KAWÓ BANWA: DEVELOPMENT AND EVALUATION OF A BUDGET MONITORING INFORMATION SYSTEM FOR URBAN BARANGAYS IN SAN JOSE, OCCIDENTAL MINDORO

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ABSTRACT

The Philippine government's commitment to promoting transparent and accountable local governance led to the development of KAWÓ BANWA, a budget monitoring information system designed for urban barangays in San Jose, Occidental Mindoro. This system addresses misallocation and mismanagement of funds, often leading to delayed projects. It addresses challenges, including the need for capacity building among local government officials, limited transparency and accountability in budget processes, inadequate stakeholder engagement, and insufficient access to modern technology. KAWÓ BANWA provides a secure and user-friendly platform for streamlined budget tracking and management, utilizing Visual Basic 2022 and Microsoft Access. The researchers conducted compatibility testing to ensure adaptability to different operating environments, and an evaluation found the system to be highly effective. Implementing KAWÓ BANWA promises to improve transparency, accountability, and resource allocation to strengthen significantly local governance and public service delivery in San Jose, Occidental Mindoro.

Keywords: *budget monitoring information system, budget tracking, allocation and management, system application.*

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INTRODUCTION

In response to the persistent challenges in local governance and the misallocation of public funds in the Philippines, the government has initiated various programs to enhance transparency and accountability. One crucial strategy involves implementing an effective budget monitoring information system at the local level, as outlined by the Department of Interior and Local Government (DILG, 2022). Despite these efforts, issues such as mismanagement persist, prompting the need for further research and practical solutions.

In this context, a notable initiative emerges in the form of the KAWÓ BANWA (Key Audit and Well-Built Operation - A Budgetary Allocation Navigation for Widespread Accounting Transactions) system, specifically designed for urban barangays in San Jose, Occidental Mindoro. The proposed system aims to streamline budget monitoring and information management, addressing critical aspects like inputting national tax allotment, expenditure programs, project implementations, program of works, and generating various reports. The development of KAWÓ BANWA is rooted in a comprehensive assessment of current practices, ensuring relevance and effectiveness through feedback from barangay officials and stakeholders.

KAWÓ BANWA utilizes Visual Studio, MS Access, and Adobe Photoshop in its creation, highlighting the integration of technology for efficiency. The proposed system is expected to enhance accuracy, transparency, and accountability in budget monitoring for urban barangays. Through real-time information access, officials and stakeholders can make informed decisions, contributing to the broader government objective of promoting good governance and improving public service delivery at the local level.

The study's objectives encompass designing the automated budget monitoring system, developing KAWÓ BANWA, evaluating its capabilities through comprehensive testing, and assessing user feedback on functionality, usability, reliability, performance, and supportability. This systematic approach aligns with the government's overarching goal of establishing sustainable and effective budget monitoring and management systems in local government units.

METHODS AND MATERIALS

Project Design

The KAWÓ BANWA: Development of a Budget Monitoring Information System for Urban Barangays in San Jose, Occidental Mindoro is a database system that enables the municipal hall personnel who serve as administrators to monitor the in and out of the budget of every barangay easily. With this system, the User or the urban barangays will have a fast and easy way to record their finances (Figure 1).

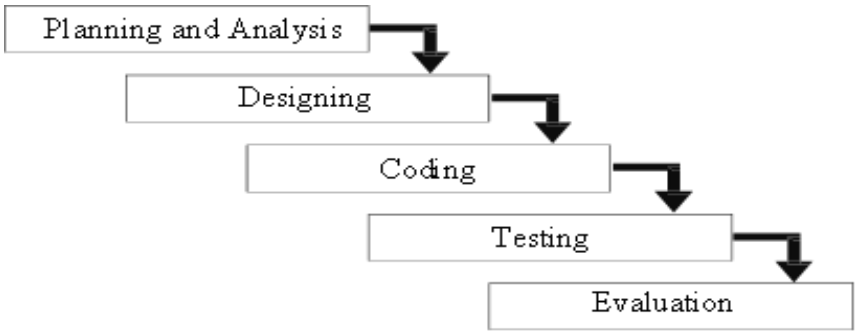

Figure 1. Flow diagram of the system.

