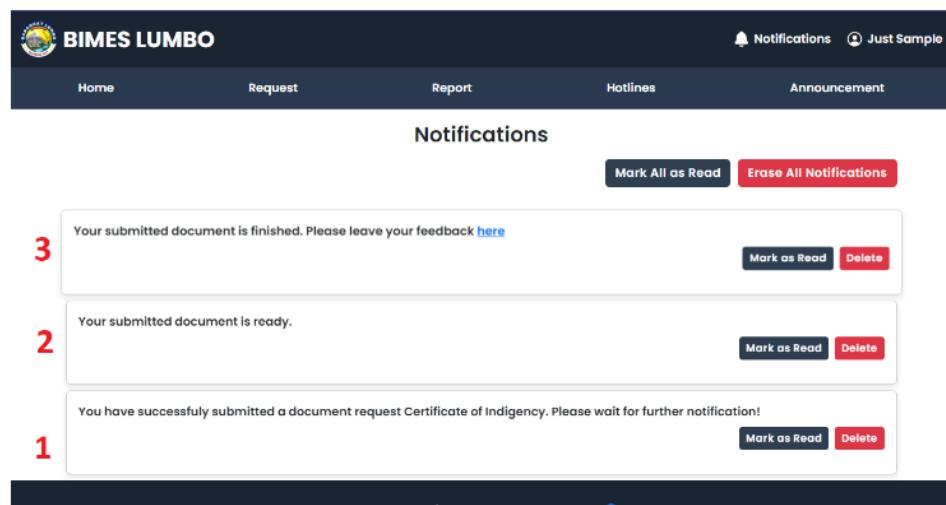


Figure 31. Form User Manual 3

How to Report?

1. Click "**Report**"
2. Fill-out the information needed and Click "**Submit**".
3. If it is **urgent or an emergency**, we strongly recommend that you **call immediately**. You can Click on '**Hotlines**' to access the contact numbers.

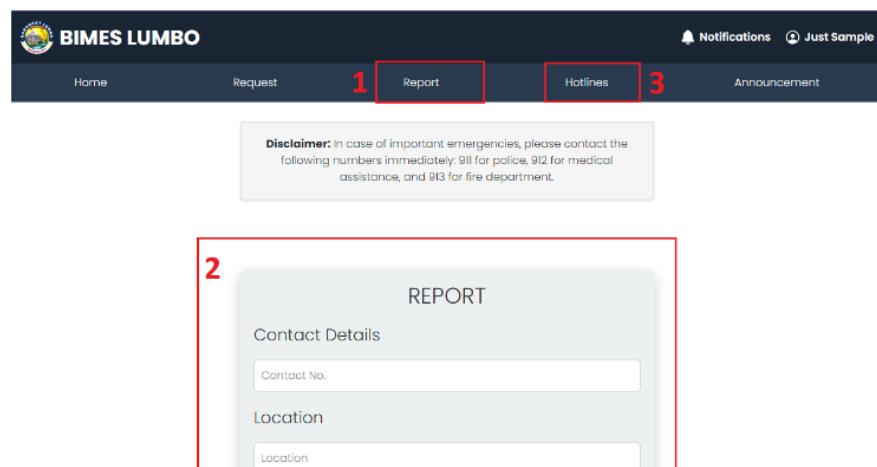


Figure 32. Form User Manual 4

1. Click on your name in the upper right corner, and options will appear:
2. **Profile:** Edit your information here.
3. **Officials and Staff:** View the list of officials and staff.
4. **About** Barangay Lumbo.
5. **Logout:** Click here when you have finished using the system.

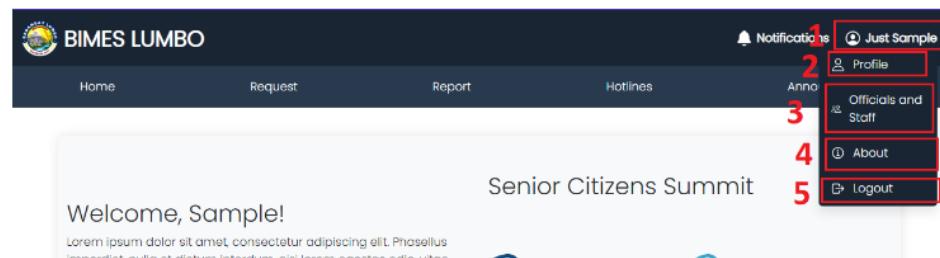


Figure 33. Form User Manual 5

iv. Survey Guideline

Guideline

For each of the following statements, **mark one circle** that **best describes your reactions** to the system you tested earlier, **1** being **Strongly Disagree** and **5** being **Strongly Agree**.

1 - "Strongly Disagree"
 2 - "Disagree"
 3 - "Neutral"
 4 - "Agree"
 5 - "Strongly Agree"

Figure 34. Survey Form Guideline

v. Survey Questions

The system is fast and responsive.*

1 2 3 4 5

Strongly Disagree Strongly Agree

It's difficult to find what I need in the system.*

1 2 3 4 5

Strongly Disagree Strongly Agree

The system consistently provides correct information.*

1 2 3 4 5

Strongly Disagree Strongly Agree

Overall, the system is cumbersome to use.*

1 2 3 4 5

Strongly Disagree Strongly Agree

I find the system's layout easy to understand.*

1 2 3 4 5

Strongly Disagree Strongly Agree

Figure 35. Survey Question Part 1

Using the system is more time-consuming compared to manual methods. *

1 2 3 4 5

Strongly Disagree

Strongly Agree

Finding information in the system is straightforward. *

1 2 3 4 5

Strongly Disagree

Strongly Agree

Technical Support is lacking when needed. *

1 2 3 4 5

Strongly Disagree

Strongly Agree

The system makes barangay services more accessible. *

1 2 3 4 5

Strongly Disagree

Strongly Agree

I wouldn't recommend the system to others. *

1 2 3 4 5

Strongly Disagree

Strongly Agree

Figure 36. Survey Question Part 2

I feel confident using my personal information in the system.*

1 2 3 4 5

Strongly Disagree Strongly Agree

The system's security features are unclear.*

1 2 3 4 5

Strongly Disagree Strongly Agree

The system effectively protects against cyber threats.*

1 2 3 4 5

Strongly Disagree Strongly Agree

I'm not promptly informed about any security issues.*

1 2 3 4 5

Strongly Disagree Strongly Agree

I'm likely to continue using the system because of its features.*

1 2 3 4 5

Strongly Disagree Strongly Agree

Figure 37. Survey Question Part 3

vi. Admin Survey Forms

Participant ID: _____ Date: _____

System Usability Scale

Instruction: For each of the following statements, check one box that best describes your reaction to the System you tested earlier with a scale of 1 to 5, 1 being **Strongly Disagree** and 5 being **Strongly Agree**.

