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DESIGN AND DEVELOPMENT OF WEB-BASED DORMITORY MANAGEMENT SYSTEM FOR CAGAYAN STATE UNIVERSITY – APARRI

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ABSTRACT

Cagayan State University – Aparri has long relied on a manual dormitory management system, leading to recurring administrative problems such as delayed processing, record-keeping difficulties, and limited access to essential data. To address these challenges, this study developed a web-based dormitory management system aimed at streamlining processes such as student registration, room assignments, occupancy tracking, billing, and report generation. The system was designed to enhance operational efficiency, minimize errors, and offer real-time data access to administrators and residents alike.

A developmental-descriptive research design was employed, using the Agile methodology to guide the system's development. Respondents were the dormitory staff and student residents and selected through purposive sampling. Data were gathered through surveys, interviews, and usability testing. Findings showed that the system greatly improved workflow, reduced reliance on manual processes, and offered a more intuitive interface for users. With positive feedback from stakeholders, the system is recommended for full deployment at CSU-Aparri and considered scalable for implementation across other CSU campuses.

Keywords: Dormitory Management System, Web-Based Application, Student Housing, Information System, Record Management

INTRODUCTION

Student housing plays a crucial role in supporting academic success and personal development. At Cagayan State University (CSU) Aparri, while dormitories are provided to meet this need, students from diverse regions face challenges in accessing and availing dormitory services due to the current manual operations. This system creates communication gaps, inefficient resource use, and operational delays.

As universities increasingly adopt smart technologies, dormitory management has evolved with the integration of IoT and digital tools, offering improved communication, security, and administrative efficiency. However, CSU Aparri continues to rely on paper-based systems for tasks such as rent tracking, room assignments, and maintenance requests—an approach that has led to delays, redundancy, and frequent errors, as identified in previous studies and surveys.

Moreover, the lack of a centralized platform results in fragmented data, miscommunication, and limited administrative insights. This situation undermines effective dormitory management and resident satisfaction. Recognizing these issues, this study introduces the development of a **Web-Based Dormitory Management System** for CSU Aparri. The goal is to modernize dorm operations through digital tools that enable better communication, transparency, and data-driven decision-making.

Objectives of the Study

This study aims to design and implement a Web-Based Dormitory Management System for Cagayan State University-Aparri to improve

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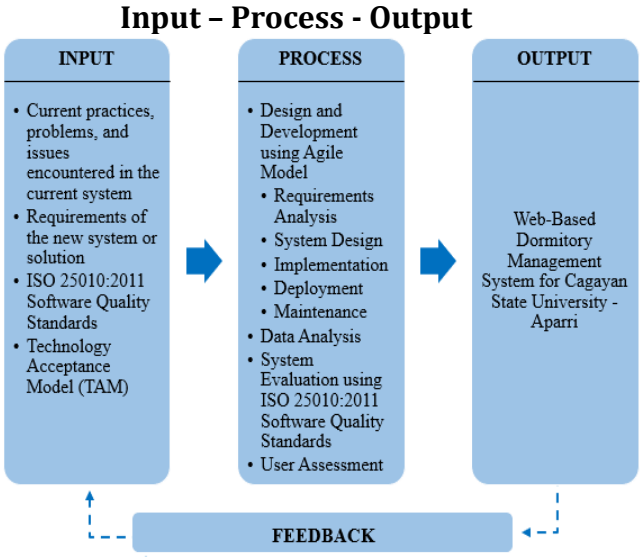
current operations. It begins by identifying existing practices, policies, and challenges within the manual dormitory system. The project then focuses on developing an application that addresses these issues to enhance efficiency and effectiveness. Once developed, the system will be evaluated by IT experts and end users based on the ISO 25010:2011 quality standards, including aspects such as functionality, reliability, usability, security, and maintainability. Additionally, user acceptance will be assessed using the Technology Acceptance Model (TAM), focusing on ease of use, perceived usefulness, and overall acceptance of the system.

Conceptual Framework of the Study

This study's conceptual framework illustrates the design and functioning of the Web-Based Dormitory Management System for Cagayan State University-Aparri, structured around the Input-Process-Output (IPO) model.

Figure 1. Input-Process-Output Diagram



The initial step involves gathering detailed information about the current dormitory operations and challenges faced by users and administrators. Key focus areas include student registration, billing, room assignments, communication, maintenance, rule enforcement, and student activities. Feedback from stakeholders is collected to define precise system requirements. The framework also incorporates quality standards from ISO 25010:2011 to guide development and uses the Technology Acceptance Model (TAM) to assess how users perceive the system's usefulness and ease of use.

