



QUEZON CITY UNIVERSITY



QCU-FMS: Facilities Management and Reporting System for Quezon City University

A Capstone Project Documentation
Presented to

The College of Computer Studies
QUEZON CITY UNIVERSITY

In Partial Fulfillment
of the Requirements for the Degree
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

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APPROVAL SHEET

In partial fulfillment of the requirements for the degree **BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**, this Capstone project entitled "**QCU-FMS: FACILITIES MANAGEMENT AND REPORTING SYSTEM FOR QUEZON CITY UNIVERSITY**", has been prepared and submitted by **Ayap Michael C., Baladhay Mark John C., Cambe Denmark O., Coballes Shyrell Patricia P., Dellomas Edrei Aaron, Elona John Andrey, Lumontod Christian B., Macaluyos Hazel G., Manliclic Eugine M., Maullon Christian Dave G., Mopal Ivan Rey C., Navarro Aldrin Jeruin C., Penohermozo Alderbert V., Regencia Arianne April A., Rementilla Kimberly B., Siang Brayaneil, Tapan Enrico I., Viene Airene Joy G., Villadarez Ian Beach M., Villanueva Shaina R., Visperas Ron Daryl R., Yap Jenny Mae R., Yecyec Jason S., and Yu Renzo Jose**, who are hereby recommended for project presentation.

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DEDICATION

This capstone is a tribute to the hard work and dedication of the SBIT-4A class 2023, particularly Group 2. We extend our heartfelt gratitude to Ms. Tanjente and our colleagues at SBIT-4A, whose unwavering support and valuable assistance have contributed significantly to the finalization of this paper. This capstone will guide aspiring Quezon City University and Information Technology students in navigating their projects, especially in the intricate realm of system development.

In addition, we express our most profound appreciation to the broader community of Quezon City University and Information Technology students, whose collaborative spirit and willingness to assist have propelled this project forward. We want to acknowledge the support of our parents, instructors, students, and friends, whose contributions have been invaluable in bringing this project to fruition.

Finally, we dedicate this project to the Physical Facilities and General Services Division of Quezon City University to assist and streamline their management processes. We hope this endeavor will benefit our immediate community and stand as a resource and inspiration for future ventures. We remain committed to our mission of providing help and assistance to those in need, and we look forward to continuing this collaborative effort with the QCU community and beyond.



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We extend our most profound appreciation to the Almighty God, who has been our constant guide and source of strength, knowledge, and wisdom throughout this journey.

We are also grateful to our Capstone Project adviser, Ms. Rose Anne Tanjente, for her selfless help, guidance, and encouragement, inspiring us to strive for excellence.

We want to thank Mr. Nelson Lazare, our client's admin of QCU Physical Facility and General Services Division, for his trust and approval in developing the QCU-FMS: Facilities Management and Reporting System for Quezon City University.

Our parents have been our pillars of support, and we owe them a debt of gratitude for their unwavering financial and moral support throughout this study.

Finally, we would like to express our sincere appreciation to the respondents and our teachers, classmates, and friends. Your belief, support, understanding, and motivation have been instrumental in our success, and we are grateful for your unwavering inspiration.



EXECUTIVE SUMMARY

Title: QCU-FMS: Facilities Management and Reporting System for Quezon City University

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Keywords: Reports Management, School Facilities, Incentive System, Job Order, Analytics, Machine Learning, Natural Language Processing, Sentiment Analysis, Reports, and Request.



The QCU-FMS system is a web-based platform that integrates a mobile application to streamline facility issue reporting, prioritize tasks, and enhance campus safety and operational efficiency. It automates communication and maintenance workflows, fostering a more secure, productive, and well-maintained campus environment. QCU-FMS revolutionizes facility management, enhancing efficiency, collaboration, and the overall campus experience for students, employees, and service providers.

A comprehensive literature and studies review was conducted using a systematic approach to gather relevant scholarly articles and research studies for the Facilities Management and Reporting System study. Developing a robust facilities management and reporting system relies on effective record management and technology solutions, such as machine learning and artificial intelligence. Additionally, implementing non-monetary incentives like gamification elements and rewards can encourage student engagement and usage. By leveraging these strategies, educational institutions can enhance operational efficiency, optimize resource allocation, and create a more conducive learning environment for students and employees, ultimately contributing to their overall success and sustainability.

A descriptive and quantitative approach was employed to analyze facility-related issues at QCU and develop the QCU-FMS system. The proposed system's efficiency and accuracy were qualitatively evaluated, undergoing planning, design, development, testing, deployment, and



feedback phases using agile principles adapted to fit project needs. The iterative nature of Agile facilitated continuous improvement, with regular reassessment of priorities and incorporation of feedback throughout the development process. Implementing QCU-FMS significantly enhances QCU facility management, streamlining processes and improving operational efficiency.

The proposed system has shown exceptional performance in functionality, efficiency, maintainability, and portability, with a weighted mean of 4.8, indicating an excellent level of performance. The system meets the specific requirements set by the service provider, performs tasks quickly and processes data efficiently, is easy to maintain and update, and works across different platforms and environments. The overall average weighted mean of the proposed system is 4.7, with an 'Excellent' verbal interpretation, ensuring that the system meets the standards of the criteria evaluated and the respondent's requirements, ensuring that their operations are carried out effectively and efficiently.

The research aimed to develop a user-friendly Facilities Management and Reporting System for Quezon City University (QCU) while assessing its functionality, efficiency, maintainability, and portability. The system's effectiveness in accomplishing QCU's numerous criteria has been agreed upon by students, admins, employees, and service providers, indicating its reliability in handling multiple campus demands and optimizing processes.



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The system was especially advised to use data analytics to enhance communication and offer helpful insights. In addition, there will be non-monetary rewards for student engagement programs, improvements to event management procedures to optimize resource allocation, cooperation with the Registrar's Office for accurate data, and integration with procurement units for expedited material requests and inventory management. Comprehensive training for efficient system use to maximize the utilization of the system's features and functionalities will also be recommended. These steps are intended to enhance the system's significance further, ensure continuous enhancements to QCU's management effectiveness, and eventually foster a more flexible and integrated academic environment.



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CHAPTER I

CAPSTONE PROJECT BACKGROUND

1.1 Introduction

Education serves as the catalyst for unlocking human potential, igniting the journey of personal and professional development. Access to quality education is not just a privilege but a fundamental right for every individual. This crucial aspect ensures that the infrastructure supporting education remains robust and conducive to learning. Behind the bustling corridors and classrooms lies a complex system that ensures the smooth operation of buildings and resources. Moreover, the impact of well-managed facilities extends beyond—it directly influences student performance, faculty satisfaction, and overall institutional reputation, amplifying its significance in the educational landscape (Yahya et al., 2023).

Within this context lie numerous challenges and considerations, including the critical need to address the ongoing management of facilities within educational institutions, which significantly impacts the learning process while ensuring that essential resources are effectively monitored adding layers of complexity to their decision-making processes (Siswanto & Hidayati, 2020). Furthermore, the delicate balance between meeting current needs and planning for future growth requires foresight and strategic planning, highlighting the dynamic nature of facility management within educational institutions.



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However, the landscape of educational facility management is not static. According to Opoku and Lee (2022), there is a growing demand for greater accountability, resource optimization, and sustainability within educational settings. As such, educational institutions are under increasing pressure to adapt and innovate, seeking novel solutions to long-standing challenges. This evolution is further propelled by technological advancements and global trends in education, necessitating a proactive approach to facility management. By embracing innovation and continuous improvement, educational institutions can position themselves as leaders in facility management practices, driving positive outcomes for their institutions.

As educational institutions embark on this quest for excellence, they are propelled by the promise of untapped potential, a solution yet to be revealed. By fostering a culture of innovation and collaboration, institutions can harness the collective expertise of stakeholders to address complex challenges and capitalize on emerging opportunities. Moreover, by leveraging data analytics and predictive maintenance strategies, educational institutions can optimize resource allocation and enhance operational efficiency, laying the foundation for long-term success in facility management.



1.2 Project Context and It's Background

Quezon City University (QCU), founded in 1994, is a significant educational institution in the Philippines. It constantly innovates to correspond with the various demands of the community and the students. The goal of the current initiative is to improve education through modernizing facilities, implementing cutting-edge technology, growing academic offerings, and fortifying community ties. QCU has a distinction for offering accessible education and a wide range of undergraduate and graduate degrees.

The current method of addressing Quezon City University (QCU) facility concerns relies heavily on manual procedures, including reports from various sources like guard communications and physical inspections. However, this process lacks efficiency and speed, leading to potential oversights and delays in addressing reported issues. Moreover, concerns about data security and inaccuracies in documentation further compound the challenges. The proponents propose to implement QCU-FMS to replace manual reporting, citing its potential to improve efficiency and accuracy by eliminating delays. QCU-FMS offers features like monitoring and task assignments to enhance decision-making and resource utilization, addressing the limitations of manual reporting and enhancing overall facility management.



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The Physical Facility Department (PF) operates seamlessly and efficiently, managing daily maintenance tasks. As assignments come in, personnel are dispatched promptly to inspect and conduct upkeep activities, ensuring the facility's safety and optimal condition. Concurrently, users encountering issues with the facility can report them through various channels, leading to meticulous documentation in logbooks or spreadsheets. Task prioritization follows, with staff assigning duties based on urgency and expertise, ensuring swift resolution by knowledgeable personnel. Throughout the process, diligent monitoring ensures tasks progress smoothly, with updates from service providers confirming completion and prompting record updates. This meticulous approach to facility management underscores Physical Facility's commitment to providing a safe and well-maintained environment.

The "QCU-FMS" system emphasizes the significance in continuous maintenance in order to keep Quezon City University's (QCU) facilities in excellent condition. It indicates a persistent and deliberate commitment to maintaining these facilities' use, efficacy, and functionality throughout time. In particular, it emphasizes the necessity of ongoing oversight, upkeep, and support to guarantee that school facilities satisfy students' academic demands. Furthermore, it implies an acknowledgment of the critical importance of proactive management to prevent the emergence of more severe and long-term issues within the QCU facilities. The inclusion of "QCU-FMS"



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mainly implies that continuous maintenance initiatives are necessary to maintain the level of quality and functionality of Quezon City University's facilities.

The QCU-FMS system is designed to optimize the process of reporting facility issues for students while also improving the efficiency of managing such matters at Quezon City University. Through a combination of a mobile application and web platform, it simplifies the reporting and prioritization of tasks, leading to enhanced campus safety and operational effectiveness. This technological advancement enables easier identification and reporting of maintenance issues across departments, and it provides valuable insights through data analytics, assisting in decision-making and long-term planning efforts. Overall, QCU-FMS is expected to elevate facility management, fostering a safer and more productive campus environment for everyone involved. QCU's recent introduction of the QCU-FMS capability reflects its unwavering commitment to excellence. Developed through extensive efforts aimed at enhancing maintenance operations throughout the campus, QCU-FMS exemplifies innovation and underscores the university's dedication to delivering exceptional service across all aspects of its operations.

The development of QCU-FMS relies on Machine Learning (ML) to maximize maintenance processes and ensure efficient asset management. By integrating ML with Natural Language Processing (NLP) algorithms, QCU-FMS can analyze textual data from maintenance reports and user



feedback to gather valuable information about facility conditions, property performance, and user satisfaction. This integration enables QCU-FMS to streamline maintenance, enhance service quality, and improve the user experience by automating communication tasks and facilitating proactive maintenance planning. The system automatically categorizes reported facility issues by analyzing descriptions, locations, and media, then forwards them to relevant departments for prompt resolution, enhancing facility management effectiveness. It also conducts sentiment analysis on English and Filipino reports, identifying issues based on keywords and patterns, and gauging users' sentiment to aid decision-making, despite challenges in interpretation.

1.3 Objective of the Study

a. General Objective

The general objective of the system is to develop QCU-FMS: Facilities Management and Reporting System for Quezon City University that aims to optimize the processes of issue reporting, event requests, and overall service management for students, employees, and administrators, fostering efficient communication and interaction within Quezon City University.

b. Specific Objectives

1. To develop a system incorporating monitoring and management tools for addressing reported issues and scheduling events.



2. To implement data analytics encompassing both prescriptive and descriptive analytics to provide actionable insights on performance and resource optimization.
3. To design a structured job order system to optimize service provider assistance.
4. To design a system that introduces a non-monetary rewards system to incentivize student participation in campus management.
5. To design a feature enabling employees to schedule events and request service provider assistance, enhancing event management efficiency.
6. To evaluate and determine the respondent's level of quality to the proposed system based on the ISO 25010 criteria such as:
 - 6.1. Functionality: This evaluates the extent to which the system meets specified functional requirements;
 - 6.2. Efficiency: This assesses the system's performance in terms of resource utilization, speed, and responsiveness;
 - 6.3. Maintainability: This examines the ease with which the system can be modified and adapted and the availability of tools for maintenance tasks;
 - 6.4. Portability: This evaluates the system's ability to function across different platforms and devices while maintaining consistent performance and functionality.



1.4 Significance of the Study

The QCU-FMS system holds significant potential in transforming the operational dynamics of Quezon City University, benefiting all stakeholders and paving the way for a more efficient, responsive, and engaged academic environment. The system's implementation promises to bring significant improvements in several key areas for Quezon City University, Administrators, Students, Employees, and Future Researchers.

For Quezon City University

The QCU-FMS at Quezon City University boosts institutional efficiency by improving decision-making and resource management. It simplifies academic and staff workflows and gives students quick access to services and incentives for acknowledgement, enhancing productivity. QCU-FMS improves university communication and professional development. QCU-FMS's specific feedback mechanisms help universities improve their facilities to meet changing functional and efficiency needs. This makes university life more pleasant and supportive.

For Admin

The implementation of the QCU-FMS greatly benefits administrators by automating routine processes, reducing administrative burden, and enabling data-driven decision-making. It



also includes an incentive system to acknowledge student and employee participation, fostering a positive relationship with stakeholders. This study promises a more efficient, transparent, and engaging administrative environment.

For Students

The QCU-FMS technology improves University students' facility access and functionality. Students can easily report facility issues and support QCU-FMS by providing constructive feedback to enhance the service access. This proactive attitude to facility issues is essential for a good learning environment. The integrated feedback system also lets students offer university facility suggestions. This part of QCU-FMS ensures that the facilities improve communication between the students and the university administration. The university's physical infrastructure and resources respond to students' changing needs, creating a more efficient and responsive instructional environment.

For Employees

The QCU-FMS technology assists Quezon City University employees in several ways. It improves employee communication and cooperation. Effective communication is essential for a professional, collaborative workplace. The system provides different reports and statistics for personal and professional progress in line with university



goals. A separate employee feedback system identifies areas for improvement, professional advancement, enhances communication, and fosters a positive workplace culture and promotes efficiency within the university's administrative ecosystem.

For Future Researchers

QCU-FMS deployment is a significant opportunity. It provides extensive data and insights and shows how technology may be used in educational administration and student services. The system's effects on university operations, student participation, and education can be studied. QCU-FMS feedback mechanisms and data analytics give valuable data for educational technology, administrative efficiency, and user experience studies.

1.5 Scope and Delimitations of the Project

Scope

1. The system tracks and manages reported issues, providing a centralized platform for users to report and monitor the resolution of facility-related problems.
2. Users can reserve facilities for events, starting from pencil bookings to final reservations. The calendar module enables transparent scheduling, promoting engagement and participation in university activities.



3. The system features a secure database with user authentication for data protection and access control. It allows authorized access based on roles and logs all actions for audit purposes, ensuring secure data management.
4. Descriptive analytics generate summary reports on user engagement, issue resolution metrics, and trend analysis, all filterable by date for detailed insights.
5. Utilizing feedback and ratings as a basis, the system employs prescriptive analytics to suggest actions or solutions to identified issues, enhancing decision-making and problem-solving processes.
6. The system incentivizes user engagement by offering certificates and vouchers as rewards for active participation, contributing to a safer and more efficient campus environment.
7. Access control features manage user permissions, allowing authorized access based on roles. Task assignment is optimized, considering service providers' availability and workload for improved efficiency.
8. The system provides a user-friendly interface with easy navigation and intuitive design, ensuring a positive user experience for all stakeholders.



Limitation/Delimitation

1. The system does not extend its services outside the Quezon City University San Bartolome campus.
2. The system requires an internet connection to function, it does not offer offline activities.
3. The system does not offer live chat, video, or call conferencing for requests and reports.
4. The system is not able to determine the origin of the damaged properties or facilities, whether the students intentionally tamper such things just to earn points.
5. The system does not have direct access to the procurement office, limiting its ability to request and check resource availability.
6. The system does not offer motor pool vehicles requesting services to users.
7. The system cannot determine when the requested resources will be provided.
8. The system is unable to capture video for reporting purposes; it only accepts pictures.
9. The system does not include laboratory rooms because it is handled by a different department.



1.6 Theoretical Framework of the Study

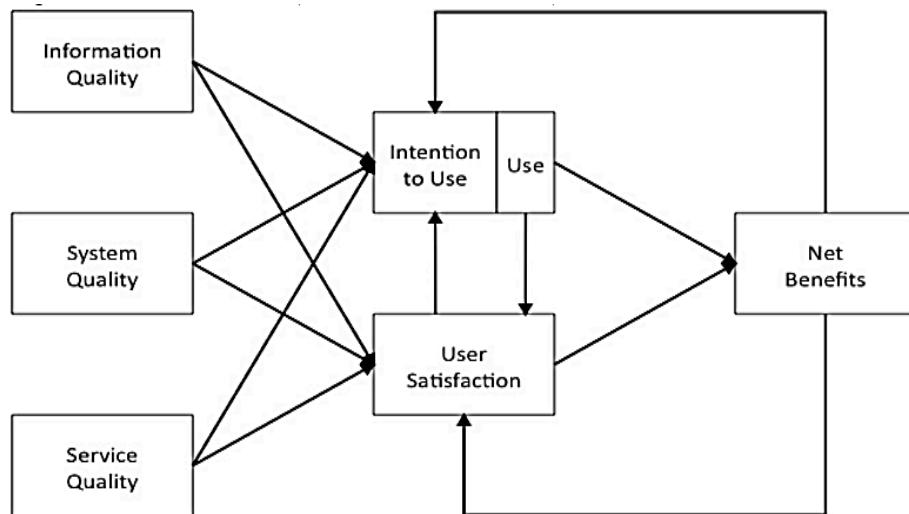


Figure 1.1 Information Systems Success Model (ISSM)

Source: Çelik, K., & Ayaz, A. (2021)

Figure 1.1 illustrates the updated Information Systems Success Model introduced by DeLone and McLean in 1992, which seeks to serve as a foundational framework for evaluating the effectiveness and impact of information systems within organizations (Çelik & Ayaz, 2021). According to Abubakar et al. (2019), "To boost the success of information management projects and applications, investing in information technology is essential". Measuring the effectiveness of the current systems has become imperative for institutions.

According to Al-Kofahi et al. (2020), The ISSM presents a holistic framework for evaluating effectiveness and influence. System quality pertains



to technical functionalities, ensuring alignment with reliability, usability, and performance standards. Information quality becomes important for delivering precise and timely data and facilitating informed decision-making. Service quality ensures users receive requisite support, fostering satisfaction and system utilization. Furthermore, individual and organizational impacts gauge how systems enhance operational efficiency, decision-making, and strategic objectives. Dalle et al. (2020) also utilized the model to investigate the effectiveness of the university's information system in Indonesia, concluding that both system quality and information quality are determinants of its success.

Applying the Information Systems Success Model (ISSM) provides a robust theoretical foundation for the development of the QCU-FMS Facilities Management and Reporting System for Quezon City University. By associating the system's performance across various dimensions such as system quality, information quality, service quality, use, user satisfaction, individual impact, and organizational impact, the ISSM guides efforts to optimize the QCU-FMS, ensuring it aligns with Quezon City University's goals of efficiency and excellence in the campus environment.

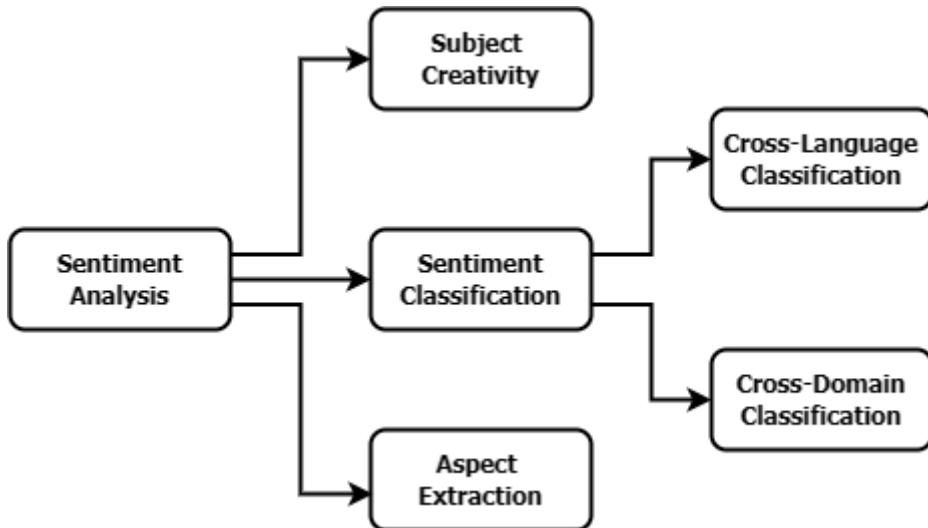


Figure 1.2 Task of Sentiment Analysis

Source: [A survey on sentiment analysis methods, applications, and challenges | Artificial Intelligence Review \(springer.com\)](#)

As shown in Figure 1.2, Sentiment Analysis, or opinion mining, is a branch of Natural Language Processing (NLP) concerned with automatically extracting the underlying context from a text. People's opinions can be helpful to the system and its users when gathering information and making decisions based on them. Through reporting, the description, including the details of the submitted report, will be extracted using an advanced NLP algorithm, and the feedback will be identified as positive, negative, or neutral, providing crucial guidance for personalized responses.

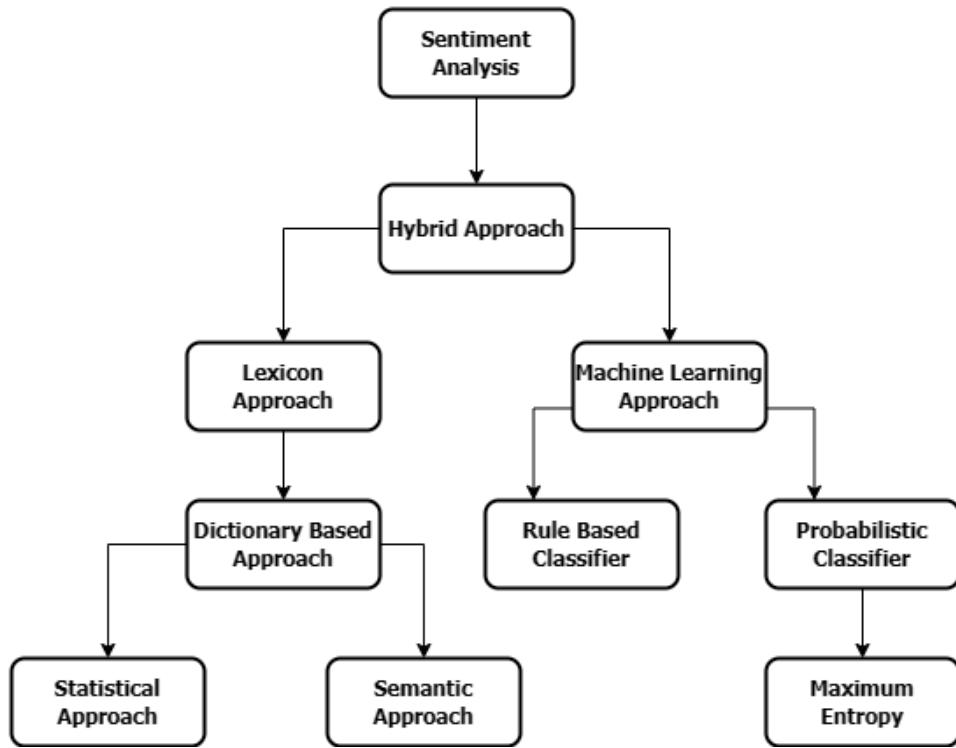


Figure 1.3 Approach of Sentiment Analysis of the Proposed System

Source: [A survey on sentiment analysis methods, applications, and challenges | Artificial Intelligence Review \(springer.com\)](https://link.springer.com/chapter/10.1007/978-3-030-36080-3_13)

The figure above shows that the approach to sentiment analysis involves several key stages for effective implementation. Initially, textual data is collected from various sources within the system, encompassing client feedback forms, evaluations, and interactions. Following this, preprocessing techniques are applied to clean and organize the text, ensuring it is ready for analysis. Feature extraction then ensues, where attributes indicative of sentiment are extracted from the text, utilizing methods like bag-of-words or word embedding's. Subsequently, a classification model is trained to predict



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the sentiment of the text, leveraging labeled data for training and validation. The model is trained and evaluated for performance and integrated into the system, enabling sentiment analysis of incoming data. Continuous monitoring and feedback mechanisms are implemented to ensure that the model remains accurate and adaptable to evolving student sentiments and language patterns, enhancing decision-making and improving the university's services. By implementing sentiment analysis in a system, Quezon City University can gain valuable insights into student's point of view, enabling them to make data-driven decisions that improve the quality of education and services. Understanding feedback can help the university identify areas that need improvement, leading to enhanced student satisfaction and retention.



1.7 Conceptual Framework of the Study

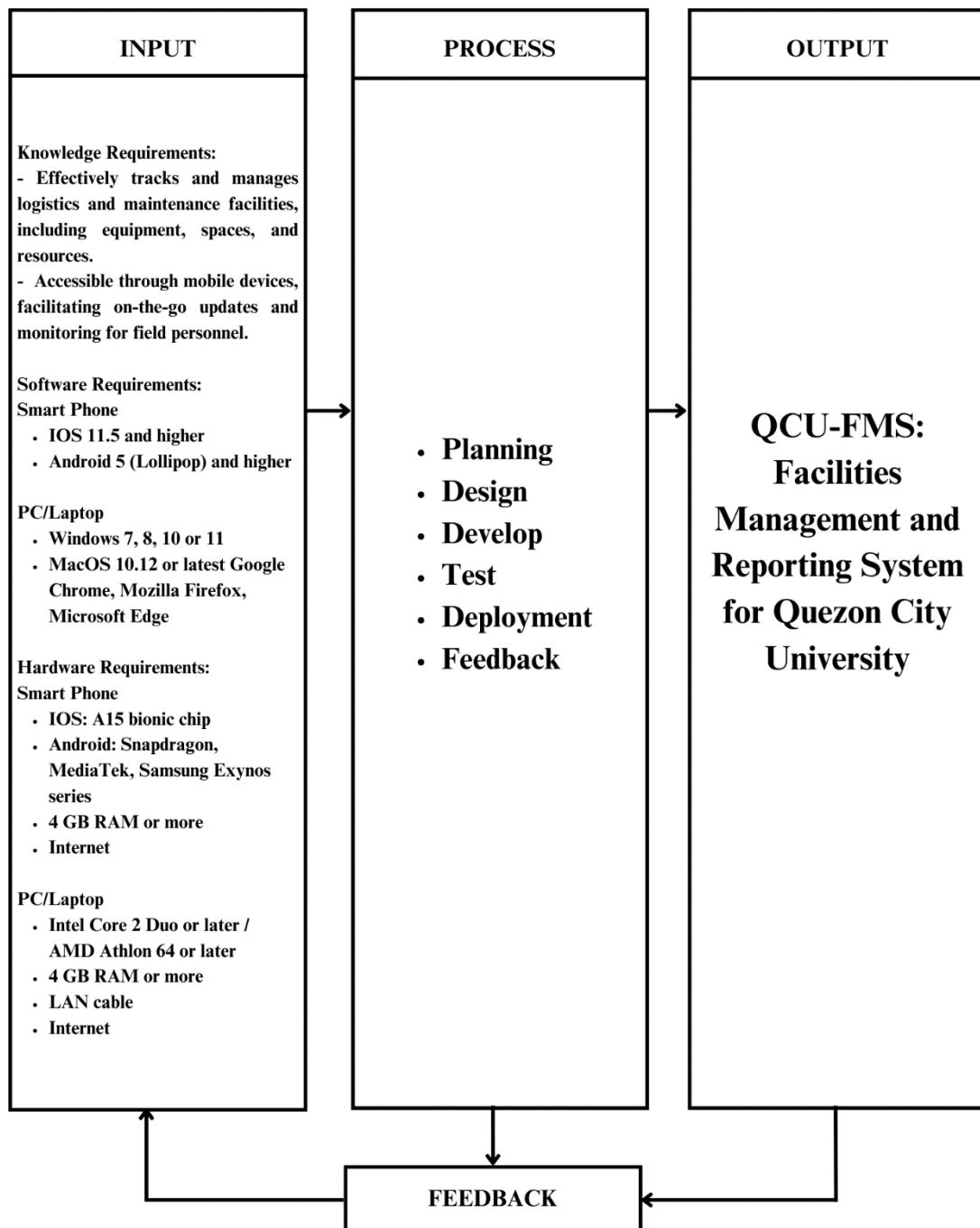


Figure 1.4 Conceptual Framework

Figure 1.4 shows a comprehensive conceptual framework encompassing input, process, and output components of QCU-FMS. The first



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column discusses the input process, for the knowledge requirements, the existing process tracks and manages logistics and maintenance facilities, including equipment, spaces, and resources, accessible through mobile devices for on-the-go updates and monitoring by field personnel. The specified software requirements encompass compatibility with IOS 11.5 and higher for smartphones, Android 5 (Lollipop) and above, along with Windows 7, 8, 10, or 11 for PCs, MacOS 10.12 or the latest versions, and major browsers like Google Chrome, Mozilla Firefox, and Microsoft Edge. These requirements are integral as they ensure the QCU-FMS system's accessibility across diverse devices, expanding its user base and accommodating various preferences. Furthermore, the hardware prerequisites, including specific chipsets like A15 Bionic for IOS and Snapdragon, Mediatek, and Samsung Exynos series for Android smartphones, and 4 GB RAM or more for smartphones and PCs, guarantee optimal performance and memory support. Additionally, the specifications for LAN connectivity and internet access ensure seamless operation, which is vital for deploying and operating the QCU-FMS platform efficiently at Quezon City University while providing an enhanced and inclusive user experience.

Planning, Design, Development, Testing, Deployment, and Feedback are integral to successfully implementing and continuously improving the QCU-FMS at Quezon City University. Planning establishes the system's groundwork by defining goals and user requirements, while Design focuses



on creating an intuitive and visually engaging interface for reporting and incentive processes. Development involves the actual construction of the system, ensuring compatibility with specified software and hardware requirements. Testing is crucial for identifying and resolving errors, guaranteeing the system's smooth functionality. Deployment orchestrates the system's release and installation, while Feedback garnered from users' experiences drives ongoing improvements, ensuring the QCU-FMS remains aligned with the university's needs and objectives. These phases collectively facilitate the systematic evolution and optimization, enabling its effectiveness in enhancing reporting, request handling, and incentive mechanisms for Quezon City University.

The output phase of QCU-FMS focuses on delivering valuable and easily accessible information to both users and administrators. An Interactive Reports and Requests Dashboard offers real-time updates on submission statuses, enhancing transparency and user convenience. Users receive notifications regarding earned rewards, providing detailed information on the criteria met for each incentive. Simultaneously, comprehensive Administrative Reports provide university administrators with insights into the types and frequencies of submissions, as well as the performance of the Incentive System across the university community. The overarching conceptual framework of QCU-FMS ensures a seamless and efficient flow of



information, empowering users and administrators alike with valuable insights.

1.8 Definition of Terms

Access Control. It involves implementing security measures to supervise and regulate access to resources or spaces within a system or physical environment.

Activity Recognition. It is a technological process where a system identifies and categorizes different physical movements or activities performed by a person or an object.

Admin. It encompasses overseeing various aspects of campus management, including job orders, service provider assignments, facility issues, and user permissions. This role involves managing tasks such as scheduling, reservations, and rewards distribution.

Artificial Intelligence. It provides suggestions and options for further changes, and other ideas.

Authentication. It's the stage or process where the user will receive an OTP to validate their identity.

Automation. It entails utilizing technology and predefined protocols to carry out tasks or processes without the need for manual intervention.

Evaluation. It involves evaluating or assessing the quality, value, importance, or efficiency of something based on specific criteria or benchmarks.



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Interactive Reports. It involves customizing reports by the admin through filtering, sorting, searching, and other forms of data manipulation.

MLP. It represents Multilayer Perceptron, a neural network type utilized for discerning patterns within data.

Module. It is a small, specialized component within a system or program designed to execute a single task. It can be integrated, removed, or modified independently, facilitating the organization and individual handling of various project components.

NLP. It involves instructing computers to comprehend and generate human language, a process known as Natural Language Processing.

Non-monetary incentive. It helps to offer non-cash perks as incentives, as this can mitigate the potential adverse impacts of monetary rewards.

QR Code. It's a form of barcode that holds data and can be scanned by digital devices like smartphones.

Real-time Notification. It ensures that short alerts or updates are promptly delivered to users or systems in real-time following an event or change, enabling recipients to receive timely information and take necessary actions promptly.

Real Time-monitoring. It is possible for admins to monitor the data and reports being submitted in real time.

Responsive System. It involves resizing and positioning web elements to adapt to the width of each device, ensuring proper visualization and enhancing the user experience.



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Service provider. It receives tasks from Admins, updates their statuses accordingly, and also receives notifications regarding new tasks and updates. Additionally, it submits task accomplishments.

Employee. It allows staff and faculty members to report facility issues, request assistance from service providers, and book venues through the reservation system. They receive updates on their requests and can assess task completion and overall system performance.

Students. It enables students to report campus facility issues and engage in a reward system for their contributions. They receive notifications about the progress of their reports and can offer feedback on task completion and facility experiences.

Terms and Conditions. It delineates the rules and guidelines detailing how the product, service, or agreement may be utilized.

Operational & Technical Definition

Access Control. *It ensures that only authorized users or entities have appropriate access privileges while preventing unauthorized access or misuse of sensitive information, is known as the practice of restricting or granting entry to resources in a computing environment based on predefined rules.* It is imperative to ensure that only authorized individuals or entities are granted entry or privileges. Only registered admins, users, and employees are permitted to access the features of the system.



Activity Recognition. *It involves analyzing patterns and features within sensor data to infer specific activities, enabling applications such as health monitoring, gesture recognition, and context-aware computing, automatically identifying and categorizing human actions or behaviors based on data acquired from sensors.* It involves the automated process of identifying and categorizing human activities based on collected data, which assists the system in analyzing activity patterns while utilizing QCU-FMS.

Admin. *It oversees the configuration, maintenance, and security of a system, network, or software application, and manages advanced controls and permissions for tasks like user management, system configuration, and troubleshooting.* It grants administrators privileged access rights, enabling them to undertake tasks like user management, system configuration, troubleshooting, and ensuring the overall functionality and security of the system.

Authentication. *It involves the process of verifying the identity of a user or system to ensure that they are who they claim to be, typically by providing credentials such as passwords, biometric data, or cryptographic keys, which are then compared against stored records to grant access to authorized resources.* It verifies the eligibility of a user by sending a code to their valid email and using a strong password for additional security.

Automation. *It involves the use of technology to perform tasks or processes with minimal human intervention, where the creation and deployment of systems*



or software capable of executing predefined actions or workflows automatically are central. Automating tasks or processes entails using technology and established protocols to perform them without manual intervention. It optimizes operations, improving efficiency and allowing resources to be allocated to more strategic endeavors, this method does.