Questions	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
The system is fast and responsive.					
It's difficult to find what I need in the system.					
The system consistently provides correct information.					
Overall, the system is cumbersome to use.					
I find the system's layout easy to understand.					
Using the system is more time-consuming compared to manual methods.					
Finding information in the system is straightforward.					
Technical support is lacking when needed.					
The system makes barangay services more accessible.					
I wouldn't recommend the system to others.					
I feel confident using my personal information in the system.					
The system's security features are unclear.					
The system effectively protects against cyber threats.					
I'm not promptly informed about any security issues.					
I'm likely to continue using the system because of its features.					

Figure 38. Admin Survey Form

APPENDIX D
USER MANUAL

1. BIMES Interface System Overview

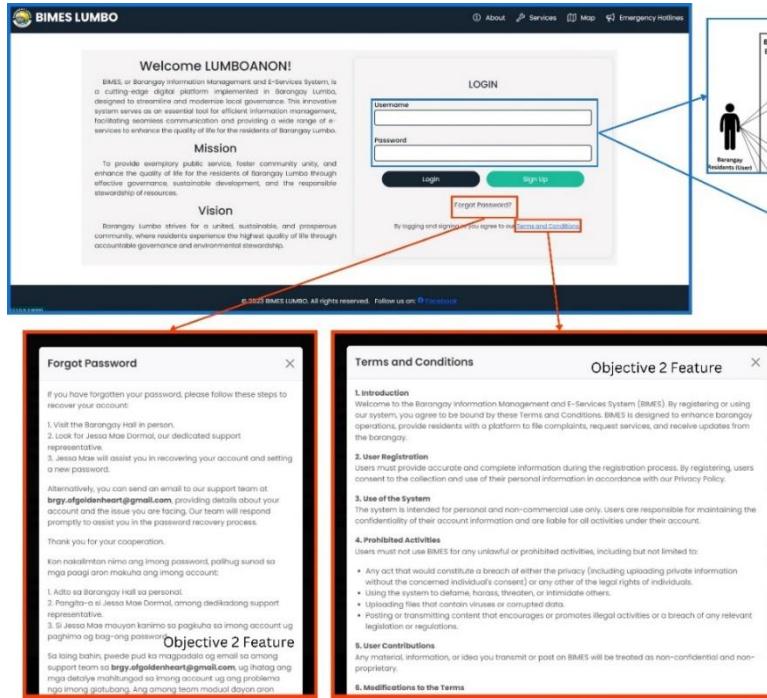


FIGURE 9. USE CASE

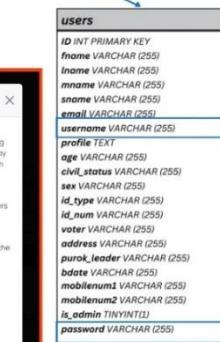


FIGURE 11. SYSTEM DATABASE

Figure 39. System Overview 1

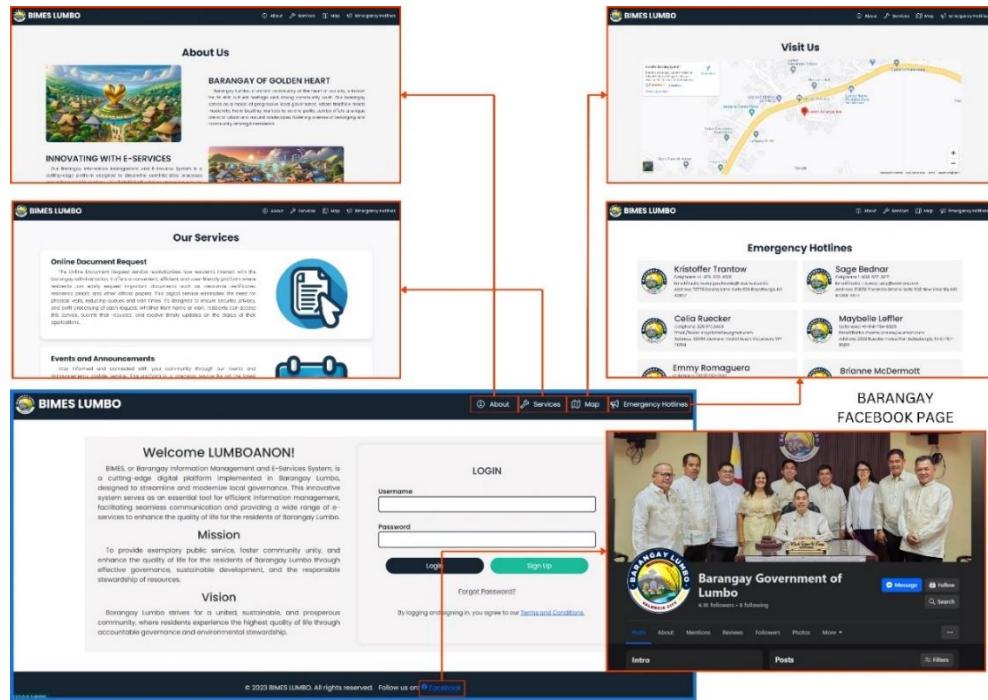


Figure 40. System Overview 2

