DEVELOPMENT OF BARANGAY E-SERVICES MANAGEMENT:
WEB AND ANDROID APPLICATION

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INTRODUCTION

The research focused on the development of a web-based and android ?Barangay?s E-Services Management? system. The system aims to improve the services of the barangays in Rodriguez, Rizal Barangays. The researchers were prompted to upgrade and innovate how this system works. The initiative is based on the belief thatdigitizing and centralizing services can bring transformation to governance, ultimatelybenefiting the community it serves. The Barangay E- services Management System addresses the need to modernize and streamline the delivery of government services. The system is limited to barangays within the Municipality of Rodriguez, Rizal. The system is Android-based where it is available even if the user does not have any computer in his/her hand. It is designed to make it easier for residents to access the services they need, fostering a relationship between citizens and government officials. The study would allow future researchers to understand how these types of system will impact and assist the service handling within the government. It was observed that 73.1% of the population in the Philippines had access to the Internet at the beginning of that year. AY E-SERVICES MANAGEMENT 3 is a 3-year project to digitize and centralize services. The system has three end-users: Municipality, Barangay, and Residents. Residents can effortlessly submit their servicerequests anywhere online either from the web or Android app. It is a centralized platform that fosters transparency, productivity, and performance monitoring of each barangay. The project aims to reduce time, save time, and resources for both residents and government officials. A more citizen-centric approach togovernance will be taken. Community engagement and public relations will be promoted as real-time updates establishes connections with their citizens. They may face challenges like inadequate digital literacy among barangay officials and their residents ii ii. Generate application forms and event certification in a PDF document. Generates request forms and request documents in aPDF document. A more citizencentric approach will be used to take. a more Citizen-centric approaches to governance. A better way to communicate with citizens will be adopted.

METHOD

Once the reply is submitted by the repeatedly-submitted by the staff or barangay admin, it will then send the data to the database of the system. Users can see the information of the publicly-available services in the barangy?s services request table. If the system encountered an error, or the staff purposelycancelled the users request, it would redirect the user to the events request panel. Both the staff and barangays admin will have different abilities when it comes to the Barangay management. The researchers prepared survey questionnaires for the residents, barangay staff and the municipality administrators inside the Municipality of Rizal to evaluate and fulfill the objectives provided by the proponents in this project. The researchers created an Activity Diagram for Barangay: Events Management in the system. In Figure 15, the action diagram describes that the Barangy Staff and BarangaysAdmin will be able to handle Events Request sent by the residents. When the system encountered an error or the staff cancelled, it will redirect the user to the service requests panel. The system compromises three entities: Municipality, Barangay Staffs / Admin, and Residents. To access the system, the users will have to login first with their corresponding credentials. The system will begin the process of fetching the existing municipal admins and display it in the accounts management panel. The residents may also and only view the information available from the barangay management provided by the baranay. If the staff cancels the process or encounters an error, any data submitted will not be recorded in the database. The user must be able to see the dashboard featuring the statistical data, news, and events and their service requests. If the system encountered an error or the staff cancelled, it will redirect the user to the inquiries panel. After submission it will be sent and recorded in the database and reflect in the management page. The admin and head admin may also modify existing events by clicking the manage button of a specific event and modifying the information within Patawag/Blotter module. The user must also be ableto see thedashboard featuring thestatistical data, News, and Events. The registration process will only be available to the residents, and will be verified by the barangay staffs/admin. Residents will have the ability to create new and edit existing municipality information by just filling

out the required information. They will also be able to create events, which will be displayed in the system. The system will then send the new information to the database. The admin can Modify the Barangay Officials in this panel. The status will be the indicator once submitted by the user on the service request. Researchers found that some barangays use manual process of requesting services to the residents by going to the barangay face-to-face. They wanted to have a Barangay E-Services Management System (BEMS) that follows the service request documents of residents. The system makes it more flexible to residents, barangy staffs and the Municipality. The associated users can also modify existing services by selecting the specific service?s manage service button and enter the necessary details. 40 respondents composed of two municipality administrators, three barangay staffs and admin, thirty residents from different barangays and five IT professionals, a total of 40 respondents. They asked the system?s functionality, merit and significance based on the standards in the study. The process starts with the residentclicking on a button to reply to a service request. If the submission fails due to errors, the resident receives an error message and may need to address the issue before resubmitting the application. The system will first fetch and display all the barangay that exists within the municipality. The system will then display the existing barangy officials for that specific baragay. The staff can sign out from their accounts once they exit the system. The user must be able to see the Inquiries Account Settings Module. The development process includes the creation and creation of the system and the creation of all the officials. The users can see the latest update of their personal account. The residents can update the personal information of their barangays. The Barangay Reports module is accessible in the side bar. The study aims to provide a centralized service and information system that would be use by different barangays of the Philippines. The researchers chose Agile Development model as the project development of the system because of its flexibility and adaptability of the process along with its needs. The system will change the way of keeping the data from manual records as well as the ease of inquiring the barangay upon their service request. The scale of the result from the result will mean the range of Likerts from the respondents to the community will be greater. The system comprises of

