

Alalay sa Impormasyon: Process-Documentation and Preliminary Assessment on Barangay San Juan ACCFAS' Data Management

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Abstract

Barangay data management systems in the Philippines have evolved to enhance governance and service delivery by streamlining processes, ensuring data accuracy, and improving communication. However, many barangays still struggle with inefficient, manual data management methods that compromise security, accessibility, and centralization. This study examines the implementation of a new data management system for Barangay San Juan ACCFA, a collaborative initiative between Manuel V. Gallego Foundation Colleges (MVGFC) and local stakeholders. The project aims to restore and digitize community records following the barangay's loss of access to a previous digital system, improving administrative efficiency and accuracy. Evaluation of the current system reveals significant deficiencies, with critical scores (1.00–1.50) across key quality dimensions, including functionality, usability, security, and performance. These shortcomings render the system ineffective and unsustainable, highlighting the need for a comprehensive overhaul. Despite delays caused by Typhoons Kristine and Pepito, addressing these deficiencies remains a priority to ensure long-term functionality and sustainability. Beyond improving local governance, this project serves as a practical learning platform for students, bridging academic theory with real-world application. Using the Community-Based Participatory Action Research (CBPAR) methodology, the initiative fosters community engagement, inclusivity, and empowerment. It also aligns with MVGFC's mission to produce competent, ethical, and socially responsible graduates. By restoring a reliable digital data management system, this collaboration strengthens barangay operations, enhances service delivery, and contributes to MVGFC's broader vision of sustainable community development and transformative governance.

Keywords: Barangay Data Management; Community-Based Participatory Action Research (CBPAR); Digital System Overhaul; Local Governance; Sustainable Development



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INTRODUCTION

The evolution of barangay data management systems in the Philippines reflects a significant shift toward enhancing local governance and improving community services. These systems are designed to streamline administrative processes, ensure data accuracy, and foster

seamless communication between barangays and their constituents. For instance, the Enhanced Barangay Information Management System incorporates features like residency certificate issuance, achieving a notable user satisfaction rating of 4.58, underscoring its effectiveness and user-friendliness (Cruz et al., 2023). By modernizing these systems,

barangays can better respond to the needs of their communities and ensure efficient and reliable service delivery.

Despite these advancements, many barangays continue to face significant challenges in data management. As populations grow, the lack of centralized systems compounds the difficulty of organizing and processing information. According to Jamis et al. (2022), barangays often rely on manual methods using tools like MS Word or Excel, which lack the security, centralization, and sharing capabilities of modern database systems. Without a robust digital solution, barangay records are vulnerable to mishandling, data loss, or corruption, posing risks to the integrity and accessibility of critical information. This highlights the pressing need for barangays to adopt secure and efficient technologies that can streamline operations and ensure data reliability.

Barangays, as the smallest administrative units in the Philippines, serve as the frontline of governance, tasked with maintaining order and delivering essential services (Altura et al., 2022). During the pandemic, barangays played a critical role in managing public demands, balancing caution with the need to deliver fast and efficient services (Lim, 2022). They are responsible for maintaining records on health, crime, and community demographics, which serve as vital inputs for national government programs and initiatives (Nasdirinov, 2013). The rise of e-government systems has further revolutionized public service delivery, enabling barangays to provide faster, more accessible, and transparent services (Tomas, 2023). As global trends in information technology continue to evolve, barangays must embrace these innovations to enhance their operational capabilities and contribute to sustainable local development (Villones, 2021).

In parallel, Higher Education Institutions (HEIs) play a crucial role in advancing the United Nations' 2030 Sustainable Development Goals (SDGs) by fostering education, community development, and sustainable practices. HEIs, however, face the challenge of addressing

systemic inequities while reaffirming critical thinking as a cornerstone of education. To navigate these complexities, HEIs must leverage sociocultural structures and build meaningful partnerships. One effective avenue is the implementation of Community Extension Services (CES), which have proven transformative in promoting social awareness, education, and student development. Research by Abiva et al. (2023) highlights CES programs as instrumental in cultivating active community engagement and enhancing academic institutions' societal impact.