Descriptive Analytics. *It involves the process of analyzing historical data to understand changes and trends over time, utilizing data aggregation and mining techniques to provide insight into the past performance of a business or process, thus helping organizations grasp the "what happened" aspect by presenting past data in an easy-to-interpret manner, often through dashboards, reports, and visualizations. It supports efficient monitoring and swift decision-making by providing clear insights into the operational dynamics of multiple buildings, allowing users to identify trends and issues through customizable time frames such as weekly or monthly intervals, with the capability to visually present complex data in an easily understandable format.*

Employees. *It comprises instructors, professors, administrators, and support staff, typically employed by an educational institution or organization, responsible for various tasks including teaching, research, administrative duties, and providing support services to students and other members of the institution. It targets users such as students, enabling staff and faculty to report and request services offered by the system.*



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Evaluation. *It involves the process of assessing the performance, effectiveness, or quality of a system, product, or solution, typically including gathering data, analyzing results, and making judgments or recommendations based on predefined criteria or objectives. It's a process designed to assess the effectiveness and quality of the system, where decisions are made by collecting data to see if it reaches the desired goal or objective.*

Interactive Reports. *It refers to documents or presentations that allow users to engage with and manipulate data dynamically, featuring interactive elements such as filters, charts, and drill-down capabilities, enabling users to explore data, uncover insights, and customize the presentation to suit their needs. It offers real-time reports that are interactive, aiding admins in making well-informed decisions by providing a flexible and interactive platform for accessing and analyzing information.*

MLP. *It is a type of artificial neural network composed of multiple layers of interconnected nodes or neurons, commonly used in machine learning for tasks such as classification and regression. It serves as a key component in the system's machine learning infrastructure, leveraging its interconnected layers of neurons to analyze complex data patterns and make predictions. It employs MLPs, enhancing its ability to classify and predict outcomes, thus contributing to more accurate decision-making and improved performance across various tasks.*

Module. *It is a self-contained unit of software that performs a specific function or task within a larger system or program, designed to be reusable and modular,*



allowing developers to organize code efficiently and facilitate code maintenance, scalability, and reusability. It functions as a discrete and focused element designed to fulfill a specific function or task, contributing to the overall functionality of the system while maintaining independence, thus allowing for easier management, modification, or replacement without disrupting the system's integrity.

NLP. *It is a field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language, facilitating the automation of communication operations by leveraging NLP integrated with machine learning algorithms, thereby streamlining and enhancing the efficiency of communication processes.* It enables a proactive maintenance approach, ensuring a comprehensive strategy for addressing maintenance needs before they escalate, by integrating NLP with machine learning algorithms.

Non-monetary incentive. *It refers to a reward or motivator that does not involve direct financial compensation, instead including benefits such as recognition, flexible work arrangements, professional development opportunities, or increased autonomy, aimed at incentivizing desired behaviors or performance within an organization, offered to users.* It reinforces user efforts, motivates continued progress, and helps recognize user milestones and privileges.

Prescriptive Analytics. *It's a type of data analytics that focuses on providing actionable recommendations and decisions based on data, utilizing advanced*



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tools and technologies, including mathematical models, simulations, and algorithms, to analyze data and predict outcomes, with the goal of helping businesses and organizations make informed decisions that optimize processes and improve efficiency. It automatically analyzes and summarizes data from various sources like feedback and reports to assess performance levels, leveraging AI to recommend actionable solutions and address identified problems, thereby enhancing operational efficiency and decision-making within the facility.

QR Code. It's a two-dimensional barcode that stores information horizontally and vertically, allowing for high-speed scanning; it's commonly used to encode URLs, text, or other data, which can be quickly read by a QR code scanner or smartphone camera for various purposes such as accessing websites, making payments, or sharing information. It allows users to access the application and quickly report with a simple scan, improving efficiency and accessibility, thanks to its ease of use and compatibility with mobile devices.

Real-time Notification. It involves an immediate alert or message delivered to users or systems as soon as an event or condition occurs, typically transmitting notifications instantly, providing timely updates, and enabling swift responses to important events or changes in a system or application. It helps the admins to be easily notified if there are new requests or reports being submitted for faster actions, also enabling users to see if their reports are being noticed and to be updated.



Real Time-monitoring. *It involves continuously tracking and analyzing data or events as they occur, providing immediate insights into the status or performance of a system, process, or environment, enabling rapid detection of issues, proactive management of resources, and timely decision-making to ensure optimal operation and performance. It enables admins to monitor the system and data being recorded in real-time, aiding them in observing and recording the changes and updates inside the system.*

Responsive System. *It refers to a software or hardware system capable of adapting its behavior or performance in real-time based on changing conditions or user interactions, designed to efficiently handle varying workloads, maintain high levels of performance, and provide seamless user experiences across different devices and environments. It efficiently processes the incoming data, providing appropriate outputs or responses in a timely manner, thus ensuring optimal performance and user satisfaction.*

Service provider. *It refers to an entity or organization that offers services or resources to clients or users, as well as individuals who provide particular services or solutions to users according to the job orders assigned to them. It offers expertise, resources, or assistance customized to meet user's needs, fulfilling contractual obligations, and upholding agreed service standards.*

Students. *It comprises individuals enrolled in an educational institution such as a school, college, or university, pursuing academic studies or training. It is the*



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students' purpose to report using the system via their smartphones, with the target users being identified.

Terms and Conditions. *It delineates the rules, responsibilities, and limitations governing the use of a product, service, or platform, covering aspects such as user rights, obligations, privacy policies, disclaimers, and the consequences of violating the agreement.* It establishes regulations, duties, entitlements, and restrictions regarding system usage, detailing the responsibilities of all parties involved, including users and providers.



CHAPTER II

REVIEW OF RELATED LITERATURE AND SYSTEMS

2.1 Review of Related Literature

FOREIGN

Machine Learning and Artificial Intelligence in Education and Facility Management

Neural networks (DNNs) have become essential in various application domains, but their execution on embedded devices faces challenges due to limited resources and high inference times. Sanz Marco et al. (2020) propose a novel approach to optimize DNN inference on embedded systems by dynamically selecting a pre-trained DNN based on input and optimization constraints. Their method uses machine learning to develop a predictive model for efficient DNN selection. By considering both desired accuracy and inference time, the approach achieves significant improvements in inference time without sacrificing accuracy. The authors demonstrate the effectiveness of their approach in image classification and machine translation domains, achieving up to a 1.8x reduction in inference time with improved accuracy for image classification and a 1.34x reduction in inference time for machine translation, with minimal impact on translation quality. This work highlights the potential of adaptive model selection for enhancing DNN performance on embedded systems.



Fang, Pitt, and Hanna (2019) investigate a machine learning approach to assist Facility Management (FM) managers and FM data analysts in automating FM data clustering and classification. The study explores how current machine learning and Natural Language Processing (NLP) techniques can address interoperability issues in FM. Experimental results demonstrate the effectiveness of deep learning networks in classifying building assets based on their group elements with over ninety percent accuracy. The Convolutional Neural Network (CNN) Classifier outperforms junior building data analysts in accuracy performance. Additionally, the Unsupervised Skip-gram Gradient Descent Model successfully clusters words in documents and reveals hidden relationships within FM data. The findings of this research provide insights into the future application of ML/NLP techniques in FM, suggesting potential advancements in FM data analysis and management.

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Huang (2023) stated that students are profoundly using the rapid advancement of artificial intelligence (AI) since It enhances educational processes through intelligent data screening, scenario reproduction, automated responses to ambiguous tasks, and simulating human brain mechanisms using tools like speech recognition, computer vision, and natural language processing which can significantly improve educational efficiency and effectiveness. However, rapid advancements in intelligent processing technologies also bring about privacy and data security concerns. Risks such



as personal data exploitation, network fraud, and data trafficking pose severe threats to student privacy.

Data Analysis and Modeling

According to Akhondzadeh (2021), Data is very sensitive and valuable in the modern world. Technology development has resulted in the production of enormous amounts of data, and this data has become increasingly important. Data risks can cause massive errors that impact other data. This emphasizes how crucial it is to put strong data protection and security measures, such as data encryption, and monitor and manage data access.

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According to Chabé-Ferret, S., Le Coent, P., David-Legleye, V., & Delannoy, V. (2023) Payments for Environmental Services (PESs) play a crucial role in promoting environmentally friendly farming practices, yet low enrollment often hampers their effectiveness. In a substantial randomized field experiment involving 20,000 participants, we explored various non-monetary incentives to boost enrollment in the French implementation of the Agri-Environmental Schemes program by the European Union. Results show that sending 10,000 information letters led to the enrollment of 75 ± 52 farmers at a cost of 102 ± 71 Euros per new enrollee. Although pre-stamped reply forms increased contacts with caseworkers, they did not elevate enrollment. Interestingly, testimonies by other farmers appeared to diminish the impact of the information letters. The study suggests that diffusion effects



could enhance the effectiveness of non-monetary incentives by 40% to 50%, reducing the cost of acquiring an additional enrollee by approximately 30%.

Education and Non-Monetary Incentives

According to Robert Scott McGowen (2019), In studying the impact of school to students outcome. Exploring the possible relationship between the school condition and students academic performance is one of the focus of the study. In Texas there are a lot of enrollees who want a better and well ventilated facility. The facilities help those students to understand the lessons because they are able to relax and are given the chance to have a clean environment. In Texas their data is always updated in terms of students' performances. Student achievement, attendance, discipline, completion rate and teacher turnover rate and their relation to school facilities were investigated using multiple regression models to compare sections and subsections of the TLEA with each of the five dependent variables. Major research findings of this the study included the following: first, student achievement, attendance and completion rate measures were not found to be statistically significant in relation to school facility conditions as measured by the TLEA at the 0.05 level; second, discipline, or behavior, was found to be significantly related to the TLEA.

Based on Abdussalam Ayad A Kerdasi & S.M. Ferdous Azam (2020), The primary objective of this study is to examine the association between



non-monetary incentives, specifically career advancement opportunities and development opportunities, and employee commitment within the telecommunications sector in Libya. Additionally, the study evaluates the moderating influence of perceived supervisory support on this relationship. Statistical analysis was conducted using SPSS and PLS-SEM software. Results indicate that the theoretical model developed for this study effectively elucidates the significant impact of non-monetary incentives on employee commitment. However, the analysis revealed that supervisory support only moderates the relationship between career advancement opportunities and employee commitment, whereas no significant moderating effect was observed for development opportunities.

38

According to Hanna M. Sittenthaler & Alwine Mohnen (2020), Standard economic theory posits that cash incentives are typically superior to non-cash incentives, or at least not inferior. This study utilizes a real effort experiment to assess the impact of monetary, non-monetary, and combined monetary and non-monetary incentives on performance, with non-monetary incentives defined as tangible incentives with market value. Our findings suggest no significant discrepancy in performance among monetary, non-monetary, and combined incentives overall. However, when considering gender, a nuanced pattern emerges: men and women respond differently to various incentives. Men exhibit notably higher performance with monetary incentives compared to non-monetary ones, whereas women's performance is



notably higher with non-monetary incentives. These gender-based disparities in incentive effectiveness appear unrelated to the perceived attractiveness of non-monetary incentives, but rather stem from differential feelings of appreciation and perceived performance pressure in competitive settings. Consequently, our study underscores the importance of accounting for gender differences when designing incentive structures.

39

According to Assessing landowners' preferences to inform voluntary private land conservation: The role of non-monetary incentives (2021), private land conservation (PLC) is gaining recognition as a strategy to address the global biodiversity crisis. To design effective voluntary strategies for PLC, it's crucial to understand landowners' context-dependent preferences for different policies. Funding constraints and diverse cultural values may challenge traditional approaches like land acquisition or payment for ecosystem services. In this study, we explore landowners' preferences for both monetary and non-monetary incentives to increase participation in PLC in Uruguay, a country in the Río de la Plata Grasslands ecoregion. This region is one of the most endangered and least protected biomes globally, making it a valuable case study. Using a choice experiment, we found that landowners were more willing to engage in voluntary PLC when policies aligned with their values and needs. Non-monetary incentives, such as access to training and technical support, were favored over monetary payments. This highlights the potential for context-specific policies that promote environmental stewardship and



long-term engagement. Designing policies that incorporate a diverse set of instruments, flexible contract lengths, and consider the social and cultural characteristics of landowners' identities and values is crucial for increasing participation in PLC.

According to Abdulkhaleq Nader Qader (2021), This study aimed to investigate the impact of non-monetary incentives and the work environment on employee job satisfaction among academic staff at Erbil Polytechnic University. Utilizing a stratified random sample of 234 individuals from a population of 601, the study employed an analytical descriptive approach along with SPSS for analysis. Findings revealed a positive, statistically significant relationship between non-monetary incentives, the work environment, and job satisfaction. Specifically, non-monetary incentives were found to be positively correlated with job satisfaction, indicating their significant positive effect on employees' overall job satisfaction.

40

According to Gerhard Riener & Valentin Wagner (2022), this paper presents findings on how students select various types of non-monetary rewards for educational achievement. These rewards are external to the learning process but differ from cash-for-grades incentives that are internal to schooling practices. Data was gathered from both a non-incentivized survey and an incentivized survey, as part of a broader field experiment.



The non-incentivized survey was conducted prior to the field experiment to ascertain students' stated preferences regarding seventeen non-monetary rewards and to select rewards for the experiment. In the incentivized survey, students were given the opportunity to choose one out of four rewards: (i) a medal, (ii) a parent-letter, (iii) a no-homework voucher, or (iv) a surprise. This setup allowed us to determine students' preferences for different non-monetary rewards by observing their choices.

The results indicate that the preferred non-monetary reward varied based on students' academic ability. Low-performing students were significantly more inclined to choose the parent-letter compared to high-performing students. Furthermore, there was little evidence of divergent preferences based on socioeconomic background.

In summary, this study sheds light on how students' academic performance influences their selection of non-monetary rewards and provides insights into the effectiveness of different incentives in educational settings.

41

According to Kassim, I., & Onyango, D. (2022), this study focused on exploring the types of non-monetary incentives provided to teachers and their impact on teachers' performance in public secondary schools in Illemela District. Utilizing a mixed-methods approach with a convergent parallel research design, the study included teachers, heads of schools, school quality assurance, and district education officers, comprising a total population of



1056 individuals. Probability and non-probability sampling techniques were employed for teachers and officers, resulting in a sample size of 182 respondents. Questionnaires and interview guides were used for data collection, and both tools demonstrated reliability through a pilot study (coefficient of reliability: 0.81). Quantitative data were analyzed using descriptive statistics in SPSS version 20, presented in tables with frequencies and percentages. Qualitative data were coded and thematically analyzed in narrative form. The findings indicated that various types of incentives exist, with non-monetary incentives playing a crucial role in ensuring teachers' job performance. In particular, the provision of meals, transport, staff houses, health services, and adequate teaching and learning materials emerged as effective incentives encouraging teachers to perform effectively. The study recommends an enhancement of non-monetary incentives to contribute to teachers' job satisfaction. Additionally, it suggests that the government should provide administrative training to heads of schools to improve their ability to enhance teachers' job performance.

42

Moore (2022) provides an overview of seminal works in motivation, memory, strategies, and creativity, acknowledging the contributions of various researchers in the field, such as Anderson, Bandura, Biggs, Bower, Deci, Ryan, Dweck, Leggett, Entwistle, Maehr, Ames, Pintrich, Nicholls, Zimmerman, Pons, Carroll, Guilford, and Torrance. The focus of the issue is on motivation, strategies for learning, and creativity, with Moore highlighting key studies in these areas. The review discusses studies on non-monetary



rewards in German adolescents, intrinsic motivation in Canadian adolescent students, achievement goals and emotional state in Korean adolescents, and career development profiles in Chinese adolescents. Additionally, a study on reading performance in USA college students from different media is examined, showing the importance of individual and situational interest in reading performance.

According to Joyce Kamene Mulu (2023), the aim of this study was to explore the impact of non-monetary incentives on the performance of employees within the Machakos County Government. Specific objectives included examining the effects of training, employee recognition, flexible work schedules, and autonomy on employee performance. The study drew on theoretical frameworks such as Expectancy theory, Reinforcement theory, Equity theory, and Spillover theory to guide its investigation.

43

A descriptive research design was employed due to its systematic and comprehensive nature. The target population consisted of 823 respondents across various levels within the Machakos County government, with a sample of 247 respondents selected for data collection. Data was primarily gathered through a questionnaire, ensuring validity and reliability through pre-testing.



Analysis involved descriptive statistics such as percentages, frequencies, standard deviations, and means, alongside inferential statistics including correlation analysis, simple and multiple regression, utilizing Stata version 17.

Findings revealed a preference among employees for autonomy, recognizing its positive impact on aligning their performance with organizational objectives. Recognition was identified as vital for enhancing employee morale and organizational efficiency. Furthermore, training was found to significantly enhance employees' skills and confidence in performing their roles effectively.

However, the study indicated that flexible work schedules had a negative effect on employee performance, suggesting that Machakos County Government should reconsider promoting them as non-monetary incentives.

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Based on these findings, recommendations were proposed. Employers were advised to prioritize non-monetary benefits such as recognition, autonomy, and training. County governments were urged to educate staff on the value of such incentives, while potential investors were encouraged to develop strategies acknowledging employees' preferences for advancement opportunities, recognition, autonomy, and flexible working hours. Additionally, the study recommended that the Kenyan government institute labor regulations emphasizing workers' recognition and autonomy within organizations over mere monetary compensation.



According to Stefany Maca-Millán et. al. This paper addresses the potential negative impact of Payments for Ecosystem Services (PES) on intrinsic motivations, a phenomenon known as motivational crowding-out. Despite theoretical concerns, empirical studies on this topic remain limited, particularly regarding the absence of economic incentives. Furthermore, research lacks insights into PES designs that mitigate the risk of motivational crowding-out.

The objective of this study is to evaluate the post-intervention effects of incorporating non-monetary incentives, such as environmental awareness and social recognition, into PES frameworks to integrate plural values. A lab-in-the-field experiment followed by a questionnaire was conducted with 120 participants in rural Cali, Colombia.

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Through non-parametric and Differences in Differences regression analysis, we demonstrate that integrating plural values via non-monetary incentives may lead to sustained conservation efforts (motivational crowding-in) compared to PES alone. Additionally, our findings do not strongly support the occurrence of motivational crowding-out with PES interventions.

We conclude that enhancing PES effectiveness and promoting equity-related outcomes can be achieved by embracing diverse perspectives, relationships, and attitudes towards nature. By integrating multiple forms of motivation



and values into PES designs, we can foster a more comprehensive approach to conservation that aligns with various stakeholders' interests and values.

According to Margaret Triyana & Justin S. White. In this study, we present evidence on the efficacy of a school-based intervention aimed at preventing risky behavior among adolescents in Indonesia, utilizing a non-monetary penalty and regular monitoring approach. The field experiment involved inviting students to commit to abstaining from tobacco use through signing a pledge, alongside a similar commitment for parents to monitor their children's behavior. Additionally, a subset of treated schools participated in group incentives, competing against each other for the highest rates of tobacco abstinence.

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Our findings indicate that the individual pledge led to a significant increase of 5 percentage points in biochemically verified tobacco abstinence. Notably, this effect persisted three months after the conclusion of the program. However, we did not observe any additional impact on tobacco abstinence from school competition.

These results underscore the effectiveness of non-monetary incentives in mitigating risky behaviors among adolescents, particularly in contexts where individuals face challenges related to limited self-control and peer pressure. By leveraging mechanisms such as pledges and parental monitoring,



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school-based programs can play a vital role in promoting healthier behaviors among youth.

47

According to Beatrice Akinyi Apuko (2021), This study investigates the impact of non-monetary rewards on employee performance in Homa Bay County Government, Kenya. Using a correlation study design guided by Herzberg's theory, the research examines the influence of employee recognition, flexi-time, and training and development on employee performance. Data was collected from 146 employees selected through stratified sampling techniques. Results indicate that non-monetary rewards explain 62.7% of the variation in employee performance. Specifically, employee recognition and training and development significantly positively affect employee performance, while flexi-time has an insignificant positive effect. The study suggests enhancing practices related to employee recognition and training and development to improve employee performance and service delivery. These findings can inform the formulation of human resource reward policies to enhance organizational effectiveness in Homa Bay County Government.

According to Alagirisamy Kamatchi Subbiah Sukumaran (2020), the study reveals that employees tend to prioritize immediate benefits of non-monetary factors over future benefits, supporting the notion of the endowment effect. These immediate benefits directly influence employee



performance. While distant benefits do not directly impact performance, they do indirectly affect it by contributing to current benefits. Employees with lower literacy levels and those in operative roles show a stronger preference for immediate benefits compared to others. Marital status does not seem to influence preference for immediate benefits. This study is one of the first to explore the endowment effect on non-monetary motivational factors and its impact on employee performance.

48

According to Mário Nuno Mata et. al. The current study aims to examine the impact of non-monetary factors, specifically career advancement opportunities, recognition, and development opportunities, on employee retention, with motivation playing a mediating role. Convenience sampling was employed, and data were collected from various higher education institutes across Pakistan, utilizing both in-person and online methods due to the Covid-19 pandemic. Analysis was conducted using SmartPLS software v.3.0, with sample size determined using G* power software.

Results indicate a significant and positive relationship between non-monetary factors and employee retention, with motivation found to mediate this relationship effectively. These findings contribute to the existing literature and serve as a foundational point for future research. However, according to Expectancy theory, the increase in non-monetary factors may lead to



negotiation and conflict among leaders and employees due to perceived nepotism.

The study concludes with theoretical, practical implications, and recommendations for future research, emphasizing the importance of considering non-monetary factors in enhancing employee retention and organizational success.

49

According to Daniel Oduor Onyango, This study examines the impact of non-monetary incentives on teacher performance in public secondary schools in Ilemela District. Using a mixed-methods approach, data was collected from teachers, school heads, quality assurance officers, and district education officers. Results indicate that non-monetary incentives, such as meals, transportation, housing, and access to teaching materials, significantly influence teacher performance. The study recommends enhancing these incentives to improve teacher job satisfaction and suggests providing administrative training to school heads to further support teacher performance enhancement.

50

According to Heider, A. K., & Mang, H. (2023), Healthcare expenditures in western countries have been rising for many years. This leads many countries to develop and test new reimbursement systems. A systematic review about monetary incentives in group settings indicated that



a sole focus on monetary aspects does not necessarily result in better care at lower costs. Hence, this systematic review aims to describe the effects of non-monetary incentives in physician groups. We searched the databases MEDLINE (PubMed), The Cochrane Library, CINAHL, PsycINFO, EconLit, and ISI Web of Science. Grey literature search, reference lists, and authors' personal collection provided additional sources. Results: Overall, we included 36 studies. We identified 4 categories of interventions related to non-monetary incentives. In particular, the category of decision support achieved promising results. However, design features vary among different decision support systems. To enable effective design, we provide an overview of the features applied by the studies included. Not every type of non-monetary incentive has a positive impact on quality of care in physician group settings. Thus, creating awareness among decision-makers regarding this matter and extending research on this topic can contribute to preventing implementation of ineffective incentives, and consequently, allocate resources towards tools that add value.

Business Intelligence and Data Visualization

According to Sindhu, Jain, and Nasreen (2020), Dashboards are essential tools in business intelligence (BI) for managing information overload, assisting employees and stakeholders in making quick, informed decisions, and improving business performance. Despite their potential, some software vendors prioritize data visualization for marketing purposes over



utilizing the full capabilities of dashboards. The study compares various types of dashboards and the tools used to create them, aiming to provide insights into selecting the most suitable dashboard and BI tool based on the business scenario and use-case, ultimately leading to more effective data-driven decisions. This comparative analysis highlights the significance of dashboards in BI and decision-making processes, enabling organizations to manage data overload and make informed decisions that drive business success.

Data Analysis and Machine Learning

51

According to Hao (2019), In the field of data analysis and modeling, machine learning has gained significant popularity. Over the last two decades, various machine learning algorithms have been created and applied in multiple programming languages. This article begins by offering an overview of machine learning and distinguishing it from statistical inference. It then discusses Scikit-learn, a widely utilized Python-based machine learning package in the domain of data science. Scikit-learn encompasses a wide array of machine learning techniques, all following consistent data and modeling procedures, rendering it a valuable resource for both educators and behavioral statisticians.

Facilities Management and Information Systems

Cruz and Ballera (2023) developed a Facilities Management Information System (FMIS) to address the challenges in predicting and



managing facilities management services. The study focuses on predicting the most frequently requested and severe cases of services using the J48 algorithm, which generates a tree model from preformatted data. The logistic regression algorithm is employed to predict the satisfaction of condominium owners with the overall quality of work delivered by service providers. The study utilizes descriptive and developmental methods, including systems development life cycle methods and PHP, to develop the web-based FMIS. Results indicate that the J48 algorithm achieved a high accuracy rate of 99.7473% in predicting severe cases and most requested services, while logistic regression achieved an accuracy rate of 91.86% in predicting satisfaction. The Technology Acceptance Model (TAM) was used to assess user satisfaction, with the majority of respondents expressing extreme satisfaction with the functionality and usefulness of the developed FMIS.

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Web-based Systems and Applications

The study aimed to create a Web-based Automobile Service Management System customized for MAS Motors LLC, a recognized Toyota dealership in Libya. The objective was to streamline daily activities within the service division across all branches by digitizing processes. The system was intended for use by various stakeholders, including Service Advisers, Workshop Managers, Storekeepers, Technicians, Customers, and Upper Management. Due to the company's expansion, manual procedures became



ineffective and insufficient for handling the increased business activities. The project strived to introduce a centralized system operational in all branches to manage their diverse business requirements. The software resulting from the project underwent thorough testing, including the Alpha and Beta testing phases. Additionally, interviews were conducted to evaluate existing business challenges and ascertain the functionalities of the proposed system. The Hewlett-Packard FURPS model was applied to assess software quality, utilizing a survey answered by a panel of respondents. The system demonstrated functionality that met the client's specifications and requirements. Shahlol, A., Alix, A., & Lagman, A. (2018, November).

Dadizon, Peñafiel, and Delos Santos (2021) explore the development of a Progressive Web Application (PWA) for managing information at the Sta. Monica Parish in Poblacion, Taytay, and Palawan. This study aims to address issues faced by the Parish Personnel in accessing sacramental records, especially for those situated far from the municipality, and the lack of easy access for both personnel and clients. The proposal utilizes JavaScript, HTML, and CSS to facilitate user access to the parish and its sacramental records. The research aims to offer enhanced access to user records and expedite transactions for Parish Personnel. Through collaboration with the parish secretary, the researchers were inspired to propose this project, anticipating a positive outcome beneficial to both Parish Personnel and clients.

Environmental Sustainability and Recycling Initiatives



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According to Benjoe Vidal, a software developer, the notion of recycling for profit via a mobile app was developed to aid local communities in successfully dealing with their growing plastic trash problem, particularly in tourist regions. Benjoe Vidal is the man behind TrashCash, a smartphone app he created with the support of his friends that allows individuals to earn money from their waste plastics. TrashCash attempts to orient, educate, and motivate Filipinos to understand their rubbish's value and environmental impact. People must download the application onto their mobile phones to use its services. The program allows users to use their cell phones to scan waste plastic materials and collect them for proper segregation and disposal. Users can earn "trash points" by delivering gathered materials to the nearest drop-off location. The associated virtual reward points can be accrued and later redeemed as a digital wallet credit or exchanged for grocery items and other merchandise via TrashCash trade partners. In today's time, every action comes with a potential reward, leading to the creation of apps that benefit developers and individuals. Just like TrashCash, every plastic waste you recycle comes with incentives and tips that help you and contribute to the solution for the growing plastic waste problem. This system aims to provide an answer to this pressing environmental issue. Furthermore, it's related to the proposed method where students' reports are accompanied by rewards that can be used for their academics, offering assistance and solutions to the challenges schools may face.



Records Management and Technology Solutions

According to Salvacion Mata-Domingo, DIT (2020), this study aims to provide the groundwork for enhancing the online discussion capabilities of current forum systems. The framework should offer functionalities that enable the monitoring of discussions and facilitate the automatic evaluation of posted remarks by the teacher-mediator and student participants. One significant limitation of conventional forum applications, as identified via thorough analysis, is their need for more functionality in facilitating instructors' supervision and evaluation of student interactions (Raga, 2013). The present study implemented a framework known as the Collaborative Interaction Management System (CIMS) to construct a forum-based setting that incorporates automated evaluation of student contributions and facilitates group-based collaborative learning. To evaluate the primary functionality of CIMS, the evaluation process, a dataset was gathered from the Slashdot forum. This dataset comprises 28 threads containing over 1000 posts covering various issue topics. Cohen's Kappa coefficient was employed to assess the numeric ratings issued by the CIMS to evaluate the levels of accuracy and dependability. In the context of system assessment technique consistency, it is necessary to ascertain the program's quality. The primary criteria for the CIMS prototype were functionality, reliability, and usability, as user groups can evaluate these aspects



Enad and Balicoco's (2023) study investigated the issues surrounding records management in public secondary schools within Sagbayan District, Bohol. Their research employed a mixed-methods approach, encompassing qualitative and quantitative research methodologies. The qualitative segment involved conducting in-depth interviews and focus group discussions with key stakeholders involved in records management. In contrast, the quantitative portion utilized survey questionnaires to collect data from relevant stakeholders, assessing the acceptability of the proposed Management Information System (MIS) among end-users. The initial findings highlighted the prevalent challenges within records management in these schools, including inefficient manual record-keeping systems, data retrieval difficulties, and the risk of data loss due to inadequate backup procedures. These challenges underscored the necessity for a comprehensive technology-based solution to enhance records management processes and ensure data security. The second-phase evaluation results indicated that the developed MIS was well-received by end users. The absence of significant differences in acceptability among participants affirmed the system's suitability in addressing their specific requirements. The successful implementation of the MIS served as an effective resolution to the records management challenges faced by public secondary schools in Sagbayan District, Bohol.

2.2 Review of Related Studies



FOREIGN

Agile Methodologies in Web Development: Benefits, Limitations, and Characteristics

57

According to Ríos, J. R. M., & Souto, N. P. (2019), in today's landscape, Agile methodologies have become increasingly popular among web-based software developers due to their many advantages and limitations. These methodologies are renowned for their flexibility, effectiveness, customer satisfaction, and streamlined documentation. However, there is a shortage of in-depth research on the crucial characteristics of web development methodologies and the various approaches that require consideration. A variety of methods of web development are available, such as hypermedia, agile development, and end-user-focused approaches, and the selection of a methodology will depend on factors such as project and feature complexity, as well as delivery timelines. Despite the obstacles, Agile methodologies offer notable improvements in efficiency, customer satisfaction, and documentation.

Facility Management and Maintenance in Educational Settings

58

Osibo (2019), Facility upkeep is an essential part of the educational system throughout early childhood education to higher education levels in Ghana. The significance of maintaining facilities for school operations is embraced globally, despite the lack of in-depth research in Ghana. In fact, several education departments all around the world have set up particular divisions or organizations that are in charge of managing and protecting



educational facilities. When school buildings are adequately cared for and administered, they foster the conditions for excellent guidance. These facilities have the potential to significantly enhance students' learning results if properly utilized and maintained. The responsibility of maintaining and modernizing a school's buildings has historically been difficult while balancing school budgets. The educational environment has improved by becoming more engaging and pleasant as a result of the dedication of school administration and continual improvements to school facilities. High-quality facilities give instructors the tools they need to better meet the changing educational demands of their pupils and get them ready for the workforce.

According to Inegbedion (2020), Preventive maintenance could be performed on the equipment. It was mentioned that reporting issues with school property as soon as feasible could help to avoid incurring large long-term costs. If school facility maintenance is scheduled, then a maintenance program will be effective and efficient. Frequent maintenance assists in locating possible problems and resolving them before they cause equipment malfunctions or breakdowns. Early problem solving typically results in lower costs than prolonged damage restoration. Upkeep is an investment in the durability and effectiveness of equipment and other resources, which can eventually result in lower costs and more reliable performance.



Yousefli (2021) asserts that hospital facility managers encounter complex maintenance decisions as a result of a multitude of maintenance requests, resource constraints, and fragmented information. The confluence of escalating maintenance requirements and inadequate management systems has led to delays in the repair and maintenance of hospital building components and systems. The occurrence of these delays can lead to emotional and psychological discomfort for both patients and healthcare personnel. This research presents an innovative methodology aimed at assisting facility managers in addressing these aforementioned difficulties. The proposed methodology employs a multimethod simulation approach to effectively integrate fragmented information pertaining to various levels of maintenance management in order to mitigate delays in hospital building repair. The simulation model consists of two primary components, namely a status tracking system (STS) and a resource allocation system (RAS). The utilization of a discrete event simulation (DES) is implemented in order to represent the progression of maintenance procedures within the STS. This simulation encompasses the management of task registration, organization, and allocation to the relevant resources. The development of a multi-agent resource allocation system (MARAS) is undertaken to simulate diverse resource allocation scenarios inside the RAS component. This system considers the interactions among decision-makers involved in the maintenance process. A case study is provided as a means to demonstrate the fundamental characteristics of the method. The findings from



the simulation indicate that the implementation of MARAS leads to a substantial reduction in maintenance delays within the context of the case study.

According to Nalanda International School (2022), every place can provide a favorable environment for people who love to read and learn. However, having a well-organized school infrastructure is essential for producing a productive and enjoyable learning environment. Although these committed students put their studies above their surroundings, in the setting of real-world educational institutions, a school's amenities have a direct impact on students' performance. The site of the school is vital, and it should be placed in a beneficial area, away from pollution and noise, in order to enable students to readily absorb information. The school should provide a calm, roomy environment with visually appealing designs. It should have sufficient lighting, necessary facilities including restrooms, playgrounds, sinks, multipurpose rooms, offices, locker rooms, and storage places, as well as a competent administration and instructional personnel.

According to Mormah, In the twenty-first century, efficient management and upkeep of physical infrastructure are essential instruments for guaranteeing excellence in higher education. This study examines pertinent literature and highlights the critical role facility management and upkeep have in educational institutions' ability to grow economically and



academically. The study explores a variety of subjects, including the benefits of maintaining school physical assets, creative ways to facilitate upkeep in higher education, and maintenance culture in postsecondary education. Maintaining equipment and facilities in top shape requires school administrators to inculcate a maintenance culture and to teach staff and students about it.

Reward Management and Employee Performance

According to Sarpong, E. O., Yun-Fei, S., & Coffie, C. P. (2019), in the intensely competitive hospitality industry of Ghana, job performance is critical for attracting and retaining customers, achieving targets, and sustaining competitiveness. Recognizing the role of motivation in employee performance, our study examines the impact of non-monetary incentives on employees at selected hotels in Ghana. Using a sample of 172 respondents from 68 hotels (with a response rate of 78.7%), we employ a hierarchical logistic model to analyze the combined effect of employees' characteristics, tangible non-monetary incentives, social non-monetary incentives, and job-related non-monetary incentives on job performance. The findings reveal that the likelihood of improved job performance is higher for male, younger, more educated employees with fewer years of service. Additionally, the hierarchical logistic regression models demonstrate that tangible, social, and job-related non-monetary incentives collectively influence the probability of



employees enhancing their job performance. These results offer valuable insights into the relationship between non-monetary incentives and employee job performance in hotels, with potential applicability to the broader hospitality industry.

62

According to Qader, A. N. (2021), this study aimed to investigate the effect of Non-Monetary Incentives & work environment on employee's job satisfaction. A Stratified random sample, which was chosen, consisted of 234 academic staff within Erbil Polytechnic University, of a population of 601 people. To achieve the objectives of the study, the analytical descriptive approach and SPSS were used. The results indicated that there is a positive statistically significant relationship between the study's two independent variables (non-monetary incentives, and the work environment), revealing that non-monetary incentives are positively correlated with job satisfaction. Also, the results show that employee non-monetary incentives have significant positive effects on employees' job satisfaction so non-monetary incentives have significant positive effects on employees' job satisfaction.

63

According to Bukhari, M. F., Shakoor, A., & Qaiser, R. S. (2022). The article provides an analysis of the current state of non-monetary incentives for Quality Assurance (QA) specialists in pharmaceutical companies, aiming to offer recommendations for enhancing personnel management in this area. The analysis reveals that pharmaceutical enterprises often have irregular and



limited practices of non-monetary motivation for QA specialists. Combining factor and cluster analyses, along with two-dimensional data analysis, uncovered a lack of alignment between the incentive systems employed and the needs of QA specialists, resulting in diminished work motivation. Non-monetary incentives offer the advantage of reduced financial burden, allowing for broader application compared to financial methods. The article suggests that the simultaneous use of monetary and non-monetary methods generates a synergistic effect, significantly boosting the productivity of QA specialists in pharmacy enterprises.

According to Bulhan, S., & Deborah, N. (2023) The study aimed to investigate the potential correlation between non-monetary incentives and staff relations at Kampala International University. Employing a cross-sectional survey research design and simple random sampling, the research focused on teaching staff. Data analysis using SPSS included descriptive statistics with a Likert scale. Three non-monetary incentive objectives—working conditions, training opportunities, and relations/recognition—were computed along with the dependent variable, yielding mean values. The researcher concluded an undecided relationship (independent variable mean: 2.676, dependent variable mean: 2.541) between non-monetary incentives and staff relations at the university. This underscores the need for addressing the perceived gap in employee-employer relations for a more harmonious workplace. Recommendations emphasize management



improvements in employee relations, such as providing necessary working equipment, defining leave policies, and encouraging employee participation in management for increased recognition and improved relations.

