POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

Developing a Faculty Academic Requirements Management System at PUP-Taguig

A Capstone

Presented to the Faculty of the Department of Computer and Information Sciences,

Polytechnic University of the Philippines

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In Partial Fulfillment of the Requirements of the Degree

Bachelor of Science in Information Technology

by

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CERTIFICATION

This research ***Developing a Faculty Academic Requirements Management System at PUP-Taguig*** prepared and submitted by FIDEL, DIANA ROSE V., MINGO, ED JUDAH E., NABAYRA, JAMES V. and VILLAMARZO, KAZEL S. in partial fulfillment of the requirements for the degree, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY has been examined and recommended for Fundamentals of Research.

Evaluation Committee

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CERTIFICATION OF ORIGINALITY

This is to certify that the research work presented in this capstone project, ***Developing a Faculty Academic Requirements Management System at PUP-Taguig*** for the degree Bachelor of Science in Information Technology embodies the result of original and scholarly work carried out by the undersigned. This capstone project does not contain words or ideas taken from published sources or written works that have been accepted as basis for the award of a degree from any other higher education institution, except where proper referencing and acknowledgment were made.

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Chapter 1

THE PROBLEM AND ITS BACKGROUND

1. Introduction

A comprehensive and transformational solution is required to address the issues that the Polytechnic University of the Philippines – Taguig (PUP-T) faces in managing faculty academic requirements in the ever-changing world of higher education. This study critically examines the importance of creating and implementing a Faculty Academic Requirements Management System that is especially suited to PUP Taguig's unique environment. Recognizing significant obstacles in the current approach to resource accessibility for faculty members, the proposed management system offers a creative solution to centralize faculty academic requirements. This aims to improve accessibility, enhance the standard of instruction, and foster a cooperative learning environment.

Fundamentally, the proposed management system is a strategic endeavor with the potential to transform conventional teaching methods, rather than merely serving as a technical add-on. By centralizing faculty academic requirements, it addresses the immediate demand for more convenient access and encourages collaborative teaching methods. This collaborative environment allows faculty members to easily share resources, ultimately improving the overall instructional quality at PUP Taguig.

This study focuses primarily on the inefficiencies related to the current method of searching for faculty academic requirements. The management system seeks to foster a unified and consistent experience for faculty members across a range of courses by reducing these inefficiencies. Redirecting time saved on searching for requirements towards more significant and impactful facets of instruction might enhance students' overall educational experience.

The Faculty Academic Requirements Management System is poised to transform PUP Taguig's educational environment. It aims to change the institution's landscape rather than just solving current problems. The system is a catalyst for change, propelling the institution towards a dynamic and collaborative future. It demonstrates PUP Taguig's commitment to embracing efficiency, creativity, and teamwork in its pursuit of academic excellence. Our goal with this research is to not only address current issues but also lay the foundation for a future where faculty academic requirements management is a dynamic and essential component of the academic program at the institution.