Project Development

The software development life cycle waterfall model of KAWÓ BANWA was described below (Figure 2). First, the researchers conducted planning and analysis of what system they used and the system's scope and limitations. The researchers decided to design the KAWÓ BANWA, a budget monitoring information system that can help barangay to monitor their budgets. In coding, the researchers hired an Information Technology expert to create the system they designed. And lastly, the researchers conducted testing and dry runs before evaluating the system.

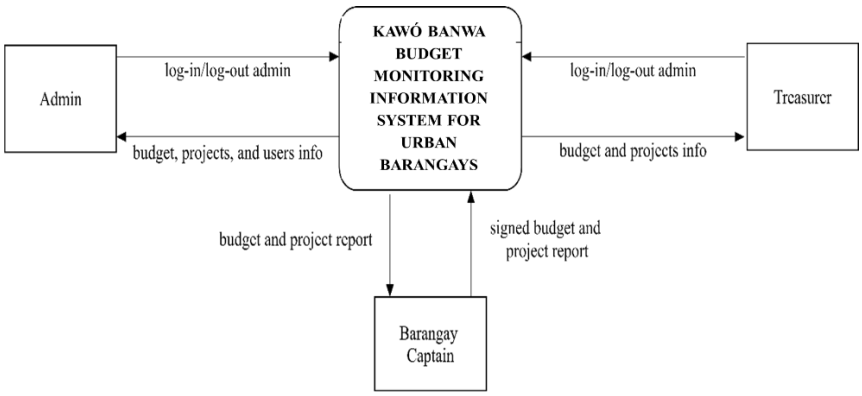

Figure 2. Waterfall Model.

Operation and Testing Procedure

The following are the procedures on how the system was operated and tested:

Operation procedure (admin)

The system's operation for administrators begins with the installation and initial sign-in, which displays the home page. Administrators can then select a page for monitoring, access user logs to review login, logout, and activity histories, and ensure system security by tracking interactions. To exit the system, administrators can either click the "Exit" button or log out, thereby securely closing their session.

Operation procedure (user)

Users start by installing the system and signing in, which brings up the home page. From there, they can select a page for editing or recording data. Users can interact directly

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with the budget rows table by double-clicking to input or modify data. When finished, users can log out or click the "Exit" button to close the system, ensuring their data is securely saved.

Testing procedures

The system was tested across multiple configurations to ensure compatibility and performance. It operates on both 32-bit and 64-bit versions of Windows 7, 8, and 10. The system's appearance was tested on screen sizes ranging from 12" to 21" to ensure a consistent user experience. Additionally, it was evaluated for performance on devices with varying memory capacities (1 GB, 2 GB, and 4 GB) and across different screen resolutions (800 x 600, 1024 x 768, and 1366 x 768) to confirm visual accessibility and functionality across a broad range of devices.

Evaluation procedure

The evaluation of the KAWÓ BANWA system involved several stages. Initially, a preliminary assessment was conducted by the developer to ensure that the system met the expected output and specifications. Following this, a project demonstration was held, where twenty-four barangay officials, three research experts, five IT experts, and four municipal hall personnel were invited to interact with the system. Their feedback was gathered to assess the system's performance and usability. In the final evaluation phase, a survey was distributed among these respondents, who rated the system based on specific criteria.

Table 1. Likert scale, description and range distribution.

SCALE	DESCRIPTION	RANGE
5	Excellent	4.51-5.00
4	Very Good	3.51-4.50
3	Good	2.51-3.50
2	Fair	1.51-2.50
1	Poor	1.00-1.50

RESULTS

Project Design

The design of the KAWÓ BANWA system includes several key pages, each serving distinct functions. The home page (Figure 3) provides an overview of essential financial data, such as the total available budget, total allocated budget, total budget used, and total project funds. It also includes a summary tally of ongoing and approved projects, offering users a comprehensive snapshot of the barangay's financial status immediately.