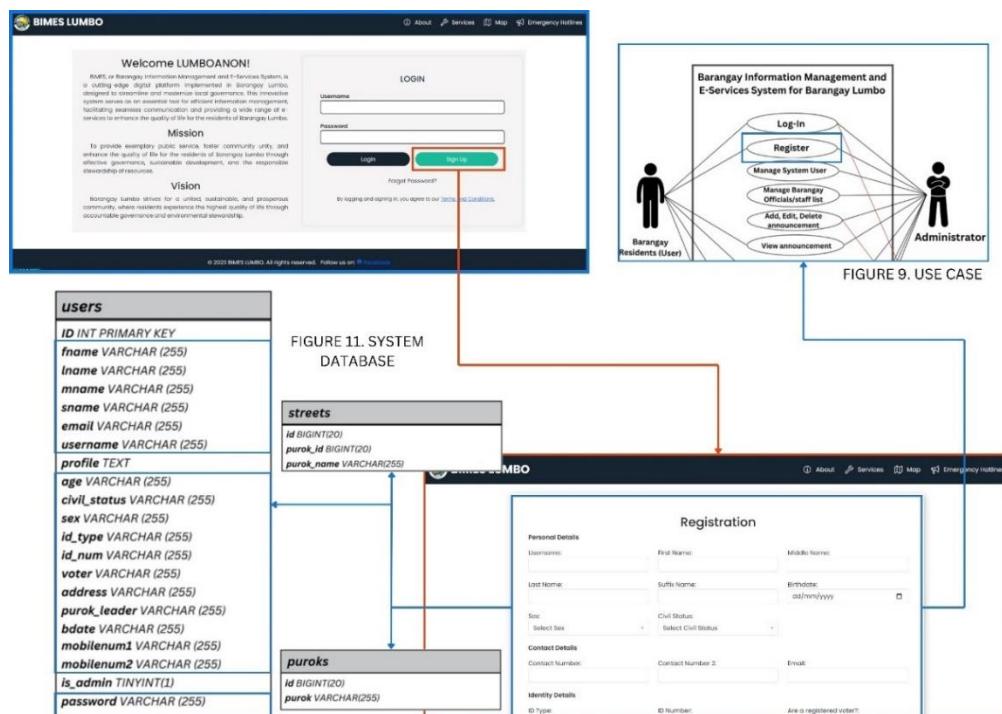


Figure 41. System Overview 3

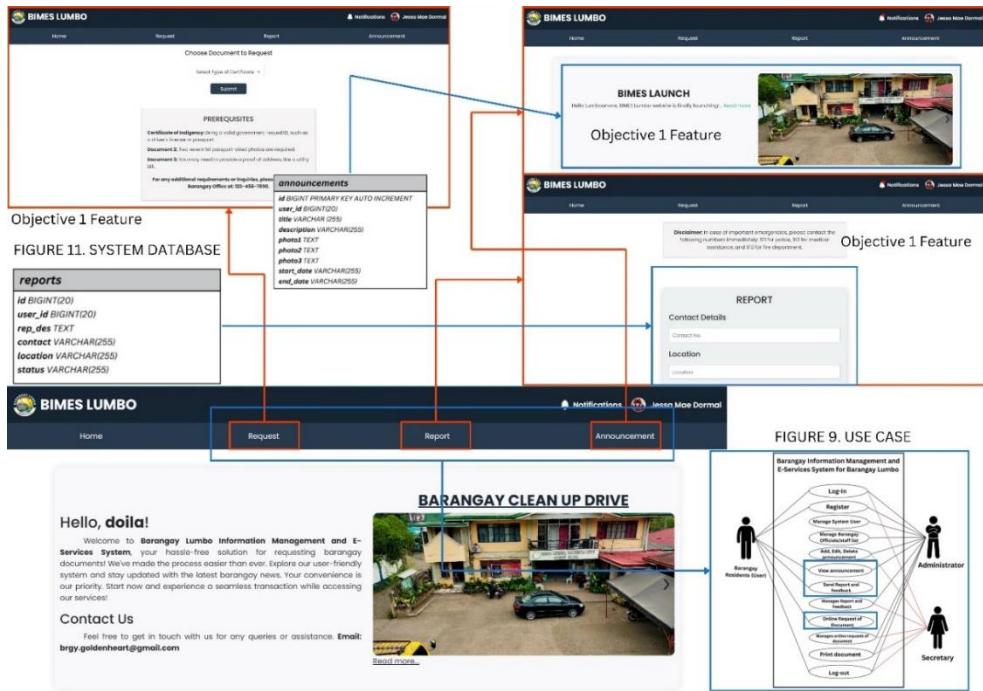


Figure 42. System Overview 4

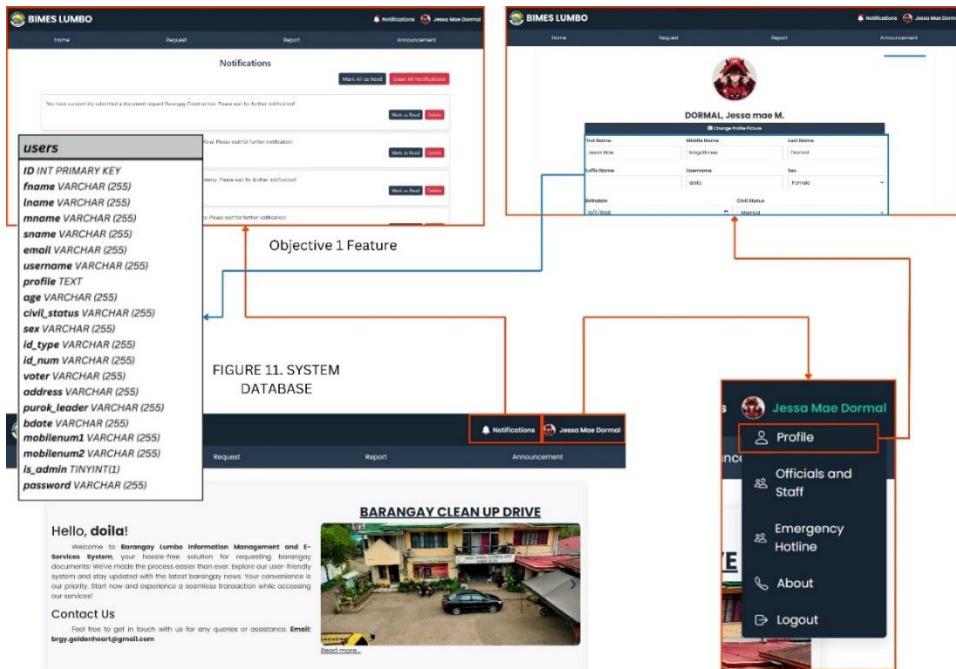


Figure 43. System Overview 5

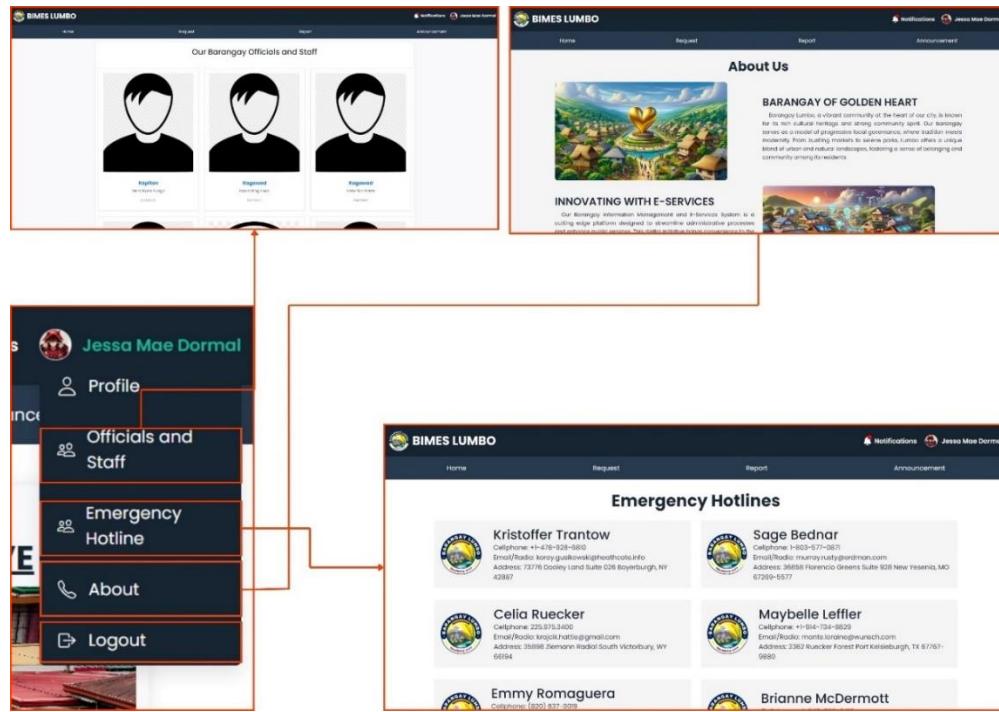


Figure 44. System Overview 6

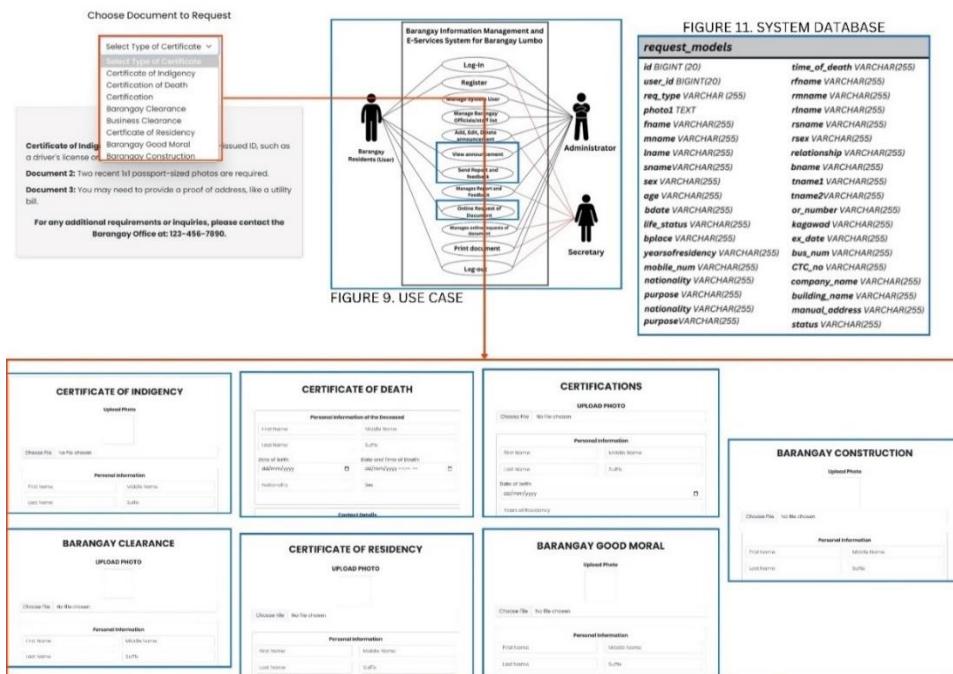


Figure 45. System Overview 7

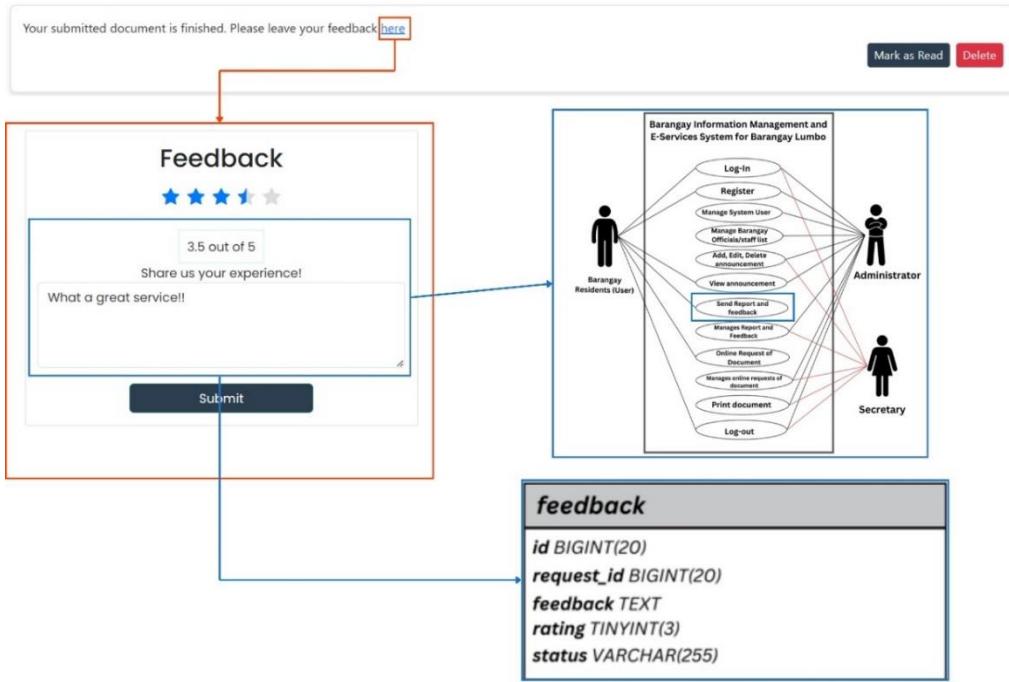


FIGURE 11. SYSTEM DATABASE

Figure 46. System Overview 8

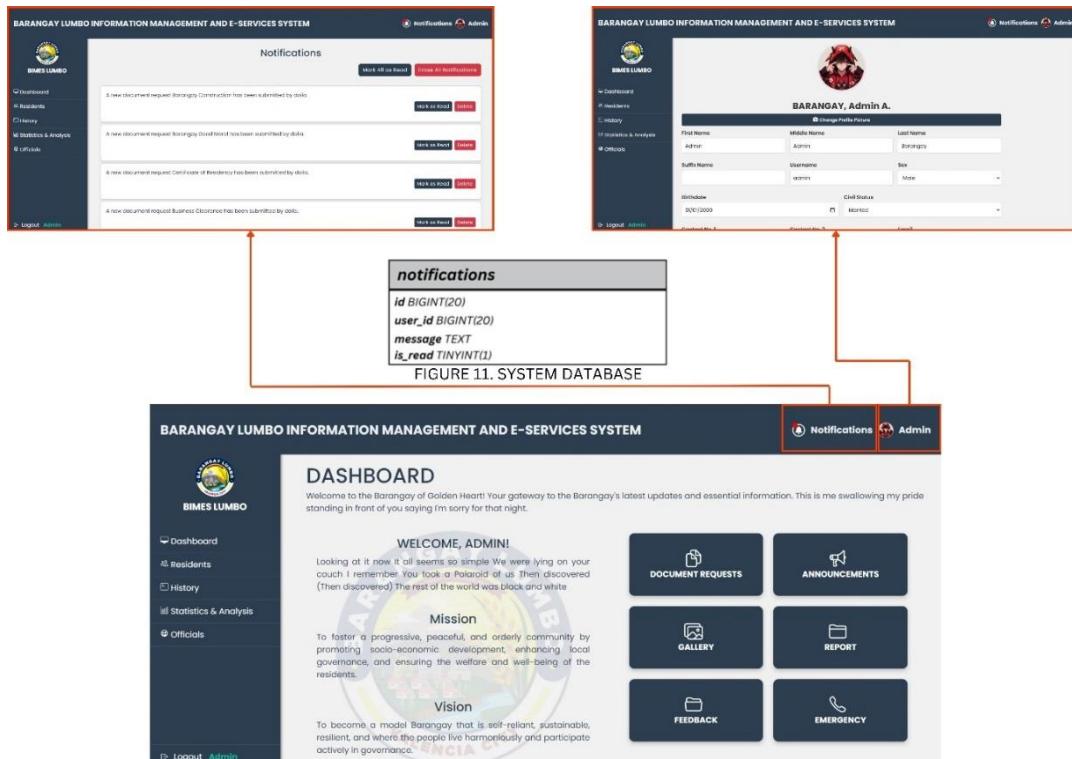


FIGURE 11. SYSTEM DATABASE

Figure 47. System Overview 9

The diagram illustrates the System Overview 10, showing the integration of several application modules:

- DOCUMENT REQUESTS**: A table listing document requests with columns: Ref No., Document Type, Status, and Action.
- ANNOUNCEMENT CORNER**: A table listing announcements with columns: Title, Start Date, End Date, and Action.
- REPORTS CORNER**: A table listing reports with columns: Report No., Location, Content, Description, Status, and Action.
- EMERGENCY HOTLINE**: A table listing emergency contacts with columns: Emergency Agency, Description, Location, Contact Number, Email/Phone Number, and Action.
