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Docu-Go: The Development and Assessment of a Web-Based Barangay Document Requesting System

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Abstract: ***A barangay plays a vital role in the development and progress of a country, requiring careful attention and improvement. In order to address the need for advancements in barangay processes, this study focused on designing, developing, and assessing a web-based barangay document requesting system called Docu-Go. The researchers employed a developmental research design, involving IT experts and residents from a barangay in Cabanatuan City, Nueva Ecija, Philippines. The researchers utilized a modified waterfall model for the system's development. To evaluate the technical features and quality of the system, an adapted survey questionnaire based on ISO 25010 was administered. The evaluation results indicated that both aspects were generally deemed acceptable by the two types of respondents. However, various recommendations were proposed to further enhance the system's functionality and user experience.***

Keywords: Assessment, Developmental Research, Document Requesting System, Docu-Go, Web-based Application.

1. INTRODUCTION

In today's world, information technology plays a crucial role in completing various tasks, and the demand for an increased number of Information Technology professionals and new IT solutions continues to grow to address pressing challenges and provide more convenient processes [1]. Castagna and Bigelow [2] define information technology as the development, processing, storage, protection, and sharing of electronic data through computers, storage, networking, and other physical devices.
The integration of information technology solutions has brought about significant changes, with cellphones and computers having a profound impact on people's lives [3]. These

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technologies have revolutionized daily activities, benefiting organizations, establishments, and learning institutions [4]. Cellphones and computers have made tasks more accessible and efficient, becoming essential tools in today's fast-paced society for communication, information access, and various other tasks. Particularly in the context of a barangay, the use of such technologies is critical for disseminating information through announcements and facilitating communication with stakeholders. Therefore, optimizing the application of these technologies is crucial for improving processes in organizations, including document processing.

Previous research has explored the use of technology to enhance the document request process in a community. Batitis et al. [5] proposed the incorporation of SMS alerts into internet-based systems, providing residents in a barrio with a faster document retrieval experience and enabling information distribution through SMS notifications. Another study addressed the challenges encountered in a document request and incident reporting system, utilizing a mixed-method approach to develop and assess the system. The findings indicated that the developed application could be beneficial in addressing the problems faced in a barangay [6].

Barangays that rely on manual document request processing face several issues, including difficulties in managing files and records, ensuring file security due to the absence of a secure repository, and generating barangay records in real-time. While many studies have proposed information technology-based solutions in a short period, researchers continue to strive to contribute to the growing body of knowledge related to document processing. Moreover, this study aims to find a more appropriate approach tailored to a specific barrio.

The present study introduces a Barangay Document Requesting System, a user-friendly web-based application developed for residents of a barangay in Cabanatuan City. This system provides residents with quick and easy access to various documents such as barangay clearances, indigent certificates, and business permits, while ensuring secure record-keeping within the barangay.

The primary goal of this project is to provide residents with a secure and convenient method of obtaining necessary documents while adhering to COVID-19 guidelines. Furthermore, the system enables residents to report complaints or difficulties to barangay officials. Users can file reports online, and officials are promptly notified when the required documents are available. Following a modified waterfall model, the researchers aim to develop the system through its various stages. Additionally, the researchers intend to assess the technical aspects and quality of the system to gain an understanding of its acceptability among the respondents. However, despite the existing studies on technology-driven document processing in barangays, there remains a gap in the literature concerning the development and implementation of a web-based document requesting system specifically tailored to the needs of a barangay. This study aims to bridge this gap by designing and evaluating a user-friendly web-based application that addresses the challenges faced by barangays in document processing, ensuring secure and efficient retrieval of essential documents while adhering to COVID-19 protocols.

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2. METHODOLOGY

This study employed a developmental research design to develop and evaluate a web-based solution for a barangay in Cabanatuan City, Nueva Ecija. In the past, several studies utilized this design and successfully developed and evaluated information technology-based projects [7, 8, 9, 10, 11, 12, and 13]. The researchers identified the respondents for this study using purposive sampling technique. The sample consisted of 30 IT experts with experience in software development, 10 barangay officials, and 60 residents.
Two sets of questionnaires were used in the study. The first set was intended for the IT experts to assess the technical aspects of the system, while the other instrument was used by the residents and barangay officials to evaluate the quality of the system. The system encompassed the ISO 25010 software standards. The researchers adapted the instrument to suit the context of this study, modifying some items to provide contextualized details.

