

General Services Office (GSO) Maintenance Management System

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Abstract— This study developed and evaluated a web-based Maintenance Management System for the General Services Office of Northern Iloilo State University (NISU) – Batad Campus to improve campus maintenance efficiency. The system streamlines task scheduling, assignment, and monitoring, enables real-time request tracking, and enhances communication between requesters and management. Replacing manual processes with a digital platform, it promotes efficiency, transparency, and accountability. Evaluation using ISO/IEC 25010:2011 standards rated the system Very Highly Effective, with high scores in Functional Suitability (4.60), Performance Efficiency (4.49), and Reliability (4.49), and improvements in request processing (4.70), tracking (4.55), and communication (4.64), achieving an overall grand mean of 4.53. Built with HTML, CSS, PHP, and MySQL using the Rapid Application Development model, the system offers a scalable, user-friendly solution for campus maintenance management.

Keywords— General Services Office (GSO), GSO Personnel, Maintenance Management System, ISO/IEC 25010:2011

I. INTRODUCTION

The General Services Office (GSO) of Northern Iloilo State University, particularly at Northern Iloilo State University Batad Campus, serves as a vital administrative support unit that ensures the efficient operation and maintenance of university facilities and services. It is responsible for managing campus infrastructure, overseeing repair and maintenance activities, facilitating procurement and supply requests, maintaining asset and facility records, and coordinating general support services. As a central service hub, the GSO connects faculty, staff, students, and administrators, ensuring that classrooms, laboratories, offices, and other facilities remain safe, functional, and conducive to learning and productivity.

Despite its crucial role, the GSO faces challenges such as inefficient manual processes, limited technological integration, staffing constraints, and communication gaps with other departments. These issues can lead to delays, misunderstandings, and reduced service quality, ultimately affecting institutional performance. To overcome these concerns, the implementation of a well-designed GSO system is essential. By streamlining workflows, enhancing communication, and integrating digital solutions, such a system promotes accuracy, transparency, and timely service delivery. Ultimately, strengthening the GSO through technological support improves operational efficiency, supports informed decision-making, and contributes to the university's overall effectiveness and achievement of its goals.

1.1 Statement of the Problem

The General Services Office (GSO) faces challenges in effectively managing maintenance across multiple departments, resulting in delayed scheduling, poor communication, and limited real-time visibility into maintenance progress.

The following statements outline the problems to be addressed:

1. How can the system help the administrator effectively manage scheduling, assigning, and tracking maintenance tasks by guaranteeing quick response times and stable performance under different workloads in the following areas:
 - Functional Suitability
 - Performance Efficiency
 - Reliability
2. How can the administrator streamline the submission of maintenance requests that feature accessibility for all users?
3. How can the system ensure effective tracking and reporting of the status and progress of ongoing maintenance jobs with a high level of usability?
4. How does the system support and guarantee effective, dependable, and user-friendly communication between the maintenance requester and management?

1.2 Scope and Limitation

This study proposes the development of an online General Services Office (GSO) Maintenance Management System for Northern Iloilo State University Batad Campus. The system enables faculty members, Contract of Service (COS) personnel, and staff to submit maintenance requests electronically through a centralized platform. It allows the GSO administrator to review, approve, assign, and monitor work orders, while maintenance personnel can update task progress, respond promptly to reported issues, and generate daily accomplishment reports. Designed to be accessible via desktop and mobile devices with internet connectivity, the platform enhances real-time coordination, improves response time, and strengthens communication within the maintenance team and campus stakeholders.

However, the scope of the study is limited exclusively to maintenance operations. It does not include other GSO functions such as inventory management, budgeting, procurement, or transportation services. The system is intended solely for internal implementation at NISU Batad Campus and is not designed for external institutional adoption. Furthermore, integration with third-party systems, external platforms, or standalone mobile applications is beyond the scope of this project.