- GALLERY**: Displays two images related to "BIMES LAUNCH" and "BARANGAY CLEAN UP DRIVE".
- FEEDBACK**: A table listing feedback requests with columns: Request ID, Document Type, Date Started, Date Finished, Feedback, Rating, and Action.
- Objective 1 Feature**: A central navigation area containing links to DOCUMENT REQUESTS, ANNOUNCEMENTS, GALLERY, REPORT, FEEDBACK, and EMERGENCY.

Figure 48. System Overview 10

The diagram illustrates the System Overview 11, showing the database structure:

- BARANGAY LUMBO**: The main application interface with a sidebar menu including Dashboard, Residents, History, Statistics & Analysis, and Officials.
- REGISTERED RESIDENTS**: A table listing registered residents with columns: Name, Address, Age, Sex, Civil Status, and Action.
- HISTORY**: A table listing history entries with columns: User ID, Table Name, Row ID, and Action.
- STATISTICS AND ANALYSIS**: A dashboard showing Population, Voters, Documents, and Report.
- BARANGAY LUMBO OFFICIALS & STAFF**: A table listing officials and staff with columns: Photo, Name, Title, and Contact Info.
- users**: Database schema definition for users.
- histories**: Database schema definition for histories.
- official_staffs**: Database schema definition for official_staffs.