64

The study by Yang, Wang, and Ding (2023) addresses a gap in the existing literature by exploring the influence of recipients' feedback on volunteers' intention to remain, in addition to organizational settings. Drawing on the affective events theory and an integrated perspective of task design and feedback, the research examines the effects of illegitimate tasks, recipients' feedback, and emotional exhaustion on volunteers' intention to remain. The study, based on data from poverty alleviation volunteers, reveals that illegitimate tasks negatively impact intention to remain, with emotional exhaustion mediating this relationship. Importantly, the study finds that recipients' feedback has a significant moderating effect, mitigating the negative impact of emotional exhaustion on intention to remain. These findings highlight the importance of feedback in shaping volunteers' intentions to remain and provide valuable insights for organizations seeking to retain volunteers through effective task design and feedback mechanisms.

65

Førland, O., & Roxå, T. (2023) say higher education institutions struggle to elevate the value and status of academic teaching. In this endeavor, rewards for excellence in teaching are becoming a standard measure. This study reports on the experience of the first academic teachers



who were given the status of rewarded teachers in new reward systems. We explore rewarded teachers' potential to influence teaching and learning culture through a socio-cultural perspective, where influence is assumed to materialize through teachers' networks and cultural change is linked to a widening of significant networks. Interviews with 13 rewarded teachers from three universities were analyzed using thematic analysis. We find that rewarded teachers maintain their positions in existing networks and gain visibility and influence in wider networks. This widening of their teaching and learning network is a first step that, over time, can become a more comprehensive, significant network potentially important in influencing culture. We suggest that a productive measure to support rewarded teachers is to provide support for expanding their effective networks further, bridging the boundaries between teaching cultures. This study adds to our knowledge about how reward impacts networks and the potential role rewarded teachers play in cultural change, a perspective underexplored in research on reward systems.

According to Bijengo Kulwa & Prosperity Mwansa Mwila, This study examined non-monetary incentives' impact on job performance among secondary school teachers in Kinondoni Municipality, Tanzania. Using a mixed-method approach, data from 42 participants, including heads of schools, teachers, and Ward Education Officers, was collected. Findings revealed dissatisfaction among teachers regarding the availability of



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non-financial incentives, such as professional growth, a positive work environment, respect, recognition, effective communication, and involvement in decision-making. Teachers expressed preferences for respect, fair treatment, suitable work environments, advancement opportunities, and involvement.

66

According to Minerva C. Manalo & Elaine Joy C. Apat, This study delves into the work motivations and job performance of non-teaching personnel within a university setting. Using a descriptive research approach, 50 administrative and support staff were surveyed using structured questionnaires. Findings highlight workplace environment and professional growth and development as key motivational factors. Additionally, a positive and significant relationship between these motivational factors and job performance in terms of both quantity and quality of work was observed. The study also identified a significant correlation between professional growth and development and attitudes toward work. These findings offer valuable insights for University Human Resource planning. However, for broader applicability, a comparative study with other higher education institutions is recommended.

67

According to Joyce O. Betonio et. al. This research investigates the satisfaction level of motivational incentives and employee efficiency in selected resorts and hotels in Dauis, Bohol. Using a quantitative-correlational method, data was gathered through a survey questionnaire distributed to 204



employees. A stratified random sampling technique was employed, resulting in a sample size of 134. Data collection was conducted online through Google Forms, with adherence to ethical guidelines ensuring participants' rights to privacy and withdrawal. Findings indicate moderate satisfaction with motivational incentives and high employee efficiency. Moreover, a significant correlation was observed between employee satisfaction with motivational incentives and their efficiency, suggesting that satisfaction influences efficiency levels. The study underscores the importance of motivational incentives in enhancing employee performance and organizational success in the hospitality sector.

68

The study's principal aim is to investigate the correlation between the implementation of reward management systems and the performance of bank employees within Istanbul's global banks. Additionally, it explores the interceding role of motivation. Prior research demonstrates that organizations utilize reward systems and strategies to incentivize their workforce and enhance overall performance. The study is poised to offer substantial contributions to the business realm by potentially guiding organizations to adapt and refine their reward systems in order to thrive within the contemporary business landscape. The research examines the effectiveness of employee performance based on reward systems. Initially, it involves a literature review and establishes hypotheses regarding the impact of reward management systems and motivation on employee performance.



Subsequently, it delves into the theoretical framework, considering the influence of reward management system applications and motivation on employee performance. Finally, the hypotheses are empirically tested using data gathered from 116 employees across 12 global banks, and the resulting research findings are meticulously analyzed.

Technology Applications in Educational Facilities Management

Ahmad (2021) conducted a study examining the maintenance practices of educational facilities and infrastructure at Vocational High School 2 Cikarang Barat. Using a descriptive qualitative analysis method, the research was carried out at the school from July to December 2020. The study involved the school principal, deputy headmaster in charge of facilities, maintenance support staff, and students as research informants—data collection methods comprised interviews, observations, and reporting studies. The data was subsequently analyzed through reduction, presentation, and conclusion. The study employed triangulation of sources, techniques, and hypotheses for validity. The findings highlighted the school's maintenance preparation process, maintenance categories, yearly budgeting, structure of maintenance tasks, and student socialization. It also discussed the maintenance techniques for classrooms, offices, specialized rooms, equipment, and technological upgrades. The study identified obstacles in facility and infrastructure maintenance, such as unexpected urgent repairs, user knowledge gaps,



insensitivity of external partners, and cultural differences among facility users.

69

Kusniyati and Rachman (2022) presented a study in the International Journal of Scientific Research in Computer Science, Engineering, and Information Technology on developing a school facility damage reporting application utilizing the Simple Additive Weighting (SAW) algorithm. The article addressed the challenges Indonesian schools face due to facility damage disrupting learning activities and the sluggish response in handling student-submitted damage reports. The authors emphasized the necessity of a reporting application accessible to students and school administration, aiming to expedite response times to ensure uninterrupted learning. Employing the SAW algorithm, the application prioritizes severity criteria, facilitating immediate responses to student complaints regarding facility damage. This web-based approach utilizes SAW's decision-making to select and address the most critical reports efficiently.

70

According to Diannisa Rizky et al., (2022) this study aims to offer suggestions that can guide tactics for maximizing resource use, enhancing the educational setting, and ultimately supporting the growth of Indonesia's youth through an examination of the advantages, disadvantages, and difficulties associated with these procedures. The cycle of educational facilities and infrastructure at an Indonesian Islamic junior high school has



been investigated in this study. The researcher aims to identify opportunities for improving the quality, efficiency, and sustainability of educational resources through an in-depth assessment of each phase, including assessing current and future needs, effective procurement practices, accurate inventory tracking, proactive maintenance strategies, and timely disposal or replacement of outdated assets.

71

Data visualization has emerged as a pivotal tool in aiding decision-making processes across various domains, including higher education. Llaha, Aliu, and Kadena (2023) emphasize the importance of data visualization in presenting complex information in a comprehensible manner. By transforming data into graphical or pictorial representations, data visualization enables stakeholders to interact with information more effectively, leading to faster and more informed decision-making. In higher education, where the volume and complexity of data continue to grow, the need for effective data visualization becomes even more pronounced. The ability to analyze and interpret data plays a crucial role in enabling administrators, academic staff, and students to make data-driven decisions. According to the study, data visualization technology has a significant impact on decision-making processes within higher education institutions, empowering stakeholders to make informed decisions more efficiently. Moreover, the study highlights the practical application of data visualization techniques and machine learning algorithms in analyzing and forecasting the



influence of data visualization on decision-making. By comparing various algorithms through a case study, the authors provide substantial evidence supporting the positive impact of data visualization on decision-making processes. Overall, the literature reviewed suggests that data visualization has the potential to revolutionize decision-making in higher education, enabling stakeholders to gain deeper insights from data and make decisions that are more aligned with institutional goals.

Impact of Infrastructure on Education and Learning

The study conducted by Miah et al. (2021) demonstrates that the Airport Pavement Management System (APMS) plays a crucial role in aiding airport authorities in making cost-effective decisions pertaining to Maintenance and Rehabilitation programs, ultimately leading to improvements in pavement conditions. The methodology utilized in this procedure is distinguished by a methodical and thoroughly documented technical framework, involving the recognition of future operational requirements and the assessment of financial demands. The Airport Pavement Management System (APMS) aids airports in the identification of optimal maintenance and repair (M&R) techniques that are both cost-effective and efficient, leading to decreased expenses and improved durability of pavement infrastructure. However, it is necessary to conduct additional research and scholarly examination in order to enhance the existing knowledge on Airport Pavement Management Systems (APMS) in airports worldwide. This is due to



the limited availability of literature that specifically addresses the modeling of airfield pavement deterioration within APMS.

72

The research by Pangestu and Hariri (2022) focuses on the management of facilities and infrastructure to improve the learning process in educational institutions. Utilizing a descriptive qualitative approach and case study methodology, the study conducts a literature review of previous research from various countries worldwide. Through interviews, observations, and documentation analysis, the research identifies key elements of facilities and infrastructure management, including planning, procurement, use, maintenance, inventory, write-off, and liability. The findings emphasize the importance of adequate facilities and infrastructure in creating a conducive learning environment for students and teachers, highlighting the need for effective management techniques. Despite limitations related to time and location, the study contributes valuable insights for educational institutions, school management, educational foundations, and teachers, aiming to enhance the overall educational experience and outcomes.

73

According to Yangambi, M (2023) the passage highlights the critical role of school infrastructure in facilitating quality education and its impact on student learning and achievement. It references studies indicating that modern physical facilities positively affect students' academic performance.



Inadequate facilities are identified as a barrier to education in some countries, contributing to low levels of education. The specific study mentioned aimed to assess the impact of school infrastructure on student learning and achievement in three schools in the Kinshasa-Ngaliema education division. The research utilized quantitative methods, including a questionnaire administered to teachers. The findings emphasized the significant influence of school infrastructure on student outcomes, suggesting that continuous improvement in infrastructure is essential to optimize both student achievement and teacher effectiveness.

74

Abban (2023) analyzed at the University of Education, Winneba, focusing on space utilization and management issues. The study highlighted concerns about space overuse during specific peak periods and identified the need for a formal space management policy. The paper proposed several recommendations, including implementing a space management policy, restructuring the space allocation committee, and utilizing the computer tabling feature on OSIS II for improved course tabling at departments. It emphasized the importance of effective space management, addressing aspects such as allocation, arrangement, and quality of space for teaching, learning, research, and other university activities. The study underscored the significant impact of space on the University's budget and its direct relationship with academic activities. The examination also noted changes in space utilization patterns over the institution's 20-year history. It stressed the



necessity of accurate and current space utilization information for effective reallocation and minimization of waste. Furthermore, it highlighted the environmental and financial impact of constructing, maintaining, and servicing spaces, emphasizing the need for energy-efficient and well-designed rooms. The paper concluded that effective space management, including automated tools and coordinated efforts among various stakeholders, is pivotal for maximizing existing space and planning for future space needs within the University.

LOCAL

Local Electronics Repair Infrastructure in Remote Areas

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This study explores the intricacies and obstacles encountered in technology repair within remote, low-income regions far from conventional ICT repair infrastructure. Our research focuses on the coastal settlements of Dibut, Diotorin, and Dikapinisan in Aurora Province, Philippines, where the residents face geographical isolation from urban areas and lack local repair shops for devices. Despite frequent damage to electronic devices due to harsh environmental conditions, the absence of repair facilities restricts access to technology and contributes to an accumulation of electronic waste. While past research highlights the emergence of local electronics repair capabilities in many rural settings globally, the effective establishment of such infrastructure relies on various structural conditions and is not guaranteed. The article exposes the hardships encountered in creating local repair about the disparity



between urban and rural infrastructures, underscoring the marginalized status of the coastal communities regarding public infrastructure. However, in these remote settings, informal repair infrastructures grounded in trust relationships emerge to bridge these disparities. Trust plays a critical role in shaping the repair infrastructure due to the area's remoteness and the significance of repair services. Networks of trust among repairers, clients, suppliers, and training institutions are vital in facilitating the exchange of resources and expertise across the Philippines but also contribute to reinforcing the marginalization of residents and repairers in the coastal areas. Despite these structural hurdles, the local communities maintain a robust ecosystem for electrical line repair. From this observation, we draw insights into a generalized model of training grounds as a means to support and sustain local repair expert communities. Jang, E. H. B., Garrison, P., Vistal, R. V., Cunanan, M. T. D., Perez, M. T., Martinez, P., ... & Heimerl, K. (2019).

Teachers' Perceptions of Reward Systems

According to Johnsen K, and Bell C, (2019) this study examined elementary teachers' perceptions of the reward system in classrooms using a descriptive quantitative research design in the School Division of Cauayan City. It utilized a researcher-made questionnaire to gather data on teachers' profiles, motivation forms, and perceptions of the strategy, analyzed using a Likert Scale and Spearman's Rho for correlation. Findings revealed that



teachers often used small items as forms of motivation and perceived the reward system as effective for all pupils, leading to increased academic performance and active student participation. Significant relationships were found between teachers' profiles, their perceptions of the reward strategy, higher educational attainment, length of service, and grade level handled. The study suggests the importance of schools encouraging teachers to enhance reward system mechanisms and recommends further research into integrating reward systems or external strategies for specific subjects and performance competencies.

Motivational Incentives and Employee Efficiency

77

According to Employees' Satisfaction with Motivational Incentives and Employees' Efficiency (2022), employee satisfaction is crucial for a company's success, and this research aimed to assess the satisfaction level of motivational incentives and efficiency among employees in selected resorts and hotels in Dauis, Bohol. The study sought to determine if there is a relationship between these two variables and the nature and strength of this relationship. Utilizing a quantitative-correlational method, a survey questionnaire was employed for data collection among 204 employees from these establishments. The study revealed a moderate level of employee satisfaction with motivational incentives and a high level of efficiency among the respondents. Importantly, there was a significant correlation between employees' satisfaction with motivational incentives and their efficiency. The findings suggest that the



level of satisfaction with motivational incentives influences the level of efficiency among employees. The study, conducted with ethical considerations and ensuring respondents' rights, provides valuable insights into the interplay between motivational incentives and employee efficiency in the context of resorts and hotels in Dauis, Bohol.

Differentiating Rewards and Recognition in Employee Motivation

According to Word (2023), it's essential to differentiate between rewards and recognition, as these terms are often used interchangeably. Rewards typically refer to tangible and measurable items, often of monetary value, given to employees for good performance. This can include bonuses or other financial incentives, distinct from regular salaries. Companies use rewards as a strategy to attract talent and motivate employees, reinforcing their positive performance. On the other hand, recognition pertains to intangible elements and does not have a direct monetary value. This may involve verbal praise or acknowledgment from management for outstanding performance. While rewards are often associated with monetary incentives, recognition focuses on acknowledging and appreciating employees' efforts in non-financial ways. In practice, these terms are frequently used together, emphasizing that effective motivation involves both tangible rewards and intangible recognition. This holistic approach recognizes that providing emotional reinforcement through praise or kind words, in addition to



monetary rewards, contributes to a more comprehensive and impactful employee motivation strategy.

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Synthesis of Related Literature and Studies

A systematic approach was employed to gather relevant scholarly articles and research studies and conduct a comprehensive literature and studies review for the Facilities Management and Reporting System study. Using Google Scholar as the primary academic database, searches were performed using a combination of keywords such as 'reports management,' 'school facilities,' 'incentive system,' 'job order,' 'analytics,' 'machine learning,' 'natural language processing,' 'sentiment analysis,' 'reports,' and 'request.' Initial screening involved reviewing abstracts and titles to assess their relevance to the research topic. Articles that addressed aspects of facilities management, reporting systems, and related technologies were prioritized for further examination. Each selected article underwent thorough scrutiny to evaluate its methodology, findings, and credibility. Attention was also given to citations and references within the articles to identify additional relevant sources. The information gathered from these sources was organized and synthesized, allowing for the identification of key themes, trends, and gaps in the existing literature. This literature review informed the development of research questions and hypotheses and provided a solid foundation for understanding the current state of knowledge in facilities management and reporting systems.



Developing a robust facilities management and reporting system relies heavily on effective record management and technology solutions. Institutions can streamline processes, track resources, and enhance decision-making by implementing a comprehensive system for recording and managing facility-related data. - Additionally, integrating machine learning and artificial intelligence into this system can further optimize facility management processes. These technologies can analyze data patterns, predict maintenance needs, and suggest efficiency improvements, leading to more proactive and effective facility management.

Implementing non-monetary incentives within the system can significantly encourage student engagement and usage. For example, offering virtual badges or rewards for completing tasks, achieving milestones, or participating in interactive features can motivate students to use the application actively. Additionally, incorporating gamification elements such as leaderboards, challenges, and levels can make the learning experience more enjoyable and competitive, incentivizing students to engage with the application regularly.

In conclusion, integrating non-monetary incentives into our system is a powerful strategy to encourage student usage and engagement. By leveraging gamification elements and rewards, QCU-FMS can create a more interactive and motivating learning environment, ultimately enhancing student participation and driving positive outcomes. Similarly, integrating technology-driven solutions such as record management systems and



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machine learning algorithms is crucial in developing an efficient facilities management and reporting system. With this literature and studies, QCU-FMS can enhance operational efficiency, optimize resource allocation, and ensure a conducive learning environment for students and employees, contributing to educational institutions' overall success and sustainability.



CHAPTER III

DESIGN AND METHODOLOGY

3.1 Research Methodology

The proponents applied a descriptive method and used a quantitative approach. Employing a descriptive method, proponents were able to thoroughly analyze and illustrate the information obtained from respondent questionnaires and interviews. Researchers can gather rich insights into the experiences and perspectives of students, employees, and service providers regarding facility-related issues. These methods allow for an exploration of the underlying factors contributing to the problems, such as maintenance challenges, safety concerns, or accessibility issues. Moreover, it facilitated the characterization of current operations in developing the proposed system. Through descriptive methods, the proponents could offer in-depth insights and enhance comprehension of the research context for designing and implementing the proposed system. On the other hand, the efficiency and accuracy of the proposed system for Quezon City University were measured quantitatively.

The proposed system was developed using Agile Methodology. The collaborative culture facilitated by Agile also improves efficiency throughout the organization as teams work together and understand their specific roles in the process. Finally, companies using agile software development can feel confident that they are releasing a high-quality product because testing is



performed throughout development. This provides the opportunity to make changes as needed and alert teams to any potential issues. (Brush & Silverthorne, 2022)

System Development Methodology



Figure 3.1 Agile Methodology

Core Principles: Agile methodology is based on the Agile Manifesto, which emphasizes individuals and interactions, working software, customer collaboration, and responding to change.

Customization for Project: Given project's specific needs and constraints, the proponents adapted the standard agile practices to fit context, particularly in terms of sprint duration and stakeholder involvement.



Phases of Development

Phase 1: Planning

The researchers brainstormed and defined the objectives of the study to analyze the problems that will be useful to develop QCU-FMS. The proponent is needed to accumulate information by conducting an interview with the client about the existing management that will help to improve the proposed system at which point solutions can be recognized and other information that can support the development of the system.

Phase 2: Design

System design involves outlining the various components, modules, interfaces, and data of the proposed system to meet specific requirements. The proponents developed a system structured into tasks aimed at managing requests and generating reports for employees and students while facilitating communication with administrators. The proponents also created a system's flowchart and interface for the user's login, reporting, and request page. Also, the researchers organized a database using the XAMPP 3.2.4 and MySQL server 8.0, while the programming language used is PHP 7.4



Phase 3: Develop

The team's assigned tasks are now being devised for the project. The members of the team are accomplishing their assigned duties. The proponents are executing the plan and design to integrate as one and develop the system. The proponents performed a function on toolboxes used in the system design. The database that the researchers created will handle all the information from the admin, employees, service providers, students, and the analytics, including the incentives issuance.

Phase 4: Test

The proponents rigorously tested the system's QCU-FMS through trial runs, meticulously checking for errors to ensure seamless functionality, particularly prioritizing user security and safeguarding information regarding reported issues. The researchers will put the system's input and output to the test in which they can suggest their opinions, corrections, and if there will be adjustments that soon can be implemented.

Phase 5: Deployment

It is the responsibility of the project management to initiate and oversee each activity as the work proceeds. The proposed system is released and presented to the end-users if the system works properly and free of bugs and errors. The researchers will supervise the admin, employees, student, and service provider according to their corresponding duties. The implementation of QCU-FMS will enhance Quezon City University's current manual process for reporting facility-related concerns. Apart from facilitating and monitoring of



the school's facilities, this system offers the ability to have a substantial impact on the university's facility operations.

Phase 6: Feedback

The final phase requires the project to be maintained, improved, and supported, and a recovery plan developed. The developers of the team would then take note of the customer feedback in order to keep the system's integrity after the project's final deployment. Gather feedback whether positive or negative, from admin, employees, students, and service providers and identify the areas of improvement.

Agile methodology is a flexible and iterative approach to software development. Unlike traditional methods, Agile focuses on collaboration, customer feedback, and small, rapid releases. The proponents chose Agile due to its adaptability and efficiency in handling changing requirements, its emphasis on continuous delivery, and its collaborative nature that aligns well with project dynamics.

Application to the Project:

In practice, the agile methodology facilitated regular reassessment of project priorities and quick incorporation of feedback. For example, after the second sprint, the proponents significantly revised their feature set in response to user feedback.



3.1.1 Sampling Technique

Table 3.1 Respondents Population and Sample Size

Respondents from Quezon City University - San Bartolome Campus	Total Population	Sampling Technique	Sample Size
Students	7,842	Convenience	381
Students Affairs Unit, Physical Facility & General Services, and Events Management Unit	4	Purposive	4
Service Provider	43	Convenience	39
Employees	375	Convenience	194

The table shows in the second semester of the academic year 2023-2024, the proponents employed convenience sampling in QCU Students, employees, and service providers from QCU San Bartolome (Main Campus) and purposive sampling for Administrative Personnel in QCU San Bartolome (Main Campus) for their study. The participants included one hundred ninety-four (194) employees, four (4) administrative personnel, thirty-nine (39) service providers, and three hundred eighty-one (381) students from Quezon City San Bartolome (Main Campus) who used the QCU-FMS. The proponents selected convenience sampling due to its accessibility and readily available participants. Given that students, employees, and service providers at Quezon City University (QCU) San Bartolome (Main Campus) possess the necessary digital resources, such as mobile phones, the proponents



decided to recruit participants from this location. On the other hand, Purposive sampling proved to be a well-suited approach for selecting respondents from the Administrative Personnel. This choice was particularly appropriate considering the Administrative Personnel role as the intended beneficiary of the research. To evaluate the effectiveness of the QCU-FMS, the proponents conducted a descriptive data analysis using a customized survey questionnaire.

Yamane's Formula:

$$n = N / (1 + Ne^2)$$

Where:

n = Number of samples

N = Total of population

e = Error of tolerance

- **QCU Students (San Bartolome Campus) : Convenience Sampling**

Step 1: The total number of students in QCU San Bartolome Campus is 7842.

e (Precision or Sampling Error): 5%

N (Population Size): 7842

Step 2:

$$n = N / (1 + N * e^2)$$

$$n = 7842 / (1 + 7842 * 0.05^2)$$



$n \approx 380.5872361077$

Step 3:

Round the sample size: $n \approx 381$

- Students Affairs Unit, Physical Facility & General Services, and Events Management Unit: Administrative Personnel QCU San Bartolome: Purposive Sampling

Step 1:

e (Precision or Sampling Error): 5%

N (Population Size): 4

Step 2:

$$n = N / (1 + N * e^2) 0.0025$$

$$n = 4 / (1 + 4 * 0.05^2)$$

$$n \approx 3.9702233251$$

Step 3:

Round the sample size: $n \approx 4$

- Service Provider from QCU San Bartolome: Convenience Sampling

Step 1:

e (Precision or Sampling Error): 5%

N (Population Size): 43



Step 2:

$$n = N / (1 + N * e^2) 0.0025$$

$$n = 43 / (1 + 43 * 0.05^2)$$

$$n \approx 38.8035$$

Step 3:

Round the sample size: **n ≈ 39**

- Employees from QCU San Bartolome: Convenience Sampling

Step 1:

e (Precision or Sampling Error): 5%

N (Population Size): 375

Step 2:

$$n = N / (1 + N * e^2) 0.0025$$

$$n = 375 / (1 + 375 * 0.05^2)$$

$$n \approx 193.5484$$

Step 3:

Round the sample size: **n ≈ 194**



3.1.2 Data Gathering Techniques

a. Observation

Observation plays a crucial role in the development of QCU-FMS by fostering an understanding of the physical state and uncovering potential issues in school facilities. This approach enables researchers to harmonize seamlessly with the natural workflows of Admin, Personnel, Students, and the service provider. By observing the school's environment, this method illuminates communication patterns, privacy considerations, and the system's overall significance. As a potent data gathering technique, observation is an effective method for acquiring information that enhances the research process and assists researchers generate insightful and significant study.

b. Interview

Utilizing interviews as a data collection method stands out as a highly effective approach for accurately identifying the objectives and beneficiaries of the system. This method has the potential to provide crucial data essential to the research process. Interviews serve as a valuable opportunity to gather insights into their experiences, perspectives, and challenges within QCU school facilities. Utilize open-ended questions to encourage respondents to provide detailed information about their roles, interactions, and suggestions for improvement. Ensure confidentiality and anonymity to promote



honest and candid responses from interviewees. The attached photo of the interview for data gathering can be found in Appendix D.

c. Questionnaire

The Questionnaire serves as a comprehensive tool to gather respondent opinions and feedback on the QCU-FMS. The survey customized to each stakeholder group provides quantitative data on satisfaction levels, resource utilization, and areas for improvement. Focus group discussions offer a platform for stakeholders to voice concerns, share experiences, and collaborate on enhancing the overall functioning of QCU school facilities.

d. Evaluation

An important part of supporting the deployment of QCU-FMS is regularly reviewing and analyzing evaluation data to identify strengths, weaknesses, and opportunities for continuous improvement in QCU school facilities.

3.2 Requirement Analysis and Documentation

Requirement Analysis

The report and request system is a system that allows users to submit requests and reports and track their progress. The system will automate report generation and distribution, reducing manual effort and improving accuracy. The Physical Facility Administrator, Employees, Service Provider, Students, and all the existing users of the system are vital



contributors throughout the development of the system. Each user has a different role and specified functionality in reporting and requesting, yet the students can earn non-monetary incentives by reporting and giving feedback.

Functional Requirements

1. User Registration and Authentication

- Users are granted access to all features of the system.
- Registration is required for users to report facility issues or access certain features.
- Administrators must log in to view the complete system.
- Guests are provided with read-only access to view articles and system information.
- Implement a secure authentication mechanism to safeguard user data and system integrity.

2. Issue Categorization and Prioritization

- The system autonomously categorizes reported issues (plumbing, electrical, etc.).
- Issues are prioritized based on severity and urgency for efficient resolution.

3. Maintenance Workflow Management

- Streamlined management of maintenance workflows from initial reporting to resolution.



- Administrators are provided with a centralized dashboard for monitoring and overseeing maintenance activities.

4. Data Analytics and Decision Support

- Utilize descriptive and prescriptive analytics to offer insights into facility conditions and maintenance trends.
- Assist administrators in making informed decisions regarding resource allocation and long-term planning.

5. Feedback Analysis

- Employ analysis algorithms to assess user feedback and identify recurring concerns.
- Enhance overall facility management experience based on feedback analysis results.

6. Automated Notifications

- Implement an automated notification system to alert relevant departments or maintenance service providers immediately upon receiving a report, ensuring prompt response and resolution of reported issues.

Non-Functional Requirements

1. Performance:

- The system should respond quickly when users interact with it or receive notifications.



- It should be able to handle many users at once without slowing down or crashing.

2. Scalability:

- The system is available all the time, even during maintenance or updates.
- It should be able to handle a large number of concurrent users without significant slowdowns or disruptions.

3. Availability:

- Users should be able to browse and read articles on the platform at any time without requiring registration or login, ensuring uninterrupted access to content.

4. Reliability:

- The system must uphold reliability by accurately monitoring and updating reports pertaining to QCU facility related issues so that stakeholders may rely on the information for well-informed choices and timely action.

5. Security:

- The system should ensure that only authorized users can access the important information.
- The system will use One-time Password (OTP) verification during account registration to prevent automated bots from accessing the system.

6. Usability:



- The system should be easy to use, so users can report issues or use the system without needing much training.

7. Mobile Responsiveness:

- It should be flexible enough to seamlessly adjust across various screen sizes and adapt well to mobile devices.

3.2.1 Software/System Development Method

Table 3.2 Event Table

Event No.	Event Description	Date	Responsibility Party	Expected Outcome
1	Initial Proposal	October 28, 2024	All Teams	Approved Proposal
2	Chapter 1 to 3	November 4, 2024	Technical Writer Team	Outlining project objectives, scope, delimitations, and methodology to ensure clarity for effective planning and development.
3	Creating Flowcharts and Diagrams	November 4, 2024	System Analyst Team	Completed the Diagrams needed.
4	Designing Phase	November 4, 2024	User Interface Designer	Completed System Design.
5	System Development	November 11, 2024	User Interface Team and Programmer Team	Aims to provide functionalities and an intuitive user experience



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				that satisfies users.
6	Project Proposal Revision	December 16, 2024	Technical Writer Team	Aims to further enhance the necessary information to be precise and appropriate with the system.