With the inputs defined, the system is designed and developed following an Agile methodology that promotes iterative improvements based on ongoing user feedback. This phase includes needs analysis, system design, development, testing, deployment, and maintenance. Continuous involvement from both administrators and students ensures the system aligns with user expectations and quality standards.

The final phase delivers the fully functional dormitory management system. This output reflects the needs identified earlier and provides an efficient digital platform for managing dormitory operations, ready to improve workflow and user experience.

This study is significant for its potential to improve the management of university accommodations across multiple levels. For university administrators, the system provides valuable data on dorm occupancy and usage, enabling better resource allocation, maintenance planning, and facility upgrades. Dormitory administrators benefit by automating routine tasks, improving issue reporting, securing important records, and efficiently managing resident information. The university as a whole can use student feedback collected through the system to foster a stronger, more engaged dormitory community. Occupants gain a convenient platform to address concerns promptly, monitor their financial status, and stay informed about announcements, policies, and events. Finally, the study offers a foundation for future research, encouraging exploration of advanced technologies such as artificial intelligence and data analytics to further enhance dormitory management systems.

The Web-Based Dormitory Management System was developed to provide a comprehensive and efficient solution for managing university housing. Its key features

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include online student registration, enabling the submission of necessary details and accommodation preferences. The system manages room assignments by considering availability and student choices. It also automates billing processes by generating monthly and yearly payment statements. Additionally, the system produces detailed reports on occupant information, payment tracking, and inventory for supplies and equipment. A centralized communication platform is integrated to facilitate smooth interaction among dormitory administrators, staff, and residents, supporting announcements, event notifications, and feedback collection.

While the Web-Based Dormitory Management System aims to resolve many management challenges, certain limitations remain. The system only includes occupants' personal information and depends heavily on a stable internet connection, meaning disruptions can affect its performance. Additionally, power outages and network failures may interrupt functionality. Effective use of the system may require training for staff and administrators to ensure proficiency. Lastly, ongoing maintenance is essential to manage software updates, security enhancements, and fix any bugs that may arise.

METHODOLOGY

This study employed a descriptive and developmental research design within the framework of the Agile Model. The descriptive component involved evaluating existing dormitory management practices, policies, and challenges at CSU Aparri. It also included assessing the newly developed Web-Based Dormitory Management System using ISO 25010:2011 quality standards and the Technology Acceptance Model (TAM).

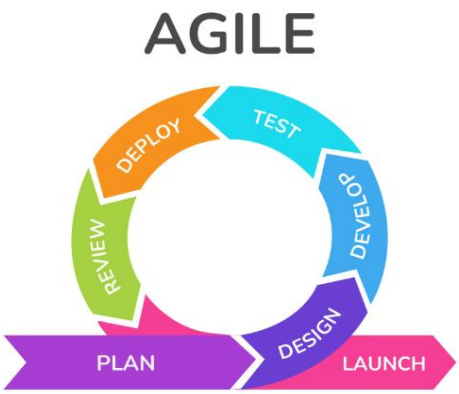

Figure 2. Agile Model

The system was developed using the Agile methodology, which structured the process into seven iterative and flexible stages. In the planning phase, the researcher defined objectives, identified key users and stakeholders, and collected requirements to establish a clear project scope. During the design phase, system architecture, database structures, and interface layouts were created, with a focus on user accessibility, scalability, and data security. The development phase involved translating these designs into a functional application, using short development cycles to allow for continuous improvements based on stakeholder input. In the testing phase, the system was subjected to unit testing, integration checks, and user acceptance testing to ensure it met performance and reliability standards. Once verified, the deployment phase introduced the platform into a live environment, with careful implementation to minimize service disruption. The review phase gathered user experiences and monitored system behavior to detect potential enhancements. Finally, the launch phase marked the formal system release, with user orientation and support initiatives designed to encourage long-term adoption and usability.

SUMMARY OF FINDINGS

This research examined the challenges of the existing manual dormitory management process at Cagayan State University–Aparri and responded by creating a web-based system designed to streamline operations. The traditional approach showed clear weaknesses in handling student registration, room allocation, billing procedures, and communication within the dormitory community. To address these concerns, a digital platform was proposed to simplify

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tasks and enhance overall management for both staff and student residents.

The newly developed system was assessed by IT experts following the ISO 25010:2011 criteria. The evaluation yielded an overall mean of **4.50**, reflecting strong performance across all evaluated areas. Among the standout features were **usability (4.63)**, **system stability (4.60)**, and **security (4.60)**, all indicating that the platform functions smoothly, securely, and is user-friendly.