A notable milestone in this endeavor is the Memorandum of Agreement (MOA) signed on April 12, 2024, between Manuel V. Gallego Foundation Colleges (MVGFC) and Barangay San Juan ACCFA. This partnership, initiated through community general assemblies organized by the MVGFC Community Extension and Outreach Program (CEOP), exemplifies the institution's commitment to community engagement and sustainable development. The MOA establishes a foundation for initiatives that prioritize sustainable solutions, aligning with MVGFC's 2024 PSG. These goals emphasize peace and order as prerequisites for community stability, economic prosperity, and social cohesion. Collaborative efforts, including partnerships with law enforcement and conflict resolution strategies, aim to create a secure and thriving environment for residents.

Barangay San Juan ACCFA previously utilized a digital data management system to streamline operations. However, due to unforeseen circumstances, the barangay lost access to the system and reverted to manual processes. This setback introduced operational inefficiencies and highlighted the urgent need for a reliable, modern solution. In response, MVGFC's Institute of Information and Communication Technology (IICT), in collaboration with the Management Information Systems (MIS) team, proposed the development and implementation of a new data management application tailored to the barangay's needs. This initiative aims to restore and digitize community records, enhance data accuracy, and improve administrative efficiency. By addressing these challenges, the project

seeks to empower local governance, streamline service delivery, and strengthen data management capabilities.

Beyond its technical goals, this initiative reflects MVGFCI's commitment to holistic education and societal development. The project provides a hands-on learning platform for students, bridging academic theory with practical application. Students will gain critical technical skills in system development, as well as essential soft skills like project management, problem-solving, and stakeholder collaboration. This experiential approach aligns with MVGFCI's mission to produce competent, ethical, and socially responsible graduates, while fostering quality instruction, research advancement, and community engagement.

The project seamlessly integrates with academic courses such as Web Enhanced Animation Graphics (ITE 415) and Web Based Application (ITE 413), ensuring alignment with the curriculum. Under the mentorship of Dr. Arnel Sevilla and John Carlo Azarcon, students Jaya Krissia Mae Donato, Jeffrey Marigmen, and Renzo Alberto will spearhead the programming and system development efforts. Set for implementation beginning July 1, 2024, the project will involve a multi-sectoral collaboration among stakeholders, including the MIS team, IICT, Student Society on Information Technology Education (SSITE), Gallegan Research and Extension Council (GREC), Office of Research and Development (ORD), Creatives Team, enrolled students, and the City Planning Development Office – Cabanatuan.

This collaborative initiative not only addresses the immediate data management needs of Barangay San Juan ACCFA but also reinforces MVGFCI's broader vision of fostering sustainable societal development. By restoring a reliable digital data management system, the barangay will regain an essential tool for governance, enabling efficient service delivery and informed decision-making. At the same time, MVGFCI faculty and students will exemplify the institution's values of academic excellence, ethical professionalism, and

community empowerment, setting a benchmark for sustainable, inclusive, and transformative development.

METHODOLOGY

This study employs the Input-Process-Output (IPO) framework within the parameters of the Community-Based Participatory Action Research (CBPAR) methodology, a dynamic and transformative approach that transcends conventional research paradigms by seamlessly integrating planning, implementation, and evaluation. CBPAR acts as a catalyst for collective action, fostering a profound understanding of the interplay between education, community extension, outreach programs, and broader societal transformation (Abiva et al., 2024a). By synergizing the Community Extension and Outreach Program (CEOP) framework with CBPAR principles, this study ensures active stakeholder participation, promoting inclusivity, empowerment, and meaningful engagement in development initiatives. The research findings underscore the critical role of community involvement in leveraging education as a driver of personal growth and sustainable societal progress (Abiva et al., 2024b). This study not only highlights the transformative impact of education and outreach but also reinforces the importance of participatory methodologies in fostering resilient and self-sustaining communities.

To comprehensively assess the current state of Barangay San Juan ACCFA's data management system, this study adopts the evaluation tool utilized in Joyce Erika S. Senaris' research, "Implementation of Barangay Management System: An Extension Service of CvSU-Tanza Campus" (2023), which employs the System's Functional Suitability Test. This tool provides a structured and reliable framework for evaluating the system's efficiency, effectiveness, and overall functionality within the barangay. Furthermore, it serves as a benchmark for identifying gaps and deficiencies, facilitating the development of targeted interventions that promote impact, relevance, and long-term sustainability. By

leveraging this evaluation method, the study ensures that its findings contribute to evidence-based decision-making and the creation of a robust, future-proof digital management system, ultimately achieving its intended objectives.