3.2.2 System Requirement Model

Use-Case Diagram

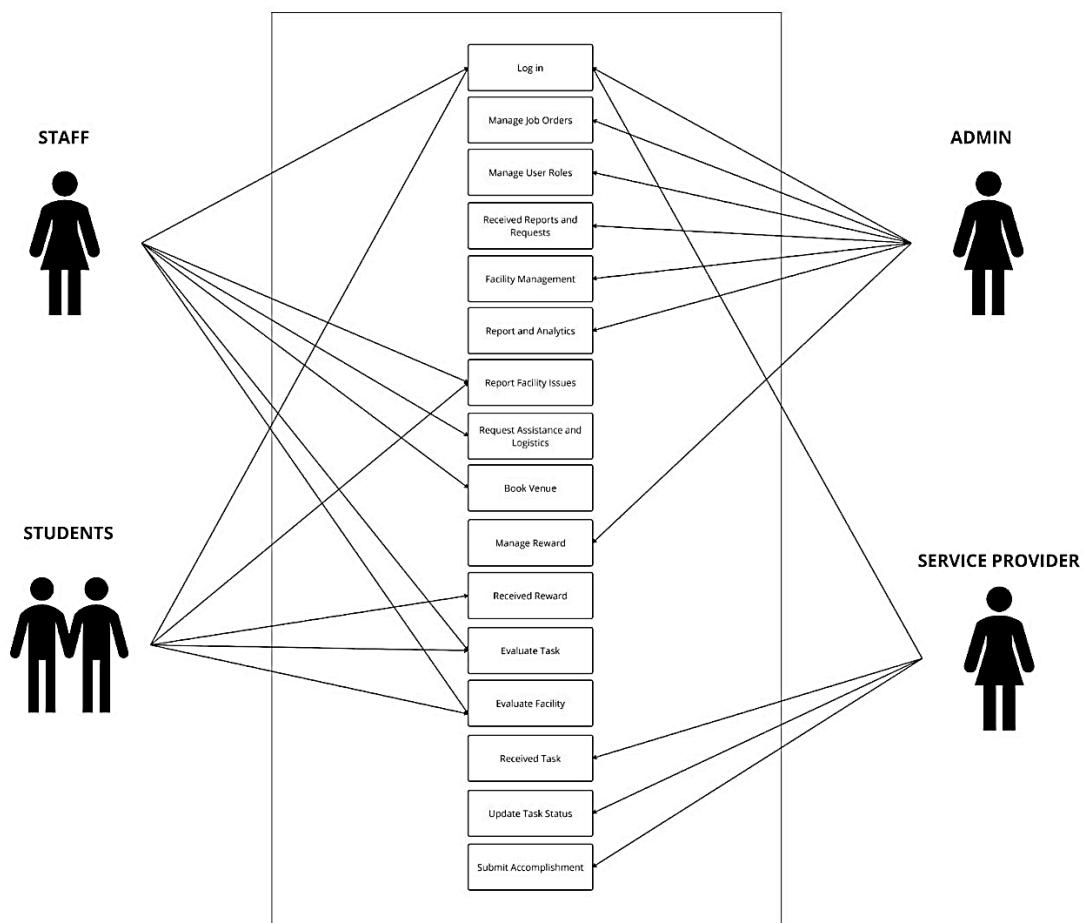


Figure 3.2 Use-Case Diagram



Context Diagram

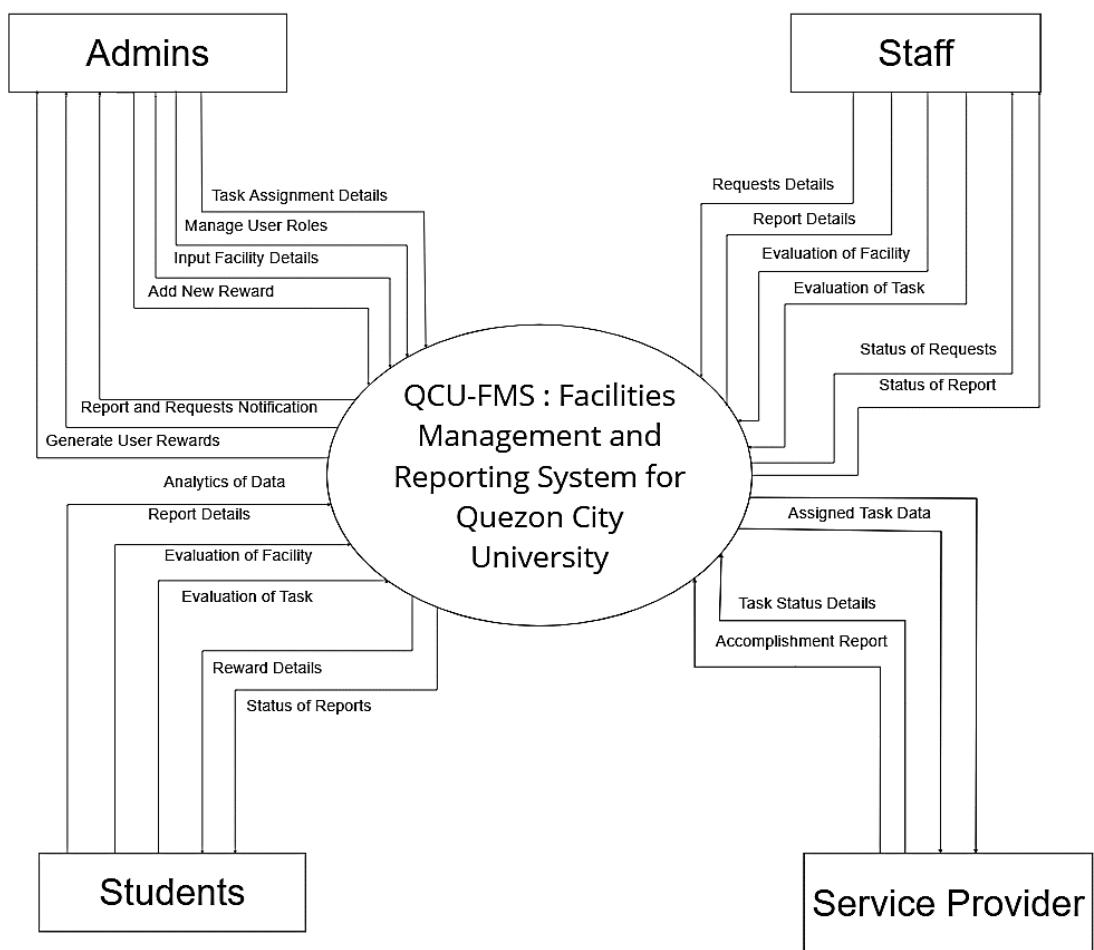


Figure 3.3 Context Diagram



Data Flow Diagram Level 0

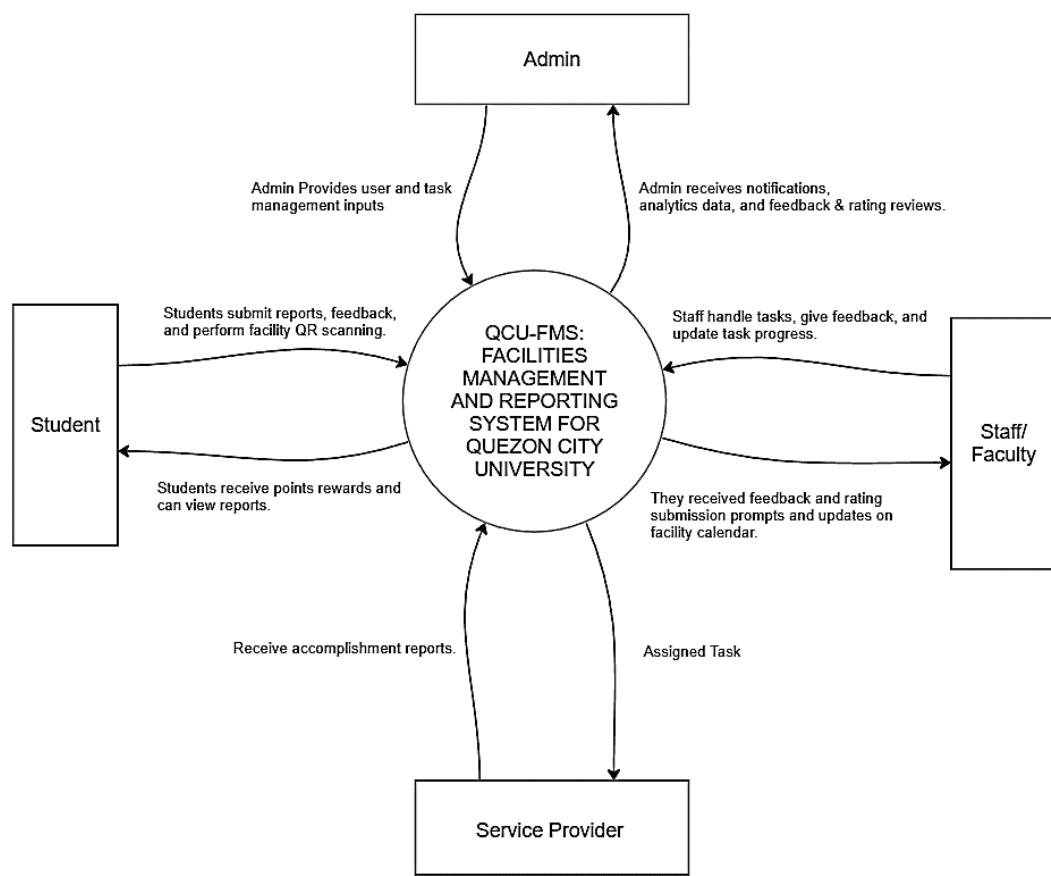


Figure 3.4 Data Flow Diagram Level 0



Data Flow Diagram Level 1

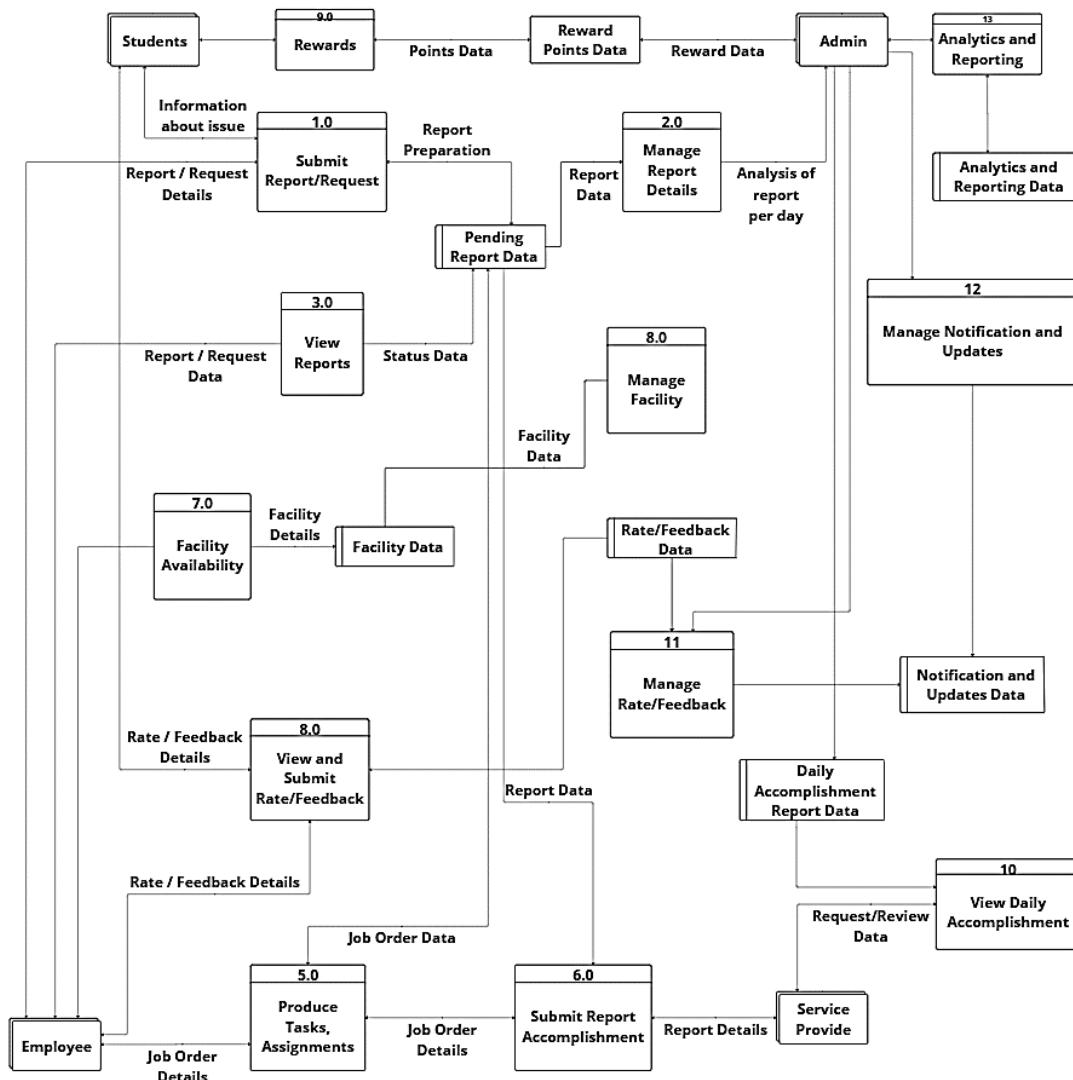


Figure 3.5 Data Flow Diagram Level 1



Existing Flowchart 1



Figure 3.6 Existing Flowchart 1



Existing Flowchart 2

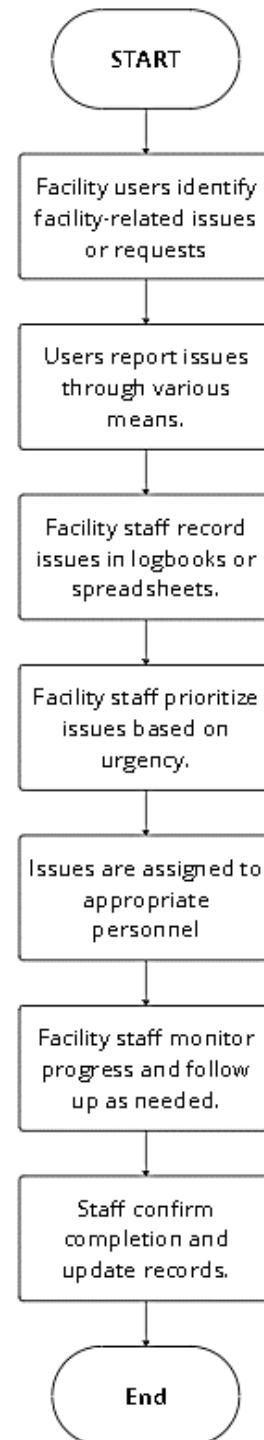


Figure 3.7 Existing Flowchart 2



SERVICE PROVIDER JOB ORDER TASK

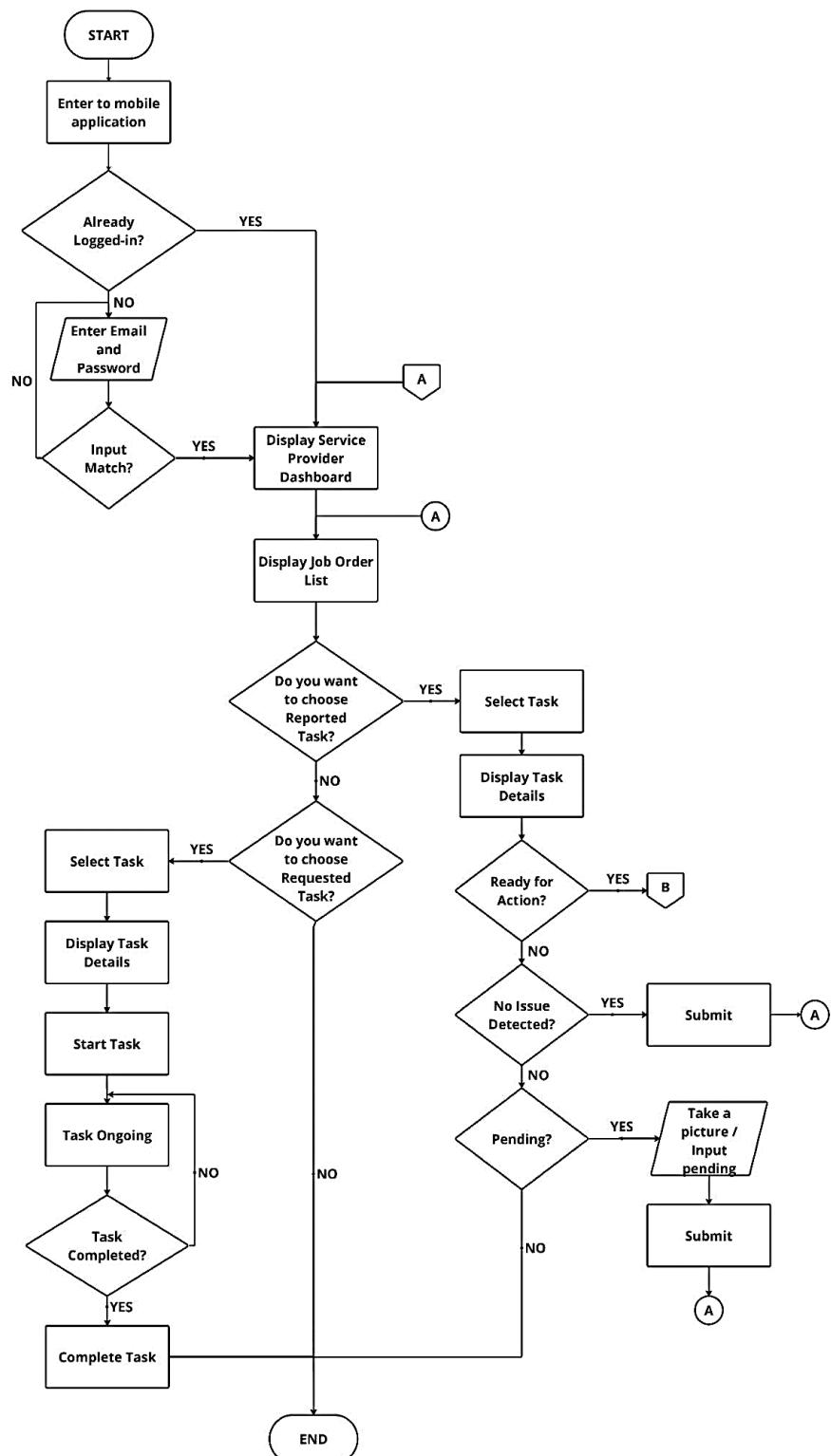


Figure 3.8 Service Provider Job Order Task

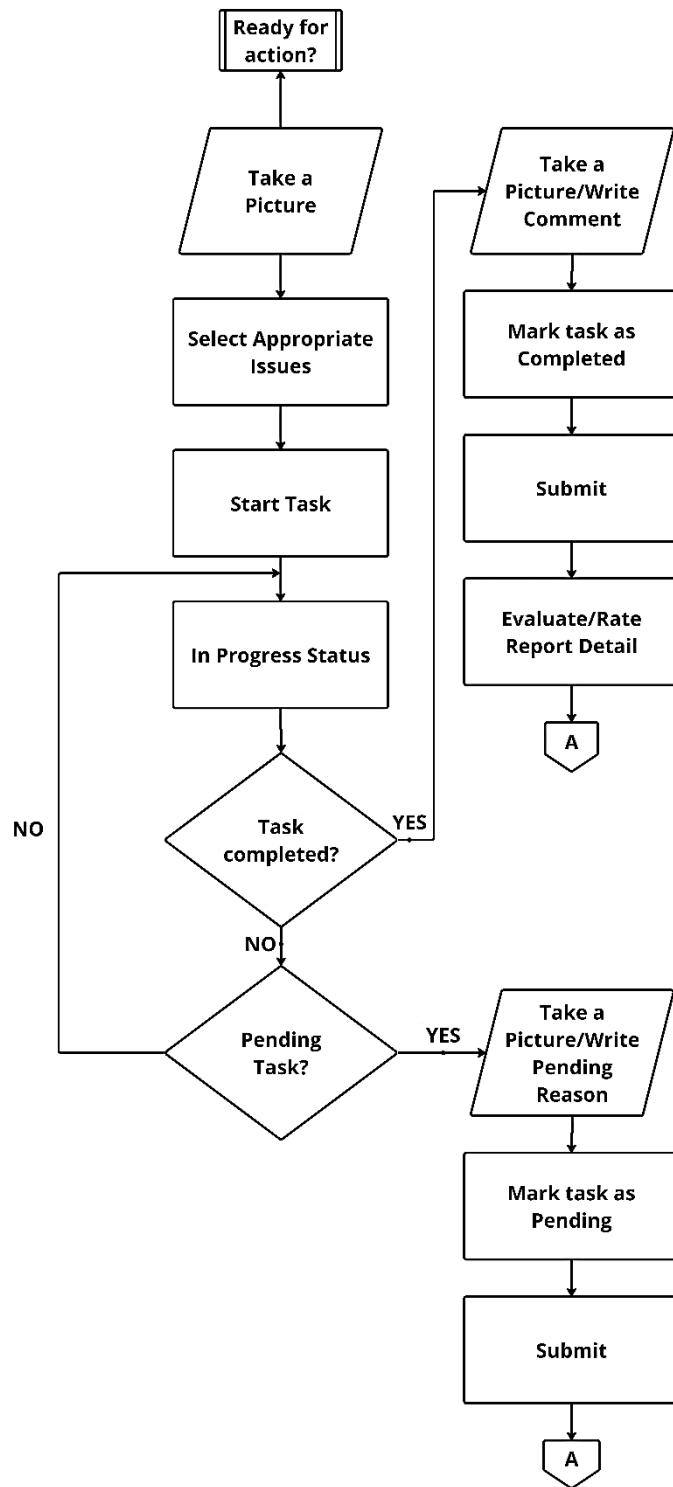


Figure 3.9 Service Provider Start Task



STUDENT REGISTRATION, LOGIN & DASHBOARD

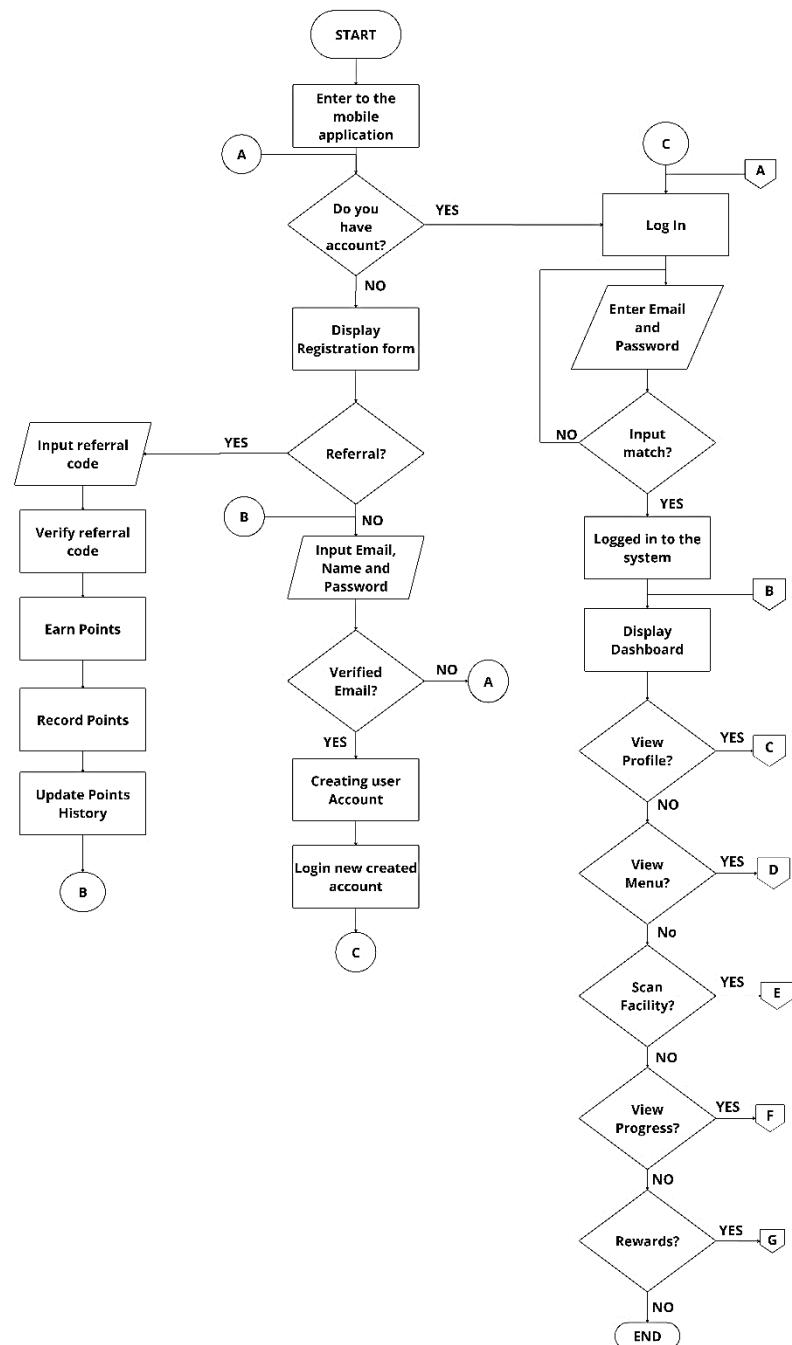


Figure 3.10 Student Registration, Login & Dashboard

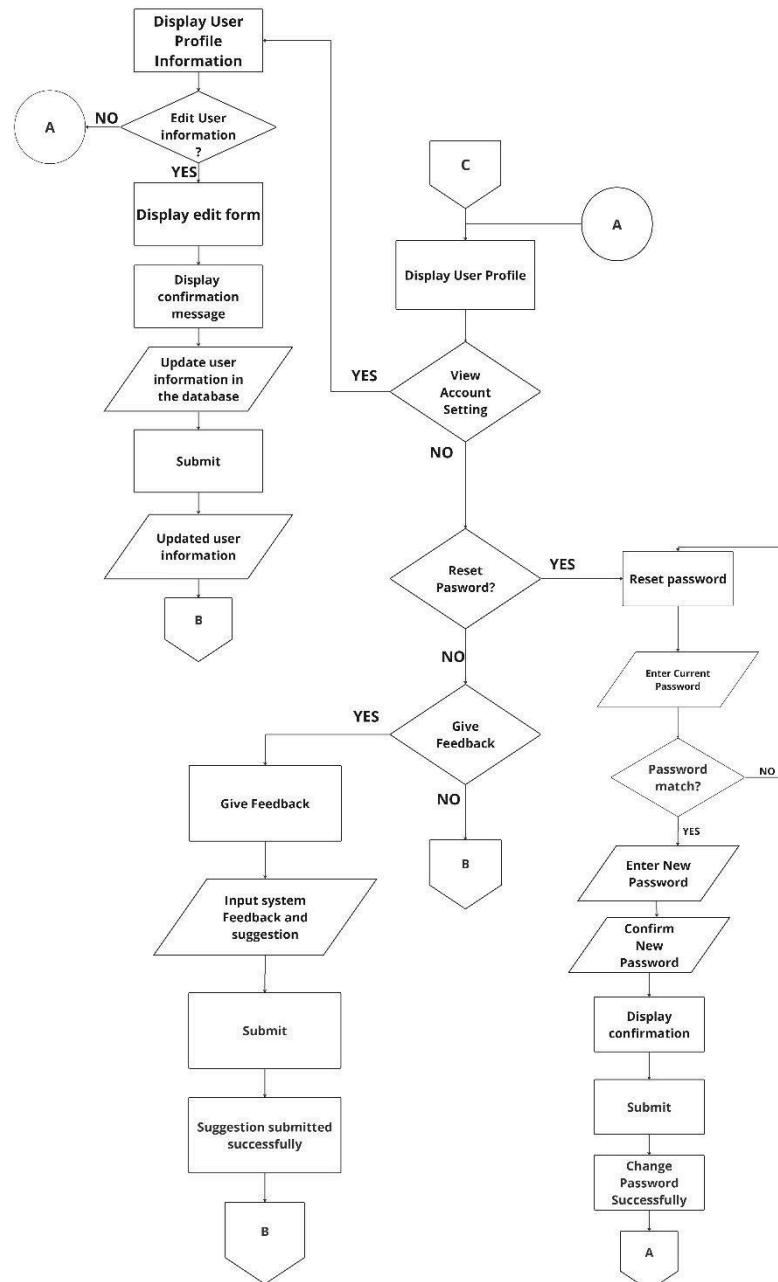


Figure 3.11 Student Edit Profile & Reset Password



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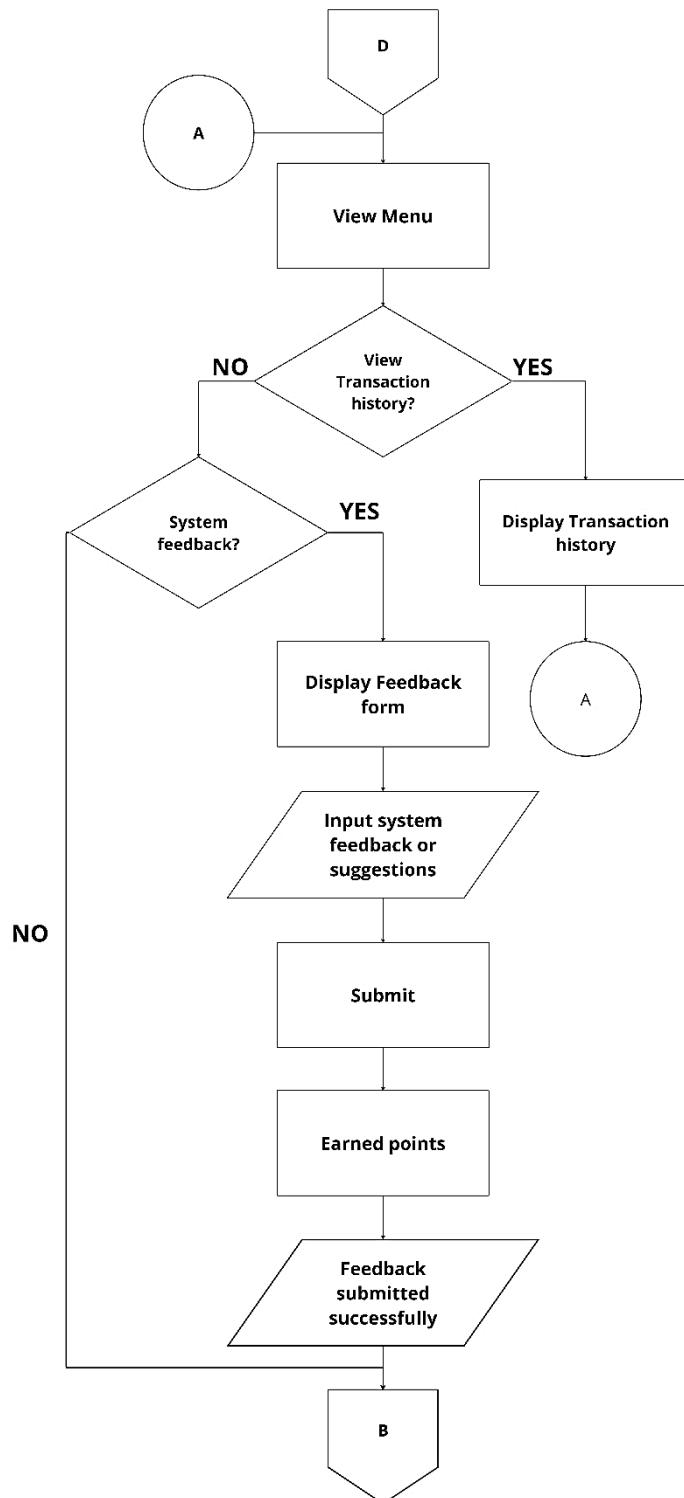




Figure 3.12 Student Transaction History

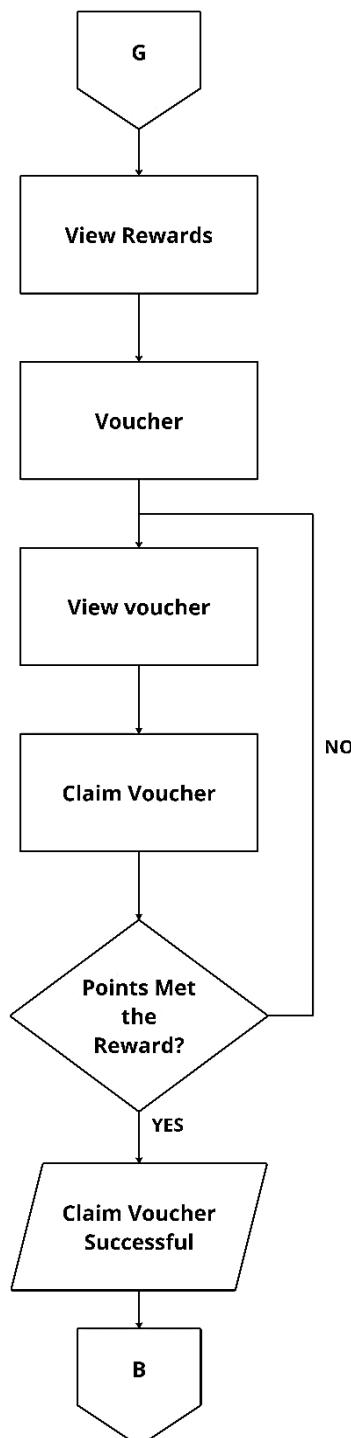




Figure 3.13 Student Rewards & Vouchers

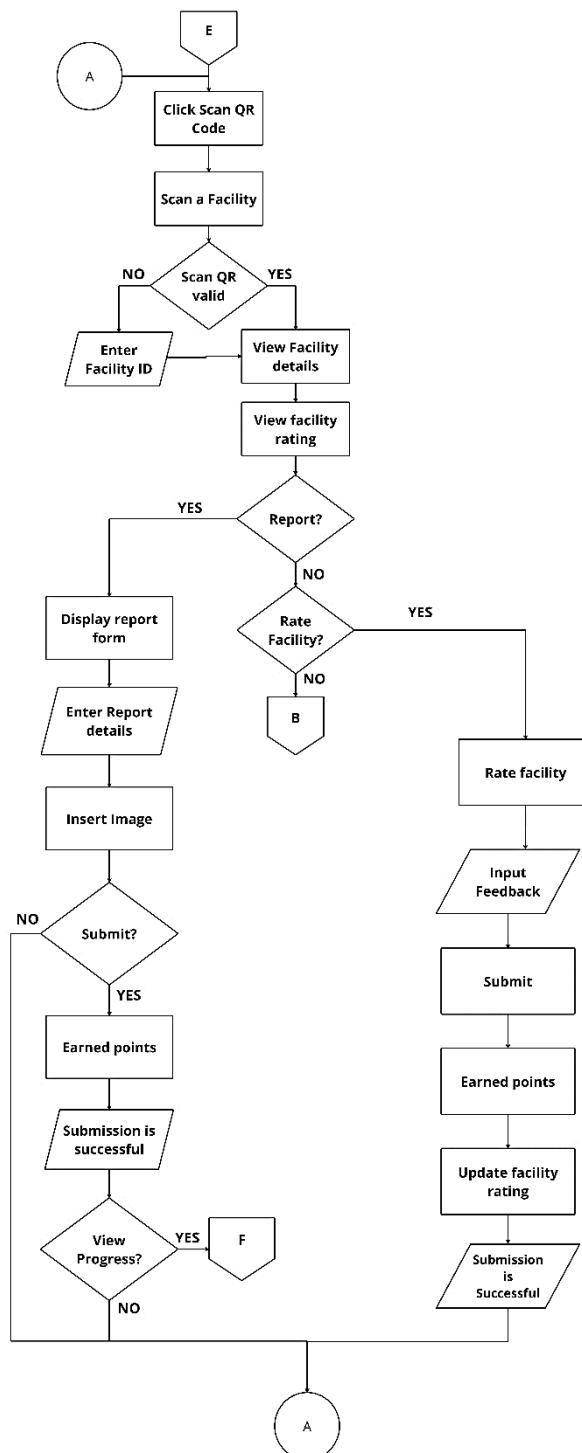


Figure 3.14 Student Issue Reporting & Rating Facility



EMPLOYEE REPORT, REQUEST & RATE

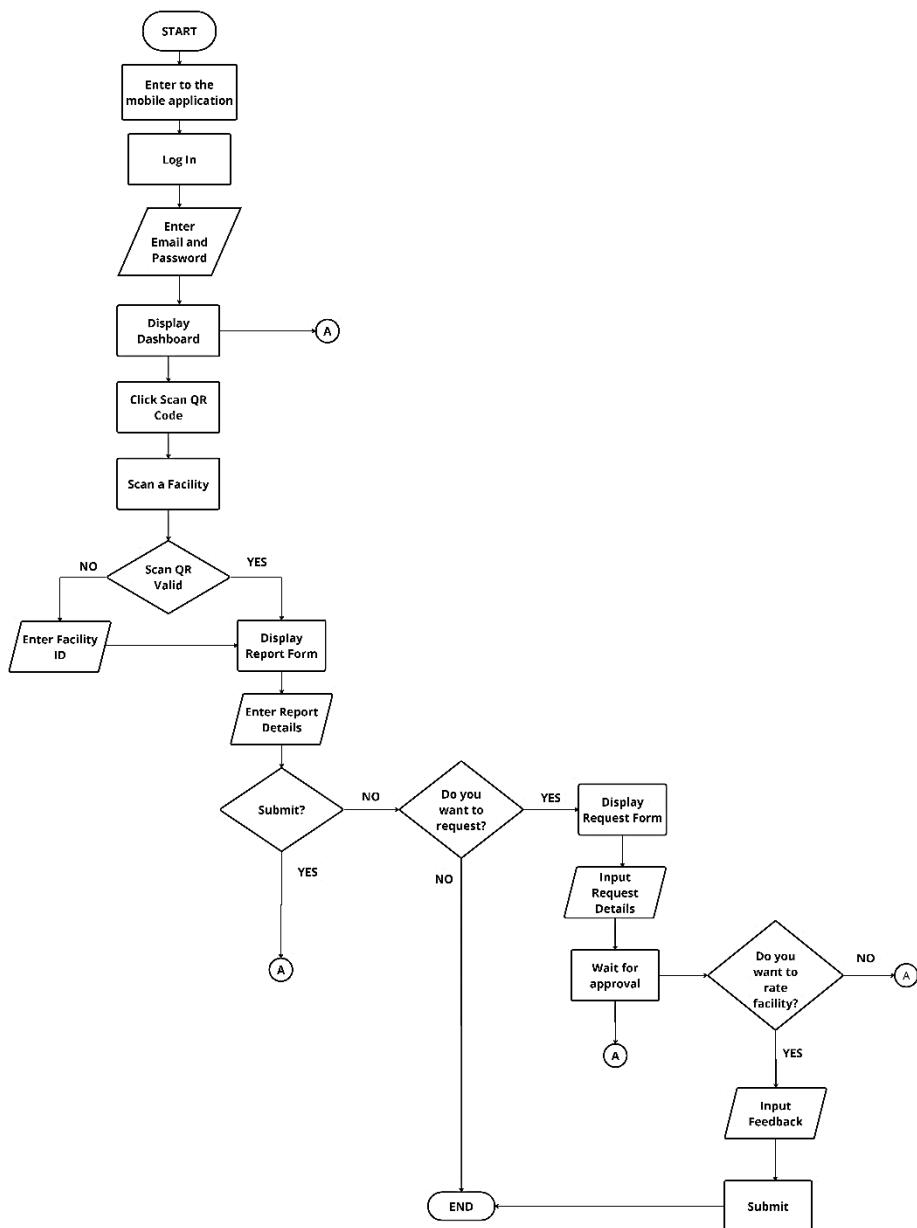


Figure 3.15 Employee Report, Request & Rate



ADMIN DASHBOARD

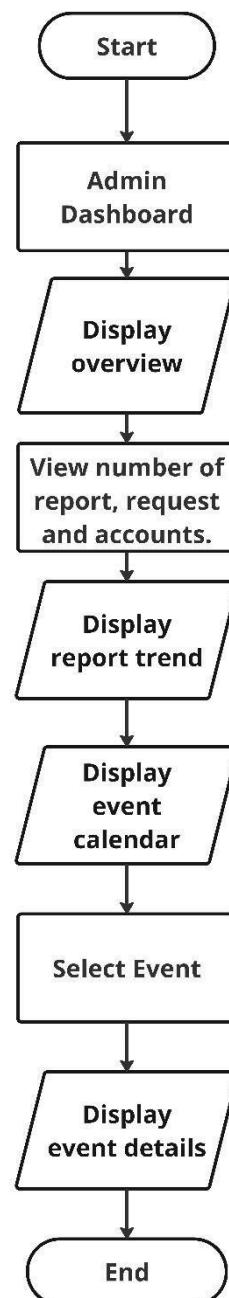


Figure 3.16 Admin Dashboard



ADMIN JOB ORDER (RECEIVED REPORT)

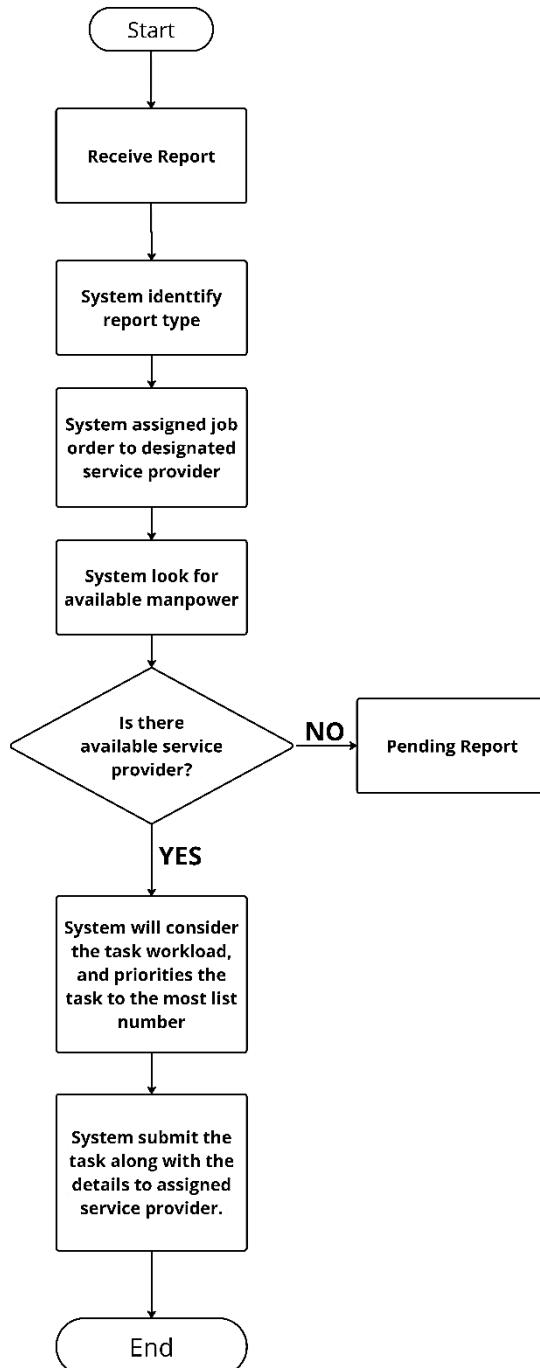


Figure 3.17 Admin Job Order (Received Report)