During the data collection, the researchers utilized Google Forms. Given that the data gathering occurred during a pandemic, ensuring the safety of all participants took precedence. Consequently, alternative methods were also considered. To guarantee comprehensive coverage of all essential information, a video demonstration was created. Moreover, the researchers maintained an open line of communication with the respondents, readily addressing any inquiries they had. The researchers prioritized the utmost confidentiality and anonymity in handling the collected information, ensuring that the data obtained were solely utilized for the purpose of this study.

3. RESULTS AND DISCUSSION

A. The Development of the Docu-Go based on the stages of the Modified Waterfall Model

In developing Docu-Go, the researchers utilized the stages of the modified waterfall model to systematically design and construct the system. The researchers followed the vital stages of the model, which included requirements analysis, design, coding, and testing, in creating the system.
During the requirements analysis stage, the researchers collected all types of requirements using various data collection techniques and tools such as document analysis, interviews with different residents, observations in the barangay, and feasibility analysis. These approaches enabled the researchers to gain a better understanding of how to initiate the system design. The requirements analysis stage served as the foundation for system development. Through this stage, the researchers thoroughly and carefully analyzed the functional and non-functional requirements in the barangay. To guide the researchers in the development of the system, a Gantt chart was developed in this stage. Figure 1 presents the Gantt chart of activities.

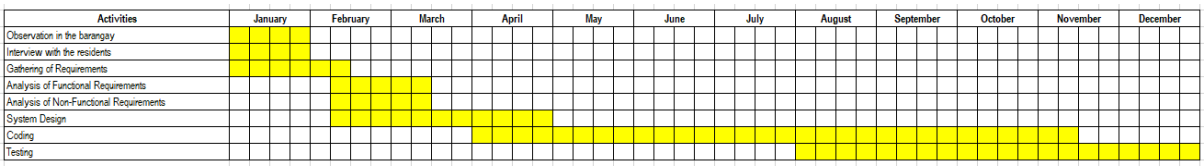

Fig. 1. Gantt chart of activities

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After the requirements analysis stage was conducted, the researchers began designing all the necessary diagrams and plans to guide them in the system development. The design stage commenced after a thorough analysis of all the functional and non-functional requirements, as well as other pertinent details required for designing the front-end and back-end components of the system. Figure 2 depicts the designed data flow diagram of Docu-Go, while figure 3 presents the use-case diagram of the system. These diagrams were essential for understanding the data flow and identifying the major processes that needed to be incorporated into the system.

