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Barangay Blotter and Clearance System of Sta. Maria, Gonzaga, Cagayan, Philippines

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ABSTRACT

The Barangay Blotter and Clearance System is a customized computer system specifically created for barangay use. The system will automate the barangay's day-to-day activities and transactions. The initiative would improve the barangay's services as well as the citizen's overall experience. The system will generate clearances or permits for the residents and record blotters easily. The system provides a user-friendly system for the employees of the barangay. The developers used the ISO 25010 standards model to evaluate the quality of the system. The result of evaluation in terms of functionality, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability of the developed system is excellent which means that the system can perform the task required and accomplished the objectives of the system. Based on the evaluation and trials conducted, the developed system gives a great help for the councilor/secretary of the daily task and in the process of recording filed blotters and releasing of permits to residents. Thus, it is recommended that the system will be fully implemented in the barangay particularly the barangay Sta. Maria of Gonzaga, Cagayan, as this will facilitate faster and efficient processing of the barangay blotter and clearances.

Keywords: *Barangay Blotter System, Clearance Automation, Citizen Services Enhancement, ISO 25010 Evaluation*

INTRODUCTION

Nowadays, computer and technology play a vital role in our lives and online communication is already part of living especially this time of the COVID19 pandemic. In the government, particularly at the barangay level, most of the barangays are still using paper-pencil to record the information of the residents. They do this day-by- day manually, which is very tiresome on the part of the record keepers or the barangay secretaries. In the past, it was easy to use paper because there were fewer residents and it was easy to manage them especially on managing their requested clearances and blotters in any incident. With the increasing barangay populations, blotter records and issuance of clearance is troublesome. Documents can be misplaced or worse is they are lost – in which case, documents lost are no longer retrievable.

Barangay Sta. Maria, until now, is using manual system. The barangay usually keeps their data hand-written on paper, and file it in a folder/logbook. Then the secretary will generate the list of all the names of an individual in a household in each purok, in hand-written again. In tracing the records, the secretary will search the records one by one search the from a filing cabinet and it takes a lot of time. These records are very important for different purposes thus should be stored securely.

Barangay Sta. Maria is aspiring to adopt technological ways in accomplishing responsibilities to create change in the life of people. It means replacing human efforts with machine to keep track of the advances of the technology.

As a result, the researchers create a system that will aid the difficulties in the barangay. The said system will reduce the hard and long-time procedure of accessing file, and will be effective in maintaining, searching, and storing of records and generating reports of the residents. The purpose of Barangay Blotter and Clearance System of Barangay Sta. Maria, Gonzaga, Cagayan is to generate clearances or permits for the residents and record blotters easily. The system will also provide a user-friendly system for the employees of the barangay.

This proposed system is intended to archive the records of the resident, blotter, and barangay clearances. This system will bring ease to them, especially in generating reports to the municipality about the status of the barangay. The proposed system will have a significant on both residents of the barangay and barangay employees still who manage the system. The system offers an assurance that files will be protected and safe for users and it will also require authorization before someone can access the system. These systems are sufficient for various purposes that required an appropriate, consistent, and secured storage of files. With the assistance of technology, barangay officers can make and keep records, announcements, reports, reservations specified the residents can have records and access to them, the proposed system can access the users online. To ensure that the files are secure, a backup of data will be integrated as one of the modules of the proposed system.

Objectives of the Study

In general, this study focuses on the design, development and implementation of Barangay Blotter and Clearance System of Sta. Maria, Gonzaga, Cagayan. Its specific goals are as follows: determine the problems and issues encountered in the barangay blotter and clearances; make an online system to facilitate the barangay blotter and clearances; evaluate the developed system in accordance with ISO 25010:2011 - Systems and software Quality Requirements and Evaluation (SQuaRE) as to: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, Portability.

MATERIALS AND METHODS

Research Design

The research employed a mixed-methods approach, incorporating both qualitative and quantitative methods. Initially, an on-site visit was conducted to interview the

target community and gather insights into the project requirements. A formal written consent was obtained prior to the scheduled visit. Subsequently, personal interviews and observations were conducted with barangay officials to develop a foundational matrix function for the project's design.