processing different range of documents offered by different barangays in the municipality such as the barangayclearances, blotter reports, services (Oplan Dental Mission, Libreng Binyagan, etc.) and other services implemented by the area. The residents (clients)will be using both web-based and android applications. The system comprises the system modules, features, user interface and user experience of the client to meet its logic, structure and algorithm idea. Agile Development methodology has six stages to follow a better control and superior quality product in the study. The process starts with the residents initiating a service request. Each entity will have the ability to access different types of services depending on the specific type of user associated with their account. The development stage was a crucial stage to develop the needs of the client in accordance with the requirement analysis stage and system design stage. The researchers gave a questionnaire to the respondents after the demonstration of the project. The results of the study will be published in the Journal of the Philippine Institute of Technology. The study developed a web-based and android application for different barangay management systems in the Municipality of Rodriguez, Rizal. The respondents were requested to answer the survey throughout its evaluation. The system?s foundation is built by the utilization of MongoDB, React JS, and the internet. The researchers must check the system's quality throughout the testing process. The study developed the system for the selected barangays in the municipality of Rodriguez in the Philippines. The results of the study were published in the journal E-Systems.

RESULTS

The resident users can view all the information about the barangay that they reside in on the resident homepage. In the Service Page, the resident user can view the services offered by the municipality. The staff may use this page to create and manage the information of the services and service forms. The residents can also view the reply and inquiry pages of the Barangay Staff / Admin and Officials in the Municipal. After verifying the security of the system to change PINs, the system will proceed to change the user to the user page. The researchers requested the barangay, a group of end-users for the system, the Residents, Barangay Staff, Municipality Admins, and IT Professionals, and tested the functionalities and features of the system. In this figure, the system will display the existing events in the respective municipality and features the respective barangays. The system allows the user to publish events and services that the baragay and municipality offers. The researchers tested a number of features and functionalities including the ability to change the password of an account. The system allows the resident users to submit event applications, service requests, and inquiries to the system. The system allows barangay admins to add and manage resident accounts to the barangays system. It provides the municipality admin the ability to download the certification and application form of the event. It allows the staff to create the lobby of the patawag where the staff, defendant, and complainant will be able to communicate to each other and handle their disputes. It also allows the municipality to have access to information, barangy officials, services, requests, blotters, residents, events, applications, inquiries, and reports. The system will display all existing services offered in the respective respective barangay and municipality. The users can successfully update and modify existing data for the respective municipality. This page will consist of all the archived events and will show the current status of each with the view event action. The system will also display all the information regarding the inquiry and also the way ofcommunication for the admin and resident to settle the inquiry. The municipality users can change the approval status of the barangays. The user can modify any personal information of their account. Figure 177 displays the Add Barangay Modal that the municipality

admins may utilize by uploading the logo and banner of the barangay. Figure 188 features the Municipality Officials Page which grants the municipality?s admins the ability to create, manage and modify barangy officials. Figure 189 displays the Create Municipality Official Modal. Figure 100 exhibits the Create Resident Page where the staff may fill out the Resident?S registration form of the resident. Figure 108 shows the View Archived Request Modal, where it displays all the data associated with the request. The system allows the municipality admins to create and modify barangays Staff ? Archive Inquiry Modal (Blotter) Document Modal. Residents can send inquiries in the Barangay Staff / Admin and Officials in the Municipal Resident ? View/Reply Inquiry Modals. The users was able to successfully view the details of the notification and log-in process. The system also provides a preview of the numerous possible actions / abilities that the users may utilize within the system. The user is immediately directed to the resident?s Dashboard in which they can see the various possible actions that they may utilize. The system allows the user to create and modify documents to be used for the services and patawag (blotters) using templates provided. The users can update.any existing barangay and municipality accounts. The system can also archive and unarchive any specific data within the barangays? service pages. It can also send a security PIN to the user?s email address to verify and allow them to change their password. The user can also attach requests to the system by entering the associated email address with their accounts. The Barangay?s Forgot Password Page allows users to send a password reset request. The Residents? Status Changer Page allows the user to update the account status of the resident. The About Us Information Page allows municipality admins to create and manage the information about the municipality. The Manage Official Barangays Modal allows the barangay staff to view and modify the official profile. The Archive Service Requests page allows the staff to archive any selected requests that they want to be hidden on the service requests page. -SERVICES MANAGEMENT 117 redirects them back to the information of the municipality, that can be found in the   homepage. The system allows all users to log in and use each side of the system Staff ? View Archived Blotters Modal. Residents ? View Barangay Information Modal, and the municipality ?