1.3 Conceptual Framework



Figure 1. Conceptual Framework of General Services Offices (GSO) Maintenance Management System

The conceptual framework of the General Services Office (GSO) Maintenance Management System for Northern Iloilo State University Batad Campus is based on the Input–Process–Output (IPO) model and evaluated using ISO/IEC 25010:2011 software quality standards, illustrating how essential data are transformed into meaningful outputs that enhance campus maintenance efficiency and effectiveness. The input component includes key documents and information such as work order forms, service requests, accomplishment reports, staff information for task assignment, and system-generated notifications, which form the foundation for organizing and managing maintenance tasks. The process component focuses on how the system handles these inputs according to ISO 25010 quality characteristics—Functional Suitability, Performance Efficiency, Reliability, and Usability—ensuring accurate task execution, stable performance, consistent availability, and user-friendly interaction for faculty, staff, and administrators. The output highlights improved maintenance operations through timely task completion, real-time status updates, and organized digital records for monitoring and reporting. Overall, the framework demonstrates how the system transforms raw data into actionable results, providing faster, transparent, and data-driven maintenance services across the campus.

1.4 Significance of the Study

This study is significant in promoting the proper maintenance and continuous improvement of facilities at Northern Iloilo State University Batad Campus, benefiting various stakeholders within the academic community.

For faculty and staff, the system enables faster reporting and resolution of maintenance concerns such as electrical faults, damaged furniture, and installation issues. With real-time status updates and easier monitoring, they can focus more on teaching and administrative responsibilities with minimal disruption. For university administration and management, the system provides accurate records, consolidated reports, and reliable data that support informed decision-making, budget allocation for repairs, and long-term facility planning, while also strengthening accountability and transparency.

GSO personnel benefit from improved organization of work orders, efficient task tracking, and simplified preparation of accomplishment reports, enhancing overall productivity and service quality. Additionally, this study serves as a valuable reference for future researchers by offering data and insights that can support further studies on campus maintenance systems, sustainability practices, cost-effective facility management, and infrastructure development. Overall, the project contributes to a more efficient, responsive, and data-driven maintenance environment within the university.

II. LITERATURE REVIEW

The growing complexity of institutional operations highlights the need for efficient maintenance management systems, especially in educational institutions where facilities affect productivity, safety, and learning. Traditional manual processes, such as paper-based work orders and fragmented communication, often cause inefficiencies and delays. Studies show that web-based maintenance systems improve workflow, communication, and data management through real-time tracking, automated task assignment, and centralized record-keeping. By promoting transparency, accountability, and adherence to ISO/IEC 25010 standards, such systems enhance operational efficiency and decision-making. This literature provides a foundation for

developing a web-based GSO Maintenance Management System to improve service delivery at NISU Batad Campus.

2.1 Effect of Using Building Maintenance Information Management System in Maintenance Process in the Ministry of Education (2020)

According to Twana Abdullah Hussein, educational buildings and schools are critical community facilities, and any issues with these structures directly affect the learning process. In Kurdistan, about 60% of schools require maintenance and renovation, highlighting the need for effective management of building information. To address this, a web-based Building Maintenance Information Management System (BMIMS) was developed to record, store, manage, and share data among technical staff at the Ministry of Education. A survey of technical staff revealed that BMIMS improved information management, communication, and cost efficiency, increasing collaboration and productivity while reducing lost data, rework, administrative costs, and time delays. The system also enhanced data gathering, decision-making for design and construction, knowledge transfer, and technical skills of staff. Key factors for successful implementation included staff training, proper IT infrastructure, and managerial support.

This study is relevant to the proposed General Services Office (GSO) Maintenance Management System at Northern Iloilo State University Batad Campus because it demonstrates how a web-based platform can effectively organize and manage maintenance operations. Similar to BMIMS, the proposed system aims to streamline maintenance requests, improve communication among staff, reduce costs, and support informed decision-making. Both cases show that digital maintenance management solutions can address challenges caused by outdated or incomplete information, leading to improved productivity, collaboration, and overall service quality.

2.2 Analysis of the Current Maintenance Management Process in School Buildings: Study Area of Primorje-Gorski Kotar County, Republic of Croatia (2022)

According to Ksenija Tijanić Štrok, education is a fundamental driver of human development, fostering cognitive abilities, a healthy mindset, and overall personal growth (Sharma, 2020). Beyond individual development, education directly contributes to societal advancement, influencing economic, social, and political growth (Tijanić Štrok, 2021). The quality of education, however, is closely linked to the condition of the physical facilities where learning takes place (Xaba, 2012; Yong & Silleman, 2015; Teixeira et al., 2017). Ensuring that school buildings are functional, safe, and conducive to learning requires continuous and systematic maintenance practices.