Sampling Technique

The researchers selected the barangay as their study site due to the absence of operational systems within their operations. Convenience sampling was employed to select the barangay for this research.

Locale of the study

The study was conducted in the chosen barangay, which was selected based on its need for an operational system to enhance its daily operations.

Research Instruments

Data collection instruments included interview guides for the personal interviews with barangay officials and a set of questionnaires for participants/users. The questionnaires were designed to assess various aspects of the developed system, including Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. A 5-point Likert scale was used for rating, with 5 representing "excellent" and 1 representing "fair".

Data Gathering Procedure

Before any data collection commenced, formal written consent was diligently acquired from the target community. An on-site visit was then orchestrated to facilitate interviews with barangay officials and gain valuable insights into the specific requirements of the project. Through personal interviews and keen observations, a comprehensive matrix function was meticulously developed in collaboration with the barangay officials, which ultimately served as the bedrock for the project's design. Subsequently, questionnaires were thoughtfully disseminated among the participants and users to assess the system's performance, aligning with the rigorous standards set forth by ISO 25010. This comprehensive approach ensured that the project was not only ethically grounded but also deeply attuned to the needs and expectations of the community it aimed to serve.

Analysis of the Data/ Statistical treatment

To analyze the results obtained during the testing phase of the system, a weighted mean was computed from the responses to the questionnaires. This facilitated an evaluation of various system attributes, including Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability, as rated by participants/users.

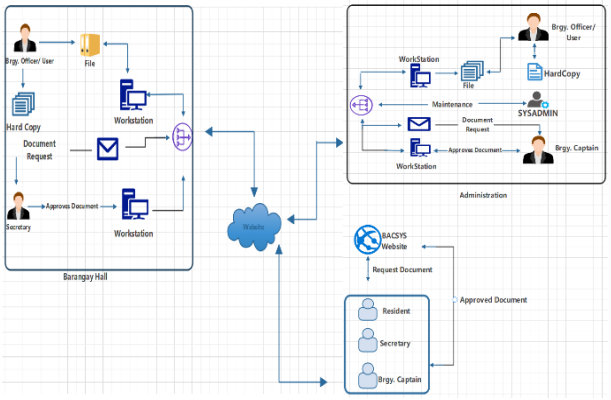

Figure 1. System Architecture.

As shown in Figure 1, the administrator of the system is in charge of accessing the system and controlling the residents' information, clearance, and blotter records.

RESULTS AND DISCUSSION

Features of the Barangay Blotter and Clearance System

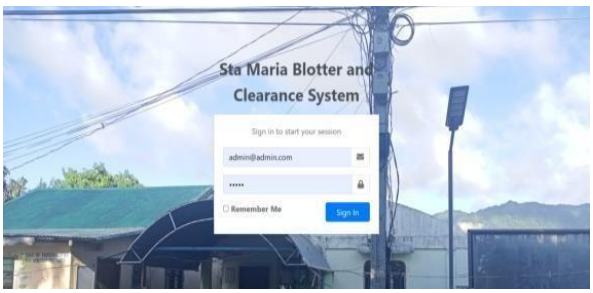

Figure 2. Sign In page.

The BBCS application's sign-in page is shown in Figure 2. Before any user may access the system, he or she must first sign in using his or her email address and password. After that, the user can now log in.

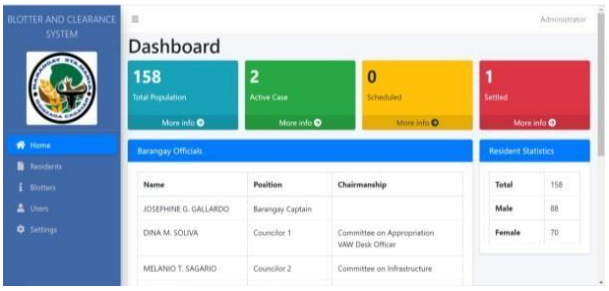

Figure 3. Home Page/Dashboard Page.