Add Municipality Admin Modal to create an admin account. The users can also access the archived events page to view the archived blotter documents. The system has the capability to generate and compute analytics and reports for users with admin access with the municipality and barangay. The system can distinguish user login and display accessible features for the specific user. The users can change the status of service requests and cancel them. The user can also access the archived events page from here by clicking the retrieved events button on the top right corner of the page. The residents can view all the notifications on their latest updates in transactions as well as the activities inside the barangays. The Barangay E-Services Management System (BEMS) is a web-based application where it is designed to streamline and enhance the process of requesting documents of every resident across all barangays in the Municipality of Rodriguez (Montalban), Rizal. The system?s functionality was tested successfully, showing that the test results satisfied the structures and procedures of the municipality and barangay. The users can archive and unarchive barangyaccounts. The Criterion Compatibility exhibits excellent compatibilit6y in the system with a. high Co-Existence and Interoperability receiving ?Highly Acceptable? ratings. The system was developed by the Municipality of Rodriguez, Rizal. The overall Usability criterion receives a mean score of 3.83. The Criterion Reliability exhibits the dependability and accessibility of the system. The users may be able to locate a specific event by using the search bar. Users can archive and unarchive barangay accounts. The system can also be used to register residents for the municipality's e-registration system. It can also provide information on events, services, tourist spots, and blotter records. The compatibilityreceived a weighted mean of 3.80 which is interpreted as ?Highly Acceptable? The repeat visit result obtained a faster full.fledgedpage reload than the first visit result for the barangay side of the system. The system successfullypasses the W3C Validation in terms of conformance. The users was able to be redirected to the respective.pages based on the type of information. The user can view the basic information of each resident. The staff can track and download all the blotter documents created for that specific patawag. The system?s main objective is to provide a centralized, efficient, and.transparent platform for every resident of

barangay to request and track their documents. The system can track the latest updates and statuses of each event applications, requests, inquiries, and patawag (blotters) It will also provide a. centralized dashboard for barangays staff to effectively manage and process resident requests, securing transparency and accountability throughout the entire. process. The users can access the archive and unarchive a number of documents. The system will not only cover the improvement of overall experience of the residents, but it also covers the improved efficiency of barangay staff. The users can archive and unarchive barangays' accounts and patawags. The system can be efficiently learned and used in the broader system. It can also be used to create event registration forms and to send and receive messages. It has been tested in the Municipality of Rodriguez (Montalban), Rizal, and the City of Manila. The system's services will be limited to the Municipality of Rodriguez, Rizal, and its constituent barangays, ensuring compliance with local regulations and policies. A live testing was conducted to confirm and witness the system?s reliability. Charts will display data ranging from ranking of the requested services, revenues for each service, resident status, archived and active residents? percentage, and so much more. The overall Security criterion received a weightedaciouslymean score of 3.57, which is interpreted as "Highly Acceptable." The Criterion Portability exhibits excellent portability in the system with sub- criterion Adaptability, Installability, and Replaceability receiving ?Highly accepted?

DISCUSSION

The system can create, monitor, and manage barangays that are within the municipality. The system has three entities which are the Municipalities, Barangay Staff and Admin, and Residents. It can archive and unarchive specific data that could be found within the system. It could be used in local government such as municipalities and to all itscontained barangay services and events. It was developed using full-stack development such as MongoDB for database, React for web, and Express and Node for Server. Developed system was successfully created as designed using various development tools. System was evaluated to be ?Highly Acceptable? using ISO 25010. E-payment features and options Implementation of Multilingual support. Different URL to log in to avoid Server overload. Improve the system?s security posture to better protect user information. The developed system was created using variousdevelopment tools such as Visual Studio Code, Hypertext Markup Language (HSML), Tailwind CSS, Node JS, React JS, and MongoDB.