1.1 Overview of the Current System Process

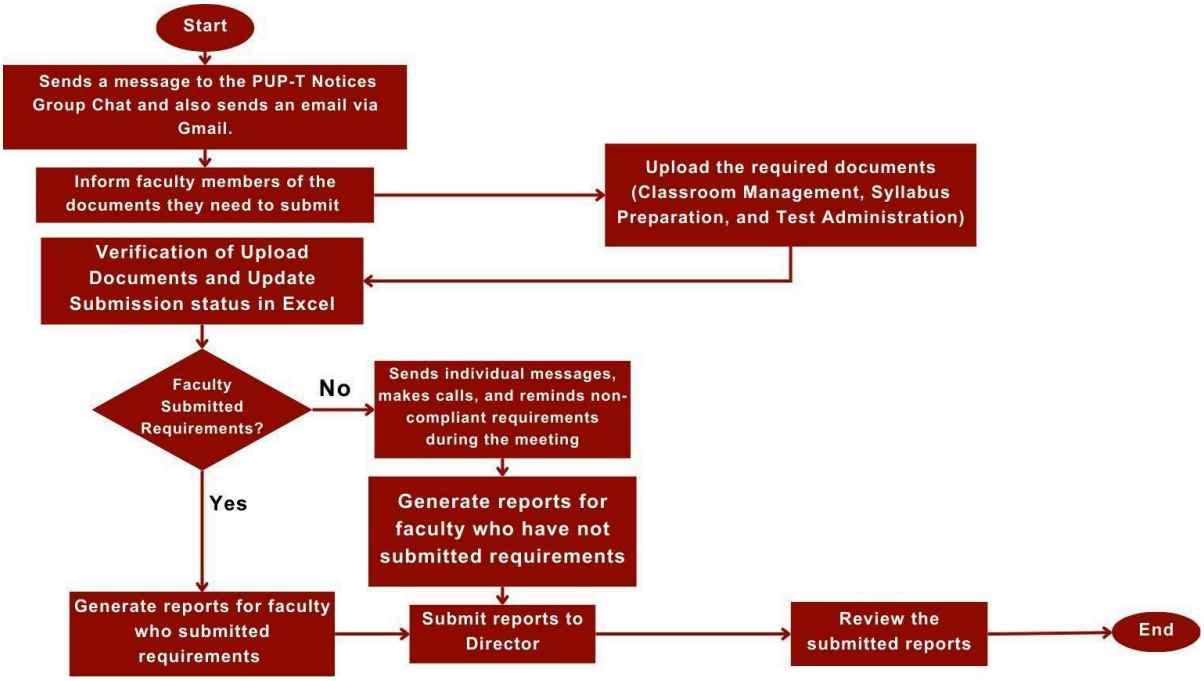

Figure 1. The Current Process of Faculty Academic Management

The following describes the step-by-step process of the manual academic management system currently in use at the Polytechnic University of the Philippines - Taguig (PUP-T). This system is essential for maintaining ISO certification standards, ensuring that faculty members adhere to document submission deadlines and that academic management practices meet the required criteria.

Communication Protocol:

Administrative Staff initiates communication with faculty members using messenger and email within the "PUPT Notices" group chat. This communication aims to remind faculty to upload required documents to Google Drive before each semester's end, crucial for ISO certification at PUP-T.

Submission Monitoring:

Admin manually checks the submission status of each faculty member by accessing their respective folders in Google Drive. Admin verifies whether faculty members have successfully uploaded their required documents or not.

Tracking Progress:

To effectively manage and track submissions, Admin maintains an Excel spreadsheet. This spreadsheet serves as an organized record of each faculty member's submission status. Admin updates this sheet regularly to reflect who has completed their uploads and who still needs to submit their documents.

Reminder System:

For faculty members who have not yet submitted their documents, Admin uses the messenger app to send individual messages. These messages serve as reminders and prompts for faculty members to complete their submissions promptly.

Importance for ISO Certification:

The entire process is crucial for maintaining ISO certification standards at PUP-T. Faculty compliance with document submission deadlines ensures that academic management practices align with ISO requirements.

1.2 Theoretical Framework

The development of the proposed Faculty Academic Requirements Management System (FARMS) at PUP Taguig is also grounded in a specific framework that operationalizes the principles of the Technology Acceptance Model (TAM) and Vygotsky's Collaborative Learning Theory. This framework integrates a structured approach to ensure the successful design, implementation, and adoption of the system while fostering a collaborative academic culture.

The framework begins with the Input Phase, which involves assessing the current manual processes, identifying inefficiencies, and gathering insights from faculty and administrative staff. Through stakeholder consultations, surveys, and feasibility studies, the system requirements are defined, focusing on ease of use and perceived usefulness, as emphasized by TAM. Faculty and staff expectations, challenges related to file organization, tracking, and communication, and the need for a secure, centralized platform are documented during this phase.