The administrator dashboard is shown in Figure 3. As the administrator, he/she has complete control over the BBCS application. The Barangay Officials, resident data, total number of residents, and the status of the blotter reports are all displayed on the home page.

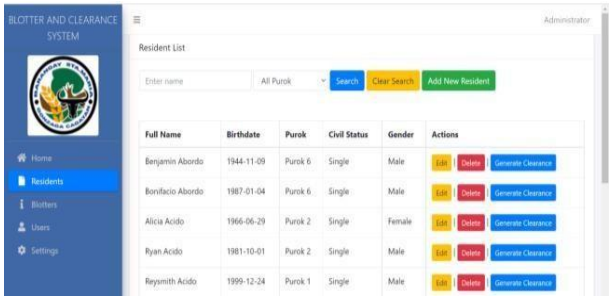

Figure 4. The graphical user interface.

Figure 4 shows the BBCS graphical user interface. After logging in as a user, he or she can now utilize and access the application's information. This page shows the information about the residents, and the user can update, delete, or add a new resident, as well as generate the resident's clearance request.

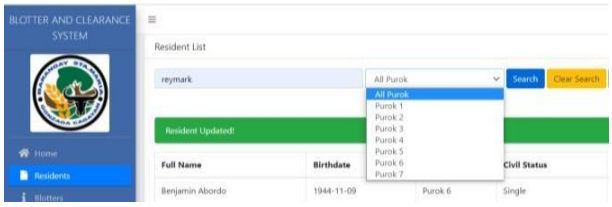

Figure 5. Residents Page.

Figure 5 shows the residents page, which allows users to search for residents by entering their name and purok in the search field. There are 7 Puroks in Barangay Sta Maria.

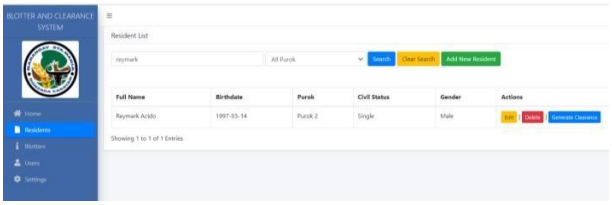

Figure 6. Residents Search Page.

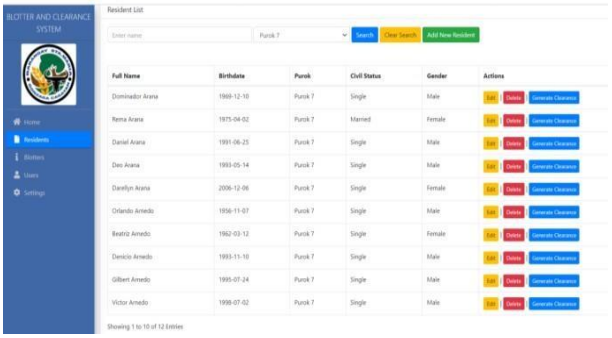

Figure 7. Purok Search Page.

Figure 6 and 7 shows the search page where user can click on the resident or purok being search and shows the resident information.

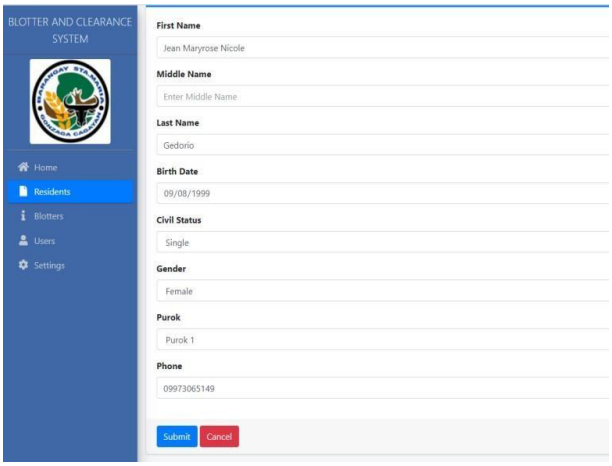

Figure 8. Add New Resident Page.