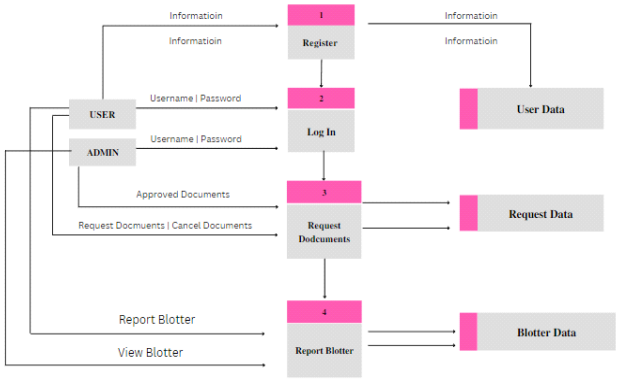

Fig. 2. Data Flow Diagram

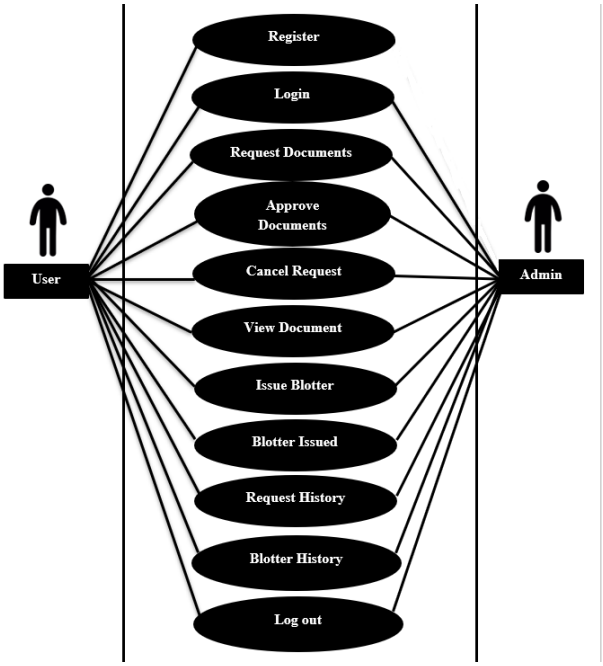

Fig. 3. Use-Case Diagram

It was also necessary to present the modules that were included in the system. Figure 4 displayed the HIPO chart of the system, while figure 5 exhibited the proposed entity-relationship diagram of Docu-Go.

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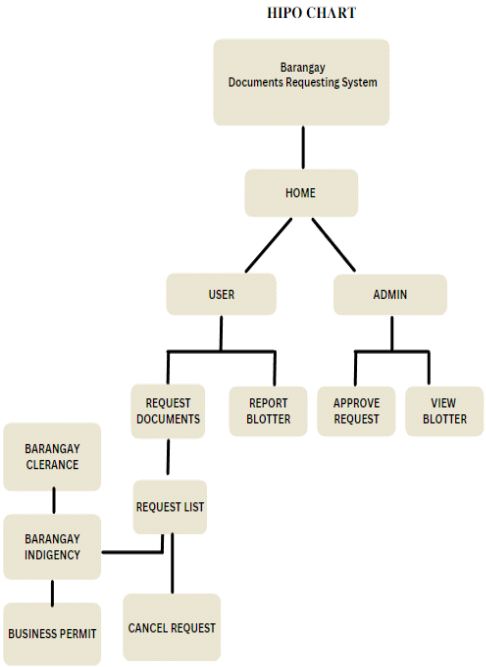

Fig. 4. HIPO Chart

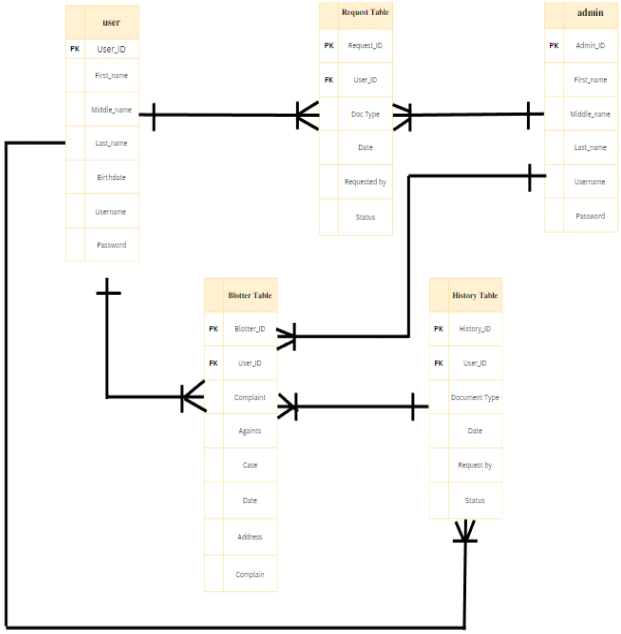

Fig. 5. Entity-Relationship Diagram

The coding stage of the modified waterfall model entailed the actual development of the system. The researchers developed the system by utilizing various integrated development environments (IDEs) and programming languages. Meanwhile, as the development progressed, the researchers conducted several testing activities using different testing techniques to ensure

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that the system met the required standards. Figure 6 illustrates the various sample user interfaces of Docu-Go.