The Process Phase focuses on system design and development. It incorporates user-centered design principles to create an intuitive interface that simplifies academic requirements management. This phase includes the development of a centralized repository for academic files, automated tracking and reminders, and robust access control mechanisms to ensure data security and integrity. Furthermore, the framework promotes collaborative processes by involving faculty members in testing and validation stages, enabling iterative improvements. The system is also integrated with the Faculty Loading and Scheduling System (FLSS), which is designed to manage the scheduling and loading of faculty members' subjects. It ensures that faculty assignments, subject allocations, and schedules are handled efficiently and align with institutional requirements. Additionally, the Human Resources Information System (HRIS) focuses on maintaining and managing faculty information, including personal and professional details, and other HR-related data necessary for organizational management and decision-making. These two systems are integrated with the PUPT (FARMS) Faculty Academic Requirements Management System to enhance its functionality and relevance, ensuring alignment with institutional processes.

Finally, the Output Phase focuses on deploying the system and evaluating its impact. The framework ensures that the deployed system meets user needs

effectively, enabling seamless academic requirements management while reducing manual effort. By fostering a collaborative culture, as underscored by Vygotsky's

Collaborative Learning Theory, the system encourages resource sharing and teamwork among faculty, thereby enhancing the overall educational quality at PUP Taguig. This structured framework ensures that FARMS is not only technically effective but also socially and institutionally transformative, addressing immediate challenges while paving the way for sustained improvements in academic management practices.

1.3 Conceptual Framework

Researchers create theoretical and conceptual frameworks that include a philosophical and methodological model to help design their work. A formal theory provides context for the outcome of the events conducted in the research. The data collection and the analysis are also based on theoretical and conceptual framework

Figure 2. This conceptual framework showed the concepts presented in the study.

The input phase encompasses the current state of the learning management system, challenges faced, client expectations. The process involves online survey, stakeholder consultation, analysis and design, development and testing to develop the system. The output is the implementation of the requirements, resulting in a developed Faculty Academic Requirements Management System.

1.4 Statement of the Problem

The current manual process of managing faculty academic requirements at the Polytechnic University of the Philippines – Taguig (PUP-T) presents several significant challenges that hinder efficiency and effectiveness. This study aims to address the following specific issues:

1. **Manual Processes for Academic Requirements Management**:
    - **Inefficient Tracking and Reporting**: The process of tracking whether faculty members have submitted their academic requirements is done manually. This includes the declaration of submission status, which relies on manual checks and updates. Such an approach is time-consuming and prone to human error, leading to potential delays and inaccuracies in the management of academic records.
    - **Cumbersome Reminders**: Reminders for faculty members to upload their academic requirements are also managed manually, typically through individual or group chat messages. This method is inefficient,

as it requires constant monitoring and manual intervention, resulting in inconsistent follow-ups and potential miscommunication.

- **Poor document categorization:** lack of consistent and descriptive labels for files uploaded to Google Drive by faculty. This makes it challenging to locate specific documents and verify if all necessary files are present.

2. **Permissions and Access Control Issues**:
    - **Lack of File Security**: There are no effective restrictions on the uploaded academic requirement files, allowing any faculty member to delete or download files indiscriminately. This lack of controlled access leads to confusion, potential data loss, and breaches of data integrity, compromising the reliability of the academic records.

3. **Insufficient and Storage Capacity**:
    - **Limited Digital Infrastructure**: The current system is unable to accommodate the volume of files uploaded by faculty members from various programs and academic years. This limitation in storage capacity creates significant bottlenecks, hindering the smooth operation and accessibility of academic resources. The inability to store and manage large volumes of academic requirements efficiently impacts the overall productivity and effectiveness of the faculty.