Students also shared their insights through the lens of the Technology Acceptance Model (TAM). Their responses indicated strong approval, with an average rating of **4.37**. The system's ease of use scored highest at **4.48**, while its perceived usefulness in managing daily dorm activities received **4.39**. Users also expressed confidence in their ability to operate the system (**4.31**) and demonstrated a high level of willingness to continue using it (**4.30**).

Overall, these findings demonstrate that the system effectively improves the efficiency, accuracy, and quality of dormitory management at CSU–Aparri and has strong potential for long-term adoption.

Table 1. Level of Acceptability Among Users Based on the Technology Acceptance Model (TAM)

Dimension	**Mean Score**	**Interpretation**
Perceived Ease of Use	4.48	Excellent
Perceived Usefulness	4.39	Very Satisfactory
Self-Efficacy	4.34	Excellent
Response Efficacy	4.49	Very Satisfactory
Adoption Intentions	4.39	Very Satisfactory
Overall Mean	**4.45**	**Very Satisfactory**

The IT experts evaluated the Web-Based Dormitory Management System very positively, as reflected in an overall mean score of 4.50, indicating a very high level of performance across all criteria. The system scored particularly well in usability (4.63), performance stability (4.60), and security (4.60), demonstrating excellent user experience, reliability, and safety. Other key areas such as reliability (4.57), functionality suitability (4.47), portability (4.40), compatibility (4.40), and maintainability (4.37) also received very high ratings, showcasing the system's strong flexibility and robustness.

Table 1. ISO 25010 Software Quality Evaluation (IT Experts)

Criteria	**Mean**	**nterpretation**
Functionality Suitability	4.47	Satisfactory – Core functions are met, though further feature refinement is recommended.
Performance Stability	4.60	Satisfactory – The system performs reliably but could benefit from optimization.
Compatibility	4.40	Satisfactory – Integrates acceptably with other systems.
Usability	4.63	Satisfactory – Generally easy to use, with minor user interface improvements suggested.
Reliability	4.57	Satisfactory – Consistently operates well under normal conditions.
Security	4.60	Satisfactory – Meets standards but still has room for technical enhancement.
Maintainability	4.37	Very Satisfactory – The system is easily updatable and testable.
Portability	4.40	Very Satisfactory – The system can be used across different platforms.
Overall Mean	**4.50**	**Very Satisfactory- meeting established standards while still allowing room for technical improvements**

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CONCLUSION

The developed Web-Based Dormitory Management System for Cagayan State University–Aparri successfully streamline operations, reduce manual workload, and improve the accuracy and efficiency of dormitory-related processes in accordance to ISO 25010:2011 standards. It is a viable solution for better implementation of dormitory policies, and establishing a stakeholder – oriented dormitory management system.

RECOMMENDATION

It is recommended that Cagayan State University–Aparri fully adopt and implement the Web-Based Dormitory Management System across all dormitory operations in order to replace existing paper-based processes, considering the findings and outcomes that are in line with the stated objectives. Administrative staff and student users ought to get continuous training and orientation to ensure proper utilization and maximize the functionality of the system. It strongly suggests that the institution maintain operational efficiency by regularly examining and updating its dorm management regulations in accordance with the system's capabilities. Regular assessments of the system utilizing ISO 25010:2011 standards and end-user input based on the Technology Acceptance Model (TAM) are necessary to ensure its continued effectiveness. Overall, the institution should continue to promote digital transformation activities that enhance operational management and service delivery. Additional features can be added based on user feedback and emerging technological advancements.

References

Al-khayyat, A. T. (2023). Web-based Management System for the Dormitory of University Students. *MINAR International Journal of Applied Science and Technology*.

Brown, J., & Garcia, M. (2017). Web-Based Dormitory Management Systems in Higher Education: Evolution and Effectiveness. *International Journal of Information Management*, 512-525.

Brown, S., & Wilson, J. (2018). Creating Inclusive Dormitory Environment: A Study of Accessibility Features in US Universities. *Journal of College and University Student Housing*.

Chen, X., & Li, Y. (2020). Impact of Web-Based Dormitory Management Systems on Student Satisfaction and Administrative Efficiency: Evidence from Chinese Universities. *Journal of Educational Technology & Society*, 102-115.

Choi, J., Kim, H., & Lee, S. (2021). Utilizing Online Platforms for Community Building in International Student Dorms. *International Journal of Intercultural Education*.

Cruz, J. R., & Ramirez, M. S. (2018). Web-Based Dormitory Management System: Enhancing Dormitory Services in Philippine Universities. *Journal of Computer Applications*, 32-45.

Farkase, S., Kalbande, M., Sarkar, S., & Verma, P. (2023). *Design and Development of Smart House Rental Management System.* IEEE.

