

FixIt Clare: A Web-Based Maintenance Request and Tracking System for Property Management and Inventory at St. Clare College

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ABSTRACT

The inefficiencies of manual maintenance reporting and inventory tracking at St. Clare College have resulted in persistent delays, miscommunication, lost records, and lack of accountability, directly impacting the quality of the learning and working environment. This study developed FixIt Clare, a web-based maintenance request and tracking system designed to integrate digital request submission, real-time status tracking, property management, and inventory monitoring into a single centralized platform. Using a quantitative descriptive research design and following the Waterfall software development methodology, the researchers administered pre-development surveys to 60 respondents from Elementary, Junior High, Senior High, and seven college departments to identify existing challenges and feature requirements. Post-development evaluation was conducted through hands-on testing using a structured questionnaire based on ISO software quality criteria. Results revealed that the current manual system suffered from significant weaknesses, with 78.3% of respondents reporting delays in request resolution, 71.7% experiencing miscommunication or lost requests, and 65.0% facing difficulty tracking inventory items. The most frequently reported maintenance concerns were malfunctioning air conditioning units (85.0%), defective projectors (78.3%), and broken chairs or desks (70.0%). Post-development evaluation demonstrated substantial improvements, with FixIt Clare receiving an overall weighted mean of 4.43 (Strongly Agree). Functional Suitability scored highest at 4.52, followed by Usability at 4.48, Performance Efficiency at 4.45, Reliability at 4.39, and Security at 4.31. FixIt Clare proves to be an effective, reliable, and user-centered solution that bridges the gap between maintenance concerns and efficient resolution.

Keywords: maintenance request system, inventory management, web-based system, property management, school facilities, real-time tracking

INTRODUCTION & LITERATURE REVIEW

Background of the Study

The background of the study shows the researcher's concern about the importance of maintaining school facilities and managing institutional resources efficiently to support effective teaching and learning. Classrooms, faculty rooms, and other facilities serve as the primary environments for learning and instruction, and their condition directly affects both the experiences and performance of students and teachers. Studies have shown that poorly maintained school facilities—such as defective projectors, malfunctioning air conditioners, broken chairs, or inadequate lighting—are linked to lower academic achievement and reduced student motivation. Nugroho and Wibowo (2020) found that school infrastructure significantly influences student activeness, noting that well-maintained facilities foster greater engagement and participation among learners. Likewise, Smith and Doe (2020) reported that teachers working in schools with reliable and well-kept resources demonstrate greater commitment and teaching effectiveness, which in turn benefits student performance. The Texas Association of School Boards (2021) also emphasized that schools with strong maintenance systems achieve higher attendance, lower dropout rates, and improved test results.

In addition to the state of classrooms and facilities, proper management of school property and inventory also plays a vital role in ensuring that institutional resources are used effectively and accounted for. Items such as academic gowns (togas), projectors, and air conditioners require systematic monitoring to avoid shortages, losses, and delays in repair or replacement. At St. Clare College, however, these processes are still handled manually. For example, togas used for graduation are recorded in paper-based logs, making it difficult to track how many have been issued, returned, or remain in storage. Similarly, equipment like projectors and air conditioners are tracked through manual lists, which makes it challenging to monitor their availability, condition, or repair needs. Without a centralized digital system, the school faces difficulties in maintaining accurate records, identifying assets in service versus those under repair, and ensuring accountability in resource allocation.

Maintenance reporting also presents similar challenges. Students, teachers, and staff currently rely on verbal communication, handwritten requests, or informal reporting to notify school personnel about broken or malfunctioning equipment. While this approach sometimes works, it often results in delays, miscommunication, or the loss of records. Even minor issues—such as flickering lights or malfunctioning air conditioners—can remain unresolved for extended periods, ultimately affecting the quality of the learning and working environment. This study aims to address these challenges by developing FixIt Clare, a web-based system that will provide students, teachers, and staff with a platform to submit maintenance requests, monitor progress, and receive updates once repairs are completed.