Building maintenance encompasses all activities undertaken to preserve, protect, and enhance the performance of facilities throughout their lifecycle, adhering to established standards. Maintenance management, as part of Facility Management (FM), involves defining strategies, assigning responsibilities, and implementing procedures through planning, organizing, directing, and controlling maintenance activities (Tijanić Štrok, 2021). This research is relevant to the development of a General Services Office (GSO) Maintenance Management System because it underscores the importance of structured and continuous maintenance practices. By facilitating efficient planning, task tracking, and resource management, a well-designed system ensures that institutional facilities remain safe, functional, and capable of supporting quality educational services.

2.3 Management for Maintenance of Public Education (2021)

According to Franciele Maria Costa Ferreira, public education buildings require systematic plans for the conservation and maintenance of their facilities and systems. In practice, managing maintenance in federal universities in Minas Gerais, Brazil, faces significant challenges, including insufficient financial resources, unqualified or limited workforce, lack of dedicated information technology systems, absence of structured maintenance programs, inadequate technical support for inspections and reporting, and insufficient care for structural elements such as steel constructions. To address these issues, the study conducted an exploratory case study of 11 public educational institutions and proposed practical guidelines for improving maintenance quality, including comprehensive knowledge of the facilities, implementation of management software, and structured maintenance programs that can be adapted and replicated across similar institutions.

This study is relevant to the development of a General Services Office (GSO) Maintenance Management System, as it highlights the operational challenges commonly faced by GSOs in public educational institutions. Issues such as limited planning, inadequate staffing, and lack of IT support directly affect maintenance efficiency and service delivery. By applying the recommended strategies—such as using digital tools for work order management, tracking maintenance activities, and implementing organized maintenance schedules—our research can enhance the GSO's ability to maintain facilities effectively. These practices provide valuable insights for improving operational efficiency, accountability, and overall service quality within the GSO framework at Northern Iloilo State University Batad Campus.

2.4 Maintenance of Office Facilities at the Makassar City Public Works Service (2022)

According to Haedar Akib et al., maintenance of office facilities is a critical activity that ensures equipment and infrastructure remain operational, allowing organizational processes to run smoothly and produce intended results. In their study on the Makassar City Public Works Department, a qualitative descriptive design was used with seven informants, employing observations, interviews, and documentation to collect data. The analysis revealed that maintenance activities in the office were carried out through routine, periodic, emergency, and preventive approaches, demonstrating that the facilities were adequately maintained to support productivity and competitiveness. The study concluded that the department's structured maintenance practices effectively sustained operational efficiency and service delivery.

This research is directly relevant to the proposed General Services Office (GSO) Maintenance Management System, as it emphasizes the importance of planned and organized maintenance for institutional facilities. Like the Makassar study, our system aims to implement structured processes for routine, periodic, emergency, and preventive maintenance to ensure continuous functionality and efficiency. The findings highlight the necessity of reliable information, systematic task tracking, and effective monitoring, all of which align with the goal of developing a web-based system that supports, streamlines, and enhances the overall maintenance management operations of the GSO at Northern Iloilo State University Batad Campus.

III. METHODOLOGY

3.1 Research Design

This study employed a developmental-descriptive research design to evaluate the impact of the General Services Office (GSO) Maintenance Management System at Northern Iloilo State University Batad Campus. The developmental-descriptive approach focuses on observing, describing, and documenting real-world situations as they naturally occur without manipulating variables. This design is well-suited for the study as it allows researchers to assess the system's effectiveness, efficiency, performance, and user satisfaction based on actual experiences and interactions. By capturing authentic user feedback and operational outcomes, this approach provides a comprehensive understanding of how the GSO Maintenance Management System functions in practice and its impact on campus maintenance operations.

3.2 Respondent and Sampling Techniques

To ensure the relevance and accuracy of data, the study employed a purposive random sampling method, selecting participants based on their direct involvement with the GSO maintenance process, such as faculty, staff, and COS personnel, while incorporating randomization to minimize bias. This approach ensures that the sample reflects individuals who interact closely with the GSO Maintenance Management System, enhancing the reliability and applicability of the findings.