ADMIN JOB ORDER (RECEIVED REQUEST)

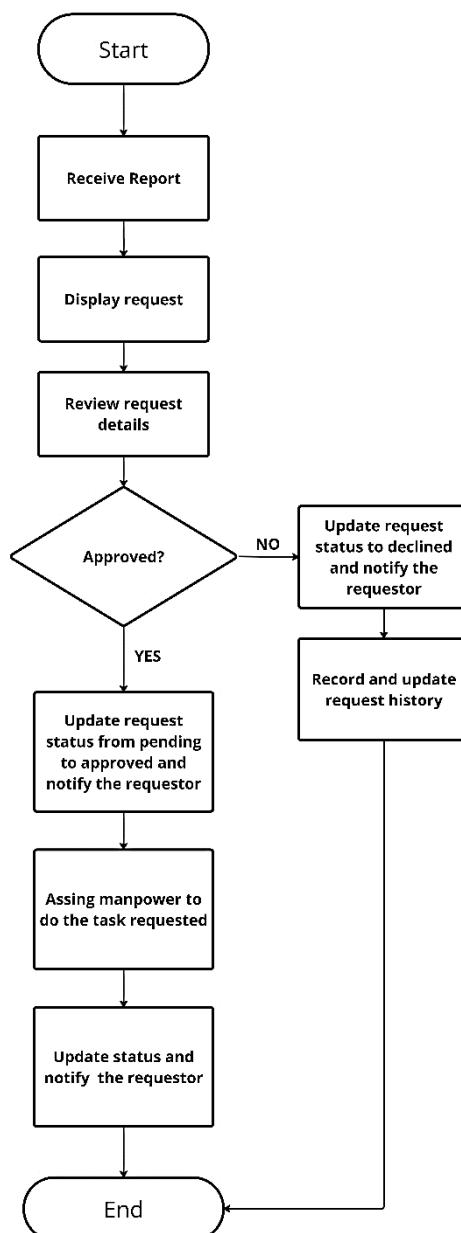


Figure 3.18 Admin Job Order (Received Request)



ADMIN JOB ORDER (PENDING REPORT TABLE)

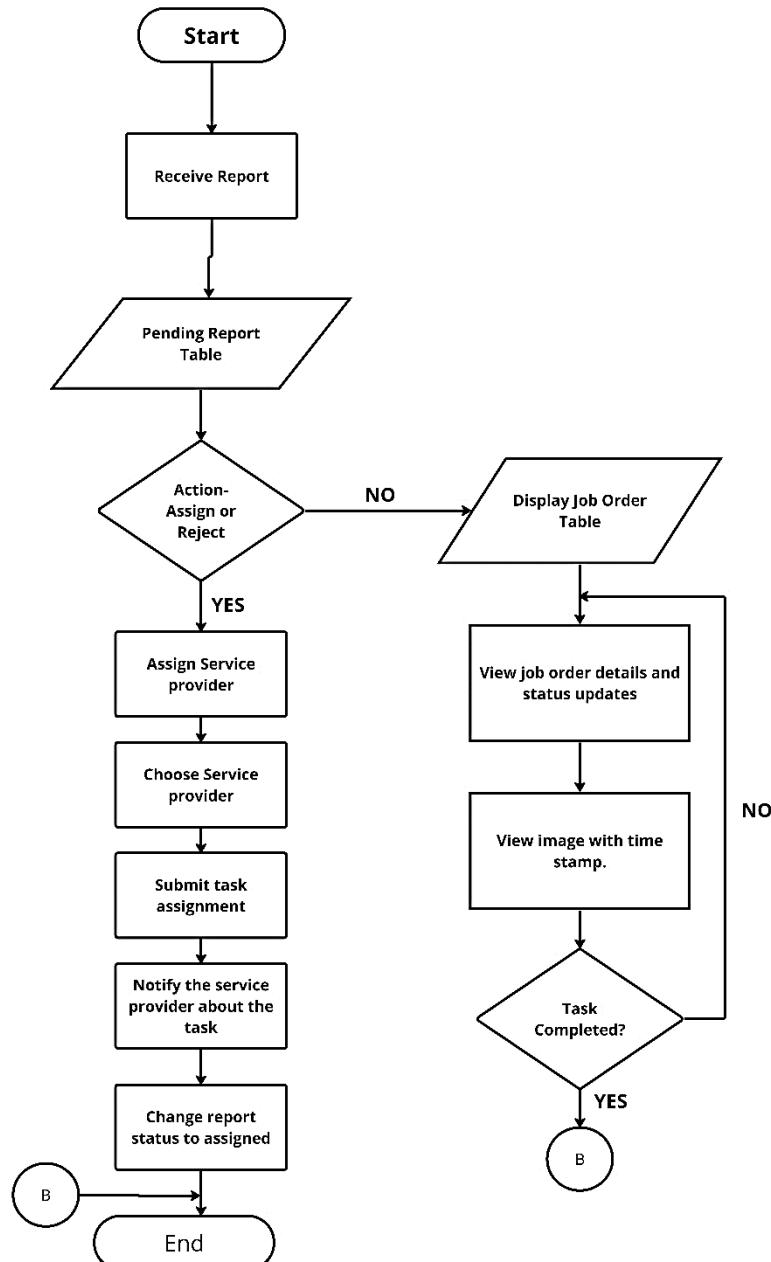


Figure 3.19 Admin Job Order (Pending Report Table)



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ADMIN JOB ORDER (ADD NEW TASK)

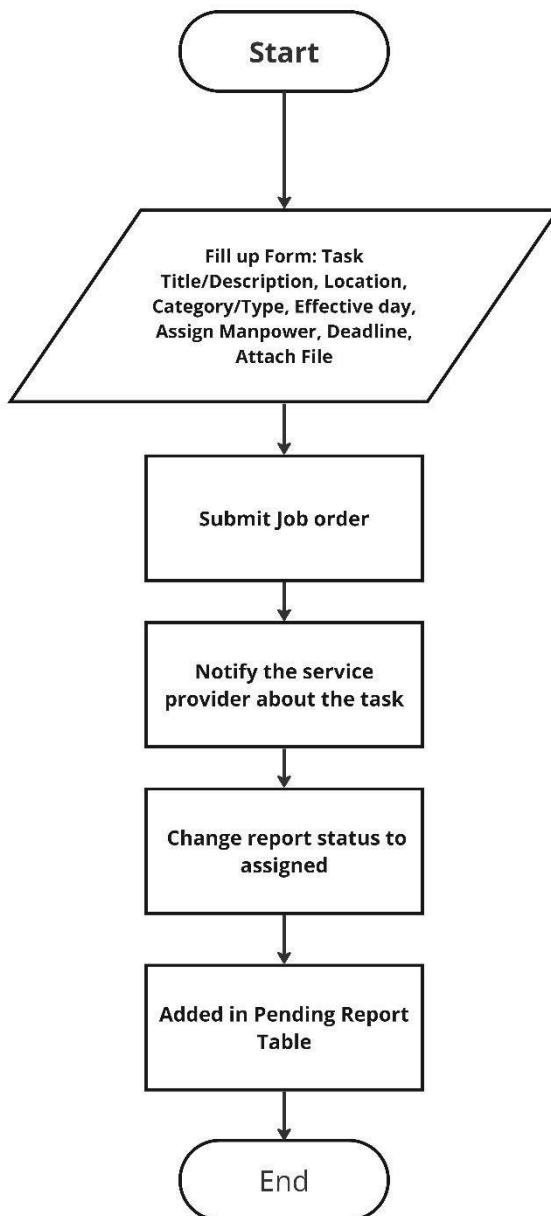


Figure 3.19 Admin Job Order (Add New Task)



ADMIN FACILITY MANAGEMENT

(ADD NEW FACILITY)



Figure 3.20 Admin Add New Facility



ADMIN FACILITY MANAGEMENT

(FACILITY RESERVATION)

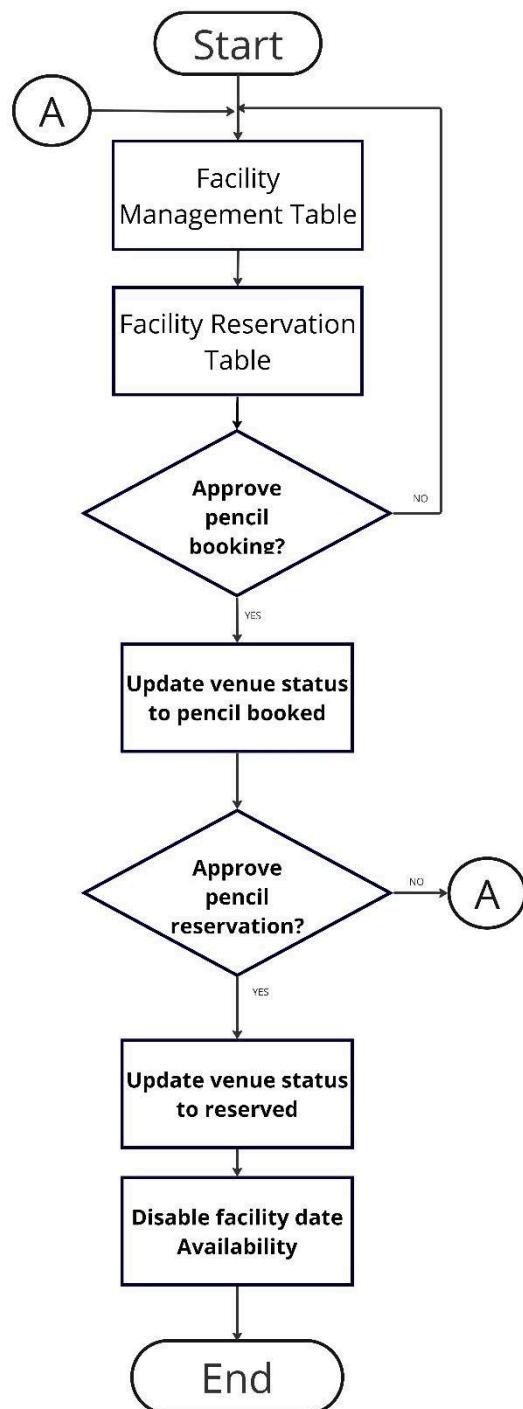




Figure 3.21 Admin Facility Reservation

ADMIN FACILITY MANAGEMENT

(REPORTS AND FEEDBACK)

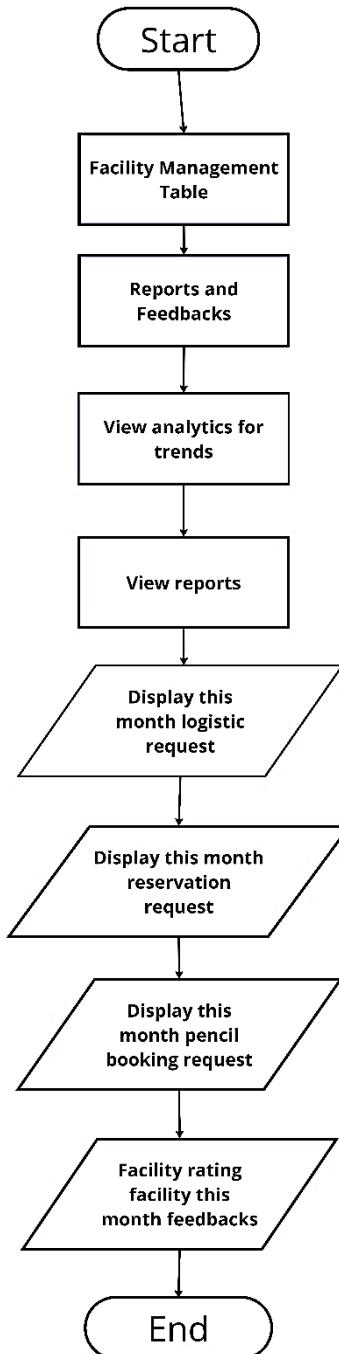




Figure 3.22 Admin Reports & Feedback

ADMIN FACILITY MANAGEMENT

(REQUEST SERVICE PROVIDER)

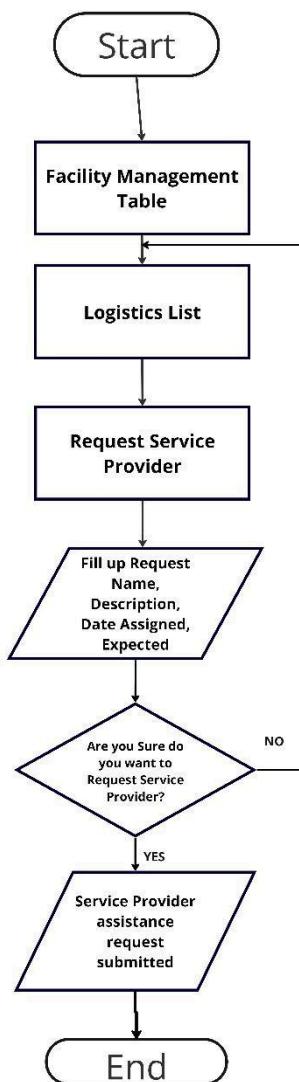


Figure 3.23 Admin Request Service Provider



ADMIN ANALYTICS

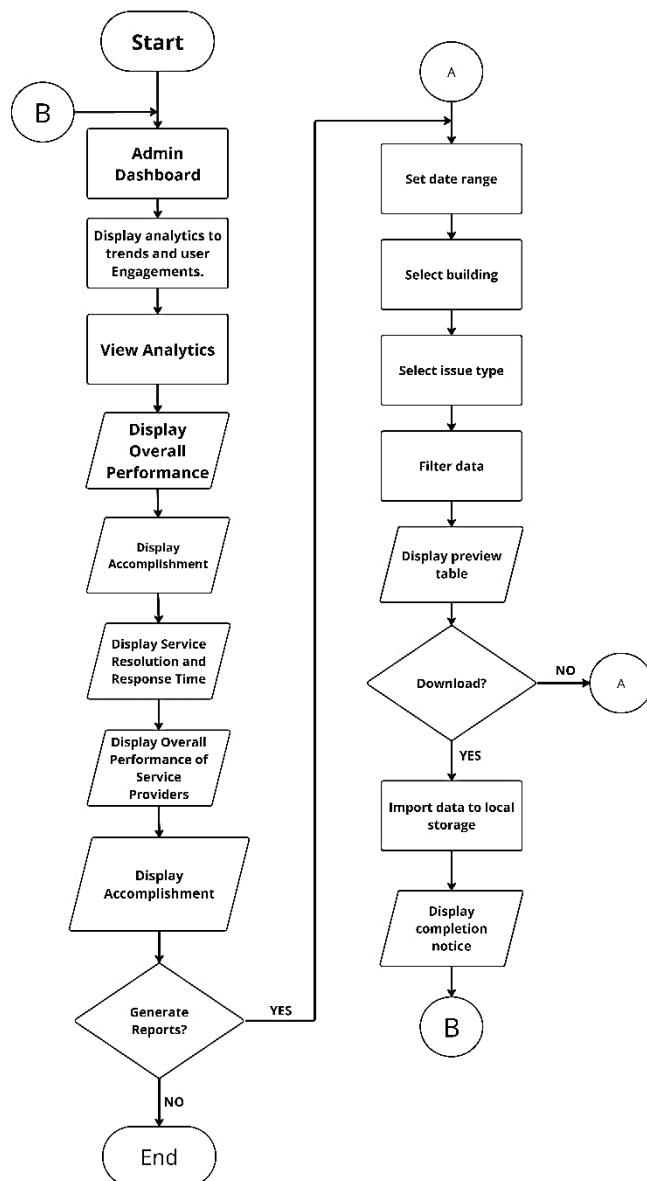


Figure 3.24 Admin Analytics



ADMIN USER MANAGEMENT

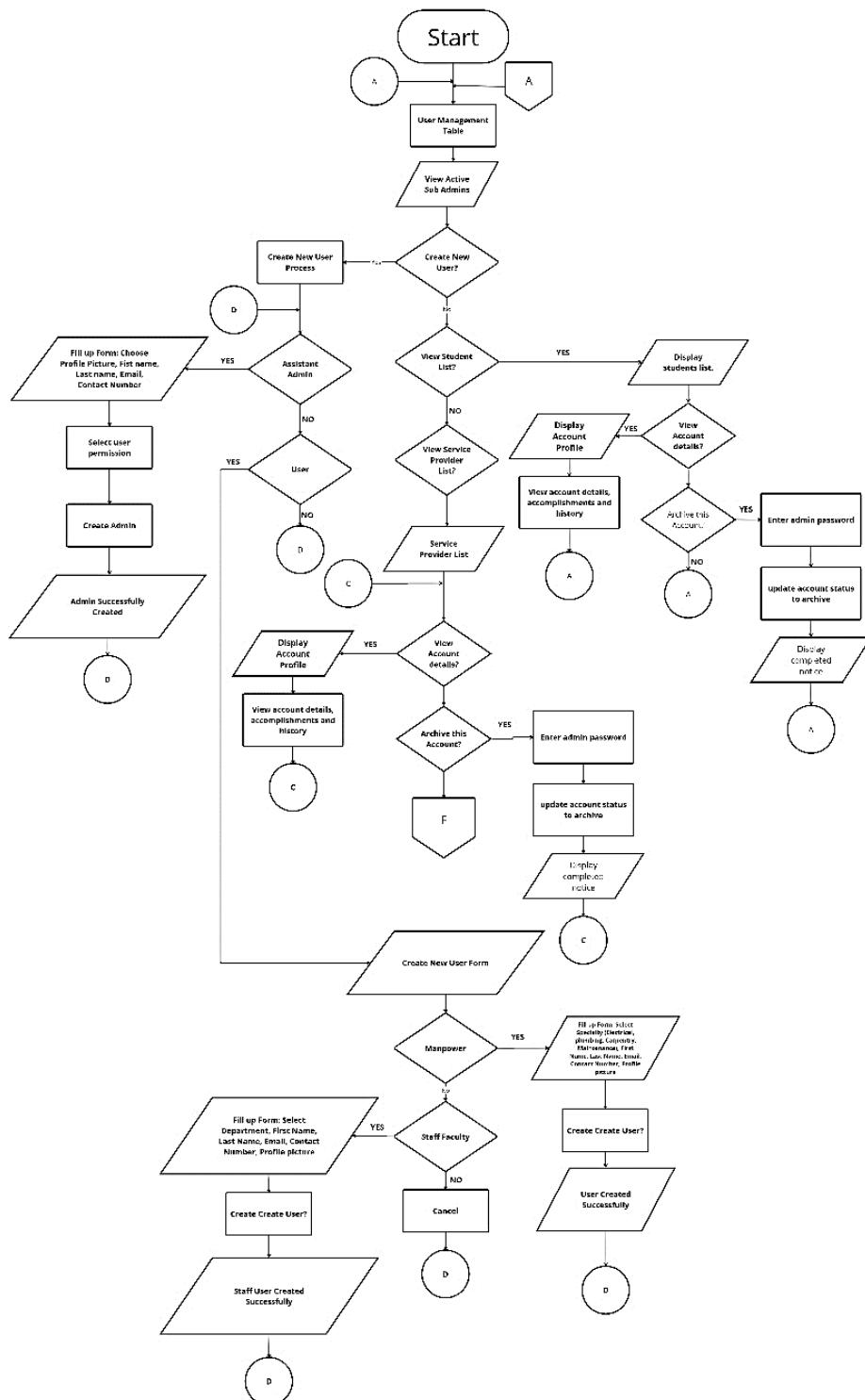


Figure 3.25 Admin User Management

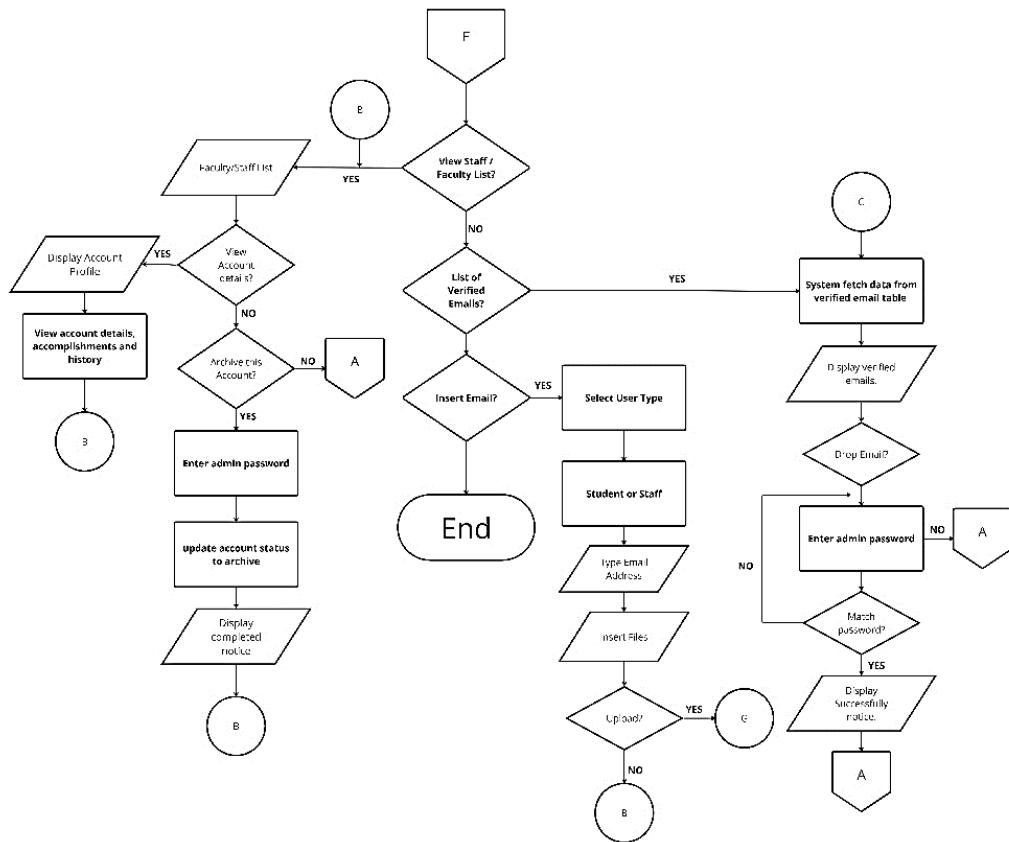


Figure 3.26 Admin Accounts (Students & Employees)



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COLLEGE OF COMPUTER STUDIES



ADMIN REWARDS MANAGEMENT

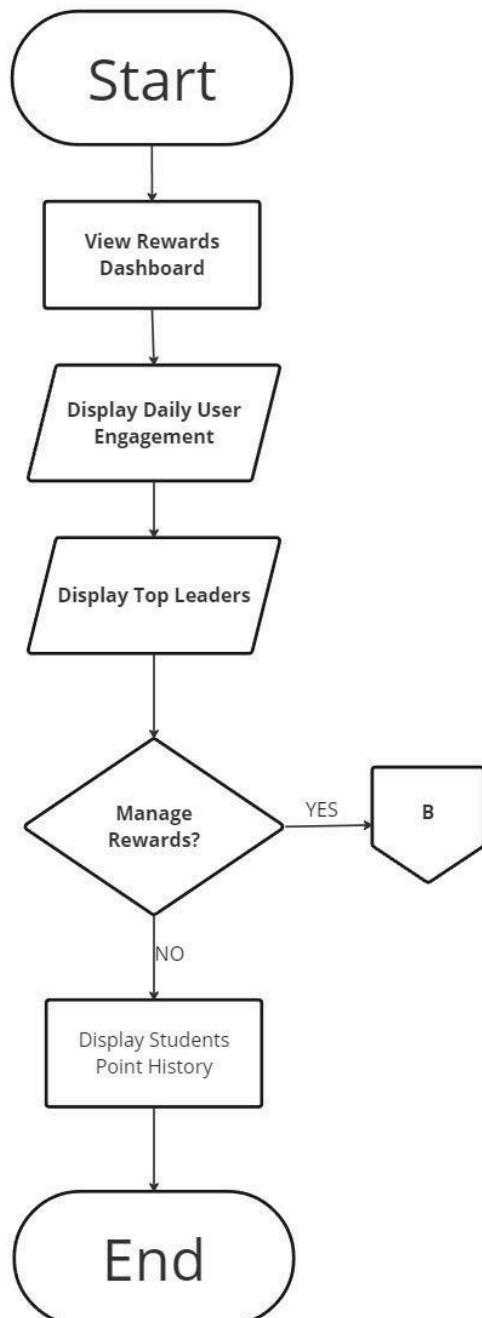


Figure 3.27 Admin Rewards Management

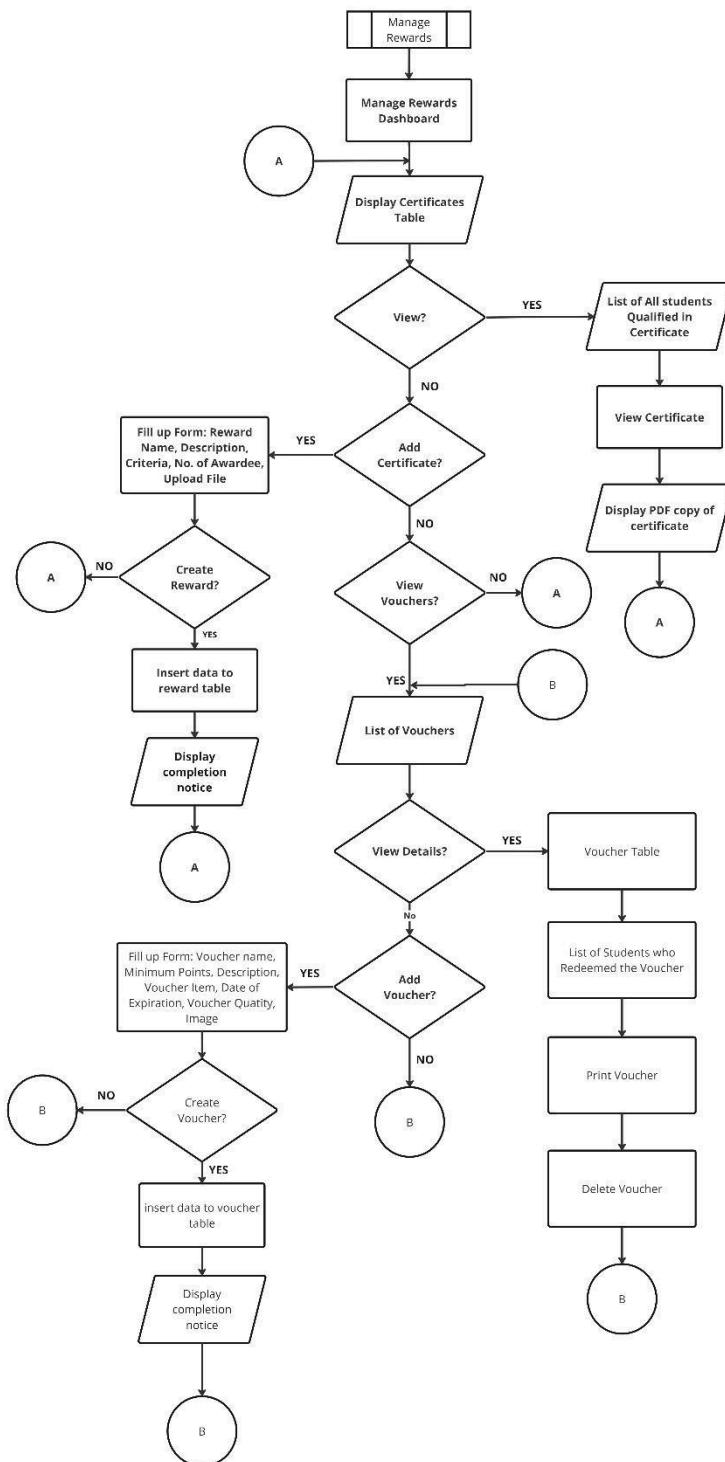


Figure 3.28 Admin Rewards Dashboard



Network Layout

In the network layout, the central component is the cloud database, which is tasked with storing and managing data accessed via the internet and a router. Mobile apps are designed to furnish reports and requests for students, employees, and service providers, whereas web apps cater to administrative functions. The integration of cellular connectivity enhances accessibility, while routine data backups enhance security measures. User roles dictate access levels, with administrators overseeing other devices, such as printers. This setup motivates consistent data interaction and cooperation, supported by a strong infrastructure capable of accommodating different user needs and thereby consistently maintaining system integrity.

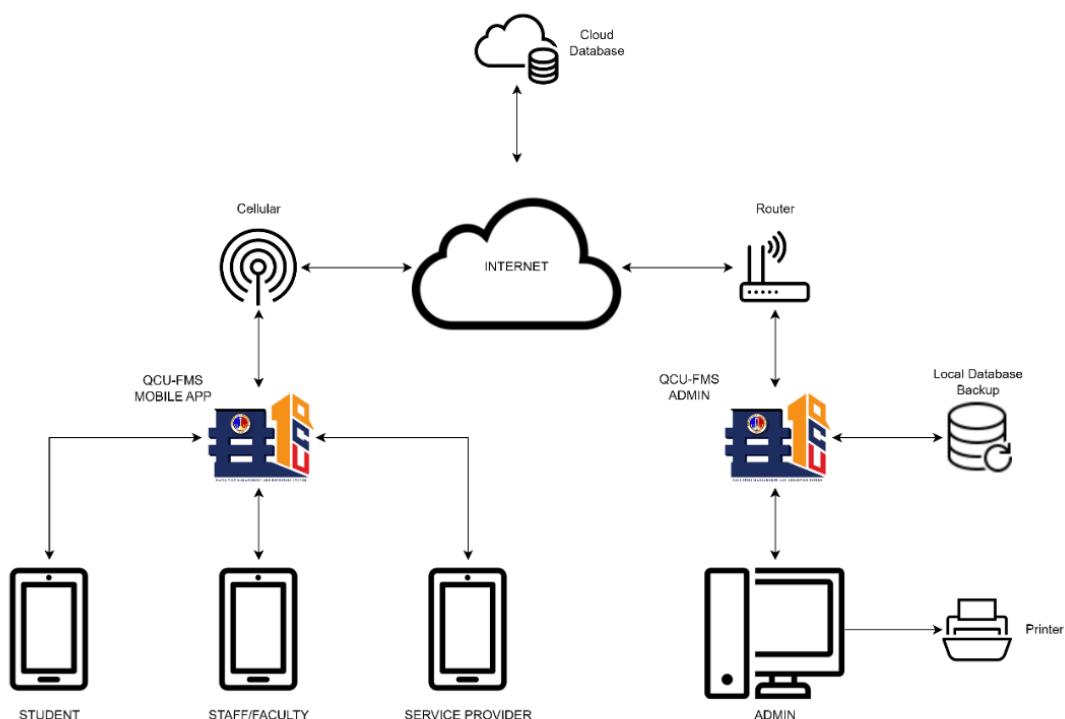


Figure 3.29 Network Layout



System Architecture

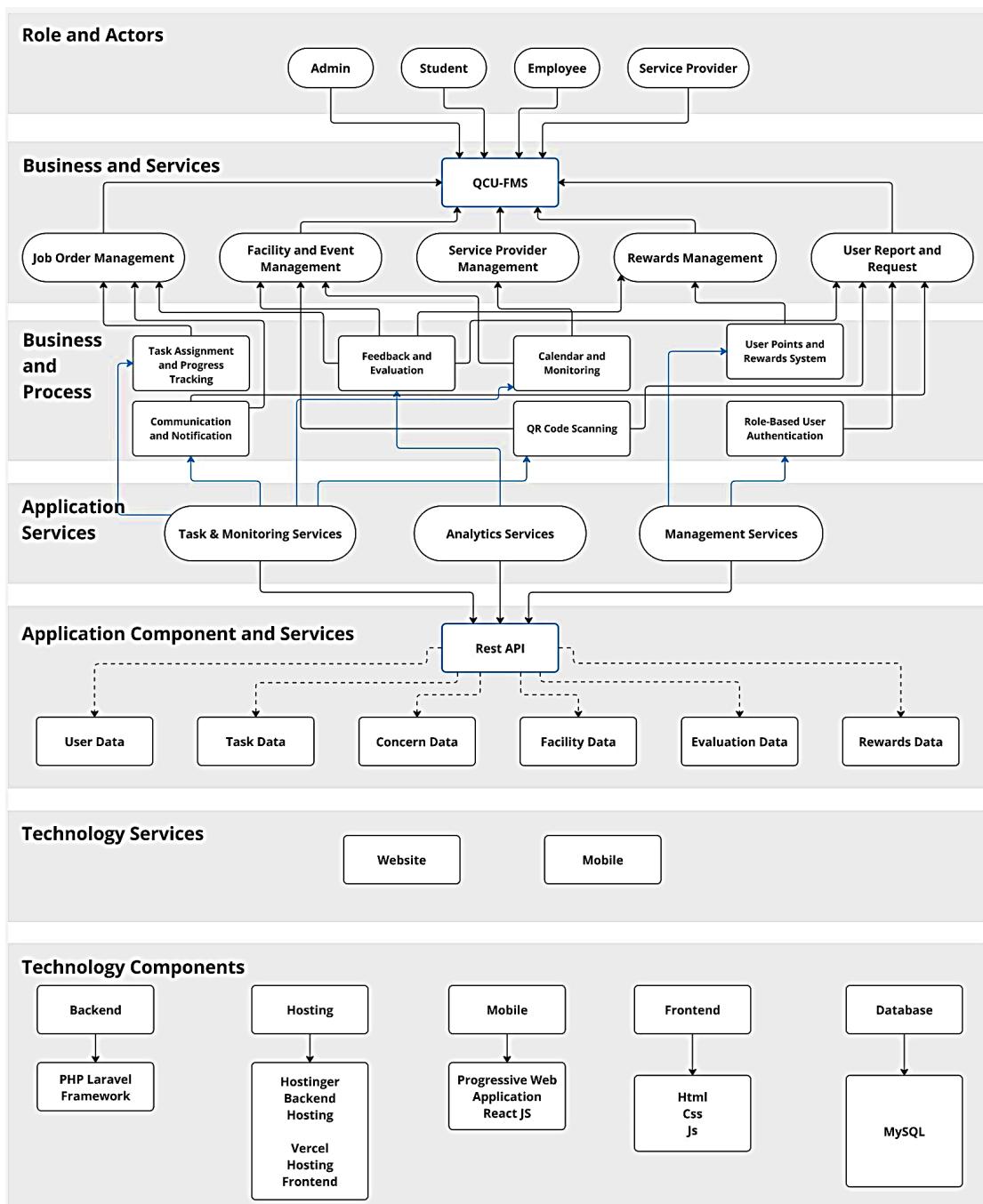


Figure 3.30 System Architecture

The System Architecture Design represents the conceptual framework outlining the system's structure, functionality, and various perspectives. Users



of the system include administrative personnel, students, employees, and service providers associated with Quezon City University. The System Architecture aims to seamlessly accommodate the needs and interactions of these stakeholders, ensuring efficient and effective utilization of the system across all user groups.

Data Analysis Plan

The data analysis plan involved the proponents analyzing data gathered from students, employees, and administrators at QCU's Facility Management Department. They used Google Forms for the survey, ensuring it was easy to access and complete. After collecting responses, the proponents cleaned the data to remove errors and inconsistencies. They then used statistical tools to analyze the data, focusing on mean and weighted mean scores. The results were interpreted to understand how they related to the research goals. The proponents also considered any limitations and suggested ideas for future research. Throughout the process, they ensured ethical guidelines were followed, including obtaining consent and protecting privacy.