FIGURE 11.
SYSTEM
DATABASE

Figure 49. System Overview 11

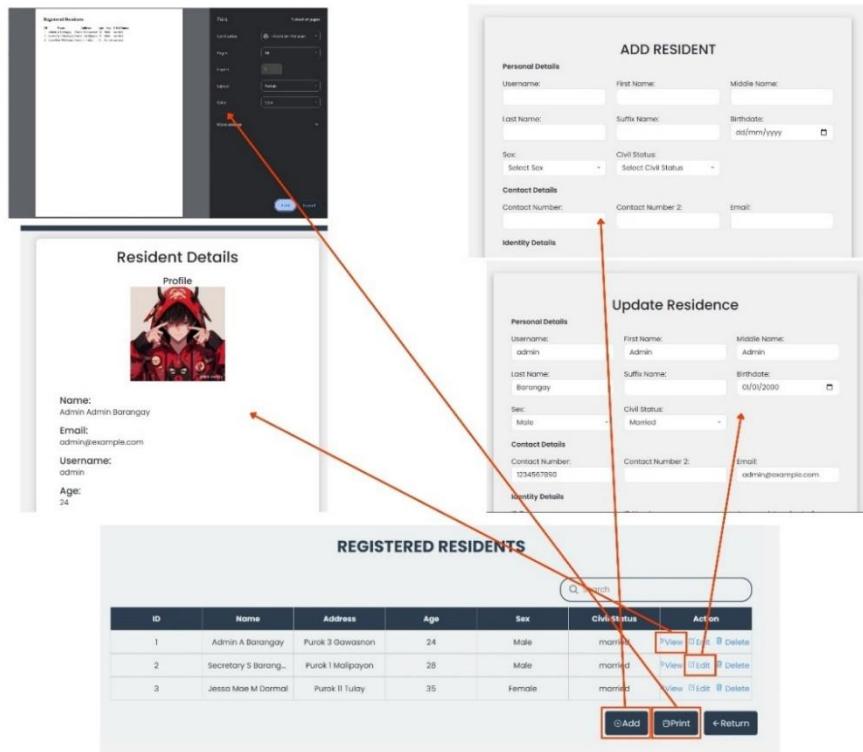


Figure 50. System Overview 12

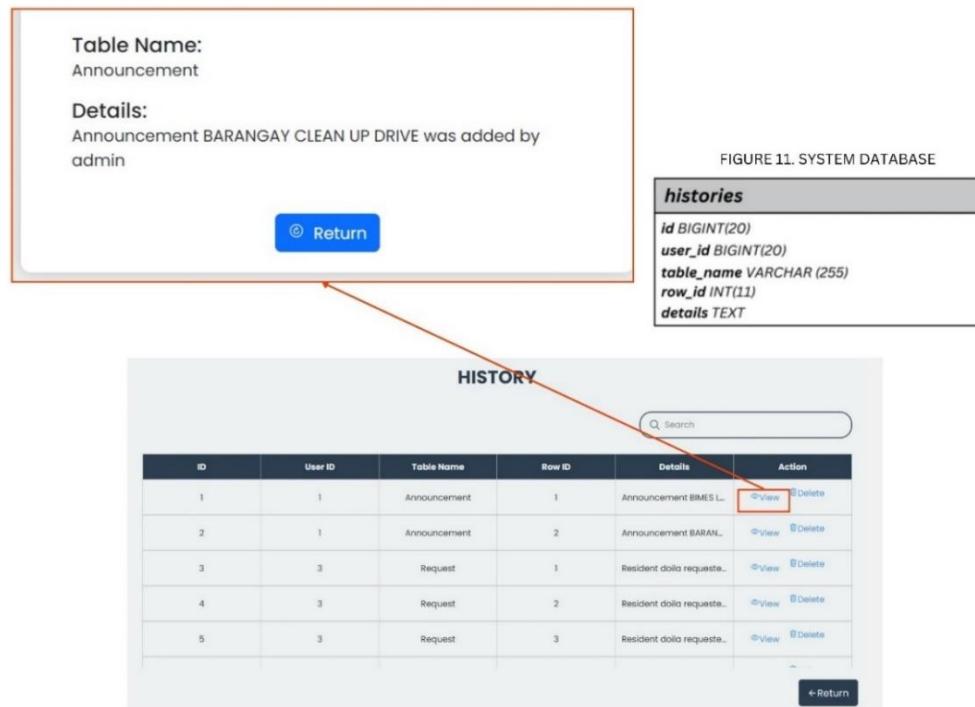


Figure 51. System Overview 13

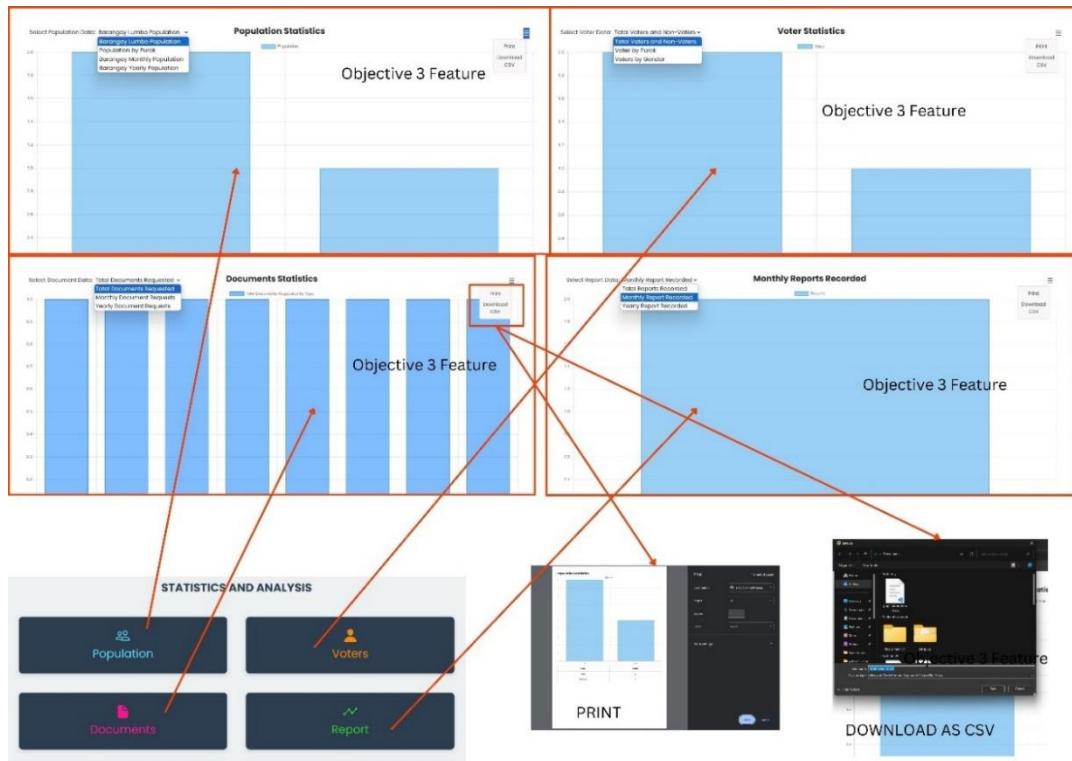


Figure 52. System Overview 14

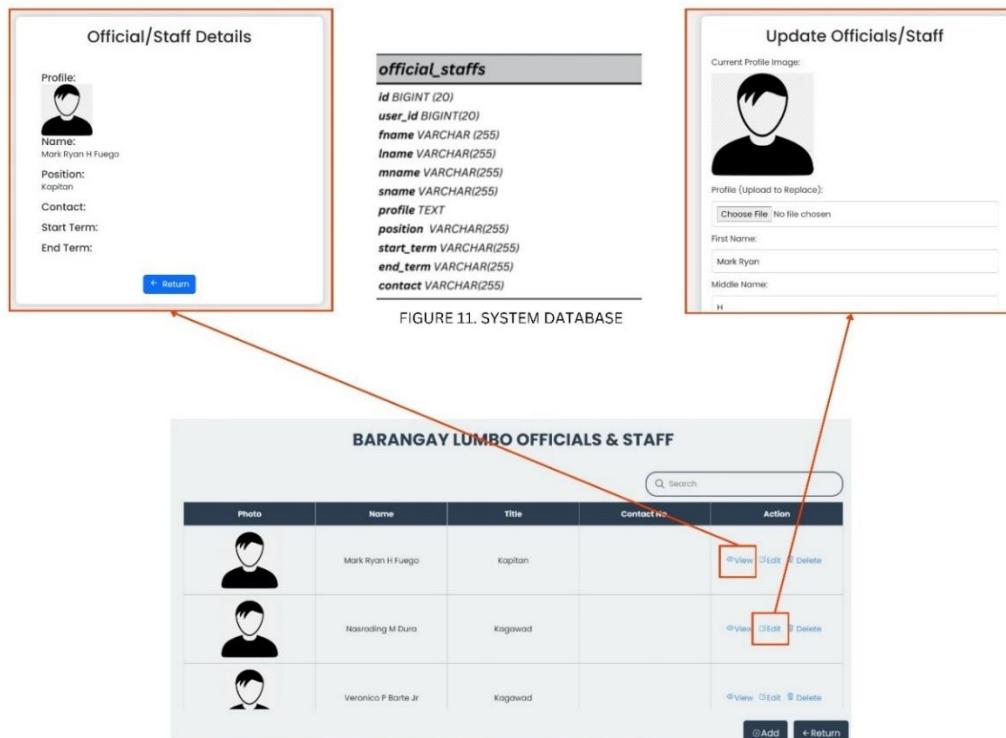


Figure 53. System Overview 15

APPENDIX E
RELEVANT SOURCE CODES

```

<?php

namespace App\Http\Controllers;

use Illuminate\Http\Request;
use App\Models\request_model;
use App\Models\official_staffs;
use App\Http\Controllers\notificationController;
use App\Http\Controllers\historyController;
use Carbon\Carbon;
//use Barryvdh\DomPDF\Facade\Pdf;
use PDF;

class requestController extends Controller
{
    //User Selection
    public function store(Request $request){
        $data = $request->validate([
            'req_type' => ['required'],
        ]);
        switch ($data['req_type']) {
            case 'Certificate of Indigency':
                $route = 'cert_indigency';
                break;
            case 'Certification of Death':
                $route = 'cert_death';
                break;
            case 'Certification':
                $route = 'certification';
                break;
            case 'Barangay Clearance':
                $route = 'bar_clearance';
                break;
            case 'Business Clearance':