As part of the initial assessment, the MVGFC-IICT team, led by John Carlo Azarcon and Jaya Krissia Mae Donato, conducted a preliminary needs assessment on May 20, 2024, in Barangay San Juan ACCFA. Utilizing the System's Functional Suitability Test checklist, the team systematically identified key operational inefficiencies and areas for improvement, laying the groundwork for the development of an optimized and sustainable data management solution.

RESULTS AND DISCUSSION

The preliminary assessment results indicate that the current data management system performs poorly across all key quality dimensions, with each criterion receiving a score of 1 (1.00–1.50), highlighting significant deficiencies.

Table 1
System's Functional Suitability Test Checklist Results

| FUNCTIONALITY SUITABILITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|
| a) Functional Completeness | ✓ | | | | |
| b) Functional Correctness | ✓ | | | | |
| c) Functional Appropriateness | ✓ | | | | |
| USABILITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Appropriateness recognizability | ✓ | | | | |
| b) Learnability | ✓ | | | | |
| c) Operability | ✓ | | | | |
| d) User error protection | ✓ | | | | |
| e) User interface aesthetics | ✓ | | | | |
| f) Accessibility | ✓ | | | | |
| RELIABILITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Maturity | ✓ | | | | |
| b) Availability | ✓ | | | | |
| c) Fault Tolerance | ✓ | | | | |
| d) Recoverability | ✓ | | | | |
| SECURITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Confidentiality | ✓ | | | | |
| b) Integrity | ✓ | | | | |
| c) Non-repudiation | ✓ | | | | |
| d) Accountability | ✓ | | | | |
| e) Authenticity | ✓ | | | | |
| MAINTAINABILITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Modularity | ✓ | | | | |
| b) Reusability | ✓ | | | | |
| c) Analyzability | ✓ | | | | |
| d) Modifiability | ✓ | | | | |
| e) Testability | ✓ | | | | |
| PORTABILITY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Adaptability | ✓ | | | | |
| b) Installability | ✓ | | | | |
| c) Replaceability | ✓ | | | | |
| PERFORMANCE EFFICIENCY | 1.00-1.50 | 1.51-2.50 | 2.51-3.50 | 3.51-4.50 | 4.51-5.00 |
| a) Time behavior | ✓ | | | | |
| b) Resource utilization | ✓ | | | | |
| c) Capacity | ✓ | | | | |

In terms of functionality suitability, the system is found lacking in essential features, failing to meet user needs, and producing unreliable outputs. The existing functions are also deemed irrelevant or unsuitable for the intended tasks. Regarding usability, users struggle to identify if the system aligns with their goals, find it difficult to learn, and experience challenges operating it. The interface is visually unappealing, and accessibility for users with disabilities is inadequate.

When it comes to reliability, the system is unstable, unavailable when needed, and unable to handle faults or recover from failures. In terms of security, the system fails to protect sensitive data, maintain data integrity, and ensure accountability. There are also weaknesses in verifying user identities and preventing unauthorized actions.

For maintainability, the system lacks modularity, reusability, and ease of modification. Diagnosing issues and testing for quality are also difficult. In terms of portability, the system is not adaptable to different environments, difficult to install, and not easily replaceable. Finally, in performance efficiency, the system performs poorly in terms of response time, consumes resources inefficiently, and cannot handle workload demands effectively.

The evaluation reveals that the system is critically deficient, with a score of 1 across all categories. It fails to meet fundamental standards in functionality, usability, reliability, security, maintainability, portability, and performance efficiency, indicating that it is neither effective nor sustainable in its current state. Comprehensive redevelopment or significant improvements are necessary to address these shortcomings.

Budget Status. The project titled Alalay sa Impormasyon: Developing Barangay San Juan ACCFA's Central Database is being led by the Institute of Information and Communication Technology (IICT) as the principal investigator and implementing institution. It involves collaboration with several other institutions,

including the Management Information Systems (MIS), Student Society on Information Technology Education (SSITE), Gallegan Research and Extension Council (GREC), Office of Research and Development, Creatives Team, students with aligned courses, and the City Planning Development Office of Cabanatuan. The total project cost is P1,800.00.

The budget breakdown outlines various expense categories under Maintenance and Other Operating Expenses (MOOE). These include transportation for local travel, supplies and materials for project activities, and communication expenses, which are not specified. The budget also covers meals, venue, and accommodation expenses for participants in the project activities. Specifically, for three activities, a total of P1,800.00 is allocated for snacks, with the amount distributed among Barangay staff, MIS and IICT representatives, and IICT students. Additionally, provisions for personnel services are planned but restricted to staff with technical responsibilities, with honoraria for resource speakers included as needed. There are no expected costs for research, publication, or equipment at this stage.