3.2.3 Cost - Benefit Analysis

Cost - Benefit Analysis

COLLEGE OF COMPUTER STUDIES



QCU - FMS

Table 3.3 Cost-Benefit Analysis of the Existing System

Personnel Monthly Salary

Personnel	Number	No. of Working Days	Hours/ Day	Rate/Day	Salary	Monthly Amount
Admin	4	20	8	1,863	37,260	149,040
Service Provider	6	20	8	563	11,260	67,560
Total						216,600

Personnel Annual Salary

Personnel	Number	No. of Working Days	Hours/ Day	Rate/Day	Salary	Annual Amount
Admin	4	20	8	1,863	37,260	1,788,480
Service Provider	6	20	8	563	11,260	810,720
Total						2,599,200

Sources:

[Systems administrator salary in Philippines \(indeed.com\)](#)



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[Teacher salary in Philippines \(indeed.com\)](#)

[Janitor salary in Philippines \(indeed.com\)](#)

Hardware Cost

Quantity	Particular	Price	Total Price
1	Latitude 5290	44, 400	44, 400
2	TC-1750 I5 12TH GEN Desktop	37, 995	75, 990
1	TC 1770 13th Gen (Tower + Monitor Bundle)	61, 999	61, 999
4	EcoTank ET-2850 All-in-One Supertank Inkjet Printer - Black	15, 392. 72	61, 570.88
Total			243, 959.88

Sources:

[Best Dell Laptops Price List in Philippines April 2024 \(iprice.ph\)](#)

[acer-aspire-tc-1750-i5-12th-gen-desktop](#)

[Epson EcoTank ET-2850 All-in-One Supertank Inkjet Printer](#)

[aspire-tc-1770-13th-gen](#)

[dell-inspiron-15-3530-i71355u-intel](#)

[hp-15s-fq5184tu-7q7j4pa-intel-core-i5-laptop-natural-silver](#)

[thinkbook-series/lenovo-thinkbook-14](#)

Software Cost



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Quantity	Particular	Price	Total Price
10	Facebook / Messenger	Free	Free
4	WINDOWS 11 PROFESSIONAL 64 BIT ENG INTERNATIONAL	9,750	39,000
4	Microsoft Office	1,258	5,032
Total			44,032

Sources:

[Windows 11 Professional](#)

[Microsoft 365 – PC Express \(pcx.com.ph\)](#)

Stationeries and Supplies Cost

Quantity	Particular	Price	Total Price
8	Mag File Horizontal Geometric Design	284	2,272
4	Desktop Organizer	1,099	4,396
1	Ballpen (Box of 25)	168	168
4	Flex Office Permanent Marker	39	156
20 reams	Long Bond Paper	350	7,000
20 reams	Short Bond Paper	338	6,760
20 reams	A4 Bond Paper	306	6,120



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4	Ink (SET)	1,713	6,852
	Total		33,724

Sources:

[magfile-horizontal-geometric-design](#)

[theorganizedhomemnl.com/products](#)

[Stationery \(nationalbookstore.com\)](#)

[Epson 104 Ink Bottle Set for Ecotank Printers - Genuine Epson Original Ink](#)

Expenses

Particular	Total Price
Hardware	243,959.88
Software	44,032
Stationeries and Supplies	33,724
Total	321,715

Summary Operational Cost

Particular	Total Price
Personnel	2,599,200
Expenses	321,715
Total	2,920,915.88



The operational cost summary provided presents an overview of the annual expenses incurred by the organization in sustaining its operations.

Personnel Costs (2,599,200): This represents the annual expenditure attributed to the organization's workforce. It encompasses salaries, wages, benefits, and other compensations disbursed to employees over the course of the year. The reason personnel costs constitute a significant portion of the annual budget is due to the crucial role employees play in driving the organization's operations forward. Each employee contributes expertise, effort, and time towards fulfilling organizational objectives, making personnel costs a fundamental investment in human capital.

Expenses (321,715): The expenses include various operational expenditures essential for maintaining day-to-day activities throughout the year. These expenses cover a broad spectrum of necessities, including but not limited to utilities, rent, office supplies, maintenance, marketing, and other miscellaneous costs. While personnel costs primarily focus on compensating the workforce, expenses encompass a large number of resources and services required to sustain operational efficiency and effectiveness. These expenses are indispensable for ensuring smooth operations and facilitating the achievement of organizational goals.



Total (2,920,915.88): The total sum of personnel costs and expenses reflects the comprehensive annual operational cost incurred by the organization. This encapsulates the financial commitment necessary to support the organization's workforce, maintain its operational infrastructure, and sustain its activities throughout the year. By aggregating both personnel costs and expenses, the total provides a holistic view of the financial resources allocated towards achieving organizational objectives.

Cost - Benefit Analysis

QCU - FMS

Table 3.4 Cost-Benefit Analysis of the Proposed System

Personnel Monthly Salary

Personnel	Number	No. of Working Days	Hours/ Day	Rate/Day	Salary	Monthly Amount
Admin	4	20	8	1,863	37,260	149,040
Programmer	5	20	8	1,678	35,784	178,920
Total						327,960

Sources:

[Systems administrator salary in Philippines \(indeed.com\)](#)

[Web developer salary in Philippines \(indeed.com\)](#)



Personnel Annual Salary

Personnel	Number	No. of Working Days	Hours/ Day	Rate/Day	Salary	Annual Amount
Admin	4	240	8	1,863	37,260	1,788,480
Programmer	5	20	8	1,678	35,784	2,147,040
Total						3,935,520

Sources:

[Systems administrator salary in Philippines \(indeed.com\)](#)

[Web developer salary in Philippines \(indeed.com\)](#)

The personnel section outlines the annual salaries for administrative staff and programmers. It calculates the total annual salary for each category based on the number of personnel, working days, hours per day, and daily rates. These figures reflect the organization's investment in human resources to operate and maintain the proposed system efficiently.

Hardware Cost

Quantity	Particular	Price	Total Price
1	Lenovo Thinkpad	18,500.00	18,500



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5	TC-1750 I5 12TH GEN Desktop	37, 995	189, 975
1	TC 1770 13th Gen (Tower + Monitor Bundle)	61, 999	61, 999
1	EcoTank ET-2850 All-in-One Supertank Inkjet Printer - Black	15, 392. 72	15, 392. 72
1	Inspiron 15 3530-I71355U Intel® Core™ i7 Laptop	63, 490. 00	63, 490. 00
1	15S-FQ5184TU (7Q7J4PA) Intel® Core™ i5 Laptop	34, 990. 00	34, 990. 00
1	ThinkBook 14 Gen 6 (14 inch AMD)	36, 473. 17	36, 473. 17
Total			420, 819. 89

Sources:

www.lenovo.com/thinkpad

[Best Dell Laptops Price List in Philippines April 2024 \(iprice.ph\)](http://Best Dell Laptops Price List in Philippines April 2024 (iprice.ph))

acer-aspire-tc-1750-i5-12th-gen-desktop

Epson EcoTank ET-2850 All-in-One Supertank Inkjet Printer

aspire-tc-1770-13th-gen

dell-inspiron-15-3530-i71355u-intel

hp-15s-fq5184tu-7q7j4pa-intel-core-i5-laptop-natural-silver

thinkbook-series/lenovo-thinkbook-14

This section enumerates the costs associated with acquiring hardware components necessary for implementing the QCU - FMS. It includes items such as laptops, desktops, monitors, and printers, along with their respective



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prices. The total hardware cost represents the financial outlay required to procure the essential infrastructure for system deployment and operation.

Software Cost

Quantity	Particular	Price	Total Price
10	WINDOWS 11 PROFESSIONAL 64 BIT ENG INTERNATIONAL	9,750	97,500
10	Microsoft Office	1,258	12,580
5	Laravel	Free	Free
1	Hostinger (Vercel)	5,000	5,000
5	Hypertext Mark-up Language	Free	Free
5	Cascading Style Sheet	Free	Free
1	PostgreSQL	863	863



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The software section outlines the expenses related to purchasing software licenses and subscriptions essential for system functionality. It includes costs for operating systems, productivity software, development frameworks, and database management systems. These expenses represent investments in software assets vital for supporting system operations and enhancing productivity.

Stationeries and Supplies Cost

Quantity	Particular	Price	Total Price
12	Mag File Horizontal Geometric Design	284	3, 408
1	Ballpen (Box of 25)	168	168
20 reams	Long Bond Paper	350	7, 000
20 reams	Short Bond Paper	338	6, 760
20 reams	A4 Bond Paper	306	6, 120
10	Ink (SET)	1, 713	17, 130
Total			40, 586

Sources:

[magfile-horizontal-geometric-design](#)

[theorganizedhomemnl.com/products](#)

[Stationery \(nationalbookstore.com\)](#)

[Epson 104 Ink Bottle Set for Ecotank Printers - Genuine Epson Original Ink](#)



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This section details the expenditures associated with procuring stationery items and supplies necessary for administrative tasks and office operations. It includes items such as file organizers, writing instruments, and various types of paper. These costs reflect the organization's ongoing need for physical resources to support day-to-day activities and documentation requirements.

Utility Cost

Quantity	Particular	Price	Total Price
10	Fiber Unli Plan 2099	2,099	20, 990
Total			20, 990

Source:

<https://pldthome.com/fiber>

The utility cost section outlines expenses related to essential services such as internet connectivity required for system operation. It includes the cost of a fiber internet plan necessary for accessing online resources, communication, and system connectivity. These expenses represent recurring operational costs vital for maintaining system functionality and connectivity.

Expenses



Particular	Total Price
Hardware	420, 819
Software	115, 943
Stationeries and Supplies	40, 586
Utility Cost	20, 990
Total	598, 338

The expenses section summarizes the total costs incurred across hardware, software, stationery, and utility categories. It provides an aggregated view of the financial outlay required for implementing and maintaining the QCU - FMS system annually.

Summary Operational Cost

Particular	Total Price
Personnel	3,935, 520
Expenses	598, 338
Total	4, 533, 858

The summary operational cost section consolidates the total annual expenses incurred by the organization for personnel and other operational



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expenditures. It represents the overall financial commitment required to operate the QCU - FMS system efficiently and sustainably on an annual basis.

This comprehensive cost-benefit analysis provides insights into the financial implications of implementing the QCU - FMS system, enabling stakeholders to assess the investment's viability and potential returns. By understanding the annual costs associated with personnel, hardware, software, supplies, and utilities, the organization can make informed decisions regarding resource allocation and budget planning for the successful deployment and operation of the proposed system.

While the provided document primarily focuses on outlining the costs associated with implementing the QCU - FMS it's essential to consider the potential benefits that such a system could offer.

Enhanced Efficiency: By digitizing facility management processes, QCU - FMS can streamline various tasks such as maintenance scheduling, inventory management, and resource allocation. Automation of routine processes can significantly reduce manual effort and increase operational efficiency.

Improved Resource Utilization: With QCU - FMS, organizations can better track and manage their resources, including equipment, supplies, and



personnel. This improved visibility allows for more effective resource allocation, reducing waste and optimizing utilization.

Real-Time Monitoring and Reporting: QCU - FMS enables real-time monitoring of facility operations and performance metrics. Administrators can access comprehensive reports and analytics, allowing for better decision-making and proactive management of facilities.

Enhanced User Experience: By centralizing facility management functions into a single platform, QCU - FMS can provide a more seamless and user-friendly experience for both administrators and end-users. This can lead to higher satisfaction levels among stakeholders and improved overall experience.

Cost Savings: While there are upfront costs associated with implementing QCU - FMS, the system can generate long-term cost savings through improved efficiency, reduced downtime, and optimized resource utilization. By minimizing manual errors and streamlining processes, organizations can achieve significant cost reductions over time.

In summary, the implementation of QCU - FMS offers a wide range of potential benefits, including enhanced efficiency, improved resource utilization, cost savings, compliance management, and data-driven



decision-making. By leveraging modern technology and automation, organizations can optimize facility management processes and improve overall operational effectiveness.

Implementation requirement

Table 3.5 Software Implementation

Software	
Server Environment	Description
Programming Languages	PHP, HTML, Python, CSS
Frameworks	Flask 2.27 and Bootstrap
Libraries	jQuery, Pusher, CloudConvert
Development Tools	Visual studio code, Postman, Git, MySql workbench, Xampp
Database	MySql
API	REST API
Browser	Google Chrome, Microsoft Edge, Mozilla Firefox



Table 3.6 Hardware Implementation

Hardware	
Hardware Environment	Description
Device	Laptop, Desktop, Mobile Devices (Android/iOs)
Operating System	Windows 10, Windows 11, Android 10 up to latest, iOs version 15 up to latest.
Processor	Minimum of i5 or equivalent
Memory	4 to 8gb RAM
Storage	256 SSD

3.3.4 Development and Testing

This section outlines the approach to developing and testing the QCU-FMS system to ensure it meets the highest standards of functionality, reliability, usability, and security.

Functionality: The development team will adopt an iterative approach, utilizing agile methodologies to ensure continuous integration and deployment. This will enable rapid prototyping and frequent validation of features against user requirements. Comprehensive functional testing will be conducted to verify that all features operate according to specification under varied conditions. Automated testing tools will be employed to cover a wide range of scenarios, ensuring that the system performs its intended functions efficiently.



Reliability: To guarantee the system's reliability, the team will implement robust error handling and fault tolerance mechanisms. Regular stress testing and load testing will be performed to ensure the system can handle high volumes of user interactions and data processing without performance degradation. The system's architecture will be designed for high availability with redundant components to prevent downtime and data loss.

Usability: The system's design will be user-centric, focusing on providing an intuitive user interface that is accessible to all users, including those with disabilities. Usability testing will be carried out with real users to gather feedback and identify areas for improvement. This testing will include a variety of user scenarios to ensure the system is easy to navigate and efficient in helping users accomplish their tasks.

Development

The development method of our system is agile methodology. The development of the system was divided into phases and the developers followed it with rigor, making sure that the feedback and consultations are considered to make valuable adjustments. The proponents make sure that the process was followed thoroughly and executed precisely according to the needs of the stakeholders. The



development team made sure that the system is beyond satisfactory to the client.

In each phase the developers work closely to achieve the desired results and monitor the progress making sure that the tasks are done within the given timeframe and weekly meetings and consultations are done to ensure the quality and make adjustments as needed. With each cycle done the developers make sure that the changes are reviewed and ensure that the goals are achieved according to plan. This development method ensures that the developers satisfy the needs of the clients and changes and adjustments are done with each consultation.

Testing

Black Box Testing

Black box testing is a method of software testing where the internal structure or workings of the system being tested are not known to the tester. Instead, the tester interacts with the system's interface and tests its functionality based on input and output without knowing the internal code, architecture, or implementation details.



Table 3.2 Black Box Testing

ADMIN

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Creation of Account	To verify if the user can create an account with valid inputs. To verify if the users cannot create an account without filling out all required fields. To verify the uniqueness of each username that was provided during	Enter valid data in all filled (such as role, first name, last name, email, contact number). Submit the form with one or more required fields left blank. The user tries to sign up using an already-use	Account creation is initiated. Account creation is not initiated due to incomplete information Account creation is not initiated due to an	The system displayed "Created account successfully" message. The system displays an error message indicating the missing or invalid field. A notice message indicating that the username is registered should	Passed Passed Passed	



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	registration.	username.	already-use username.	appear on the system.		
	To verify the system enforces password strength requirements during registration.	Attempt to register with a password that does not reach the requirement.	Account creation is not initiated due to a weak password.	The system should display an error message indicating that the password is too weak.	Passed	
New User Log In	To verify if the user can log in successfully with valid credentials	Valid username and password are provided.	User is redirected to the dashboard or home page.	The user gets directed to the dashboard or home page without seeing any error messages.	Passed	
	To verify whether the system prohibits using an incorrect username to log in.	Users use the invalid username.	Account creation is not initiated due to an invalid username.	An error message is displayed indicating "account doesn't exist"	Passed	



	To verify whether the system prohibits using an incorrect password to log in.	User input an incorrect password.	Account creation is not initiated due to an incorrect password.	An error message stating that the "account doesn't exist" appears.	Passed	
Admin Dashboard	To verify if the system is able to display the total reported issues and able to assign service providers . To confirm whether the system can show all of the school properties' requests.	If the user can view and assign the available manpower. If the user is able to go over the specifics of their property request for the school.	It displays the total report. Identify all requests and prioritize the urgent requests.	It showed an overview of the issues that were reported, allowing for the assignment of the available manpower. The summary of the requests for school properties was shown.	Passed Passed	



	To verify that the Employee, Student, and Service Provider accounts — as well as all other current accounts — are visible.	If a recently made account is displayed.	Shows each account that has been created.	It displayed every account that has been made, including those for employees, students, and service suppliers.	Passed	
Summary of Analytics	Verify that the analytics system can reliably track and display sequences over time.	In the occurrence that reports, requests, and satisfaction rates have changed recently, it will be displayed.	The percentage of ratings, reports, and requests is properly interpreted.	Periodically, the system showed the precise and current analytics.	Passed	
New User Creation	To verify if admin can create an account for Assistant admin, Service Provider	Input a needed, valid, and complete information.	Account creation is initiated.	The admin successfully created an account.	Passed	



	and Employee e.					
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ADMIN'S FACILITY DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Search Bar Button	To ensure that the search bar allows users to search for specific facilities.	The admin is viewing the facility page.	Enter a search query in the search bar and press Enter.	Display facilities matching the search query.	Passed	
Add Building Button	To ensure that clicking the "Add Building" button displays the form to add a new building .	The admin is logged in and navigates to the facility page.	Click on the "Add Building" button..	Form to add a new building is displayed .	Passed	
Verify Building Name Field	To validate that the admin can input the	The admin is filling out the "Add Building" form.	Enter the name of the new building in the appropriate field.	The building name is correctly entered into the form.	Passed	



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	name of the new building .					
Verify Building Code Field	To ensure that the admin can input the code of the new building .	The admin is filling out the "Add Building " form.	Enter the code of the new building in the appropriate field.	The building code is correctly entered into the form.	Passee d	
Verify Description Field	To confirm that the admin can provide a description for the new building .	The admin is filling out the "Add Building " form.	Enter a description for the new building in the appropriate field.	The description is correctly entered into the form.	Passee d	
Verify Floors Field	To ensure that the admin can specify the number of floors in the new building .	The admin is filling out the "Add Building " form.	Enter the number of floors for the new building in the appropriate field.	The number of floors is correctly entered into the form.	Passee d	



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Verify Rooms Per Floor Field	To validate that the admin can specify the number of rooms per floor in the new building .	The admin is filling out the "Add Building" form.	Enter the number of rooms per floor for the new building in the appropriate field.	The number of rooms per floor is correctly entered into the form.	Passee d	
Upload Image Button	To confirm that the admin can upload an image for the new building .	The admin is filling out the "Add Building" form.	Upload an image file for the new building.	The image is successfully uploaded and displayed in the form.	Passee d	
Cancel Button	To ensure that clicking the "Cancel" button cancels the building creation process and closes the form.	The admin is filling out the "Add Building" form.	Click on the "Cancel" button.	The form is closed without creating a new building.	Passee d	



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Create Building Button	To validate that clicking the "Create Building" button submits the form and creates a new building.	The admin has filled out all required fields in the "Add Building" form.	Click on the "Create Building" button.	The new building is successfully created and added to the building list.	Failed	Ensure the "Create Building" button adds new buildings accurately, validates real-time updates and data retention.
View Building Details	To ensure that clicking the "View Details" button displays detailed information about the building.	The admin is logged in and viewing the list of buildings.	Click on the "View Details" button next to a building.	Detailed information about the building is displayed.	Passed	
Upload File for Facility Picture	To validate that the admin can upload a new picture for the building.	The admin is viewing the detailed information about the building.	Click on the "Upload File" button for a facility picture.	The admin selects and uploads a new picture for the building.	Passed	



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The admin selects and uploads a new picture for the building	To ensure that clicking the "Print QR" button generates a printable QR code for the building.	The admin is viewing the detailed information about the building.	Click on the "Print QR" button.	A printable QR code for the building is generated.	Passed	
Download QR Button	To validate that clicking the "Download QR" button downloads a QR code image for the building.	The admin is viewing the detailed information about the building.	Click on the "Download QR" button.	A QR code image for the building is downloaded.	Passed	
Edit Button	To ensure that clicking the "Edit" button allows the admin to edit	The admin is viewing the facility details.	Click on the "Edit" button.	Facility details become editable.	Passed	



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	facility details.					
Verify Facility Name Field	To validate that the admin can edit the facility name.	The admin is editing facility details.	Change the facility name in the appropriate field.	The facility name is updated.	Passed	
Verify Location Field	To ensure that the admin can edit the location of the facility.	The admin is editing facility details.	Change the location of the facility in the appropriate field.	The location of the facility is updated.	Passed	
Verify Description Field	To confirm that the admin can edit the description of the facility.	The admin is editing facility details.	Change the description of the facility in the appropriate field.	The description of the facility is updated.	Passed	
Verify Capacity Field	To ensure that the admin can edit the capacity of the facility.	The admin is editing facility details.	Change the capacity of the facility in the appropriate field.	The capacity of the facility is updated.	Passed	
Verify Status Field	To validate that the admin	The admin is editing	Change the status of the	The status of the	Passed	



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	can edit the status of the facility.	facility details.	facility in the appropriate field.	facility is updated.		
Save Facility Button	To ensure that clicking the "Save Facility" button saves the edited facility details.	The admin has made changes to the facility details.	Click on the "Save Facility" button.	The edited facility details are saved.	Passed	
Verify Close Button	To validate that clicking the "Close" button closes the edit mode without saving changes.	The admin is editing facility details.	Click on the "Close" button.	The edit mode is closed without saving changes.	Passed	
Verify Report History Drop-down	To ensure that the admin can access the report history dropdown.	The admin is viewing the facility details.	Click on the "Report History" dropdown.	Report history dropdown is displayed .	Passed	



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Verify Report ID Display	To validate that the admin can view the ID of each report in the dropdown.	The admin is viewing the report history dropdown.	Check if the ID of each report is displayed.	IDs of all reports are displayed in the dropdown.	Passed	
Verify Date and Time Display	To ensure that the admin can view the date and time of each report in the dropdown.	The admin is viewing the report history dropdown.	Check if the date and time of each report are displayed.	Date and time of each report are displayed in the dropdown.	Passed	
Verify From Display	To confirm that the admin can view the source of each report in the dropdown.	The admin is viewing the report history dropdown.	Check if the source of each report is displayed.	Sources of all reports are displayed in the dropdown.	Passed	
Verify Issue Display	To ensure that the admin can view the report	The admin is viewing the report	Check if the issue of each report is displayed	Issues of all reports are displayed	Passed	



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	view the issue of each report in the dropdown.	history dropdown.	displayed.	in the dropdown.		
Verify Description Display	To validate that the admin can view the description of each report.	The admin is viewing the report history dropdown.	Check if the description of each report is displayed.	Descriptions of all reports are displayed in the dropdown.	Passed	
Verify Report Image Display	To ensure that the admin can view the image attached to each report in the dropdown.	The admin is viewing the report history dropdown.	Check if the image of each report is displayed.	Images of all reports are displayed in the dropdown.	Passed	
Verify Status Display	To confirm that the admin can view the status of each report in the dropdown.	The admin is viewing the report history dropdown.	Check if the status of each report is displayed.	Statuses of all reports are displayed in the dropdown.	Passed	



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Verify Total Reports Display	To ensure that the admin can view the total number of reports in the dropdown.	The admin is viewing the report history dropdown.	Check if the total number of reports is displayed.	Total number of reports is displayed in the dropdown.	Passee d	
Verify Search Bar Functionality	To validate that the admin can search for specific reports using the search bar.	The admin is viewing the report history dropdown.	Enter a search query in the search bar and press Enter.	Reports matching the search query are displayed.	Passee d	
Verify Reservation History Drop-down	To ensure that the admin can access the reservation history dropdown.	The admin is viewing the facility details.	Click on the "Reservation History" dropdown.	Reservation history dropdown is displayed.	Passee d	
Verify Event Details Display	To validate that the admin	The admin is viewing the	Check if the event details of each	Event details of each reservati	Passee d	



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	can view the details of each reservation event in the dropdown.	reservation history dropdown.	reservations are displayed.	on are displayed in the dropdown.		
Verify Date Start Display	To ensure that the admin can view the start date of each reservation in the dropdown.	The admin is viewing the reservation history dropdown.	Check if the start date of each reservation is displayed.	Start date of each reservation is displayed in the dropdown.	Passed	
Verify Date End Display	To confirm that the admin can view the end date of each reservation in the dropdown.	The admin is viewing the reservation history dropdown.	Check if the end date of each reservation is displayed.	End date of each reservation is displayed in the dropdown.	Failed	Verify that the admin can see reservation end dates in the dropdown for accurate display and functionality.
Verify Feedback History Drop-	To ensure that the admin is viewing the	The admin is viewing the "Feedback"	Click on the "Feedback"	Feedback history dropdown is		



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down	can access the feedback history dropdown.	facility details.	History" dropdown	displayed .	Passem	
Verify Product Name Display	To validate that the admin can view the product name of each feedback item in the dropdown.	The admin is viewing the feedback history dropdown.	Check if the product name of each feedback item is displayed.	Product name of each feedback item is displayed in the dropdown.	Passem	
Verify Color Display	To ensure that the admin can view the color of each feedback item in the dropdown.	The admin is viewing the feedback history dropdown.	Check if the color of each feedback item is displayed.	Color of each feedback item is displayed in the dropdown.	Passem	
Verify Category Display	To confirm that the admin can view the category of each	The admin is viewing the feedback history dropdown.	Check if the category of each feedback item is displayed	Category of each feedback item is displayed in the dropdown.	Passem	



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	feedback item in the dropdown.					
Verify Price Display	To ensure that the admin can view the price of each feedback item in the dropdown.	The admin is viewing the feedback history dropdown.	Check if the price of each feedback item is displayed.	Price of each feedback item is displayed in the dropdown.	Passed	
Verify Edit Button	To validate that the admin can edit the feedback item by clicking the edit button.	The admin is viewing the feedback history dropdown.	Click on the "Edit" button for a feedback item.	Feedback items are opened for editing.	Passed	
Verify Update Button	To ensure that clicking the "Update" button applies the changes made to	The admin has made changes to the field.	Click on the "Update" button.	Changes are saved and applied to the element.	Passed	



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	the element.					
Verify View Room Details	Confirm "View Details" for a room, displays availability type, and history.	The user clicks on the View Details button next to a room.	Detailed information about the room is displayed.	Room details including availability, type, and history are displayed.	Passee d	
Verify Add Venue Form Display	To ensure that clicking the "Add Venue" button displays the form to add a new venue.	The admin is logged in and navigates to the facility page.	Click on the "Add Venue" button.	Form to add a new venue is displayed.	Passee d	
Verify Venue Name Field	To validate that the admin can input the name of the new venue.	The admin is filling out the "Add Venue" form.	Enter the name of the new venue in the appropriate field.	The venue name is correctly entered into the form.	Passee d	
Verify Capacity Field	To ensure that the admin can specify	The admin is filling out the "Add	Enter the capacity of the new venue in the	The capacity is correctly entered	Passee d	



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	the capacity of the new venue.	Venue" form.	appropriate field.	into the form.		
Verify Description Field	To confirm that the admin can provide a description for the new venue.	The admin is filling out the "Add Venue" form.	Enter a description for the new venue in the appropriate field.	The description is correctly entered into the form.	Passed	
Verify Upload File	To validate that the admin can upload a file for the new venue.	The admin is filling out the "Add Venue" form.	Upload a file for the new venue.	The file is successfully uploaded and displayed in the form.	Passed	
Verify Cancel Button Functionality	To ensure that clicking the "Cancel" button cancels the venue creation process and closes the form.	The admin is filling out the "Add Venue" form.	Click on the "Cancel" button.	The form is closed without creating a new venue.	Passed	



Verify Add Venue Button Functionality	To validate that clicking the "Add Venue" button submits the form and adds a new venue.	The admin has filled out all required fields in the "Add Venue" form.	Click on the "Add Venue" button.	The new venue was successfully created and added to the venue list.	Passee d	
Verify View Building Details Functionality	To confirm that the admin can view detailed information about a building	The admin clicks on the View button next to a building .	Detailed information about the building is displayed.	Building details including rooms, floors, and history are displayed	Passee d	
Verify View Venue Details Functionality	To confirm that the admin can view detailed information about a venue.	The admin clicks on the View button next to a venue.	Detailed information about the venue is displayed.	Venue details including capacity, description, and history are displayed	Passee d	

ADMIN'S EVENT DASHBOARD



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Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Verify details of request	To verify the functionality of the details of a request.	Click on a specific request to view its details.	Details of the request should be displayed, along with options for rejection and acceptance.	Request details are displayed, and options for rejection and acceptance are available	Passed	
Verify calendar functionality	To ensure the calendar functions correctly.	Navigate to the calendar view.	The calendar should display a legend for "Reserved", "Pencil Booking", and "Pending" dates.	The calendar correctly displays the legend for different date statuses.	Passed	
Verify add the event button	To test the function of adding an event to the calendar.	Click on the "add event" button.	Users should be able to add an event to the calendar.	The "add event" functionality allows users to successfully add events to the calendar.	Passed	
Verify Logistic	To confirm that	The user is on the main	Display a list of logistics	List of logistics items		



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List button	clicking the Logistic List button displays a list of logistics items on the main dashboard .	dashboard of the logistics management system.	items including name, type, total quantity, current quantity, and actions.	displayed correctly.	Passed	
Verify Facility Reservation button	To validate that the Facility Reservation button opens the facility reservation form.	The user is on the main dashboard of the logistics management system.	Open the facility reservation form.	Facility reservation form is displayed.	Passed	
Verify Edit button	Ensure clicking "Edit" for a logistics item opens a pre-filled form for name, type, quantity, with update/ close options.	The user is viewing the details of a logistics item.	Open the edit form for the item with pre-filled information for name, type, and total quantity.	Edit form for the item is displayed with pre-filled information for name, type, and total quantity. Options to update or close are provided.	Passed	



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Verify Add button	To validate that clicking the Add button opens the form to add a new logistics item.	The user is on the main dashboard of the logistics management system.	Open the form to add a new logistics item.	Form to add a new logistics item is displayed.	Passee d	
Verify Logistic List button	To confirm that clicking the Logistic List button displays a list of logistics items on the main dashboard .	The user is on the main dashboard of the logistics management system.	Display a list of logistics items including name, type, total quantity, current quantity, and actions.	List of logistics items displayed correctly.	Passee d	
Verify Logistic Request button	To verify if clicking the Logistic Request button opens the logistic request form.	The user is on the main dashboard of the logistics management system.	Open the logistic request form.	Logistic request form is displayed.	Passee d	
Verify Facility Reservation button	To validate that clicking the Facility	The user is on the main dashboard of the logistics	Open the facility reservation form.	Facility reservation form is displayed.	Passee d	



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	Reservation button opens the facility reservation form.	management system.				
Verify Add button	To validate that clicking the Add button opens the form to add a new logistics item.	The user is on the main dashboard of the logistics management system.	Open the form to add a new logistics item.	Form to add a new logistics item is displayed.	Passed	
Verify Logistic Request Actions	To verify that the Logistic Request form displays requester name, description and actions including accept and reject.	The user is viewing a logistic request in the system.	Display requester name, description, and actions including accept and reject buttons.	Requester name, description, and actions displayed correctly.	Passed	
Verify accepting Logistic Request	To ensure that clicking the accept button in a logistic request assigns manpower if the	The user is viewing a logistic request with an accepted status.	Assign manpower to the logistic request.	Manpower assigned successfully.	Passed	



	status is accepted.					
Verify Logistic Request reject	To ensure that clicking the reject button in a logistic request states the reason if the request is rejected.	The user is viewing a logistic request with a rejected status.	State the reason for rejecting the logistic request.2	Reason for rejection started successfully.	Passed	
Verify Logistic Request drop-down	To confirm that selecting a status from the dropdown menu filters the logistic requests accordingly.	The user is viewing the logistic requests in the system.	Filter the logistic requests based on the selected status.	Logistic requests filtered correctly based on the selected status.	Passed	

ADMIN'S JOB ORDER DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Pending	The list of job order should display the list of	The list has been sorted into list of pending	The list displays the list of job orders that will display pending	Categorized the list with pending job orders with their information	Passed	



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	pending job orders	job orders	job orders if they're labeled as pending	ns and you can assign a manpower for that task and mark it as pending		
Assigned or On-going	The list of job order should display the list of assigned or on-going task	The list has been sorted into list of assigned / on-going job orders	The list displays the list of assigned/ on-going job orders with their information	Categorized list of assigned/ on-going job orders with information and status.	Passed	
Archived	The list should display the list of archived job orders	The list separated the archived job orders from the other categories	The list will display the job orders from completed or invalid job orders in archived category	The system displays the completed and invalid job orders in archived including their status, information, and date	Passed	
Add Task	Being able to add task for job orders	Successfully add tasks	The system should be able to add a task for the job order	The system is able to add tasks with their corresponding information and get posted and be ready to	Passed	



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				have an action taken		
Request	Should be able to list the requests being made	Successfully list the list of requests	List of request being made by the users with its information	Displays the list of request with their informations and being able to assign a manpower for the task or reject the request	Passed	
Man-power	Should be able to display the list of manpower	Displays the list of available to assigned manpower	Can display the list of manpower from available to assigned with their information	The system shows manpower sorted by expertise, with ratings and searchable by name. Reports display job details, including before and after.	Passed	

ADMIN'S REWARD DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Rewards Dashboard	To verify that the admin rewards	Admin credentials are valid.	View the daily user engagement	Accurate daily user engagement		Addressed inaccurate



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	<p>dashboard displays daily user engagement, student points per day, and top leaders for monthly, weekly, and all-time periods accurately</p>	<p>The rewards dashboard is accessible.</p>	<p>ent metrics, including the number of users active each day.</p>	<p>ent metrics, displaying the number of active users each day.</p>	<p>Failed</p>	<p>information and improved regaining techniques in order to create an accurate Rewards dashboard.</p>
Manage Rewards Certificate	To verify that the admin can successfully manage rewards, including certificates with images, rewards	Admin credentials are valid and the manage rewards section is accessible	Add new rewards with certificate image, name, qualification criteria, and validity.	Adding a new reward with a certificate image, rewards name, criteria, and validity period.	Failed	Ensure that admin management worked effectively adding images, defining award specifics,



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	name, criteria, validity period, and actions.		Able to View, edit, and delete rewards.	Able to view, edit and delete a list of rewards.		and permitting adjustment and deletion.
Coupons	To verify that the admin can successfully manage coupons.	The coupon management section is accessible .	Generate new coupons with unique voucher codes and update the status of coupons (e.g., mark as redeemed).	Generating new coupons with unique voucher codes. Assigning statuses to coupons (e.g., setting as active, expired, redeemed)	Passed	
Create Certificate	To verify that the admin can successfully create certificates with various details.	Admin credentials are valid and the certificate creation page is accessible .	The admin completes the certificate creation process by uploading a template file, naming the reward, and	The admin successfully completes the certificate creation process	Passed	



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			describin g significan ce			
Student Points History	To verify that the admin can view a history of student points, and total points accumulated.	Admin credentials are valid and the student points history section is accessible.	View a list of student points history records, each containing the student's information and date of points acquisition.	View a list of student points history records, with all relevant details displayed for each entry.	Passed	

ADMIN'S NOTIFICATIONS AND UPDATES DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Verify Notification and Update button .	Ensure the notification/update button displays messages with date and time.	The user is logged into the system.	Click on the Notification and Update button.	Display notification and update messages along with the date and time of the message .	Passed	



ADMIN'S ANALYTICS AND REPORTING

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Generate Report Button	To verify that clicking the "Generate Report" button produces a PDF file summarizing all reports based on the selected conditions.	Click the "Generate Report" button after selecting different conditions from the dropdown filter (All Month, This Month, This Week, and All).	A PDF file containing the Job Order ID, reporter name, issue category, description of the report, assigned service provider, status, and resolution time in minutes for reports matching the selected conditions.	The system successfully generates a PDF report with the specified details based on the selected conditions.	Passed	
Drop-down Filter	To ensure that the dropdown filter functions correctly and filters the reports	Select each option from the dropdown filter (All Month, This Month,	"All Month": The report should include all reports	"All Month": The report correctly includes all reports	Passed	