Review of Related Literature

Digital repository and maintenance management systems have been widely adopted internationally and locally. Zhang, Huang, and Yuan (2021) conducted a literature review examining 148 papers on spare parts inventory management, classifying studies based on spare parts characteristics, inventory systems, and supply chain structure. Their review's novelty lies in analyzing supply chain structures of different inventory networks and classifying literature by analytics techniques including descriptive, predictive, and prescriptive analytics. Shaheen and Németh (2022) examined 54 articles to understand how Industry 4.0 technologies integrate with maintenance management system functions. Key findings show that main maintenance functions are significantly influenced by artificial intelligence, machine learning, cyber-physical systems, Internet of Things, big data, augmented reality, and cloud computing. The integration promotes real-time condition monitoring, enables data management and curation, increases coordination between maintenance tasks, facilitates remote maintenance supervision, and ultimately improves operations and productivity.

Achouch et al. (2022) presented an exhaustive literature review identifying the life cycle of maintenance projects, challenges encountered, and models associated with predictive maintenance. Although Maintenance 4.0 faces organizational, financial, and data source challenges, it minimizes machine downtime and associated costs, maximizes machine life cycle, and improves production quality and cadence. In the Philippine context, Ayochock and Perez (2024) critically investigated limitations of inventory management systems in State Universities and Colleges in Mountain Province, revealing that manual systems hinder effective resource management and allocation. Their research identified an urgent need for a modernized approach integrating advanced digital technologies to optimize procurement, inventory tracking, and resource distribution.

Jesalva et al. (2024) developed a web-based inventory management system with QR code capabilities at La Consolacion University of the Philippines. Their system allows users to easily identify, manage, monitor, and list inventory with just a click or scan, eliminating manual handwritten work. Evaluated using ISO 25010 standards, the system received an overall rating of "Very Good" (mean 4.22), with excellent ratings for functionality, maturity, testability, and installability. Bautista and Dela Cruz (2022) created an Inventory Management and Monitoring System using Progressive Web Application Frameworks. Their study revealed that administrator and employee respondents rated the system as "very suitable," "very efficient," "very compatible," "very usable," "very reliable," "very secured," "very maintainable," and "very portable" across all ISO quality dimensions.

Related studies provide empirical insights. D'Orazio, Ruan, and Chiatti (2022) compared Sentiment Analysis techniques and Human Manual Annotation to automatically define maintenance severity ranking using

approximately 12,000 requests from 23 university buildings. Madamidola et al. (2024) traced the evolution of inventory management systems from manual methods through Just-in-Time methodology, barcode scanning, RFID, and Internet of Things. Soegoto and Palalungan (2020) showed that web-based online inventory systems enable accurate, fast, and concrete information control. Agboola et al. (2022) developed a computerized inventory management system using modular design and MySQL database.

Local studies further support the need for digital solutions. Caringal (2021) improved inventory management using the 5S principle, TAM, ADKAR framework, and Airtable. Tungcul and Kummer (2021) demonstrated that modern inventory management systems simplify processes by allowing fast, accurate, and real-time tracking through computers. Accad et al. (2023) developed an integrated inventory management and asset tracking system receiving high mean scores of 4.61 from end-users and 4.68 from IT experts. Tanaman et al. (2023) created a web-based inventory management system enabling business owners to manage inventories with efficiency and convenience.

The synthesis of literature confirms that digital maintenance and inventory systems are a fundamental necessity for modern academic institutions. The challenges of long-standing problems with the manual process, miscommunication, inaccurate records, and lack of proper accountability. FixIt Clare fills the gap of offering an integrated maintenance request and tracking system with property management capabilities tailored for a specific educational institution.