A total of 88 respondents from Northern Iloilo State University Batad Campus participated in the study, representing a diverse group of faculty, staff, and COS personnel from various demographic backgrounds. Their direct engagement with the maintenance system provided valuable insights into its effectiveness, efficiency, and overall impact on campus operations.

3.3 Research Instrument

This study used a structured questionnaire to collect data for developing and evaluating the General Services Office Maintenance Management System at Northern Iloilo State University – Batad Campus. Designed based on the ISO/IEC 25010:2011 software quality model, the questionnaire assessed system quality through user feedback. It consisted of two parts: the first gathered demographic information (e.g., role, name, department), and the second evaluated the system's effectiveness across key ISO 25010:2011 quality dimensions.

3.4 Software Development Methodology

The researchers propose to use the Rapid Application Development (RAD) Model as the Software Development Life Cycle (SDLC) for the development of the General Services Office (GSO) Maintenance Management System.



Figure 2. Rapid Application Development Model of General Services Offices (GSO) Maintenance Management System

Requirements Planning Phase: Researchers interviewed GSO staff and administrators at NISU Batad Campus and observed the manual maintenance workflow to identify issues like delayed approvals, limited tracking, and communication gaps. Functional (e.g., request submission, task assignment, real-time updates) and non-functional requirements (e.g., usability, responsiveness, mobile access) were defined, and the system's scope, timeline, and resources were finalized.

User Design Phase: Requirements were translated into interface mockups and system workflows, including screens for submitting requests, assigning tasks, updating statuses, and generating reports. Staff and faculty feedback ensured an intuitive and practical design.

Construction Phase: Developers built the system using HTML, CSS, PHP, and MySQL, coding front-end and back-end components, while testing each module for proper functionality and integration.

Cutover Phase: The system was deployed to a live server, with final testing, data migration, and user training conducted. After implementation, the GSO began using the system for daily operations, with ongoing maintenance and updates ensuring reliability, optimized performance, and responsiveness to evolving user needs.

IV. RESULTS AND DISCUSSION

4.1 Over-all Level of Managing the Scheduling, Assignment, and Tracking of Maintenance Tasks by Ensuring Fast Response Times and Stable Performance Under Varying Workloads

Variables	Mean	Interpretation
Functional Suitability	4.60	Very Highly Effective
Performance Efficiency	4.49	Very Highly Effective
Reliability	4.49	Very Highly Effective
Grand mean	4.53	Very Highly Effective

The evaluation of the GSO Maintenance Management System indicates that it is Very Highly Effective, with an overall Grand Mean of 4.53. Key software quality dimensions—Functional Suitability ($M = 4.60$), Performance Efficiency ($M = 4.49$), and Reliability ($M = 4.49$)—were all rated Very Highly Effective, demonstrating that the system efficiently supports the scheduling, assignment, and tracking of maintenance tasks. Moreover, it maintains fast response times and stable performance under varying workloads, confirming its reliability and effectiveness in streamlining campus maintenance operations.

4.2 Results on Administrative Strategies for Streamlining Maintenance Request Submissions with Accessibility Features

Statement	Mean	Interpretation
Grand Mean	4.70	Very Highly Effective
The maintenance request submission process is easy to understand and follow.	4.74	Very Highly Effective
The system provides clear instructions for submitting maintenance requests.	4.67	Very Highly Effective
The request submission interface is user-friendly and easy to navigate.	4.60	Very Highly Effective
The administrator can easily track and manage submitted requests from various users.	4.68	Very Highly Effective
Overall, the system effectively improves accessibility and simplifies maintenance request submission.	4.72	Very Highly Effective

Arbitrary Scale: 4.20-5.00 Very High Degree; 3.40-4.19 High Degree; 2.60-3.39 Moderate Degree; 1.80-2.59 Low Degree; 1.00-1.79 Very Low Degree

Findings show that the system is Very Highly Effective in

streamlining maintenance request submissions, with a Grand Mean of 4.70. Its user-friendly interface and clear instructions enable efficient tracking, management, and monitoring of requests, improving coordination and reducing processing time. These results align with previous studies emphasizing that user-centered digital systems enhance administrative efficiency, accessibility, and error reduction.