```

```

$route = 'business_clearance';
break;

case 'Certificate of Residency':
$route = 'cert_residency';
break;

default:
$route = 'default.page';

}

return      redirect(route($route))->with('success',      'Request      created
successfully.');
}

public function cert_indigency()
{
    return view('form/cert_indigency');
}

public function bar_clearance()
{
    return view('form/bar_clearance');
}

public function business_clearance()
{
    return view('form/business_clearance');
}

public function cert_death()
{
    return view('form/cert_death');
}

public function cert_residency()

```

```

{
    return view('form/cert_residency');
}

public function certification()
{
    return view('form/certification');
}

//Delete function
public function delete(request_model $req){
    $delete = $req->delete();

    $details = "Resident {$req->user->username} document request was
deleted by " . auth()->user()->username;
    HistoryController::logHistory(auth()->id(), 'Request', $req->id, $details);

    $userRole = auth()->user()->is_admin;
    if ($userRole == '2') { // Secretary
        // Redirect to the secretary's dashboard or appropriate page
        return redirect(route('secretary.request'))->with('error', 'Request
successfully canceled!');
    } elseif ($userRole == '1') { // Admin
        // Redirect to the admin's dashboard or appropriate page
        return redirect(route('admin.request'))->with('error', 'Request
successfully canceled!');
    } else {
        // Redirect to a default page for regular users
        return redirect(route('home'))->with('error', 'You do not have access to
this action.');
    }
}

```

```

/*this is the store function of all document request*/

//Certificate of Indigency
public function cert_indigency_store(request_model $reqs, Request
$request) {
    $data = $request->validate([
        'req_type' => ['string', 'max:255'],
        'fname' => ['required', 'string', 'max:255'],
        'lname' => ['required', 'string', 'max:255'],
        'mname' => ['nullable', 'string', 'max:255'],
        'sname' => ['nullable', 'string', 'max:255'],
        'bdate' => ['required', 'date'],
        'mobile_num' => ['required', 'numeric'],
        'address' => ['required', 'string', 'max:100'],
        'photo1' => ['nullable', 'image'],
        'purpose' => ['required', 'string', 'max:255'],
        'yearsofresidency' => ['required', 'string', 'max:255']
    ]);
    $birthdate = Carbon::parse($data['bdate']);
    $age = Carbon::now()->diffInYears($birthdate);
    $data['age'] = $age;
    $data['req_type'] = 'Certificate of Indigency';

    // Check if a photo is uploaded and store it if available
    if ($request->hasFile('photo1')) {
        // Store the uploaded file in the storage/app/public directory
        $path = $request->file('photo1')->store('/certificate-indigency', 'public');

        // Get the public URL for the stored file
        $url = \Storage::url($path);

        // Save the file URL in the $data array
        $data['photo1'] = $url;
    }
}

```

```

// Create a new CertIndigency record in the database
$user = auth()->user();

// Use the return value of create to check for success
$createdRequest = $user->request_model()->create($data); // Save the
created request to a variable

// Ensure that the createdRequest has an ID
if ($createdRequest->id) {

    //log history
    $details = "Resident {$user->username} requested a {$data['req_type']}
document",
    HistoryController::logHistory(auth()->id(), 'Request', $createdRequest-
>id, $details);

    //create notification
    $adminMessage = "You have successfully submitted a document
request {$data['req_type']}. Please wait for further notification!";
    NotificationController::createNotification(auth()->id(),
$adminMessage);

}

return redirect()->route('request')->with('success', 'Request successfully
created');
}

//Certificate of Death
public function cert_death_store(request_model $reqs, Request $request) {
//dd($request->all());
$data = $request->validate([
'fname' => ['required', 'string', 'max:255'],

```

```

'lname' => ['required', 'string', 'max:255'],
'mname' => ['nullable', 'string', 'max:255'],
'sname' => ['nullable', 'string', 'max:255'],
'sex' => ['required', 'string', 'max:255'],
'address' => ['required', 'string', 'max:100'],
'bdate' => ['required', 'string', 'max:100'],
'nationality' => ['required', 'string', 'max:255'],
'time_of_death' => ['required'],
//requester
'rfname' => ['required', 'string', 'max:255'],
'rmname' => ['required', 'string', 'max:255'],
'rlname' => ['required', 'string', 'max:255'],
'rsname' => ['nullable','string', 'max:255'],
'relationship' => ['required', 'string', 'max:255'],
'mobile_num' => ['required', 'numeric'],
]);
}

$birthdate = Carbon::parse($data['bdate']);
$age = Carbon::now()->diffInYears($birthdate);
$data['age'] = $age;
$data['req_type'] = 'Certificates of Death';

// Create a new CertIndigency record in the database
$user = auth()->user();

// Use the return value of create to check for success
$createdRequest = $user->request_model()->create($data); // Save the
created request to a variable

// Ensure that the createdRequest has an ID
if ($createdRequest->id

```

APPENDIX F
FIGURES, DIAGRAM & TABLES

1. System Wireframe

<p>ADMIN Dashboard</p>	<p>ADMIN Document Request</p>
<p>ADMIN Announcement</p>	<p>ADMIN Gallery</p>
<p>ADMIN Report</p>	<p>ADMIN Feedback</p>
<p>ADMIN Residents</p>	<p>ADMIN History</p>
<p>ADMIN Statistics & Analysis</p>	<p>ADMIN Officials & Staff</p>

BARANGAY LUMBO INFORMATION MANAGEMENT AND E-SERVICES SYSTEM



Notifications Profile

Dashboard

Residents

History

Statistics & Analysis

Officials & Staff

Change Profile Picture 

First Name Last Name Title/Position

Sex Birth Date Address

Contact no. 1 Contact no. 2 Email Address

Term Start Date Term End Date Password

BIMES LUMBO

WELCOME LUMBOANON!