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		<p>based on the selected time frame.</p> <p>This Week, and All) and observe the generated report.</p>	<p>from the entire month.</p> <p>"This Month": The report should include reports from the current month.</p> <p>"This Week": The report should include reports from the current week.</p> <p>"All": The report should include all available reports without any time constraints.</p>	<p>from the entire month.</p> <p>"This Month": The report accurately includes reports from the current month.</p> <p>"This Week": The report precisely includes reports from the current week.</p> <p>"All": The report appropriately includes</p>		
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				all available reports without any time constraints.		
Completed Task Pie Graph	To verify that the Completed Task Pie Graph accurately represents completed tasks based on the selected dropdown filter.	Select different options from the dropdown filter (All Month, This Month, This Week, and All) and observe the generated pie graph.	It should display the distribution of completed tasks among the categories of electrical, plumbing, carpentry, maintenance	It correctly reflects the distribution of completed tasks according to the selected time frame and categories, showing the percentage of completed tasks in each category.	Passed	
Task Completed Label	To confirm that the Task Completed Label accurately displays the exact amount of completed tasks for each	Select different options from the dropdown filter (All Month, This Month, This Week, and All) and	It should dynamically update to show the exact number of completed tasks for each category	It correctly displays the precise amount of completed tasks for each category according	Passed	



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	category (electrical, plumbing, carpentry, maintenance) based on the selected dropdown filter.	observe the displayed Task Completed Label.	based on the selected time frame and dropdown filter.	g to the selected time frame and dropdown filter.		
Accomplishment Bar Graph (Pending and completed every week or month)	To ensure that the Accomplishment Bar Graph accurately represents pending and completed tasks based on the selected dropdown filter, with dynamic labeling based on the time frame chosen.	Select different options from the dropdown filter (All Month, This Month, This Week, and All) and observe the displayed Accomplishment Bar Graph and its labels.	When selecting the "Month" option from the dropdown filter, the bar graph should display pending and completed tasks for each month, with labels changing to the names of the months. When selecting the "Week" option from the dropdown filter,	When selecting the "Month" option, the bar graph correctly displays pending and completed tasks for each month, with labels representing the names of the months. When selecting the "Week"	Passted	



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			<p>the bar graph should display pending and completed tasks for each week, with labels changing to represent each day of the week.</p>	<p>option, the bar graph accurately displays pending and completed tasks for each week, with labels changing to represent each day of the week.</p>		
Drop-down filter (All Month, This Month, This Week, and All)	To ensure that the dropdown filter functions correctly and filters the reports based on the selected time frame.	Select each option from the dropdown filter (All Month, This Month, This Week, and All) and observe the generated report.	<p>"All Month": The report should include all reports from the entire month.</p> <p>"This Month": The report should include reports from the current month.</p>	<p>"All Month": The report correctly includes all reports from the entire month.</p> <p>"This Month": The report accurately includes reports from the</p>	Passted	



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			"This Week": The report should include reports from the current week. "All": The report should include all available reports without any time constraints.	current month.	"This Week": The report precisely includes reports from the current week. "All": The report appropriately includes all available reports without any time constraints.	
Avg. Response Time Label (Carpen -try, Electrical, Maintenance, and Plum-	To verify that the Avg. Response Time Label accurately displays the average response time, interpreted in minutes,	Select different options from the dropdown filter (All Month, This Month, This Week, and All) and	I should dynamically update to show the average response time, interpreted in minutes,	It correctly displays the average response time, interpreted in minutes, of service	Passee d	



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bing)	of service providers in the fields of electrical, plumbing, carpentry, and maintenance based on the selected dropdown filter.	observe the displayed Avg. Response Time Label.	of service providers for each category (electrical, plumbing, carpentry, maintenance) based on the selected time frame and dropdown filter.	providers for each category according to the selected time frame and dropdown filter.		
Avg. Resolution Time Label (Carpentry, Electrical, Maintenance, and Plumbing)	To confirm that the Avg. Resolution Time Label accurately displays the average resolution time, interpreted in minutes, of service providers in the fields of electrical, plumbing, carpentry, and maintenance based on	Select different options from the dropdown filter (All Month, This Month, This Week, and All) and observe the displayed Avg. Resolution Time Label.	It should dynamically update to show the average resolution time, interpreted in minutes, of service providers for each category (electrical, plumbing,	It correctly displays the average resolution time, interpreted in minutes, of service providers for each category according to the selected time frame and	Passem	



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Service Provider Overall Performance Pie Graph	the selected dropdown filter.		carpentry, maintenance) based on the selected time frame and dropdown filter.	dropdown filter.		
Service Provider Rating	To verify that the Service Provider Rating Bar Graph accurately represents	Review the generated bar graph after collecting and analyzing service	It should display the performance rating of each service	It correctly displays the performance rating of each	Passed	



	the performance rating of each service provider.	provider performance rating data.	provider, with each bar representing a different service provider.	service provider, providing a clear comparison of ratings among them.		
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ADMIN'S ACTIVITY LOGS

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Activity Logs Table	To ensure that the Activity Logs Table accurately displays all activities performed by the admin in the system.	Review the entries in the Activity Logs Table after the admin has performed various actions within the system.	The Activity Logs Table should include columns for "Performed By" (admin username or identifier), "Role" (role of the admin), "Date and Time Performed" (timestamp of when the action was	The Activity Logs Table correctly displays all activities performed by the admin, with each entry containing the performer's identity, role, timestamp, and description of the action taken, providing a comprehensive record of system activities.	Passed	



			performed), and "Action Performed"			
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STUDENT'S DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Creation of Account	To verify if the user is a QCU student by using their University's email.	Students use the unenrolled email address.	Account creation is not initiated due to an unenrolled email address.	The application will prompt that the Email is not registered.	Passed	
	To verify if the enrolled student in QCU will create their account.	Student use the enrolled email address that are registered in registrar	Account creation is initiated using an enrolled email address.	Account is successfully created.	Passed	
New User Log In	To verify if the OTP will receive thru the enrolled email address.	Did not receive any email that contains the OTP.	Students received an email to initiate their account.	Student can successfully log in their account	Passed	



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Scan QR Code to report	To verify that the system can read the QR codes in different school facilities.	QR code is valid.	QR Codes read by the system.	System generates the reports using QR Code.	Passed	
Facility ID to report	To verify that the system can read the assigned Facility ID in different school facilities.	Facility ID is valid.	Facility ID read by the system.	System generates the reports using Facility ID.	Passed	
Notification	To verify if students can view all notifications correctly on their dashboard.	All notifications including the changes to their account settings are visible to their dashboard.	List of notifications related to their reports, earned reward points, and account settings is displayed .	It displayed all notifications with accurate details, including the title, content, and timestamp.	Passed	
Display Reward Points	To ensure that the reward points that are	The student earned reward point	Depending on how many points	Reward points were displayed on the	Passed	



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	shown are updated instantly.	through actions such as reporting issues, providing comments, and rating facilities.	were gained, it showed reward points on the student's dashboard.	dashboard and increased by the appropriate amount as the student accumulated more points.		
Points Earned History	To verify if the student can view the history of their reward points.	Analyze the list of points earned, which includes the date, the name of the activity, and the points each entry has earned.	Continuous list of points earned should be displayed.	It includes a history of points earned and a list of all the points the student earned from different activities.	Passed	
	To test if Students can rate and give impactful feedback about the facility.	If the feedback and rating will reflect to the system.	System will receive the feedback.	The rating and feedback of the student will be displayed to the application.	Passed	
	To test if students can view the events in calendar	If the application will display the events in order.	The events will display.	The students can view all the events in the University.	Passed	



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	To test if application can display their standing in the leaderboard	If the leaderboard list is updated after claiming the rewards.	The leaderboard will display the list of students and their points.	The students and corresponding points can be seen on the system. The top three students who report will also be generated.	Passed	
View Report History	To prove that students can precisely view the specifics of their reports on their dashboard.	Evaluate the displayed report list, show the details and status (finished, pending, and ongoing)	It should display the detailed content of each report.	It displayed the detailed content of each report and can give feedback to earn additional points.	Passed	
Profile Information	To verify that the student can access their profile and account information.	If students can check their profile, reset their password, and provide feedback to the system.	Accurate personal information about the student should be included on the profile page.	The student's personal information should be shown on the profile page, where they may also update their password and provide	Passed	



				feedback to the system.		
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EMPLOYEE'S DASHBOARD

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
Creation of Account	To verify that users can successfully create an account with their personal information.	The registration page is accessible.	The user should be able to input the required fields and receive a confirmation message indicating that the account was created successfully.	The user successfully enters all required information into the registration form and submits it. A confirmation message is displayed, confirming that the account has been created successfully.	Passed	
New User Log in	Provide a unique identifier or name	To verify that employee members can successfully log into the system.	Employee member credentials are valid. Sending an OTP email.	The employee member successfully logged into the system and was redirected to the	Passed	



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				employee dashboard		
Scan to Report	To verify that the system can read the QR codes in different school facilities.	QR code is valid.	QR Codes read by the system.	System generates the reports using QR Code.	Passem d	
	To verify that the system can read the assigned Facility ID in different school facilities.	Facility ID is valid.	Facility ID read by the system.	System generates the reports using		
	To test if Students can rate and give impactful feedback about the facility.	If the feedback and rating will reflect to the system.	System will receive the feedback.	The rating and feedback of the student will be displayed to the application .	Passem d	
	To verify that employee members can view pencil	Employee member credentials are valid.	The employee member should be able to see pencil	The employee successfully logged into the calendar		



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	booked and reserved slots on the calendar system	The calendar system is accessible and operational. There are pencil booked and reserved slots on the calendar.	booked and reserved slots clearly marked on the calendar interface, distinguishing them from available slots	system and can see pencil booked and reserved slots clearly indicated on the calendar interface, allowing them to plan their schedule accordingly.	Passed	
Available Facility	To ensure the availability facility feature functions correctly by allowing users to book facilities for events with specified requirements.	Facility name and ID are provided.	Input the facility name, ID, and specify the number of attendees and necessary details for the availability of the facility.	The user successfully inputs all required information, selects logistics requirements, uploads a file if necessary, and submits the booking request without encountering any errors or issues.	Passed	



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View Request	To verify that employee members can successfully submit requests for manpower assistance, maintenance, and logistics support.	Employee Member credentials are valid.	Select the type of request from a dropdown menu, and provide a description of the request.	The employee member successfully selects the type of request, and a confirmation message is displayed, confirming that the request has been successfully submitted.	Passed	
Pencil Book History	To verify that employee members can view the history of pencil bookings with various statuses such as pending, pencil booked, rejected, and reserved.	Employee member credentials are valid. There are pencil bookings with different statuses in the system.	To efficiently manage pencil bookings that could be a database or spreadsheet with filtering and sorting capabilities.	The employee member successfully accesses the pencil book history section and can view a comprehensive list of pencil bookings. The employee member is able to filter or sort the list.	Passed	



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Profile Information	To verify that the student can access their profile information.	The student navigates to the profile page to view and potentially change password and give feedback to the system.	The profile page should display the student's personal information accurately.	The profile page should display the student's personal information and can	Passed	
View Notifications	To verify that the student can view notifications related to their reports and reward earned points.		List of notifications are displayed.	List of notifications related to their reports and earned rewards points is displayed.	Passed	

SERVICE PROVIDER

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action
New User	To verify the user is a service provider	If the user will receive an email	Account creation is initiated using the default	The user logged in successfully.	Passed	



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	of the QCU.	containing their newly created password.				
Report Status	To test what will be shown after clicking the report.	If the service provider presses the report, it will show all the recent job orders assigned and completed	The service provider should be able to refresh the report status, and the dashboard should display the updated status of reports.	The dashboard shows the most recent status of all reports, and the service provider has the ability to refresh the report status.	Passed	
Request Status	To test what will be shown after clicking the report.	If the service provider presses the report, it will show all the recent job orders assigned and completed	The service provider should be able to refresh the report status, and the dashboard should display the most up-to-date status of all reports.	The dashboard shows the most recent status of all reports, and the service provider has the ability to refresh the report status.	Passed	



Report Form	To test what will happen if the service provider clicks the Report Form.	If the service provider clicks the report form status he/she will then be directed to fill the necessary fields to send their report.	The Admin will receive the report uploaded by the service provider.	The admin has received a report and will be added to their accomplishment report.	Passed	
Profile Information	To verify that the service provider can access their profile and account information.	If service provider can check their profile, reset their password, and provide feedback to the system	Accurate personal information about the service provider should be included on the profile page.	The service provider's personal information should be shown on the profile page, and update their password and provide feedback to the system.	Passed	

SIDE BAR MODULE

Test Case	Test Purpose	Test Condition	Expected Output	Actual Result	Remarks	Corrective Action



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Dashboard	Quick light overview of reports and analytics	Displays the quick overview of analytics and updates	The Dashboard should be able to display a quick overview of analytics and updates	The system displays report trend analytics and quick updates of reports, requests, and active student accounts	Passed	
Users	List of active accounts and online users	Displays the list of accounts	The system should be able to record every registered user.	The system displays the list of users from active to inactive and a list of online users	Passed	
Facility	List of the covered venues and buildings	Displays the list of buildings and venues that are covered by the system	The Facility dashboard should be able to display the list of buildings and venues that are covered by the system.	When accessing the Facility dashboard, it displays a comprehensive list of integrated buildings and venues, giving a clear overview of covered locations.	Passed	



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Events	List of events for approval, pencil booked, reserved, rejected	Shows the events list and calendar with the events.	The system should be able to list the events from pencil booking, reserved, approved, and rejected.	The system successfully lists events categorized as penciled, reserved, approved, and rejected.	Passed	
Job Orders	To show the list of reports that are being reported	Displays the list of reports that are being reported	The system should be able to display the list of job orders that needed actions	The system effectively displays a list of job orders requiring actions, facilitating timely management and prioritization of tasks.	Passed	
Rewards	To display the points being distributed to the students	Displays an analytics of distributed rewards, Rewards list, and Rewards history.	The system should be able to display the rewards analytics and reward milestones	The system accurately presents rewards analytics alongside reward milestones, enabling users to track progress and achievements effectively.	Passed	



Notifications and Updates	List of notifications and updates that the system received	Displays the notifications and updates	The system should be able to receive notifications.	Notifications and updates are received by the system with a notification sound	Passed	
Analytics and Reports	To display the analytics of tasks	Displays and can generate a report	The system should be able to display the monthly analytics of completed tasks, providing insights into productivity trends and performance over time.	The system effectively presents monthly analytics of completed tasks, providing insights into productivity trends and performance over time.	Passed	
Activity Logs	To display the history of the activities being done in the system.	Shows the history of activities and changes being made inside the system.	The system should be able to detect the actions that are made by the admins while using the system	Activities that are made in different dashboards are being recorded in the activity logs including the performed action, and time and date	Passed	

Statistical Treatment of Data



For the statistical treatment of data, the following statistical tools were utilized to provide accurate interpretations based on collected responses from the respondents.

1. Percentage Distribution

Percentage and frequency of distribution were used to describe the profile of the respondents.

Formula:

$$\% = \frac{f}{n} * 100$$

Where:

% = percentage

f = frequency

n = number of respondents

0. Weighted Mean

To qualify the respondents on the rating scale, the five-point Likert Scale Method of measuring perception was used. Each statement had five responses classified under degree of frequency with weights of 5,4,3,2 & 1. The respondents reacted to every perception item by checking one out of five possible answers or responses. Thus, the score was the sum of the weight of the reactions checked.

Formula:

$$W = \frac{\sum wx}{\sum w}$$

Where:

w = weight



x = matching value

0. Likert Scale

The 5-point Likert scale was used to scale the respondent's response to the given statements.

Table 3.8 Likert Scale and Its Interpretation

Scale	Range	Verbal Interpretation
5	4.50 - 5.00	Excellent
4	3.50 - 4.59	Very Good
3	2.50 - 3.49	Good
2	1.50 - 2.49	Fair
1	1.00 - 1.49	Poor

3.2.5 Implementation Plan

The implementation plan outlines the strategic roadmap for implementing and maintaining the QCU-FMS. This holistic approach addresses various aspects of the project, from deployment and promotions to training, support, and feedback strategies, ensuring a successful and sustainable mobile application solution for Quezon City University.

Table 3.9 Implementation Plan

STRATEGY	ACTIVITIES	PERSON INVOLVED	DURATION



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Deployment	Deploy the mobile application to the production environment including preparation, server setup, database configuration, and actual deployment	Proponents and System Administrator	2 Weeks
Promotions	Develop promotional materials such as posters, flyers, and social media content	User Interface and Technical Writer Team	1 Day
	Create a promotional strategy outlining target audience and channels (e.g., social media)	Systems Analyst Team	3 Hours
	Launch promotional campaigns to generate awareness and interest in the mobile application	Proponents	1 Day
Training	Develop training materials including user guides, and tutorials	Systems Analyst and User Interface Team	1 Day
	Conduct training sessions for students on how to use the mobile application	Proponents and Students	1 Day
	Organize training sessions for the department that will utilize the application on administration and usage	Proponents and System Administrator	2 Days



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Support and Feedback	Collect feedback from users and system administrators through surveys or feedback forms.	Proponents, System Administrator, and Students	1 Week
Maintenance and Updates	Schedule regular maintenance updates to address bugs	Programmers and System Administrator	Ongoing



CHAPTER IV

RESULTS AND DISCUSSION

This chapter contains a detailed interpretation and discussion of this study's data analysis and results related to the objectives stated in Chapter I. The frequency stables show the findings as derived from the respondents' responses to the various questions contained in the questionnaires, followed by the discussions.

4.1 Develop a system incorporating monitoring and management tools for addressing reported issues and scheduling events.

The screenshot displays two views of the QCU-FMS software interface, specifically focusing on the 'Job Orders' module. Both views show a list of pending and reported job orders with details such as date, time, location, issue type, and status.

Pending Tab:

ID	DATE AND TIME	DETAILS	ISSUE	REPORT IMAGE	URGENT	STATUS	ACTION
1	Apr 28, 2024, 2:07 AM	From: Brayaneil Siang Location: IK501 View more details	Others		YES	PENDING	Assign Task Notify User
2	Apr 23, 2024, 9:46 PM	From: Eugene Manlicic Location: IC207a View more details	Outdoor Lighting - Electrical		NO	PENDING	Assign Task Notify User
3	Apr 14, 2024, 4:44 PM	From: Kimberly Rementilla Location: IL101 View more details	Window Breaks - Carpentry		NO	PENDING	Assign Task Notify User

Reported Tab:

ID	DATE AND TIME	DETAILS	ISSUE	REPORT IMAGE	STATUS	ISSUE STATUS
197	Apr 20, 2024, 10:54 PM	From: Jenny Mae Yap Location: IL102 View more details	Electrical - Electrical Issue		Reported	There have been 4 reports of Electrical Issue for this facility.
184	Apr 17, 2024, 7:18 PM	From: Hazel Macaluyos Location: IL102 View more details	Electrical - Electrical Issue		Reported	There have been 3 reports of Electrical Issue for this facility.
183	Apr 17, 2024, 7:17 PM	From: Hazel Macaluyos Location: IL102 View more details	Electrical - Electrical Issue		Reported	There have been 2 reports of Electrical Issue for this facility.
179	Apr 16, 2024, 10:56 PM	From: Brayaneil Siang Location: IL103 View more details	Electrical - Electrical Issue		Reported	There have been 2 reports of Electrical Issue for this facility.
178	Apr 16, 2024, 10:40 PM	From: Brayaneil Siang Location: IL102 View more details	Electrical - Electrical Issue		Reported	There have been 1 report of Electrical Issue for this facility.

Figure 4.1 Job Order Pending and Reported Tab

COLLEGE OF COMPUTER STUDIES



Figure 4.1 illustrates how QCU-FMS effectively integrates monitoring and management tools within the administrative aspect of the system. In the Job Order process, reported issues are initially designated as pending. Should there be no immediate service provider available, the Admin is tasked with assigning the issue to an accessible service provider. Moreover, the system retains a comprehensive history of reported issues within specific facilities, aiding in prioritization and offering proactive solutions to mitigate recurring issues.

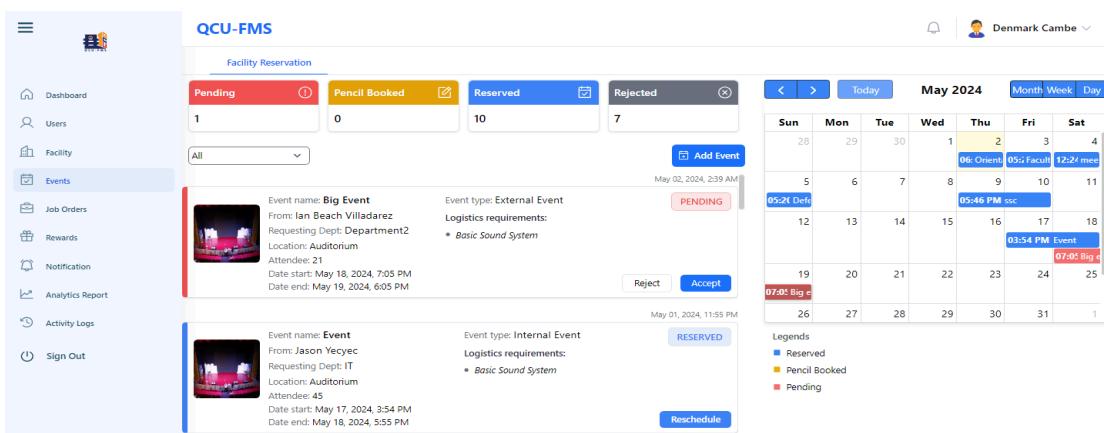


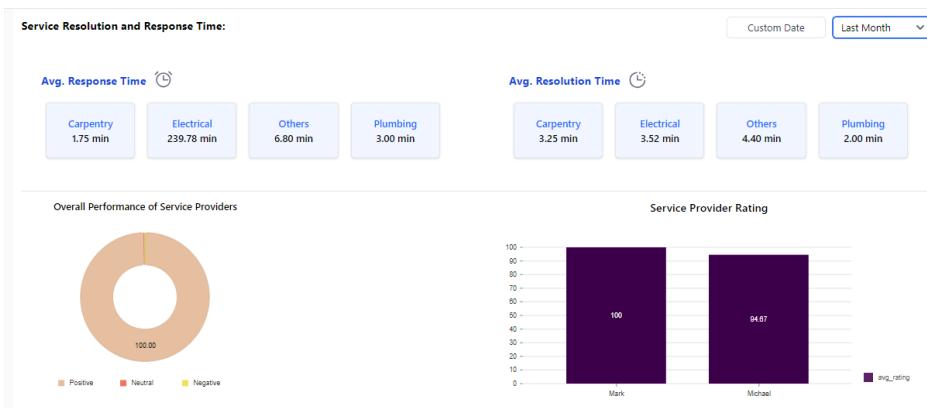
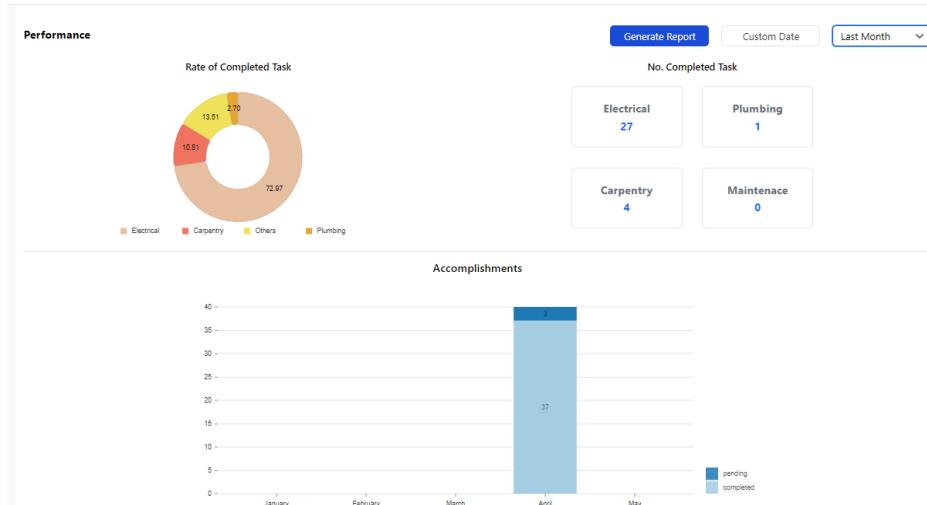
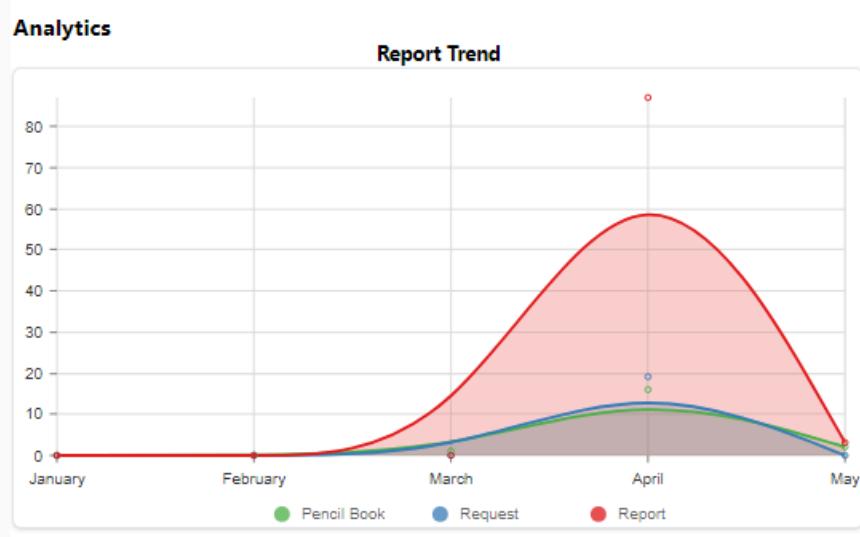
Figure 4.2 Events: Facility Reservation

Figure 4.2 demonstrates that QCU-FMS provides pencil booking functionality for events at Quezon City University, specifically tailored for employees. Upon approval by the president, the pencil booking secures the event for the specified time and date.

4.2 Implement data analytics encompassing both prescriptive and descriptive analytics to provide actionable insights on performance and resource optimization.



Descriptive:



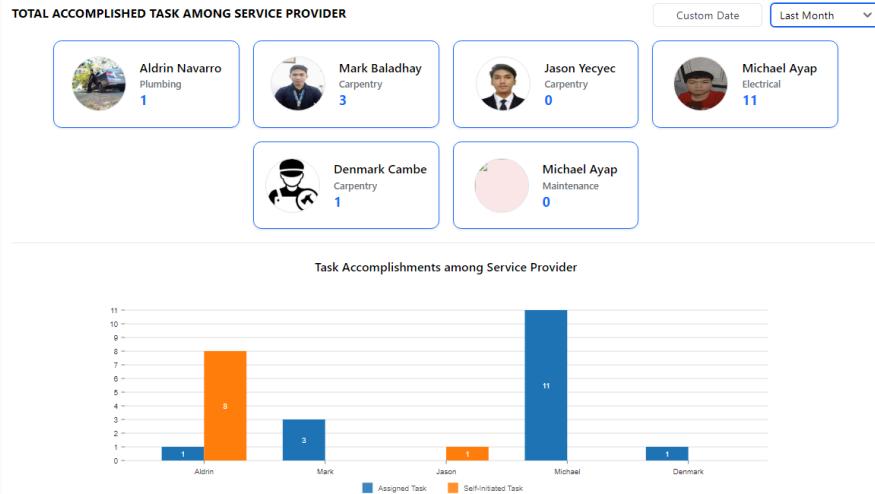


Figure 4.3 Descriptive Analytics

Figure 4.3 shows that QCU-FMS offers a comprehensive suite of descriptive analytics features that enable users to analyze and interpret the system's data quickly. The trend report, depicted through a line graph, visually represents the highest number of pencil bookings, requests, or reports, helping users quickly identify areas of high demand. The pie chart showcasing the rate of completed tasks in various categories, such as electrical, carpentry, and plumbing, offers a clear understanding of the system's performance in each area. The numerical analytics showing the number of completed tasks in each category and the bar graph comparing completed and pending reports provide a detailed view of the system's status.

Furthermore, the system's performance rating of each service provider, visualized through a bar graph, helps users evaluate the quality of service each provider offers. The distribution of feedback on service provider performance, illustrated through a pie graph, provides insight into customers'



satisfaction levels, with positive, neutral, and negative feedback categorized appropriately. Finally, the numerical report displaying the average response time for service resolutions gives an overall picture of the system's efficiency. It helps users to understand how quickly users' reports and requests are being addressed. Overall, QCU-FMS provides a comprehensive and user-friendly analytics suite, allowing users to manage their facilities effectively.

Prescriptive:

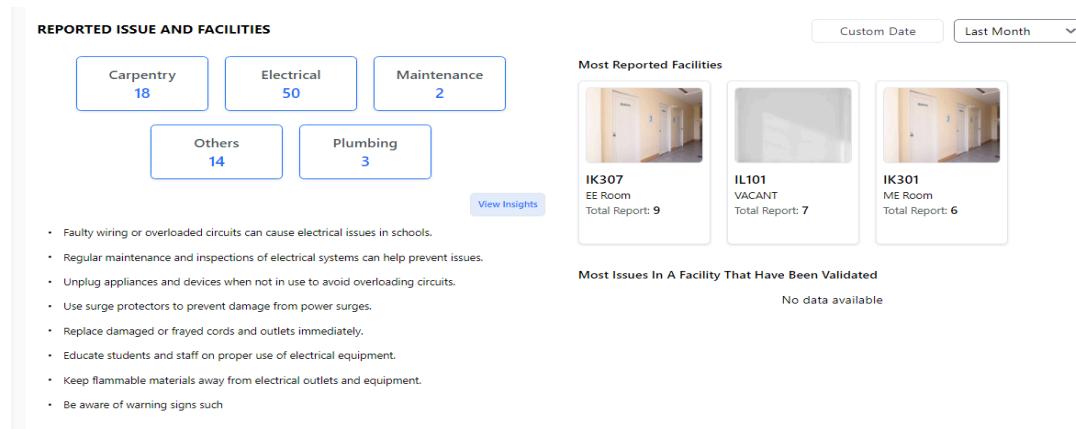


Figure 4.4 Prescriptive Analytics

Figure 4.4 showcases the prescriptive analytics features of QCU-FMS, which go beyond descriptive analytics by providing users with potential solutions to issues. The system uses reported issues and facilities to identify possible root causes of problems and offer suggested solutions. This enables the admin to take proactive measures to prevent the issues from occurring in the future.

Moreover, the system offers insights into the most frequently reported facilities that have been validated. This information can help users identify



areas that require more attention and resources to maintain and improve their facilities' overall performance. By leveraging this prescriptive analytics suite, users can make data-driven decisions and take proactive measures to ensure their facilities operate efficiently.

4.3 Design a structured job order system to optimize service provider assistance.

ID	NAME	STATUS	EXPERTISE	Avg. Response Time	Avg. Resolution Time	TOTAL TASK	CURRENT TASK	ACTION
20	Aldrin Navarro 0/5	AVAILABLE	Plumbing	2.0 min	3.0 min	1	N/A	<button>View Activity</button>
21	Mark Baladhay 5.0/5	ASSIGNED	Carpentry	2.3 min	2.0 min	3	N/A	<button>View Activity</button>
29	Jason Vecyc 0/5	ASSIGNED	Carpentry	0.0 min	0.0 min	0	N/A	<button>View Activity</button>
32	Michael Ayap 4.7/5	ASSIGNED	Electrical	3.1 min	572.8 min	12	Issue: upuan nasira Location: IC304a View more details	<button>View Activity</button>
59	Denmark Cambe 0/5	ASSIGNED	Carpentry	6.0 min	0.0 min	1	N/A	<button>View Activity</button>

ID	DATE AND TIME	DETAILS	ISSUE	STATUS
277	May 02, 2024, 12:57 AM	<small>REPORT</small> From: Brayanell Slang Location: IK501	Carpentry	ASSIGNED
258	Apr 23, 2024, 3:07 AM	<small>REPORT</small> From: Eugene Mantic Location: IC304a	Carpentry	COMPLETED
61	Apr 23, 2024, 1:41 AM	<small>REQUEST</small> Request Type: Manpower	N/A	COMPLETED
245	Apr 22, 2024, 6:44 AM	<small>REPORT</small> From: Aranice Cutie Location: IL102	Carpentry	ASSIGNED
18	Apr 22, 2024, 2:39 AM	<small>REQUEST</small> Request Type: Manpower	N/A	ASSIGNED
203	Apr 18, 2024, 9:23 PM	<small>REPORT</small> From: Brayanell Slang Location: IL4CRM	Others	COMPLETED



The screenshot shows the QCU-FMS Job Order System interface. On the left is a sidebar with navigation links: Dashboard, Users, Facility, Events, Job Orders (which is selected), Rewards, Notification, Analytics Report, Activity Logs, and Sign Out. The main area has a header with tabs: Reports, Request, Service Providers, and Anonymous Report. Below this is a search bar with filters: Pending, Assigned / Ongoing (which is selected), Historical Tasks, Reported, + Add Task, All, and a search input. A table lists three job orders:

ID	DATE AND TIME	DETAILS	ISSUE	VALIDATED IMAGE	STATUS	ASSIGNED TO
1	May 02, 2024, 12:57 AM	From: Brayaneil Siang Location: IK501 View more details	Carpentry - Roof Leaks		Assigned	Mark Baladhay Jason Yecyc Denmark Cambe
2	May 01, 2024, 11:39 PM	From: Jason Yecyc Location: Auditorium View more details	Electrical - Electrical Issues	N/A	Assigned	Michael Ayap
3	Apr 29, 2024, 2:16 AM	From: Eugine Manlicic Location: IC304a View more details	Carpentry - Broken Furniture		Ongoing	Michael Ayap

At the bottom, it says "Showing 1 to 5 of 17 Entries" with a navigation bar: < Previous, 1, 2, 3, 4, Next >.

Figure 4.5 Job Order System

Figure 4.5 shows that QCU-FMS has structured its job order system to optimize service provider assistance. It presents a list of service providers, allowing the admin to identify those available quickly and those currently assigned tasks. Moreover, the admin can access the activity logs, which provide details such as date, time, issue description, and status. In the assigned/ongoing tab, reported issues are displayed alongside validated images, status updates, and the designated service provider's information. This level of transparency and accessibility ensures that all parties are kept informed and up-to-date, ultimately leading to timely and effective resolution of issues.



4.4 Design a system that introduces a non-monetary rewards system to incentivize student participation in campus management.

Qualified Students

100 Points Milestone
For achieving the condition of accumulating 100 points
Points to achieve 100 points

Qualified Students

1.		Kimberly Rementilla 20-1695		715 Points
2.		Alderbert Penohermoso 20-1511		362 Points
3.		Shaina Villanueva 20-2093		360 Points

Rewards

TOTAL POINTS
 68 Points

Certificates **Vouchers**

100 Points Milestone

100 pts
[View Certificate](#)

70 Point Milestone

70 pts
[View Certificate](#)

200 Point Milestone

200 pts
[View Certificate](#)

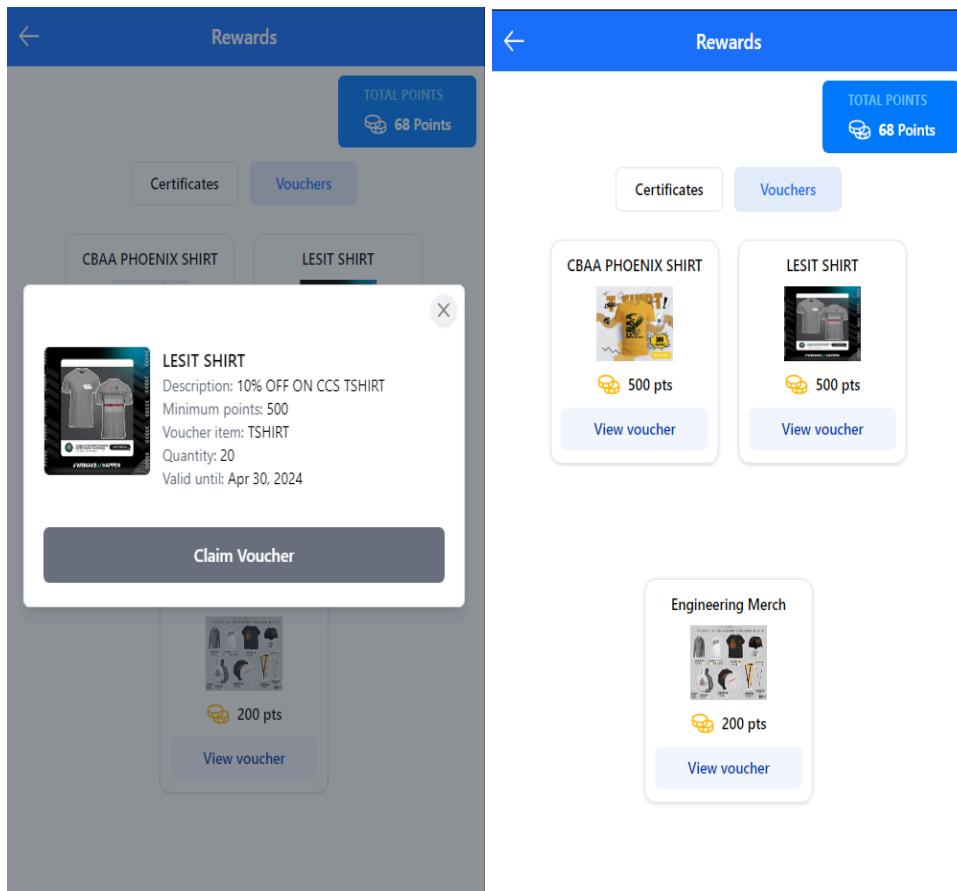


Figure 4.6 Non-Monetary Reward System

Figure 4.6 illustrates that QCU-FMS has implemented a system that encourages student engagement and motivation by providing virtual badges and rewards upon completion of tasks. These badges serve as a form of recognition and validation for their efforts, boosting their morale and inspiring them to continue participating actively in the application. Moreover, students can earn certificates for achieving milestones or participating in interactive features, such as rating a facility, further adding to their sense of accomplishment. The application also offers a points-based system, where students can accumulate points through various activities, which can be redeemed for vouchers offering discounts on course-specific organizations.