4.3 System Features for Effective Tracking and Reporting of Maintenance Job Status with High Usability

Statement	Mean	Interpretation
Grand Mean	4.55	Very Highly Effective
The system provides clear and real-time updates on the status of maintenance jobs.	4.54	Very Highly Effective
The system provides detailed information on work stages (e.g., requested, assigned, in progress, completed).	4.60	Very Highly Effective
The system supports visual indicators (e.g., progress bars, color codes, icons) to show task progress clearly.	4.60	Very Highly Effective
Notifications and alerts are provided for updates or changes in task status.	4.52	Very Highly Effective
Overall, the system's tracking and reporting features are highly usable and improve maintenance monitoring.	4.64	Very Highly Effective

Arbitrary Scale: 4.20-5.00 Very High Degree; 3.40-4.19 High Degree; 2.60-3.39 Moderate Degree; 1.80-2.59 Low Degree; 1.00-1.79 Very Low Degree

The system is Very Highly Effective in tracking and reporting maintenance job status, with a Grand Mean of 4.55. Real-time updates, detailed work-stage information, visual indicators, and notifications enhance transparency, usability, and user awareness. This supports previous research highlighting the importance of organized monitoring, demonstrating that automated tracking improves accuracy, efficiency, and overall maintenance management compared to manual methods.

4.4 System Features that Facilitate Effective, Reliable, and User-Friendly Communication Between Maintenance Requesters and Management

Statement	Mean	Interpretation
Grand Mean	4.64	Very Highly Effective
The system provides clear and accessible channels for communication between requesters and management.	4.65	Very Highly Effective
The system allows users to easily send maintenance requests, inquiries, or follow-ups.	4.71	Very Highly Effective
The messaging/notification features are reliable and consistent.	4.57	Very Highly Effective
The system allows users to easily send maintenance requests, inquiries, or follow-ups.	4.60	Very Highly Effective
Overall, the system improves communication, coordination, and transparency between maintenance requesters and management.	4.67	Very Highly Effective

Arbitrary Scale: 4.20-5.00 Very High Degree; 3.40-4.19 High Degree; 2.60-3.39 Moderate Degree; 1.80-2.59 Low Degree; 1.00-1.79 Very Low Degree

The system is Very Highly Effective in facilitating communication between maintenance requesters and management, with a Grand Mean of 4.64. Reliable notifications, clear channels, and easy follow-up mechanisms enhance coordination and timely information exchange, addressing communication gaps commonly found in traditional maintenance processes. This aligns with previous studies emphasizing communication as a critical factor in effective maintenance management.

V. CONCLUSION AND FUTURE WORKS

5.1 Conclusion

The study concludes that the GSO Maintenance Management System at Northern Iloilo State University – Batad Campus effectively enhances maintenance operations by addressing key challenges in scheduling, task assignment, tracking, and

communication. The system demonstrated Very Highly Effective performance in Functional Suitability, Performance Efficiency, and Reliability, ensuring fast response times, stable operation under varying workloads, accurate task recording, and consistent system availability. It significantly streamlines maintenance request submissions through a user-friendly interface, clear instructions, and centralized request handling, allowing administrators to efficiently monitor and manage requests. Additionally, the system provides real-time job tracking, detailed work-stage information, visual indicators, and automated notifications, improving transparency, accountability, and decision-making. Communication between requesters and management is also enhanced through built-in messaging and notification features, reducing misunderstandings and promoting coordination. Overall, by meeting ISO/IEC 25010 quality standards, the system proves to be a reliable, efficient, and user-friendly solution that successfully resolves delays, improves workflow, and strengthens maintenance operations within the GSO at NISU Batad Campus.

5.2 Future Works

The General Services Office (GSO) is encouraged to fully adopt and utilize the Maintenance Management System as the primary platform for managing campus maintenance, with ongoing enhancements to improve its functionality, usability, and effectiveness in supporting daily operations. To ensure efficient use of the system, the GSO must be equipped with a stable internet connection, and personnel should undergo training to become proficient in paperless transactions. Additionally, staff must have access to appropriate devices and communication tools to manage requests and work orders from various units, including installation and maintenance services. The system should also continue to strengthen its monitoring and reporting capabilities by providing real-time status updates, automated notifications, and comprehensive reports, supporting informed decision-making, faster response times, and overall improved maintenance performance.

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