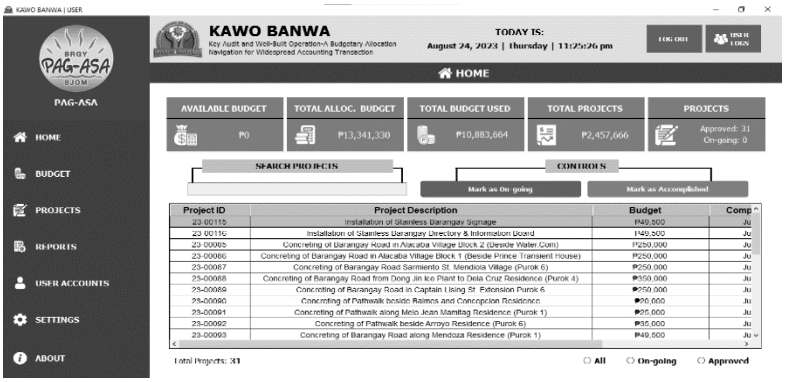

Figure 3. Home page.

The budget page (Figure 4) is more detailed, featuring a table that categorizes specific barangay expenditures. Additionally, this page includes a graph that tracks budget allocations from the current year and the three preceding years, allowing users to analyze trends in financial planning and execution. This visual representation aids in making informed decisions about future budget allocations.

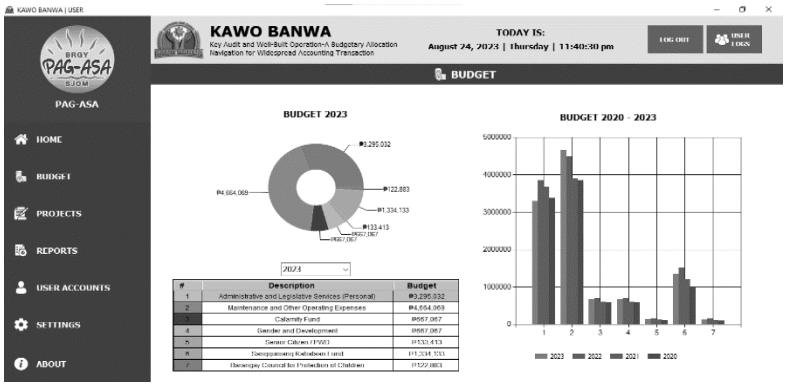

Figure 4. Budget page.

The project page (Figure 5) is organized into four sections, each corresponding to a quarter of the barangay's development fund. While administrators could monitor and print project details, users have more interactive capabilities, such as adding, editing, deleting, and printing project data. This division of functionality ensures that the system is both secure and user-friendly, providing different levels of access based on the user's role.

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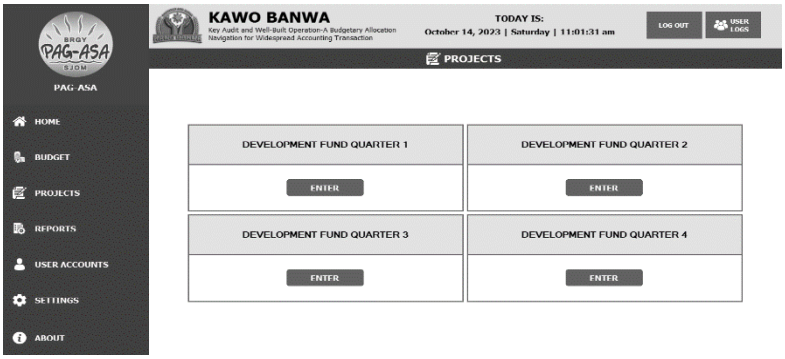

Figure 5. Project page.