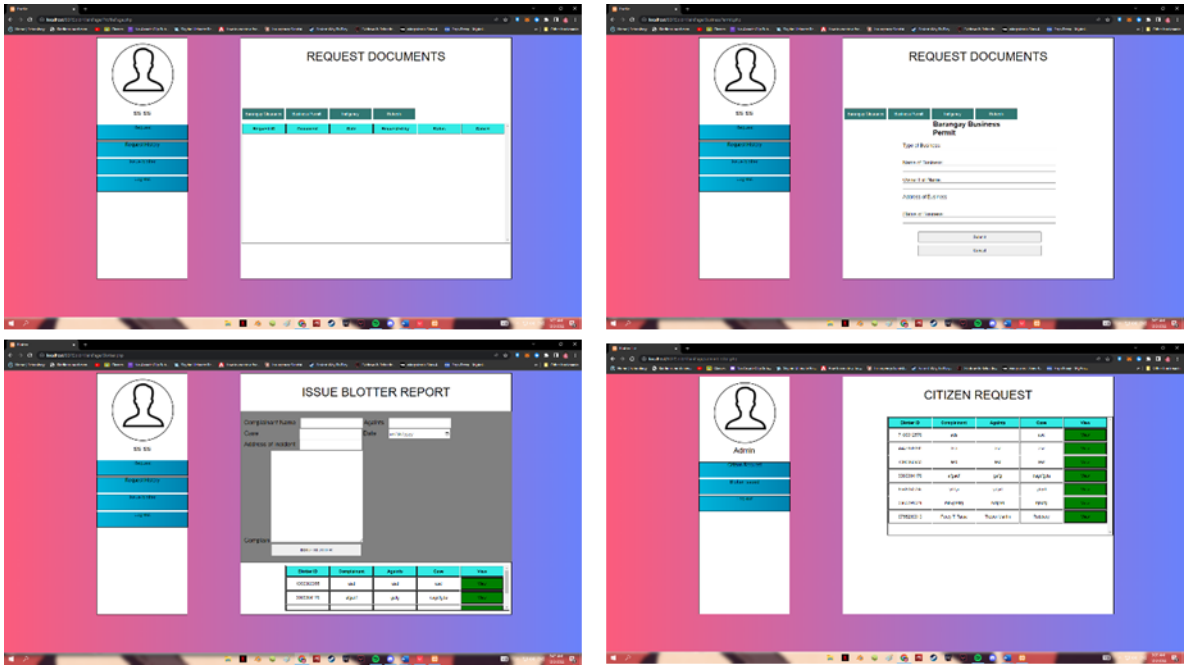

Fig.6. Sample User Interface of Docu-Go

B. Assessment on the Technical Features of Docu-Go by IT Experts

Table 1 presents the result of the assessment made by IT experts on the technical aspects of Docu-Go. The assessment was necessary to understand how to further improve the system in relation to its technical features.

Table 1: Assessment on the Technical Features of Docu-Go made by IT experts

Criteria	Mean Rating	Verbal Interpretation
Functional Suitability	2.55	Agree
Reliability	2.50	Agree
Usability	2.52	Agree
Performance Efficiency	2.58	Agree
Security	2.51	Agree
Maintainability	2.50	Agree
Portability	2.50	Agree
Compatibility	2.58	Agree
Overall Grand Mean	**2.41**	
Overall Verbal Interpretation	**Acceptable**	

Table 1 presents the assessment of IT experts on the technical features of Docu-Go. The table includes various criteria such as functional suitability, reliability, usability, performance

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efficiency, security, maintainability, portability, and compatibility. The mean ratings for each criterion are provided, along with the corresponding verbal interpretation.

Based on the results, the mean ratings for functional suitability, reliability, usability, performance efficiency, security, maintainability, portability, and compatibility are 2.55, 2.50, 2.52, 2.58, 2.51, 2.50, 2.50, and 2.58, respectively. These ratings indicate that the IT experts agree that Docu-Go possesses acceptable levels of these technical features.

Drawing insights from the results, it can be observed that Docu-Go generally performs well in terms of the assessed criteria. The mean ratings are relatively consistent, with no significant variations among the different technical features. This suggests that the system has achieved a satisfactory level of performance in various aspects, which is a positive outcome.

However, despite the overall positive assessment, there is still room for enhancement in the technical features of Docu-Go. While the system meets the basic requirements and is deemed acceptable by the experts, there are areas that could be further refined to enhance its performance, usability, and reliability.