Fernandez, S. M. (2022). Dormitory Management Information System with SMS Notification and Biometric Security. *Indian Journal of Science and Technology*.

Garcia, L. M., & Reyes, R. T. (2019). Challenges and Opportunities of Web-Based Dormitory Management Systems in Philippine Universities. *International Journal of Information Management*, 112-125.

Gu, J., Hu, Y., Lu, Y., & Zhang, X. (2011). University Dormitory Management System Based on Agile Development Architecture. *IEEExplore*.

Gupta, R., Soni, S., & Dalal, U. (2017). Dormitory Management System Using Android App. *7th International Conference on Cloud Computing, Data*

ISSN 3028-1687
Page No. 114-120

Science & Engineering - Confluence. IEEE.

Jia, Z., Shi, H., Wu, C., Xie, W., Yang, S., Zhang, Y., & Zhao, S. (2019). Smart Dormitory: A Model of IoT Application in University. *IEEE SmartWorld, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovation.* IEEE.

Jones, B., & Lee, S. (2020). Web-Based Dormitory Management Systems in Asian Universities: A Comparative Analysis. *International Journal of Educational Technology in Higher Education*, 112-125.

Kim, S., & Park, H. (2019). Meta-Analysis of Web-Based Dormitory Management Systems in Higher Education: Benefits, Challenges, and Future Directions. *Educational Technology Research and Development*, 257-273.

Lee, Y., & Kim, J. (2018). Designing shared living spaces in university dorms: A comparative study of Australian and European universities. *Journal of College and University Student Housing*.

Leona, R. F., Espiritu, B. P., Guiling, J. L., Manantan, K. K., Nelmida, C. J., Olipas, C. N., & Puzon, J. M. (2023). Development and Assessment of AppStay: A Web-Based Room, Dorm and Apartment Reservation System. *ResearchGate*.

Lim, K. S., & Santos, A. B. (2019). Legal and Regulatory Considerations in Web-Based Dormitory Management Systems: Implications for Philippine Higher Education Institutions. *Philippine Law Journal*, 78-91.

Lopez, E. S., & Cruz, M. D. (2016). Impact of Web-Based Dormitory Management Systems on Student Retention and Satisfaction in Philippine Higher Education Institutions. *Journal of Student Affairs*, 56-58.

Martinez, J. P., & Fernandez, S. T. (2019). Smart Technologies Integration in Web-Based Dormitory Management Systems: A Case Study in Philippine Universities. *International Journal of Smart Home*, 45-58.

Meyer, H., Schmidt, L., & Muller, P. (2020). Green Dorms: Implementing Sustainable Practices in Europian University Housing.

Patel, V., Smith, K., & Johnson, R. (2022). Implementing smart dormitory management systems: A survey of North American universities. *Facilities*.

Putra, J., & Putra, Y. H. (2020). Innovation Development of Web-Based Dormitory Information System at Boarding School SMA Terpadu Krida Nusantara.

Rodriguez, M., & Martinez, J. (2018). Enhancing Safety and Security in European University Dormitories through Web-Based Management Systems: A Comparative Analysis. *International Journal of Security and Networks*, 87-102.

Santos, A. B., & et. (2020). Implementing a Web-Based Dormitory Management System in Philippine Universities. *Philippine Journal of Information Technology*, 45-58.

Santos, M., & Reyes, L. (2019). The Role of Web-Based Systems in University Dormitory Management: Addressing Administrative Challenges in the Philippines. *Philippine Journal of Educational Technology*, 45-58.

Smith, A. e. (2019). Enhancing Student Dormitory Experience through Web-Based Management Systems: A Comparative Study. *Journal of Higher Education Management*, 45-60.

Student Council, C. A. (2023). *Dorm Life Survey Report.* Unpublished.

Tan, R. C., & Reyes, R. T. (112-125.). Promoting Inclusivity through Web-Based Dormitory Management Systems: Supporting Students with Disabilities in Philippine Higher Education Institutions. *2019*, Journal of Diversity in Higher Education.

Tanaka, Y., & Yoshida, S. (2020). Enhancing student wellbeing through AI-powered dormitory management in Japan.

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International Journal of Educational Technology in Higher Education.

Torres, F. D., & Dela Cruz, J. M. (2017). Training Strategies for Web-Based Dormitory Management Systems in Philippine Universities. *Journal of Educational Technology*, 78-91.

Wei, W., & Chen, L. (2019). A Survey of College Student Dormitory Lifestyle and Related Management Strategies. *Asian Education Studies*, 1-10. doi:10.20849/aes.v4i1.567

Yang, Z., & Huang, X. (2021). Application of Web-based Dormitory Management System inUniversity Dormitory Management. *Journal of Physics: Conference Series*.