The reports page (Figure 6) compiles all completed projects funded by the development funds, with options for both administrators and users to sort reports by year and print them. This feature is crucial for maintaining records and preparing documentation for audits or public dissemination.

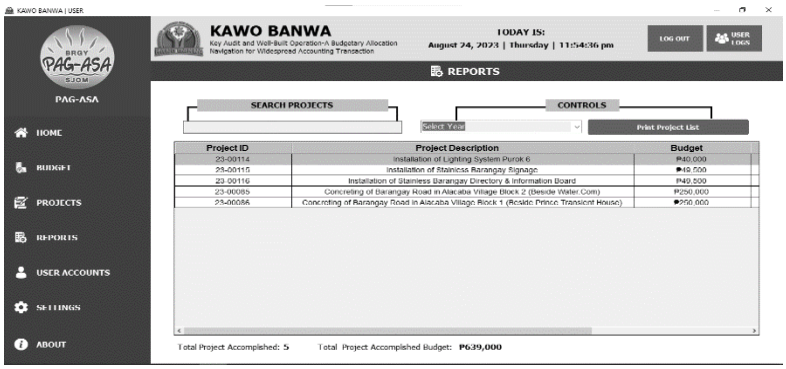

Figure 6. Reports page.

User account management is divided into two interfaces, as shown in Figures 7 and 8. The admin view (Figure 7) allows the administrator to manage user accounts by adding new users, deleting accounts, and clearing account details. In contrast, the User view (Figure 8) focuses on account settings, where users can modify their details by selecting the "Modify" option. This clear separation of roles helps maintain system security and user autonomy.

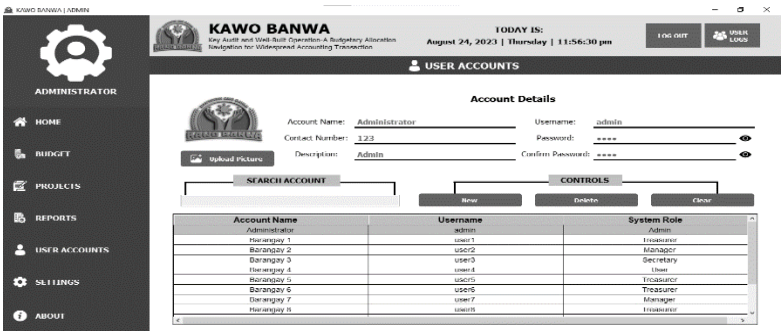

Figure 7. user accounts as admin

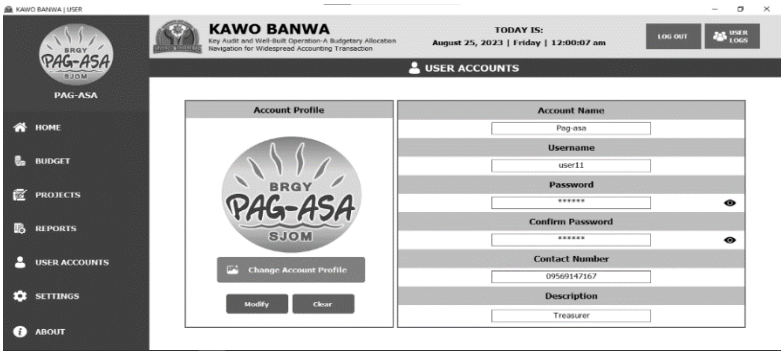

Figure 8. User account as user

The settings page (Figure 9) contains essential information about the barangay, providing a centralized location for administrative data. The About page (Figure 10) offers details about the system itself, introduces the developers, and includes a user manual, which guides users through the system's functionalities.