Figure 8 shows the form where user can input the information of the new resident and submit to save and display the new residents' info. On figure 15 shows the new resident is added successfully.

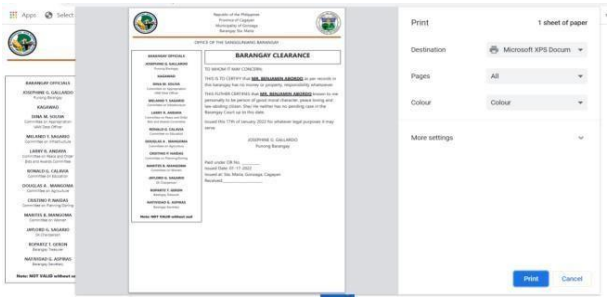

Figure 9. Generate/Print Page.

The resident page also can generate the request clearance of the resident and can be printed as shown in Figure 9.

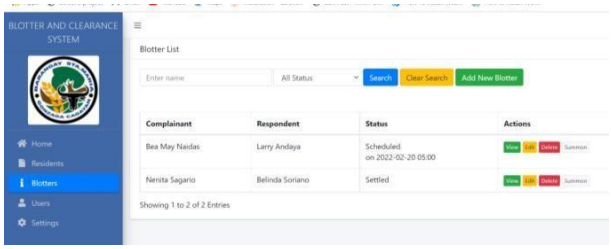

Figure 10. Blotter Page.

Figure 10 shows the blotter page where a user can access and manage the blotter reports of the residents of the barangay.

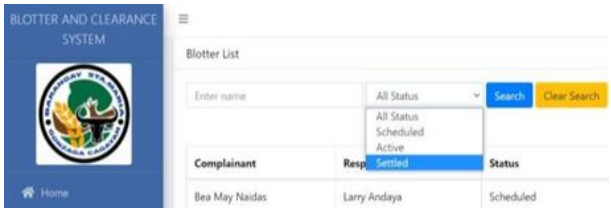

Figure 11. Blotter Search Page.

User can also search residents name and status of the blotter on the search blotter page. In this page, the use can select on the status of the blotter in the search bar as shown in Figure 11.

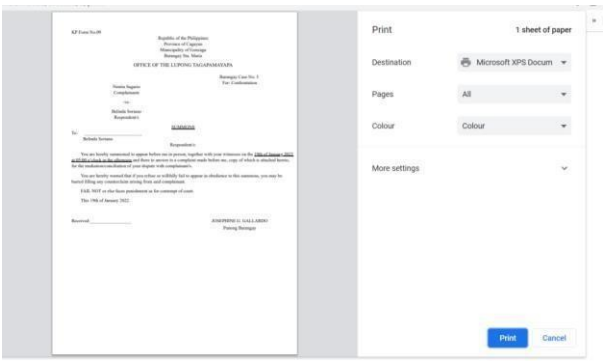

Figure 12. Blotter Print Page.

If the selected status of the blotter is "scheduled", the user can generate and print summon letter as shown in Figure 12.

Table 1. Results of Evaluation Testing by the expected users in terms of Functional Suitability.

Indicators	Weighted Mean	Descriptive Value
Functional Suitability (Completeness, Correctness, Appropriateness)		
1. The set of function perform the entire task required.	5	Excellent
2. The function covers all the specified task and user objectives.	4.8	Excellent
3. The function facilities the accomplishment of specified task and objectives.	5	Excellent
Overall Weighted Mean	**4.93**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

Table 1 shows the result of evaluation in terms of functionality done by the expected users of the system. From the results, the cumulative mean of 5 with a descriptive value of "excellent" means that the system can perform the tasks required and accomplished the objectives of the system.

The overall mean of 4.93 with a descriptive value of "excellent" means that the system meets its functionality. This implies that the developed system meets the requirements as to how it handles suitability, accurateness, interoperability, security of the system.