The implications of these results highlight the importance of continuous improvement and refinement in the technical features of Docu-Go. The feedback from IT experts indicates areas that need attention and further development. Addressing these areas can lead to an even more effective and efficient system, ensuring that it meets the evolving needs and expectations of its users. By focusing on enhancing functional suitability, reliability, usability, performance efficiency, security, maintainability, portability, and compatibility, Docu-Go can strive towards providing an optimized and user-friendly document management solution.

C. Assessment on the Quality of Using Docu-Go by End-Users

Table 2 shows the result of the assessment on the quality of using the system as perceived by the different end-users. The results would contribute to the improvement of the system in the future.

Table 2: Assessment on the Quality of Using Docu-Go made by End-Users

Criteria	Mean Rating	Verbal Interpretation
Functional Suitability	2.50	Agree
Reliability	2.50	Agree
Usability	2.55	Agree
Overall Grand Mean	**2.51**	
Overall Verbal Interpretation	**Acceptable**	

Table 2 presents the assessment of the quality of using Docu-Go as evaluated by end-users. The table includes the criteria evaluated, their respective mean ratings, and the verbal interpretations associated with each criterion. The criteria assessed are functional suitability, reliability, and usability, with mean ratings of 2.50, 2.50, and 2.55, respectively. The overall grand mean, calculated based on these criteria, is 2.51. The verbal interpretation for the overall

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assessment suggests that the system is deemed acceptable by the end-users, but it also highlights the need for further improvements.

Looking at the results, several valuable insights can be drawn. Firstly, the mean ratings for functional suitability, reliability, and usability are relatively consistent, with scores around 2.50 to 2.55. This indicates that the end-users generally agree that the system possesses functional suitability, reliability, and usability to an acceptable extent. However, it is worth noting that the mean ratings fall around the middle of the scale, suggesting that there is room for improvement in these areas.

The overall grand mean of 2.51 implies that, on average, the end-users find the quality of using Docu-Go acceptable. However, the verbal interpretation suggests that further improvements are needed. These results highlight the importance of addressing the areas that require enhancement to enhance the overall user experience and satisfaction. It is crucial to focus on refining the functional suitability, reliability, and usability aspects to ensure that the system meets the needs and expectations of the end-users effectively.

The assessment results indicate that while the end-users find Docu-Go to be acceptable, there is still room for improvement. These findings emphasize the need to address the identified areas for enhancement in functional suitability, reliability, and usability. By focusing on these aspects and making necessary improvements, the system has the potential to provide a better user experience and meet the expectations of the end-users more effectively. This underscores the significance of continuous evaluation and refinement to ensure that the system remains aligned with user requirements and delivers optimal performance.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the researchers concluded that Docu-Go could be developed using the modified waterfall model. The model served as an effective guide for the developers in building the application. Additionally, the technical features of Docu-Go were evaluated by IT experts, and the results showed that the system achieved an acceptable level of performance. However, it was recognized that continuous improvement is necessary to further refine the system.

Similarly, the evaluation conducted with end-users also indicated that the system requires further improvement to enhance the quality of user experience. Although both IT experts and end-users considered the system acceptable, there is still room for improvement that needs to be taken into consideration. These findings emphasize the importance of ongoing efforts to enhance and optimize the system's functionality and usability.

Based on the conclusions drawn from the study, the following recommendations can be made:

1. Continuous System Improvement: To address the need for further refinement identified by both IT experts and end-users, it is crucial to allocate resources and efforts towards the continuous improvement of Docu-Go. This can involve conducting regular evaluations and

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gathering feedback from users to identify areas of the system that require enhancement. By implementing iterative development cycles and incorporating user feedback, the system can be continuously optimized to meet the evolving needs and expectations of its users.

2. User-Centric Design: Given the importance of usability and user experience, it is recommended to prioritize a user-centric design approach during the system's improvement phase. This can involve conducting user research, usability testing, and incorporating user feedback to identify pain points, improve navigation, and streamline processes within the system. By focusing on user needs and preferences, the system can be tailored to provide a more intuitive and satisfying experience for its users.
3. Collaboration with IT Experts: Building on the positive evaluation results from IT experts, it is beneficial to maintain an ongoing collaboration with these professionals. Their expertise can be leveraged to identify areas of improvement in terms of technical features and performance. By actively involving IT experts in the development process, the system can benefit from their knowledge and insights, leading to enhanced functionality and reliability.

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