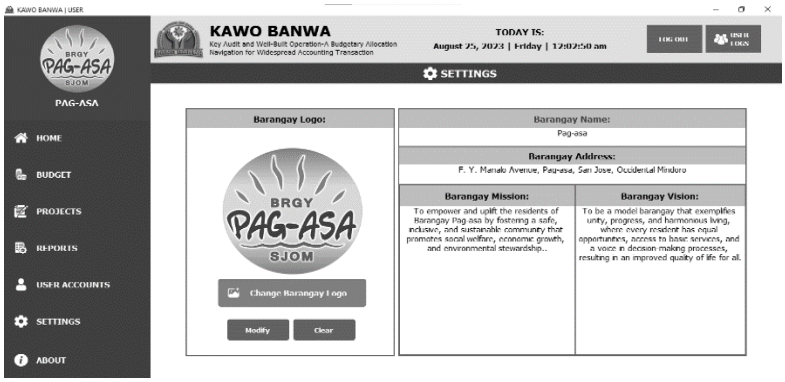

Figure. 8 Settings page

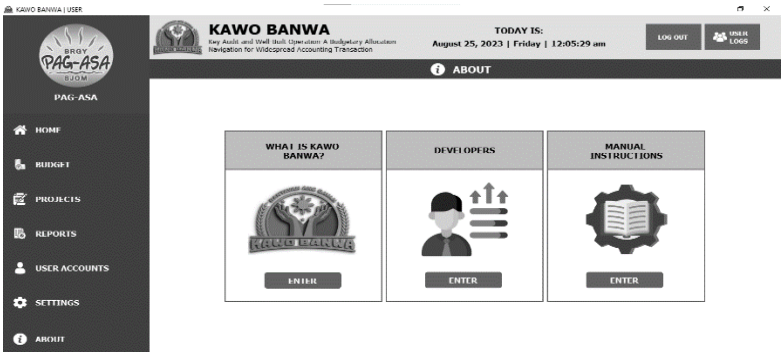

Figure 9. About page

Testing results for the system indicate that it performed successfully across various operating systems, including Windows 7, 8, and 10. The system was also tested on different monitor sizes, ranging from 12" to 21", and demonstrated compatibility across all sizes, displaying content correctly. Furthermore, the system functioned smoothly with varying memory capacities of 1 GB, 2 GB, and 4 GB, and maintained correct display across screen resolutions of

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800x600, 1024x768, and 1366x768. These results confirm the system's robustness and versatility, ensuring it meets the diverse needs of its users (Table 2).

Table 2. Test result of KAWÓ BANWA.

COMPUTER COMPONENTS	FINDINGS
Operating system	
Windows 7	Passed, the system functioned successfully.
Windows 8	Passed, the system functioned successfully.
Windows 10	Passed, the system functioned successfully.
Monitor size	
12" monitor	Passed, the system was compatible. Displayed the content correctly.
15.5" monitor	Passed, the system was compatible. Displayed the content correctly.
17" monitor	Passed, the system was compatible. Displayed the content correctly.
21" monitor	Passed, the system was compatible. Displayed the content correctly.
Memory capacity	
1 GB	Passed, the system run successfully.
2 GB	Passed, the system run successfully.
4 GB	Passed, the system run successfully.
Screen resolution	
800x600	The system was displayed correctly.
1024x768	The system was displayed correctly.
1366x768	The system was displayed correctly.

Project Evaluation

The functionality of the system (4.40 ±0.10) was assessed with a high level of operational effectiveness. Usability (4.56 ±0.17) demonstrated the system's user-friendly interface and ease of use. Reliability (4.35 ±0.12) indicated consistent and stable performance across various conditions. The system's performance (4.52 ±0.09) reflected its efficiency and responsiveness, while supportability (4.53 ±0.04) highlighted the ease of maintenance and the availability of technical support. Overall, the project achieved a grand mean score of (4.47 ±0.10), placing it within the "Very Good" category according to the evaluation criteria.

Table 3. Summary of evaluation results.