In terms of performance efficiency of the system as presented in Table 2, the results show that with the respondents' cumulative mean of 5 with a descriptive value of "excellent", the system can perform its functions and meet its requirements.

Table 2. Results of Evaluation Testing by the expected users in terms of Performance Efficiency.

Indicators	Weighted Mean	Descriptive Value
Performance Efficiency (Time Behavior, Resource Utilization, Capacity)		
1. The response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.	5	Excellent
2. The amounts and types of resources used by a product or system, when performing its functions, meet requirements.	5	Excellent
3. The maximum limits of the productor system, parameter meet requirements.	4.8	Excellent
Overall Weighted Mean	**4.93**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

The overall mean of 4.93 with a descriptive value of "excellent" means that the system meets the demands of performance efficiency. This indicates that the developed system meets the requirements as how it handles maturity, fault tolerance and recoverability of the system.

The compatibility of the system is presented in Table 3. From the result of the evaluation done by the expected users of the system, the mean of 4.8 with a descriptive value of "excellent" means that the system can perform the accomplished objectives of the system.

Table 3. Results of Evaluation Testing by the expected users in terms of Compatibility.

Indicators	Weighted Mean	Descriptive Value
Compatibility (Co-existence, Interoperability)		
1. A product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.	4.8	Excellent
2. Two or more systems, products or components exchange information and use the information that has been exchanged.	4.8	Excellent
Overall Weighted Mean	**4.8**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

In terms of performance efficiency of the system as presented in Table 2, the results show that with the respondents' cumulative mean of 5 with a descriptive value of "excellent", the system can perform its functions and meet its requirements.

The overall mean of 4.93 with a descriptive value of "excellent" means that the system meets the demands of performance efficiency. This indicates that the developed system meets the requirements as how it handles maturity, fault tolerance and recoverability of the system.

The overall mean of 4.8 with a descriptive value of "excellent" means that the system is reliable if its compatibility, co-existence, and interoperability are evaluated. This implies that the developed system meets the requirements of compatibility, i.e., as to how it handles without detrimental impact any product and use of the information that has been exchanged into the system.

The usability of the system is presented in Table 4. From the result of the evaluation done by the expected users of the system, the mean of 5 with a descriptive value of "excellent" means that the system can perform the tasks required.

Table 4. Results of Evaluation Testing by the expected users in terms of Usability.

Indicators	Weighted Mean	Descriptive Value
Reliability (Maturity, availability, Fault Tolerance, Recoverability)		
1. User can recognize whether a product or system is appropriate for their needs.	4.8	Excellent
2. A user learns how to use the system easily.	4.8	Excellent
3. A user uses the system without much effort.	5	Excellent
4. A user interface enables pleasing and satisfying interactions for the user.	4.8	Excellent
5. A product or system can be used by people with widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.	4.8	Excellent
Overall Weighted Mean	**4.8**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

The overall mean of 4.87 with a descriptive value of "excellent" means that the system is usable when its appropriateness, recognizability, learnability, operation, user error protection, user interface, and accessibility are evaluated. This implies that the developed system meets the requirements as to how it handles error after failure.

The reliability of the system is presented in Table 5. The results show that the system can perform the tasks required as indicated by the mean of 5 with a descriptive value of "excellent". This means that the system can recover from its failure or can recover the data of the system.

The overall mean of 4.85 with a descriptive value of "excellent" means that the system is reliable when its maturity, availability, fault tolerance and recoverability are evaluated. This implies that the developed system meets the requirements as to how it handles elimination of faults after failure.

Table 5. Results of Evaluation Testing by the expected users in terms of Reliability.

Indicators	Weighted Mean	Descriptive Value
Usability (Appropriateness recognizability, Learnability, Operation, User error protection, User Interface, Accessibility)		
1. A system, product or component meets for reliability under normal operation.	4.8	Excellent
2. A product or system is operational and accessible when required for use	4.8	Excellent
3. A system, product or component operates as intended despite the presence of hardware or software result.	4.8	Excellent
4. In the event of an interruption or a failure, a product or system can recover the data establish the desired state of the system	5	Excellent
Overall Weighted Mean	**4.87**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

Table 6. Results of Evaluation Testing by the expected users in terms of Security.