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

MISSION

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

VISION

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

ADMIN Edit Profile

LOGIN

Username

Password

[Forgot password?](#)

By logging and signing up you agree to our [Terms & Conditions](#)

BIMES LUMBO

SIGN UP

Personal Information

Username First Name
 Middle Name Last Name
 Suffix Birth Date
 Sex Civil Status

Contact Information

Contact no. 1 Contact no. 2
 Email Address

Request Report Feedback Gallery Emergency

BIMES LUMBO

ANNOUNCEMENTS

Latest Updates

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

Contact Us

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

SIGNUP

USER Main Page

BIMES LUMBO

Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username

Choose Document to Request

Select Document

Prerequisites

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

Choose Document to Request

Barangay Clearance

Barangay Clearance

Upload Photo

Personal Information

First Name Middle Name
 Last Name Suffix

BIMES LUMBO

Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username

USER Request

USER Request Documents

BIMES LUMBO

Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username

Disclaimer

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

REPORT

Contact Details
 Location Details
 Description
 Enter description

Reference no.	Document Type	Date Requested	Date Finished	Rating

BIMES LUMBO

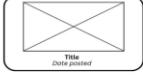
Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username

USER Report

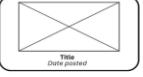
USER Feedback

BIMES LUMBO

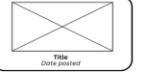
Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username



Title
Date posted



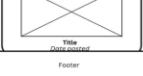
Title
Date posted



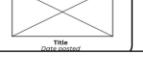
Title
Date posted



Title
Date posted



Title
Date posted



Title
Date posted

BIMES LUMBO

Request **Report** **Feedback** **Gallery** **Emergency** Notifications Username

Emergency Hotlines













USER Gallery

USER Emergency Hotline

Figure 54. System Wireframe

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APPENDIX G
DOCUMENTATIONS



Figure 55. Capstone Project Proposal Defense



Figure 56. First Client Visit



Figure 57. Client Project Proposal



Figure 58. First Monthly Meeting with Client



Figure 59. Admin Testing and Survey



Figure 60. Resident Testing and Interview



Figure 61. Resident Testing and Interview (Business)



Figure 62. Resident Testing and Interview



Figure 63. Final Defense

APPENDIX H
BUDGET & RESOURCES

1. Budget

Items	Cost	Frequency	Total Cost	Description
Hosting (Hostinger)	PHP 479.00	1 Month	PHP 479.00	For hosting the web-based system (BIMES)
Domain Name (Hostinger)	PHP 59.00	1 Month	PHP 59.00	For Domain Name

2. Resources

Resource Type	Specific Resources	Description
Human Resources	Developer	Focuses on the user interface and user experience and handles the server side of the application
	Researcher	Conducts various types of research necessary for the project's success (include market research, user research, or technical research)
	Tester	Ensures the web-based system is functional, user-friendly, and bug-free.
	Adviser	Provides strategic guidance and expert advice on various aspects of the project
Physical Resources	Laptops and Phones	Used in Developing and testing
Technical Resources	Hostinger Domain	Provide platform for the web-based system

	Development Tools	Software applications that developers use to write, test, debug, and manage code for building applications
	Software Frameworks and Libraries	Provide a structured foundation and built-in features to simplify the development of complex applications
Information Resources	Related system studies	Related studies from Research or Academic Papers, Books and Online tutorials

APPENDIX I
QUALIFICATION AND CURRICULUM VITAE

VERLIE FEA GRACE CELLAN

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PROFILE

I am Verlie Fea Grace P. Cellan, a Bachelor of Science in Information Technology student at Central Mindanao University. I bring a unique blend of academic excellence, practical experience, and technological proficiency to the table. With a passion for information management and a commitment to continuous learning, I am poised to make impactful contributions in the field of technology.

EDUCATION

Elementary: Plantation Elementary School

High School: Libona National High School

College: Central Mindanao University

KEY SKILLS

Organizational Skills:

- Implemented meticulous organizational skills in handling business-related tasks, ensuring accuracy and precision.
- Adapted to different roles and responsibilities, transitioning seamlessly from academic settings to business environments.
- Developed strong problem-solving skills through academic challenges and programming projects.

Soft Skills:

- Communication Skills
- Critical Thinking
- Time management
- Adaptability

Hard Skills:

- Programming Languages :**
Python, Java, PHP
- Front End Web Technologies:**
CSS, HTML, Bootstrap

EXPERIENCE

Senior High School Immersion

Gained exposure to Fire Department Jobs, acquiring practical insights into diverse professional fields.

College Internship

Completed a 486-hour internship at Kyogojo Engineering and Water Service Cooperative, cleaning and migrating data from old system to new, designing and developing website and mobile application using Flutter

REFERENCE

GLYRHIZ MARHIEL A. TABAMO

Capstone Adviser

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JESSA MAE DORMAL

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PROFILE

I am Jessa Mae M. Dormal, a Central Mindanao University student pursuing a career in information technology with a focus on information management. My strong dedication to study and success has been evident throughout my academic career, as evidenced by my constant honor roll from elementary school through high school. Technology and its useful applications are my passion, and I have a special interest in programming languages like HTML, CSS, PHP, and Python.

EDUCATION

Elementary: Manuto Elementary School

High School: Quezon National High School

College: Central Mindanao University

KEY SKILLS

Organizational Skills:

- Excellent at setting priorities for tasks and managing time.
- Competent in both project management and execution.
- Efficient in managing resources and coordinating a team.
- Capable of managing data and preserving accurate records.
- Strong analytical and problem-solving abilities.
- Strong interpersonal skills and a clear communicator.
- Capable of multitasking in dynamic environments.

Hard Skills:

- **Programming Languages :** Python, Java, PHP
- **Front End Web Technologies:** CSS, HTML, Bootstrap

Soft Skills:

- Communication Skills
- Critical Thinking
- Time management
- Adaptability

EXPERIENCE

Senior High School Immersion

Participated in practical training at Mag'z, a multipurpose shop offering printing, net café, and computer accessory sales.

College Internship

Completed a 486-hour Internship at CMU Journal of Science, migrating data and creating new journal system using OJS.

REFERENCE

GLYRHIZ MARHIEL A. TABAMO

Capstone Adviser

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ALYANNA KRISTINA JEN MONTALLA

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PROFILE

I am Alyanna Kristina Jen F. Montalla a graduating student pursuing a Bachelor of Science in Information Technology with a specialization in Information Management at Central Mindanao University. Proficient in Python for data interpretation and PHP for web development, I also excel in HTML and CSS. My strong report-writing skills complement my technical expertise. Inspired by current technological advancements, I am driven to contribute to the future of information technology.

EDUCATION

Elementary: Esperanza Central Elementary School

Junior High: Esperanza National High School

Senior High: Father Saturnino Urios College of Bayugan Inc.

College: Central Mindanao University

KEY SKILLS

Organizational Skills:

- Prioritizing tasks, setting deadlines, and adhering to schedules for timely project completion.
- Assessing task importance and urgency, organizing in priority order, and addressing high-priority items first for optimal productivity.
- Articulating ideas clearly, active listening, and maintaining open communication for smooth collaboration within a team or organization.

Hard Skills:

- Programming Languages: Python, PHP
- Front End Web Technologies: CSS, HTML, Bootstrap

Soft Skills:

- Communication Skills
- Critical Thinking
- Leadership Skills
- Adaptability

EXPERIENCE

Senior High School Immersion

Completed a 2 month training as an Office Clerk at MENRO located in Esperanza Agusan del Sur.

College Internship

Completed a 486-hour Internship at CMU Journal of Science, migrating data and creating new journal system using OJS.

REFERENCE

GLYRHIZ MARHIEL A. TABAMO

Capstone Adviser

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