INDICATORS	MEAN	SD
Functionality	4.40	0.10
Usability	4.56	0.17
Reliability	4.35	.0.12
Performance	4.52	0.09
Supportability	4.53	0.04
Grand Mean	4.47	0.10

Legend: 1.00-1.50 Poor 1.51 – 2.50 Fair 2.51 – 3.50 Good 3.51 – 4.50 Very Good 4.51 – 5.00 Excellent

DISCUSSION

The KAWÓ BANWA system is designed as a budget monitoring information system specifically for urban barangays in San Jose, Occidental Mindoro. It facilitates efficient tracking of financial activities and was developed using web development tools such as Visual Basic 2022, Microsoft Access, and Adobe Photoshop. Operating offline, the system ensures accessibility even in areas with limited internet connectivity. Municipal hall personnel manage the system, while barangay officials use it for financial record-keeping.

An evaluation of the system, conducted with 36 randomly selected respondents including barangay officials, IT experts, and municipal hall personnel, assessed its functionality, usability, reliability, performance, and supportability. The results indicated strong performance and consistent user experiences (Paz & Pow-Sang, 2015). Usability was particularly well-regarded, with users finding the system intuitive and easy to use, suggesting a high level of satisfaction and potential for widespread adoption (Fink et al., 2023). Supportability was also positively evaluated, reflecting efficient access to assistance and increased user confidence in resolving issues (Blanc et al., 2024).

The system's performance was rated highly, with users satisfied with its speed, accuracy, and responsiveness, which are crucial for maintaining productivity (Fortier & Michel, 2003). Functionality was generally well-received, though there is room for enhancement to better meet user expectations (Fleischmann et al., 2016). Reliability, while slightly lower, was still commendable, indicating that the system performs consistently without failure (Breznická et al., 2023). Overall, the evaluation results underscore positive user perceptions and the system's effectiveness in budget monitoring for urban barangays. Further refinements could enhance functionality and user satisfaction, ensuring the continued success and relevance of the KAWÓ BANWA system.

Despite the positive outcomes of the KAWÓ BANWA system evaluation, several limitations should be noted. First, the study's sample size of 36 respondents, although diverse, may not fully represent the broader population of users across all urban barangays. This limited sample could affect the generalizability of the findings. Additionally, the study primarily focused on user feedback and did not include a longitudinal analysis of the system's performance over time. This lack of long-term evaluation may overlook potential issues that could arise with extended use. Another limitation is the system's offline operation, which, while beneficial in areas with limited internet access, may not fully address the needs of users in regions with reliable internet connectivity. Lastly, the study did not explore the impact of varying levels of technical expertise among users on their experience with the system. Future research could address these limitations by incorporating a larger and more diverse sample, conducting longitudinal studies, and exploring the implications of online functionality and user expertise on system performance.

CONCLUSION

The evaluation of the KAWÓ BANWA budget monitoring system produced positive outcomes, with an overall rating reflecting commendable excellence and validating its effectiveness in improving budget monitoring for urban barangays. The system's strengths and

user-driven recommendations highlight opportunities for targeted enhancements, such as transitioning to an online server. This change would align with user expectations for improved speed and accessibility, broadening KAWÓ BANWA's market application and increasing its usability. Nonetheless, the system's offline nature limits real-time updates and collaborative capabilities. Furthermore, access is restricted to authorized personnel within their respective cooperatives, which could hinder broader stakeholder engagement. Despite these limitations, KAWÓ BANWA remains a robust solution for transparent and efficient budget management, with ongoing user feedback and planned enhancements ensuring its continued success and relevance.

To address these limitations, it is recommended that future iterations of the system incorporate online capabilities to facilitate real-time updates and collaboration. Expanding access permissions to include a broader range of stakeholders could also enhance transparency and engagement. Furthermore, continuous user feedback should be integrated to guide ongoing refinements and ensure the system's sustained success and relevance. Despite these constraints, KAWÓ BANWA remains a robust solution for transparent and efficient budget management, with its potential for further development promising significant benefits.

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