METHODOLOGY

Research Design

This study employed a quantitative descriptive research design to examine the existing maintenance request and inventory management processes at St. Clare College and to identify the requirements for the development of the FixIt Clare system. The design was used to systematically describe current conditions, identify common maintenance-related problems, and gather measurable data from students, faculty, and staff without manipulating variables. Using structured survey questionnaires, data were collected and analyzed through descriptive statistics such as frequency and percentage to identify trends and patterns.

Data Gathering Procedure

The data gathering procedure began with the researchers securing official approval from the Department Head and Thesis Adviser to conduct the study. Upon approval, the research instrument was finalized to ensure clarity, validity, and alignment with the study's objectives. The survey questionnaire was administered exclusively through Google Forms to ensure efficient distribution, ease of access, and accurate recording of responses. A total of 60 respondents participated from Elementary, Junior High, Senior High, and seven college departments. Among respondents, 46.7% were male and 45% were female, with 83.3% aged 18 to 24 years. The survey instrument consisted of 11 questions organized into demographic information and process evaluation.

Software Development Methodology

The development of FixIt Clare followed the Waterfall Model, a structured and sequential approach to software development. The phases included: Requirements Analysis (gathering data through survey questionnaires to identify common maintenance concerns and determine functional requirements), System Design (creating process flow diagrams, database schemas, and user interface designs), Development (implementing core functionalities including request submission, tracking, status updates, and notification features), Testing (functional testing to ensure correct operation), Implementation (deployment for actual use), and Maintenance (continuous monitoring and system enhancement).

Research Instrument and Statistical Treatment

The researchers utilized a structured survey questionnaire designed to evaluate the acceptability and technical performance of FixIt Clare based on standard software quality criteria measuring Functional Suitability,

Usability, Reliability, Security, and Performance Efficiency using a 5-point Likert Scale. To ensure validity, the initial draft was reviewed by the thesis adviser and a faculty expert. The researchers employed frequency and percentage distribution to describe respondent profiles, weighted mean as the primary statistical tool to analyze respondents' assessment of the system, and a 5-point Likert scale with verbal interpretations from 1.00 (Strongly Disagree) to 5.00 (Strongly Agree).

RESULTS AND DISCUSSION

Evaluation of FixIt Clare System

The respondents assessed the FixIt Clare system across five criteria using a 5-point Likert scale. The weighted mean results are summarized as follows: Functional Suitability (4.52 - Strongly Agree), Usability (4.48 - Strongly Agree), Reliability (4.39 - Strongly Agree), Security (4.31 - Strongly Agree), and Performance Efficiency (4.45 - Strongly Agree). The overall weighted mean was 4.43, interpreted as "Strongly Agree."

Table 1. Summary of System Evaluation Results

Criterion	Weighted Mean	Verbal Interpretation
Functional Suitability	4.52	Strongly Agree
Usability	4.48	Strongly Agree
Reliability	4.39	Strongly Agree
Security	4.31	Strongly Agree
Performance Efficiency	4.45	Strongly Agree
Overall Weighted Mean	4.43	Strongly Agree

Functional Suitability: Respondents strongly agreed that the system successfully provides its core functions, including submission of maintenance requests for facilities and equipment such as air conditioners, projectors, chairs, and lighting; tracking of request status from submission to completion; monitoring of inventory items including academic gowns (togas), projectors, and air conditioning units; and generation of real-time reports for administrators. These findings align with Jesalva et al. (2024) whose web-based inventory management system received an overall rating of "Very Good" (mean 4.22), and with Accad et al. (2023) whose integrated system received mean scores of 4.61 from end-users. The high rating in functional suitability indicates that FixIt Clare successfully addresses the core needs identified during the requirements analysis phase, particularly the need for a centralized platform where maintenance concerns can be properly documented and tracked.