Indicators	Weighted Mean	Descriptive Value
Security (Confidentiality, Integrity, Non-Repudiation, Accountability, Authenticity)		
1. The prototype ensures that data are accessible only to those authorized to have access.	5	Excellent
2. A system, product or component prevents unauthorized access to, or modification of, computer programs or data.	5	Excellent
3. Actions or event can be proven to have taken place, so that the events or actions cannot be repudiated later.	4.6	Excellent
4. The actions of an entity can be traced uniquely to the entity.	5	Excellent
5. The identity of a subject or resources can be proved to be the one claimed.	5	Excellent
Overall Weighted Mean	**4.92**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

The security of the system is presented in Table 6. The result shows that the system can perform the tasks required as indicated by the mean of 5 with a descriptive value of "excellent".

The overall mean of 4.92 with a descriptive value of "excellent" means that the system is secured when its confidentiality, integrity, non-repudiation, accountability, and authenticity are evaluated. This implies that the developed system meets the requirements as to how it handles elimination of faults after failure.

Table 7. Results of Evaluation Testing by the expected users in terms of Maintainability.

Indicators	Weighted Mean	Descriptive Value
Security (Confidentiality, Integrity, Non-Repudiation, Accountability, Authenticity)		
1. A system or computer program is composed of discrete components such that a change to one component has minimal impact on other components.	5	Excellent
2. An asset can be used in more than one system, or in building other assets.	5	Excellent
3. It is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identity parts to be modified.	4.8	Excellent
4. A product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality.	5	Excellent
5. Test criteria can be established for a system, product or component and test can be performed to determine whether those criteria have been met.	5.00	Excellent
Overall Weighted Mean	**4.96**	**Excellent**

Legend:
4.20 – 5.00 Excellent 1.80 – 2.59 Good
3.40 – 4.19 Very Satisfactory 1.00 – 1.79 Fair
2.60 – 3.39 Satisfactory

The maintainability of the system is presented in Table 7. The result shows that the system can perform the accomplished objectives of the system as indicated by the mean of 5 with a descriptive value of "excellent".

The overall mean of 4.96 with a descriptive value of "excellent" means that the system is maintainable when its modularity, reusability, analyzability, modifiability, and testability are evaluated.

Table 8. Results of Evaluation Testing by the expected users in terms of Portability.

Indicators	Weighted Mean	Descriptive Value
Portability (adaptability, Installability, Replaceability		
1. A product or system can be effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.	5	Excellent
2. A product or system can be successfully installed and/or uninstalled in a specified environment.	5	Excellent
3. A product or system can replace another specified software product for the same purpose in the same environment.	5	Excellent
Overall Weighted Mean	**4.93**	**Excellent**

Legend:
4.20 – 5.00 Excellent
3.40 – 4.19 Very Satisfactory
2.60 – 3.39 Satisfactory
1.80 – 2.59 Good
1.00 – 1.79 Fair

The portability of the system is presented in Table 8. The result shows that the system can perform the tasks required as indicated by the mean of 5.00 with a descriptive value of "excellent".

The overall mean of 5.00 with a descriptive value of "excellent" means that the system is portable when its adaptability, install ability, and replaceability are evaluated. This implies that the developed system meets the requirements as to how it handles error after failure.

CONCLUSION

The researcher concludes based on the results evaluated that the system will be a great help to the barangay because it makes a more efficient and effective manipulation of the barangay blotters and clearances compared to the manual system. It is also found out that the develop system is more reliable because it is more secured as regards to keeping of records. On the other hand, it will also make the operations in the barangay faster since it is a computer-based, thus, it minimizes time effort and energy.

RECOMMENDATIONS

It is then recommended that the developed system be utilized in the barangay to facilitate in the issuance of clearances and blotters to residents. Also, the barangay may consider of improving the computer systems in their office to maximize the use of the system.

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