Administrative costs, set at 5%, are also included, with the total project cost amounting to P1,800.00. The funds will be utilized to establish a central data management system for Barangay San Juan ACCFA, which will significantly enhance the efficiency and accuracy of its operations. Through this collaborative effort, IICT students will gain valuable technical experience, ensuring that the project meets its goals and supports the community's needs.

Challenges and Issues. The project encountered significant delays due to the impact of two major typhoons, Typhoon Kristine and Typhoon Pepito, which severely disrupted the planned schedule and hindered the team's ability to proceed with key activities on time. These natural disasters created a range of logistical challenges, including power outages, communication breakdowns, transportation difficulties, and limited access to essential

resources and facilities. These factors substantially impeded the progress of system development and hindered coordination between the project stakeholders.

As a result, critical stages of the project were delayed, including ongoing collaboration between IICT students, faculty supervisors, and barangay officials. Additionally, development and testing of the system were temporarily halted due to the adverse weather conditions. The disruption caused an inability to adhere to the original timeline, affecting the achievement of several key milestones. These setbacks significantly slowed the momentum of the project, pushing back expected completion dates and the overall progress.

Conclusion. The evaluation results unequivocally indicate that the system is critically deficient across all key quality dimensions, with a score of 1 (1.00–1.50) in each category. The system fails to meet basic functional, usability, reliability, security, maintainability, portability, and performance standards, rendering it ineffective and unsustainable in its current state. Its lack of essential features, poor usability, instability, security vulnerabilities, and inefficiency across various metrics highlight the urgent need for a comprehensive overhaul. To ensure the system meets the required standards and effectively serves its intended purpose, significant improvements or redevelopment are essential. Addressing these deficiencies will be crucial for enhancing the system's overall performance, user satisfaction, and long-term viability.

However, the project faced significant challenges due to the impact of two major typhoons, Typhoon Kristine and Typhoon Pepito. These natural disasters severely disrupted the planned schedule and hindered the team's ability to proceed with key activities on time. The logistical challenges, including power outages, communication breakdowns, transportation difficulties, and limited access to essential resources and facilities, created substantial delays. Critical stages of the project, such as ongoing collaboration between IICT students, faculty supervisors, and barangay officials,

were delayed. Additionally, the development and testing of the system were temporarily halted due to the adverse weather conditions. As a result, the project could not adhere to its original timeline, affecting the achievement of several key milestones. These setbacks significantly slowed the momentum of the project, pushing back expected completion dates and overall progress. Despite these challenges, addressing the system's deficiencies remains a priority to ensure its successful completion and future sustainability.

Recommendations. Based on the evaluation results and the challenges faced during the project, the following recommendations are proposed to address the system's deficiencies and ensure its successful completion:

1. Given the critical deficiencies in functionality, usability, reliability, security, maintainability, portability, and performance, a full system redesign is recommended. This overhaul should prioritize the inclusion of essential features, improved user interfaces, enhanced system stability, and robust security measures to meet the required standards.
2. To address the delays caused by external factors such as natural disasters, it is crucial to improve communication and collaboration among all stakeholders, including IICT students, faculty supervisors, and barangay officials. Establishing more reliable and flexible communication channels, such as cloud-based platforms, can help mitigate the impact of unforeseen disruptions.
3. The system's current inability to meet performance and security standards highlights the need for a more rigorous testing and quality assurance process. Implementing comprehensive testing phases, including stress testing, security audits, and user acceptance testing, will ensure that the system performs reliably under various conditions and meets user needs effectively.

4. Considering the impact of Typhoon Kristine and Typhoon Pepito, it is recommended to establish a robust disaster recovery and contingency plan for the project. This plan should include backup systems, alternative work arrangements, and predefined strategies to minimize the impact of unforeseen events on project timelines and progress.
5. Given the delays experienced during the project, it is essential to establish clear milestones and realistic timelines for the system's redevelopment. Regular progress reviews and adjustments to the timeline should be made to ensure that the project remains on track despite potential challenges.

By implementing these recommendations, the system can be significantly improved, ensuring that it meets the necessary quality standards and can fulfill its intended purpose effectively. Addressing these issues will also help mitigate future risks and ensure the system's long-term sustainability.

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