Usability: Respondents strongly agreed that the system is easy to navigate with a clear and intuitive user interface, accessible to authorized users including class representatives, faculty, and staff, and designed with user-friendly forms and understandable status indicators. This supports the findings of Bautista and Dela Cruz (2022) who reported that respondents rated their system as "very usable" across all ISO quality dimensions, and Agboola et al. (2022) who described their system as user-friendly and adaptable. The usability rating of 4.48 suggests that the system's design effectively accommodates users with varying levels of technical expertise, which is crucial for an educational institution where users range from elementary students to college faculty.

Reliability: Respondents strongly agreed that the system operates consistently without frequent errors or crashes, maintains accurate records of maintenance requests and inventory data, and provides dependable real-

time updates on request progress. These results are consistent with Soegoto and Palalungan (2020) who demonstrated that web-based online inventory systems enable accurate, fast, and concrete information control. The reliability rating of 4.39 indicates that the system can be trusted to maintain data integrity and provide consistent performance, addressing the 55.0% of respondents who reported incomplete or inaccurate records with the manual system.

Security: Respondents strongly agreed that the system protects user accounts through secure login credentials, restricts access to authorized personnel only, and safeguards sensitive information such as maintenance records and inventory logs. The security rating of 4.31, while the lowest among the five criteria, still falls within the "Strongly Agree" range. This indicates that users are confident in the system's ability to protect their data, though there may be opportunities for enhancement in this area, such as implementing multi-factor authentication or more granular role-based access controls.

Performance Efficiency: Respondents strongly agreed that the system loads pages quickly with minimal delay, processes request submissions and status updates efficiently, and responds promptly to user actions and system queries. This aligns with Gumilao (2024) whose automated system enabled accurate, real-time data processing and streamlined asset tracking. The performance efficiency rating of 4.45 demonstrates that the system meets user expectations for speed and responsiveness, which is critical for encouraging adoption and continued use.

Comparison with Current Manual Process

Based on respondent feedback, the current manual system for maintenance reporting and inventory tracking at St. Clare College exhibited significant weaknesses. Table 2 presents the identified issues and the percentage of respondents affected.

Table 2. Weaknesses of the Current Manual System

Issue	Percentage of Respondents Affected
Delays in request resolution	78.3%
Miscommunication or lost requests	71.7%
Difficulty tracking inventory (e.g., togas, projectors)	65.0%
Lack of accountability in request handling	60.0%
Incomplete or inaccurate records	55.0%

Respondents indicated that FixIt Clare addresses these issues by providing a centralized digital platform for all maintenance requests, real-time status tracking and automated notifications, digital inventory records with accurate quantity and condition monitoring, and activity logs that ensure accountability. This supports the conclusions of Shaheen and Németh (2022) that integration of digital technologies promotes real-time condition monitoring, enables data management, increases coordination, and ultimately improves operations and productivity.

The reduction in communication gaps is particularly noteworthy. The manual system's 71.7% rate of miscommunication or lost requests is directly addressed by the system's digital submission and tracking features, which eliminate the need for verbal handoffs and paper-based records that can be easily misplaced. Each request is assigned a unique identifier and status, allowing all authorized users to view its progress at any time.

Most Common Maintenance Concerns

Table 3 presents the most frequently reported maintenance concerns at St. Clare College.

Table 3. Most Common Maintenance Concerns

Maintenance Concern	Frequency (%)
Malfunctioning air conditioning units	85.0%
Defective projectors or multimedia equipment	78.3%
Broken chairs or desks	70.0%
Flickering or defective lighting	66.7%
Computer laboratory equipment issues	60.0%

These findings are consistent with D'Orazio, Ruan, and Chiatti (2022) who analyzed approximately 12,000 maintenance requests from university buildings. The high frequency of air conditioning and projector issues reflects the tropical climate of the Philippines and the heavy reliance on multimedia equipment for modern instruction. These results informed the system's categorization and prioritization features, ensuring that the most common and urgent request types can be quickly identified and addressed by maintenance personnel.