This incentivizes students to engage with the application and participate in its features, ultimately enhancing their overall experience.

4.5 Design a feature enabling employees to schedule events and request service provider assistance, enhancing event management efficiency.

Schedule events:

AVAILABLE FACILITY

Enter facility name:

Image	Description
	Available
	IC407a Description: Lecture Room (CBA) Building: Belmonte Building Floor: 4 Capacity: 1 Available
	Auditorium Description: For Big Events Capacity: 300 Available
	QCU Triangle Description: QCU Triangle Main Campus Capacity: 250 Available

PENCIL BOOK

Facility ID: 230377

Event type: Internal Event External Event

Event name: Summit

Attendees: 300

Date start: 24/05/2024 01:00 am

Date end: 24/05/2024 05:00 pm

Logistics requirements:

Basic Sound System Full set-up sound system with lights

Chairs Tables



Pencil Book History

Pencil Book Details

All

RESERVED

Event Name	Location	Date Start	Date End	Status	Action
Meeting	Bautista Building / IK102	May 4, 2024, 12:24 PM	May 4, 2024, 11:24 AM	RESERVED	View
Xmas	Bautista Building / IK101	Apr 17, 2024, 3:29 PM	Apr 16, 2024, 7:29 PM	REJECTED	View
Alumni	Bautista Building / IK101	Apr 20, 2024, 6:43 PM	Apr 20, 2024, 10:43 PM	REJECTED	View

Event name: meeting
Event type: Internal Event
Location: IK102
Attendees: 50

Logistic requirements

Basic Sound System

Reservation request letter

201207_TCP_Congestion_Control_Comparison.Pdf

Figure 4.7 Event Scheduling for employees

Figure 4.7 showcases a remarkable feature of the QCU-FMS application that has significantly simplified the event scheduling process for employees. With just a few clicks, employees can easily select the desired facility, fill out an online booking form and schedule an event with ease. The booking form is intuitive and straightforward and captures all the necessary details such as the event type, name, number of attendees, start and end dates with times, logistical requirements, and specific chair and table arrangements. With this feature, employees no longer have to go through the tedious process of filling out manual booking forms, reducing the risk of errors and saving them valuable time.



Request:

The screenshot displays two main sections: a 'Request' form on the left and a 'REQUEST HISTORY' list on the right.

Request Form (Left):

- Type of Request: Service Provider Assistance
- Date and Time: 16/05/2024 03:15 pm
- Description: Help our office to replace the utilities to the other building.
- Buttons: CANCEL (gray) and SUBMIT (blue)

REQUEST HISTORY (Right):

- Request ID: 68 (PENDING):** Today 7:13 AM
Service Provider: [redacted] Status: PENDING
Description: Help our office to replace the utilities to the other building.
Date and Time: May 16, 2024, 3:15 PM
- Request ID: 61 (COMPLETED):** Apr 22, 2024, 10:49 AM
Service Provider: [redacted] Status: COMPLETED
Description: Requesting assistance for setting up of room for meeting.
Date and Time: Apr 25, 2024, 1:01 PM
- Request ID: 13 (ASSIGNED):** Apr 22, 2024, 8:38 AM
Service Provider: [redacted] Status: ASSIGNED
Description: Help sa pag setup nang gamit
Date and Time: May 16, 2024, 10:55 AM
- Request ID: 1 (COMPLETED):** Apr 15, 2024, 7:46 PM
Service Provider: [redacted] Status: COMPLETED
Description: [redacted]
Date and Time: [redacted]

Figure 4.8 Requesting Service Provider Assistance

Additionally, Figure 4.8 shows that QCU-FMS offers where employees can request service provider assistance if needed, further streamlining the event planning process and ensuring a hassle-free experience. Overall, this feature has made event scheduling at QCU-FMS a seamless and efficient process, enhancing the user experience and making the application an indispensable tool for event management.



4.6 To evaluate and determine the respondent's level of quality to the proposed system based on the ISO 25010 criteria such as:

- 4.6.1. Functionality:** This evaluates the extent to which the system meets specified functional requirements;
- 4.6.2. Efficiency:** This assesses the system's performance in terms of resource utilization, speed, and responsiveness;
- 4.6.3. Maintainability:** This examines the ease with which the system can be modified and adapted and the availability of tools for maintenance tasks;
- 4.6.4. Portability:** This evaluates the system's ability to function across different platforms and devices while maintaining consistent performance and functionality.

Demographic Profile of the Students According to Course

Table 4.1 Course Profile of Students

Course	Frequency	Percentage
Bachelor Of Early Childhood Education	11	2.89%
Bachelor of Science in Accountancy	19	4.98%
Bachelor of Science in Entrepreneurship	113	29.66%
Bachelor of Science in Electronics Engineering	13	3.41%
Bachelor of Science in Industrial Engineering	85	22.31%
Bachelor of Science in Information Systems	1	0.26%
Bachelor of Science in Information Technology	133	34.91%



Bachelor of Science in Management Accounting	6	1.57%
Total	381	100%

The table shows the distribution of students across various courses in a particular institution. Among the courses listed, Bachelor of Science in Information Technology has the highest frequency, accounting for 34.91% of the total student population, followed closely by Bachelor of Science in Entrepreneurship at 29.66%. Conversely, BSIS (Bachelor of Science in Information Systems) has the lowest frequency, comprising only 0.26% of students.

Demographic Profile of the Admin according to Job Position.

Table 4.2 Job Position Profile of Admins

Job Position	Frequency	Percentage
Student Affairs Unit	1	25%
Physical Facilities & General Services Division	2	50%
Physical Facilities & General Services Division - Events Management Unit	1	25%
Total	4	100%

The table offers the distribution of admins with their Job Position. Among the listed units, the Physical Facilities & General Services Division holds the highest frequency, with two instances representing 50% of the total.



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Additionally, the Student Affairs Unit and the Physical Facilities & General Services Division - Events Management Unit each have one example, accounting for 25% of each.

Demographic Profile of the Employee according to the Department

Table 4.3 Department Profile of Employees

Department	Frequency	Percentage
College of Business Administration & Accountancy	51	26.29%
College of Engineering	24	12.37%
College of Computer Studies	1	0.52%
College of Education	45	23.20%
National Service Training Program	5	2.58%
Library Resources and Services	4	2.06%
Accounting Division	3	1.55%
Financial Management Division	2	1.03%
Medical And Dental Services Unit	1	0.52%
Physical Facilities & General Services Division	43	22.16%
Scholarship, Placement and Alumni Relations Division	4	2.06%
Registrar & Admission Division	10	5.15%
Students Affairs Unit	1	0.52%
Total	194	100%



The table shows the different departments of employees. The College of Business Administration & Accountancy emerges as the most prominent unit, with 51 frequency representing 26.29% of the total. The College of Education is closely behind, with 45 frequency comprising 23.20%. The Physical Facilities & General Services Division also stands out with 43 frequencies, accounting for 22.16%. The College of Engineering follows with 24 frequencies. Meanwhile, the Registrar & Admission Division has ten frequencies, representing 5.15%. Other units, such as Library Resources and Services, Accounting Division, and Financial Management Division, have the lowest frequency.

Demographic Profile of the Service Provider according to Job Position

Table 4.4 Job Position Profile of Service Provider

Job Position	Frequency	Percentage
Security Guard	14	35%
Excellent	17	42.5%
Maintenance Worker	9	22.5%
Office-In-Charged	0	0%
Total	4	100%

The table shows the data illustrates job positions' frequency and percentage distribution of service providers. Security Guard has the highest frequency, with 14 frequencies constituting 35% of the total. Following closely is Excellence, with 17 frequencies, representing 42.5%. Maintenance Worker



accounts for nine frequencies, 22.5% of the total. Notably, Office-In-Charged has zero frequencies, indicating 0% representation.

Table 4.5 Student Evaluation

Students Evaluation on the Functionality of the Proposed System

Functionality	Weighted Mean	Verbal Interpretation
The system responsiveness when submitting report issues, receiving rewards and tracking its progress.	4.8	Excellent
The ease of reporting issues, tracking their progress, and receiving notification updates.	4.7	Excellent
4.8The non-monetary rewards motivate the user to take part in reporting issues.	4.7	Excellent
The ability to provide evaluation on completed report tasks.	4.8	Excellent
QCU-UPKEEP assembled an overall functionalities that are aligned to the user's role.	4.8	Excellent
Average Weighted Mean	4.8	Excellent

The table above presents an overview of students' evaluation regarding the 'Functionality' of the Proposed System. The weighted mean for this criteria's first, fourth, and fifth questions stands at 4.8, while the second and third questions achieved a 4.7 weighted mean. Remarkably, all five questions received a verbal interpretation of 'Excellent.' This underscores its capacity to fulfill specific features, encompassing issue reporting, review processes, tailored feedback mechanisms, and a point-based incentive system for user engagement.



Furthermore, the system offers additional capabilities, empowering students to rate facilities at QCU, access the activity calendar, monitor their status on the problem-reporting scoreboard, and explore rewards corresponding to earned points. This comprehensive suite of features enriches the user experience and signifies the system's versatility and alignment with user preferences and requirements.

Students Evaluation on the Efficiency of the Proposed System

Efficiency	Weighted Mean	Verbal Interpretation
The system has comprehensible notifications and supports the mobile application.	4.8	Excellent
Feedbacks come up with exact information regarding the reported issue.	4.7	Excellent
In mobile devices, the application launches and operates according to the services needed.	4.7	Excellent
Attaching photos and giving feedback are applied and easy to access.	4.8	Excellent
Claiming rewards is efficient and easy.	4.8	Excellent
Average Weighted Mean	4.8	Excellent

The table above provides a comprehensive evaluation of the 'Efficiency' aspect of the Proposed System by students. All five questions received a resounding 'Excellent' rating, with a weighted mean of 4.8 for the first, fourth, and fifth questions and 4.7 for the second and third. Clear notifications and robust mobile support ensure seamless service access, while precise feedback



mechanisms bolster issue resolution. The mobile app operates smoothly across devices, with user-friendly features like photo attachments and enhancing interactions. Furthermore, an efficient reward-claiming process reflects the system's commitment to user satisfaction.

Students Evaluation on the Maintainability of the Proposed System

Maintainability	Weighted Mean	Verbal Interpretation
Within the mobile application, the process of tracking reports is consistent.	4.8	Excellent
The leaderboards are updated continuously.	4.7	Excellent
Information that is stored is educational and timely.	4.8	Excellent
The QR code scanner is producing precise information such as location, information of the building, etc.	4.8	Excellent
The system is not complicated to use and provides information about reported issues with the help of the algorithm.	4.7	Excellent
Average Weighted Mean	4.8	Excellent

This shows a comprehensive assessment of the 'Maintainability' dimension of the Proposed System by students. The uniform 'Excellent' rating across all five questions, with a weighted mean of 4.8 for the first, third, and fourth queries and 4.7 for the second and fifth, attest to the system's remarkable performance. Moreover, within the mobile application of the proposed system, users benefit from seamless report tracking and real-time



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access to updated leaderboards. Information stored within the system is educational and timely, enhancing its utility. The QR code scanner functionality is precise, providing users with accurate location and building details. Furthermore, the system's intuitive design fosters ease of use, complemented by an algorithm that furnishes comprehensive insights into reported issues.

Portability	Weighted Mean	Verbal Interpretation
Mobile applications adapt and function correctly to the different mobile devices such as its screen, display and resolutions.	4.8	Excellent
The Quick Response code is capable of providing the exact location of the reported issue.	4.8	Excellent
The application is compatible with other operating systems such as iOS, and Android.	4.8	Excellent
QCU-FMS is capable of adapting to dynamic environmental factors such as vulnerability of network connections, and device's orientation.	4.8	Excellent
The system does not require a large capacity of a device to function and operate.	4.8	Excellent
Average Weighted Mean	4.8	Excellent

This shows the system's 'Portability,' with all five questions receiving an 'Excellent' rating and a weighted mean of 4.8. The system demonstrates adaptability across various mobile devices and operating systems, including iOS and Android. Notably, its QR code scanning feature facilitates efficient



issue identification for prompt resolution. Additionally, the system's ability to accommodate dynamic environmental factors, such as network connection vulnerabilities and device orientations, enhances its reliability. Furthermore, its streamlined design enables efficient operation, even on devices with limited storage capacity, contributing to optimal performance and user satisfaction.

Table 4.6 Admin Evaluation

Functionality	Weighted Mean	Verbal Interpretation
The system's capability includes receiving reports and requests, as well as storing data for comprehensive analytics.	5.0	Excellent
The system demonstrates efficiency in tasks such as generating QR codes, collecting feedback, and managing event scheduling.	4.8	Excellent
The system is capable of generating visual representation charts and graphs, facilitating the rapid and effortless presentation of information.	4.8	Excellent
The system's user-friendly interface allows users to create and view activity history, enhancing facility management capabilities.	4.8	Excellent
The system is capable of automating job orders to service providers, ensuring prompt resolution of reported tasks.	5.0	Excellent
Average Weighted Mean	4.9	Excellent

The table shows a comprehensive assessment of the 'Functionality' dimension of the Proposed System by admin. The uniform 'Excellent' rating across all five questions, with a weighted mean of 4.9 for the second, third,



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and fourth queries and 5.0 for the first and fifth, attest to the system's remarkable performance. The proposed system meets the requirements and has many capabilities, including receiving reports and requests, storing data for analytics, and automating job orders to service providers. It also demonstrates efficiency in generating QR codes, collecting feedback, and managing event scheduling. The system can create visual charts and graphs, making it easy to present information. Its user-friendly interface allows users to create and view activity history, enhancing facility management capabilities. Overall, the system is highly efficient and effective in its various tasks.

Efficiency	Weighted Mean	Verbal Interpretation
The system efficiently tracks the performance of service providers, monitoring their accomplishments.	5.0	Excellent
The system efficiently manages penciled-in events for improved organization and management.	4.8	Excellent
The system efficiently generates analytics reports within a short time frame.	4.8	Excellent
The system adeptly handles multiple reports and requests, each with diverse characteristics or requirements.	5.0	Excellent
The system efficiently manages user information and regulates resource access within the framework of user management.	4.8	Excellent
Average Weighted Mean	4.9	Excellent



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This shows a comprehensive assessment of the 'Efficiency' dimension of the Proposed System by admin. The uniform 'Excellent' rating across all five questions, with a weighted mean of 4.8 for the second, third, and fifth queries and 5.0 for the first and fourth. The proposed system meets the requirements and is highly efficient and effective in its various tasks, including tracking service provider performance, managing penciled-in events, generating analytics reports, handling multiple requests with diverse characteristics, and managing user information and resource access through user management.

Maintainability	Weighted Mean	Verbal Interpretation
The system easily implements backup and recovery procedures to address data loss or system failure scenarios.	4.8	Excellent
The system allows access control modifications based on the administrative role.	4.8	Excellent
The system's updating and upgrading functions are tailored to meet the current needs of Quezon City University.	4.8	Excellent
The system facilitates seamless sharing and collaboration among different teams working on it.	5.0	Excellent
The system ensures that collected data can be saved, exported, and archived, thereby enhancing system maintainability.	4.8	Excellent
Average Weighted Mean	4.8	Excellent



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The table shows a comprehensive assessment of the 'Maintainability' dimension of the Proposed System by admin. There is a uniform 'Excellent' rating across all five questions, with a weighted mean of 4.8 for the first, second, third, and fifth queries and 5.0 for the fourth question. The proposed system meets the requirements and has various features that make it efficient and effective. These include backup and recovery procedures, access control modifications for administrative roles, tailored updating and upgrading functions, seamless sharing and collaboration, and data archiving for better maintainability.

Portability	Weighted Mean	Verbal Interpretation
The system provides a straightforward process for accessing the web application.	5.0	Excellent
The system seamlessly adapts to changes in hardware or software configurations without compromising its functionality.	4.8	Excellent
The system replaces specified software, performing the same task, such as sending accomplishment reports from service providers to administrators.	4.8	Excellent
The system supports smooth transitions between various usage environments.	4.8	Excellent
The system is capable of handling the workload of reports and requests.	5.0	Excellent
Average Weighted Mean	4.9	Excellent

The table shows the overall admin' evaluation of the Proposed System's "Portability." The second, third, and fourth questions under these



criteria got a 4.8 weighted mean, and the first and last questions got a 5.0 weighted mean. All five questions got a verbal interpretation of 'Excellent'. The proposed system offers user-friendly access to its web application and smoothly adapts to hardware or software changes while maintaining functionality. It replaces designated software tasks, such as sending accomplishment reports, and facilitates seamless transitions between different usage environments. Additionally, it efficiently manages the workload of reports and requests.

Table 4.7 Employees Evaluation

Functionality	Weighted Mean	Verbal Interpretation
The system's services offered is fully-functional such as reporting and requesting.	4.9	Excellent
Job requirements and tasks are fulfilled upon using the system.	4.8	Excellent
QCU-FMS is reliable and stable to aid a day-to-day task, while minimizing the time and effort.	4.8	Excellent
The system provides a collaborative user engagement within the university locales by contributing on reporting issues and giving feedback.	4.8	Excellent
The workflow of requesting management enables the user to lessen the time to make a reservation in terms of venue, chairs and tables, lights, and speakers.	4.8	Excellent
Average Weighted Mean	4.8	Excellent



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The table shows the overall Employees evaluation of the Proposed System's "Functionality." The second to fifth questions under these criteria got a 4.8 weighted mean, and the first got a 4.9 weighted mean. All 5 five questions got a verbal interpretation of 'Excellent'. The proposed system provides fully functional services for reporting and requesting tasks, ensuring job requirements are met efficiently. It offers reliable support for day-to-day tasks, fostering user engagement within the university community. Additionally, its requesting management workflow streamlines venue reservation processes, effectively reducing wait times.

Efficiency	Weighted Mean	Verbal Interpretation
Resources including equipment, software, and services are being utilized with the system.	4.8	Excellent
Tasks particularly for employee accounts like reporting and requesting are enhanced by reducing errors or mistakes.	4.8	Excellent
The system is capable of optimizing resource and services allocation within the university.	4.8	Excellent
QCU-FMS operates and supports the users' needs in terms of requesting and reporting issues.	4.8	Excellent
The request and report submitted are answered and resolved in a timely manner.	4.8	Excellent
Average Weighted Mean	4.8	Excellent

The table shows the overall Employees evaluation of the Proposed System's "Efficiency." All questions under these criteria got a 4.8 weighted



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mean with a verbal interpretation of 'Excellent'. The proposed system effectively utilizes resources, including equipment, software, and services. It enhances tasks for employee's accounts, minimizing errors. Furthermore, it optimizes resource allocation across the university. QCU-FMS caters to users' needs for requesting and reporting issues promptly, ensuring timely resolution.

Maintainability	Weighted Mean	Verbal Interpretation
How would you rate the system's accommodation in terms of answering a complaint regarding the system's vulnerabilities?	4.8	Excellent
Employees are able to track the history of their activities such as requested materials, services, and reports.	4.8	Excellent
The logs are generated and stored appropriately.	4.8	Excellent
The system facilitates seamless sharing and collaboration among different teams working on it.	4.9	Excellent
The developers provided clear and accurate instructions to use the system properly.	4.8	Excellent
Average Weighted Mean	4.8	Excellent

The table shows the overall Employees evaluation of the Proposed System's "Maintainability." The first, second, third, and fifth questions under these criteria got a 4.8 weighted mean, and the fourth got a 4.9 weighted mean. All five questions got a verbal interpretation of 'Excellent'. The proposed system responsiveness to addressing vulnerabilities receives



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commendation. Employees can efficiently track their activity history, including requested materials, services, and reports.

Moreover, the system ensures proper log generation and storage. Additionally, it fosters seamless sharing and collaboration among different teams. The developers' provision of clear and accurate instructions enhances user experience and system usability.

Portability	Weighted Mean	Verbal Interpretation
The system is accessible across different devices (e.g., tablet, smartphone).	4.9	Excellent
The system supports multiple operating systems (Android, Apple iOS, etc.).	4.9	Excellent
The mobile application is easy to configure and install on their own devices.	4.8	Excellent
The system effectively manages updates, especially considering various device types and operating systems.	4.8	Excellent
The system handles the network-related problems like delays in real-time updates.	4.9	Excellent
Average Weighted Mean	4.9	Excellent

The table shows the overall Employees evaluation of the Proposed System's "Portability." The first, second, and fifth questions under these criteria got a 4.9 weighted mean, and the third and fourth questions got a 4.8 weighted mean. All five questions got a verbal interpretation of 'Excellent'. The proposed system boasts accessibility across various devices and supports



multiple operating systems, ensuring versatility. Installation and configuration of the mobile application are user-friendly, allowing for easy setup on personal devices. Efficient management of updates, tailored to diverse device types and operating systems, enhances system performance. Additionally, the system adeptly handles network-related issues, ensuring smooth real-time updates.

Table 4.8 Service Provider Evaluation

Functionality	Weighted Mean	Verbal Interpretation
The system allocates tasks that align with my specialization.	4.7	Excellent
The system allows me to monitor the status and progress of reported issues.	4.7	Excellent
The system allows me to monitor the status and progress of reported issues.	4.7	Excellent
The system effectively defines the information required about the reported issues.	4.8	Excellent
The system efficiently processes updates of reports and requests and notifies different users accordingly.	4.7	Excellent
Average Weighted Mean	4.7	Excellent

The table shows the overall Service Provider evaluation of the Proposed System's "Functionality." The first, second, third, and fifth questions under these criteria got a 4.7 weighted mean, and the fourth question got a 4.8 weighted mean. All five questions got a verbal interpretation of 'Excellent'.



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The proposed system effectively allocates tasks according to specialization, enabling efficient handling of reported issues. Users can easily monitor the status and progress of their reports, ensuring transparency and accountability. Additionally, the system streamlines the process of defining necessary information for reported issues and efficiently processes updates and requests, providing timely notifications to relevant users.

Efficiency	Weighted Mean	Verbal Interpretation
The system manages the assignment of reported facility-related tasks based on the availability of service providers.	4.7	Excellent
The system organizes the resources required to perform tasks.	4.7	Excellent
The system enhances transparency and accountability in resolving facility-related issues.	4.7	Excellent
The system minimizes data usage, particularly when accessing and transmitting large amounts of data.	4.7	Excellent
The system promptly disseminates job orders.	4.7	Excellent
Average Weighted Mean	4.7	Excellent

The table shows the overall Service Provider evaluation of the Proposed System's "Efficiency." All questions under these criteria got a 4.8 weighted mean and verbal interpretation of 'Excellent'. The proposed system efficiently handles the assignment of facility-related tasks, ensuring transparency and accountability while optimizing data usage. It organizes



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resources and promptly disseminates job orders, streamlining operations and enhancing overall effectiveness.

Maintainability	Weighted Mean	Verbal Interpretation
Clear documentation and guidelines for troubleshooting and resolving issues are provided.	4.7	Excellent
Backups and recovery procedures can be implemented in case of data loss or system failure easily.	4.7	Excellent
External problems are managed within the system.	4.7	Excellent
Configurations are managed within the system.	4.7	Excellent
The development team is responsive to addressing maintenance issues and implementing requested changes.	4.8	Excellent
Average Weighted Mean	4.7	Excellent

The table shows the overall Service Provider evaluation of the Proposed System's "Maintainability." The first to fourth questions under these criteria got a 4.7 weighted mean, and the fifth question got a 4.8 weighted mean. All five questions got a verbal interpretation of 'Excellent'. The proposed system provides comprehensive documentation and troubleshooting guidelines for issue resolution. It offers seamless implementation of backup and recovery procedures, efficient management of



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external and configuration issues, and prompt responsiveness from the development team for maintenance and requested changes.

Portability	Weighted Mean	Verbal Interpretation
Accessibility of necessary data and information within the mobile application while on the go.	4.7	Excellent
The mobile application functions across different devices commonly used by service providers.	4.7	Excellent
The mobile application is capable of handling large volumes of reports and user interactions simultaneously.	4.7	Excellent
Support is provided by the mobile application to service providers in accessing reports and completing tasks regardless of their geographical location.	4.8	Excellent
Backup and recovery of data by the mobile application to keep important information safe and ensure smooth operation.	4.7	Excellent
Average Weighted Mean	4.7	Excellent

The table shows the overall Service Provider evaluation of the Proposed System's "Portability." The first, second, third, and fifth questions under these criteria got a 4.7 weighted mean, and the fourth question got a 4.8 weighted mean. All five questions got a verbal interpretation of 'Excellent'. The proposed system provides on-the-go access to necessary data and information and is compatible with various devices commonly used by



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service providers. It efficiently handles high volumes of reports and user interactions, ensuring prompt task resolution. Additionally, it offers remote support to service providers, enabling them to access reports and complete tasks regardless of location. Robust backup and recovery mechanisms are integrated to safeguard essential data and ensure continuous operation.

Table 4.9 Overall Weighted Mean for Students of Proposed System

Criteria	Weighted Mean	Verbal Interpretation
Functionality	4.8	Excellent
Efficiency	4.8	Excellent
Maintainability	4.8	Excellent
Portability	4.8	Excellent
Average Weighted Mean	4.8	Excellent

Table 4.9 shows the overall students evaluation of the Proposed System in which it's Functionality, Efficiency, Maintainability, and Portability has a weighted mean of 4.8 with a verbal interpretation of 'Excellent'. The overall average weighted mean of the proposed system is 4.8 with an 'Excellent' verbal interpretation. Therefore, the proposed system has met the standard of the following criteria and the student's requirements.

Table 4.10 Overall Weighted Mean for Admin of Proposed System

Criteria	Weighted Mean	Verbal Interpretation
Functionality	4.9	Excellent
Efficiency	4.9	Excellent



Maintainability	4.8	Excellent
Portability	4.9	Excellent
Average Weighted Mean	4.9	Excellent

Table 4.10 shows the overall admin evaluation of the Proposed System in which its Functionality, Efficiency and Portability has a weighted mean of 4.9 with a verbal interpretation of 'Excellent' while Maintainability has a weighted mean of 4.8 with a verbal interpretation of 'Excellent'. The overall average weighted mean of the proposed system is 4.9 with an 'Excellent' verbal interpretation. Therefore, the proposed system has met the standard of the following criteria and the Admin's requirements.

Table 4.11 Overall Weighted Mean for Employees of Proposed System

Criteria	Weighted Mean	Verbal Interpretation
Functionality	4.8	Excellent
Efficiency	4.8	Excellent
Maintainability	4.8	Excellent
Portability	4.9	Excellent
Average Weighted Mean	4.8	Excellent

Table 4.11 shows the overall Service Provider evaluation of the Proposed System in which its Functionality, Efficiency, and Maintainability have a weighted mean of 4.8, and Portability has a weighted mean of 4.9. All five questions have a verbal interpretation of 'Excellent'. The overall average weighted mean of the proposed system is 4.8 with an 'Excellent' verbal



interpretation. Therefore, the proposed system meets the standards of the following criteria and the requirements of the Service Provider.

Table 4.12 Overall Weighted Mean for Service Provider of Proposed System

Criteria	Weighted Mean	Verbal Interpretation
Functionality	4.7	Excellent
Efficiency	4.7	Excellent
Maintainability	4.7	Excellent
Portability	4.7	Excellent
Average Weighted Mean	4.7	Excellent

Table 4.12 shows the overall Service Provider evaluation of the Proposed System. Its Functionality, Efficiency, Maintainability, and Portability have a weighted mean of 4.7 with a verbal interpretation of 'Excellent'. The overall average weighted mean of the proposed system is 4.7 with an 'Excellent' verbal interpretation. Therefore, the proposed system meets the standards of the following criteria and the service provider's requirements.

Table 4.13 Overall Weighted Mean for all of Respondents

Criteria	Weighted Mean	Verbal Interpretation
Functionality	4.8	Excellent
Efficiency	4.8	Excellent
Maintainability	4.8	Excellent
Portability	4.8	Excellent
Average Weighted Mean	4.8	Excellent



Table 4.13 shows the overall respondents evaluation of the Proposed System. Its Functionality, Efficiency, Maintainability, and Portability have a weighted mean of 4.8 with a verbal interpretation of **Excellent**. The overall average weighted mean of the proposed system is 4.7 with '**Excellent**' verbal interpretation. Therefore, the proposed system meets the standards of the following criteria and the service provider's requirements.



CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter briefly discusses the topic in the previous chapter that led to the completion in developing the QCU-FMS: Facilities Management and Reporting System for Quezon City University. After conducting research, the proponents have come up with the following Conclusion and Recommendation of the study.

Summary of Findings

The findings of the study summarized in accordance with the Objectives that outlined in Chapter 1 and Discussed in Chapter 4.

Summary of Findings

The findings of the study summarized in accordance with the Objectives that outlined in Chapter 1 and Discussed in Chapter 4.

1. Develop a system incorporating monitoring and management tools for addressing reported issues and scheduling events.

Addressing the functionality criteria, the respondents allocate rating based on the extent to which respondents agree to propose a system that contains monitoring and managing reported issues and overseeing event scheduling. The admins' response with an average weighted mean of 4.9, interpreted as 'Excellent'. Employees respond with an average weighted



mean of 4.8, interpreted as 'Excellent' which means it indicates that the Admins and Employees agreed that the proposed system corresponds and meets the requirements. The module provides a unified platform for monitoring, managing, and overseeing various aspects of the system, including reported issues and event scheduling. It integrates tools and features to simplify processes, enhance communication, and ensure efficient management of tasks and events.

Also, Addressing the portability criteria, The students' response with an average weighted mean of 4.8, interpreted as 'Excellent'. Admins' response with an average weighted mean of 4.9, interpreted as 'Excellent'. Employees' response with an average weighted mean of 4.9, interpreted as 'Excellent'. Service Providers' response with an average weighted mean of 4.7, interpreted as 'Excellent' agreed that the proposed system corresponds and meets the requirements.

2. Implement data analytics encompassing both prescriptive and descriptive analytics to provide actionable insights on performance and resource optimization.

Addressing the efficiency criteria, the respondents allocate a rating based on the extent to which respondents agree that the system can generate summary reports to provide administrators with actionable insights. The Admins' response with an average weighted mean of 4.9, interpreted as 'Excellent' which means it indicates that the Admins agreed that the system



can effectively generate analytics reports and that it complies with the requirements.

3. Design a structured job order system to optimize service provider assistance.

Addressing the efficiency criteria, the respondents allocate a rating based on the extent to which respondents agree that the system provides an automated task allocation for the service providers deployment for campus operation. The Admins' response with an average weighted mean of 4.9, interpreted as 'Excellent'. Service Providers' response with an average weighted mean of 4.7, interpreted as 'Excellent' which means it indicates that the Admins and Service Providers agreed that the proposed system corresponds and meets the requirements.

4. Design a system that introduces a non-monetary rewards system to incentivize student participation in campus management.

Addressing the efficiency criteria, the respondents allocate a rating based on the extent to which respondents agree that the system introduces a non-monetary reward such as certificates, vouchers, and discounts to incentivize student participation in campus management. The Students' response with an average weighted mean of 4.8, interpreted as 'Excellent'.

Also, Addressing the maintainability criteria, The student responded with an average of 4.8 interpreted as 'Excellent' which means it indicates that



the Students agreed that the proposed system corresponds and meets the requirements.

5. Design a feature enabling employees to schedule events and request service provider assistance, enhancing event management efficiency.

Addressing the efficiency criteria, the respondents allocate a rating based on the extent to which respondents agree that the system provides a feature that enables employees to enhance the event management and service provider assistance. The Admins' response with an average weighted mean of 4.9, interpreted as 'Excellent'. Employees' response with an average weighted mean of 4.8, interpreted as 'Excellent' which means it indicates that the Admins and Employees agreed that the proposed system corresponds and meets the requirements.

This summary of findings concisely encapsulates the key points of a research report, offering a clear overview of the results and providing recommendations based on the data collected. Researchers presented the findings of the study examining the Facilities Management and Reporting System for Quezon City University. Through surveys and interviews with a sample of students, Service Providers, Employees, and the Physical Facility Admin, we highlighted the importance of implementing comprehensive strategies to improve the reporting of facility-related issues, optimize event requests and overall service management promoting effective interaction and



communications at Quezon City University. The study indicates that respondents are compliant to 25010 Standard, which translates to meeting the quality system specifications.

Conclusion

The data gathered from survey participants was interpreted and analyzed to determine the study's result. Forming a particular conclusion was attainable considering all of the findings:

1. Upon reviewing the implementation data, the Quezon City University Facilities Management System (QCU-FMS) was developed with the general objective of optimizing processes of issue reporting, event requests, and overall service management across the university community. The system successfully integrated advanced monitoring and management tools that streamlined the management of reported issues and facilitated efficient scheduling of events. Based on the analysis, the comprehensive data analytics framework, which incorporated both prescriptive and descriptive analytics, provided actionable insights that enhanced performance and resource optimization.
2. Based on the security assessments, the design of a secure database with robust user authentication protocols was confirmed to effectively protect data. A structured job order system was implemented, optimizing resource allocation. Additionally, the introduction of a



non-monetary rewards system has significantly fostered greater student engagement in campus management activities. Enhancements also included expanded system features that allowed employees to efficiently schedule events and request necessary services, thus improving event management efficiency.

3. Based upon the evaluation of the ISO25010 Software Product Quality criteria, the QCU-FMS exhibited commendable functionality, efficiency, maintainability, and portability. It met specified functional requirements, demonstrated high efficiency in resource utilization, was easy to maintain and modify, and proved portable across various platforms and devices. In conclusion, the QCU-FMS has achieved its intended objectives, establishing a more connected, efficient, and participative campus environment at Quezon City University. This system not only supports current operational needs but also sets a robust foundation for future enhancements and scalability.

Recommendations

This study highlights the effectiveness of the proposed Facilities Management and Reporting System for Quezon City University. As a result, the system empowers physical facilities and general services division to efficiently manage and monitor reported issues, event requests, and address facility needs, leveraging data analytics for actionable insights. Hence, the proponents suggest the following measures to further enhance the system.



1. Given the proposed system's proven effectiveness in the evaluation, it is recommended that administrators and service providers undergo training to operate the system effectively and introduce the mobile application to employees and students. This will standardize processes such as pencil booking for employees and issue reporting for all users, thereby maximizing the utilization of the system's features and functionalities.
2. Based on the evaluation findings with the events management unit, it is recommended that users be removed from the option to choose event locations, as the events management unit will be responsible for assigning locations based on the request. Additionally, a feature in the events management panel should be integrated to notify users if their reservations will be rescheduled due to more important events.
3. To enhance student participation in campus management, stakeholders should expand and outline the non-monetary rewards system within the QCU-FMS. Recognition and rewards should be provided to students who actively engage with the system by reporting issues and contributing to overall campus improvement efforts.
4. The proponents recommend the Registrar's Office's crucial role in the system. System stakeholders and the Registrar's Office must collaborate systematically to update students' email addresses in the system. Given that the system is exclusive to current students in the



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school, this synchronization process is crucial for maintaining accurate and up-to-date information.

5. The involvement of the procurement and supplies unit is recommended to establish an efficient process for requesting materials and managing inventory across all facilities. This proactive approach will optimize resource utilization and minimize disruptions in facility operations.