System Features Identified as Essential

Table 4 presents the features identified by respondents as essential for an effective web-based maintenance and inventory system.

Table 4. Essential System Features

Feature	Importance (%)
Real-time request status tracking	91.7%
Automated notifications and updates	88.3%
Digital inventory of school property	85.0%
Activity log for accountability	81.7%
Administrative dashboard with reports	80.0%

The high importance ratings for real-time tracking and automated notifications indicate that users value transparency and proactive communication, which were severely lacking in the manual system where 71.7% reported miscommunication or lost requests. The strong demand for digital inventory features (85.0%) confirms the need identified in the background of the study regarding the challenges of tracking academic gowns, projectors, and other school property through paper-based logs. All of these features were successfully implemented in FixIt Clare, contributing to the system's high overall acceptability rating.

CONCLUSION

Based on the findings presented, it can be concluded that the challenges experienced by students, faculty, and staff in reporting maintenance concerns and tracking inventory at St. Clare College are primarily due to the absence of an integrated, transparent, and real-time system. The reliance on traditional manual methods, such as verbal communication, handwritten notes, and paper-based logs, leads to delays, miscommunication, lost records, and reduced accountability, which negatively impact the ability of the institution to respond effectively to facility and resource management needs. The high percentage of respondents experiencing delays (78.3%) and miscommunication (71.7%) provides strong empirical evidence supporting this conclusion, demonstrating that the manual system is no longer adequate for the operational needs of St. Clare College.

The implementation of FixIt Clare successfully addresses these challenges by integrating digital maintenance request submission with real-time tracking and inventory management. The system ensures that maintenance concerns are properly documented, categorized, and monitored, improving response times and accountability. The high weighted mean results across all evaluation areas—Functional Suitability (4.52), Usability (4.48), Performance Efficiency (4.45), Reliability (4.39), and Security (4.31)—with an overall rating of 4.43 (Strongly Agree), demonstrate that the system effectively meets its intended objectives and provides significant improvements compared to previous manual methods. These results are comparable to or exceed those reported in similar studies, such as Jesalva et al. (2024) with a mean of 4.22 and Accad et al. (2023) with means of 4.61 and 4.68, confirming that FixIt Clare represents a high-quality solution.

The study also concludes that the most critical maintenance concerns—malfunctioning air conditioning units (85.0%), defective projectors (78.3%), and broken chairs (70.0%)—require immediate and systematic attention. The ability of FixIt Clare to categorize, prioritize, and track these specific types of requests represents a substantial improvement over the previous manual approach. Furthermore, the integration of property and inventory management features addresses the 65.0% of respondents who reported difficulty tracking inventory items, providing a centralized digital record that enhances accuracy and accountability.

Finally, the study concludes that the features identified as essential by respondents—real-time tracking, automated notifications, digital inventory, activity logs, and administrative dashboards—were successfully implemented and contributed to the system's high acceptability rating. The strong user support for these features validates the requirements gathered during the analysis phase and confirms that FixIt Clare is aligned with the actual needs of its intended users. The system provides St. Clare College with a transparent, accountable, and user-centered platform that modernizes maintenance coordination and property management, ultimately contributing to a safer, more efficient, and well-supported learning environment.

Recommendations

The following recommendations are proposed for future improvements and sustainability of the FixIt Clare system.

1. Automated purchasing workflow for replacement parts and new equipment
2. Barcode scanning for asset tracking
3. Integration with school's existing learning management system (LMS)
4. Chat or messaging feature for requester-maintainer communication
5. Mobile Application Development
6. Comparative Studies. Conduct comparative research between institutions using manual systems and those using web-based systems to quantify the impact on operational efficiency, cost savings, and user satisfaction.
7. Sentiment Analysis for Request Prioritization, may implement natural language processing to automatically prioritize maintenance requests based on urgency and sentiment.

8. Predictive Maintenance Features, could incorporate data analytics to predict equipment failures before they occur.

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