1.5 Objectives of the Study

The primary objective of this research is to develop and implement a Faculty Academic Requirements Management System (FARMS) integrated with the Faculty Loading and Scheduling System (FLSS) and the Human Resources Information System (HRIS) to enhance the efficiency, security, and overall quality of academic operations at the Polytechnic University of the Philippines – Taguig (PUP-T). The integration with FLSS ensures that faculty schedules, subject assignments, and workload management are seamlessly aligned with the academic requirements. This enables the system to automatically verify faculty availability and optimize schedules based on submitted requirements. Meanwhile, the integration with HRIS provides access to comprehensive faculty data, including personal and professional details, employment records, and other HR-related information. This integration facilitates streamlined user authentication, role-based access, and personalized management of academic requirements, ensuring the system aligns with both academic and administrative processes.

Specific Objectives

1. **Automate and streamline the tracking and reporting of faculty academic requirements:**

- To develop an automated system that can efficiently track the submission status of faculty academic requirements, replacing the current manual methods. This will include features such as automated reminders and notifications to faculty members about upcoming deadlines and submission statuses and automate accurate file categorization. The system aims to reduce the administrative burden on staff, minimize errors, and ensure timely submissions.

2. **Enhance the integrity of academic requirement files:**
    - To implement a robust access control mechanism that restricts permissions for uploading, downloading, and deleting academic requirement files. This system will ensure that only authorized personnel can make changes, thereby preventing unauthorized. access, accidental deletions, or modifications. The goal is to maintain the integrity and confidentiality of academic records, providing a reliable and secure repository for faculty submissions.

3. **Improve storage capacity and digital infrastructure:**
    - To design and integrate a scalable storage solution capable of handling the growing volume of academic requirement files submitted by faculty members across various programs and academic years.
    - This solution will include features such as efficient data organization, easy retrieval, and backup capabilities to ensure that academic

resources are always accessible and protected against data loss. the objective is to support the institution’s need for ample storage space while maintaining high performance and reliability of the system.

1.6 Scope and Limitations of the Study

This study focuses on developing and implementing a Faculty Academic Requirements Management System at PUP-Taguig integrated with Faculty Loading and Scheduling System (FLSS) and Human Resources Information System (HRIS). The scope of the study includes designing and developing a comprehensive system to centralize and streamline the management of academic requirements for faculty members at PUP-Taguig, thereby enhancing the efficiency and effectiveness of academic requirements management. Additionally, the study aims to assess the backgrounds of respondents, including faculty members and administrative staff, to understand their roles and needs. The evaluation will also cover the current system's reliance on manual Google Drive usage, decentralization of file storage, administrative permissions, flexibility, and storage capacity.

Additionally, it will integrate the Faculty Academic Requirements Management System with the Faculty Loading and Scheduling System (FLS) and Human Resources Information System (HRIS). This integration aims to create a seamless workflow that connects academic management with faculty scheduling and human resources data, ensuring that all relevant information is centralized and easily

accessible. By linking these systems, the study seeks to reduce redundancy, minimize errors, and improve overall coordination between academic and administrative processes at PUP-Taguig. This integration will also allow for better tracking of faculty workloads, ensuring compliance with institutional policies and facilitating data driven.

Furthermore, the study will assess user satisfaction with the current system and identify challenges faced by faculty members and administrators. Analyzing the impact of the proposed system on the quality of teaching and learning at PUP-Taguig is a crucial part of this study. The study will culminate in the implementation and testing of the developed system, focusing on its functionality, performance, and user satisfaction.

The study is subject to several limitations. Firstly, the focus on the PUP-Taguig campus may limit the generalizability of the findings to other institutions with different contexts and requirements. Technical constraints, such as budgetary considerations and potential compatibility issues with existing systems and

infrastructure, may affect the development and implementation process. The success of the system also depends on the adoption and engagement of faculty members and administrative staff, which may vary based on their technological proficiency and willingness to adapt to the new system. Privacy and security

concerns related to handling sensitive academic information within the system must be addressed. Resource constraints, including time, funding, and technical expertise, may limit the scope and scale of the development and implementation process. Additionally, objectively measuring the success and impact of the system on the quality of teaching and learning may be challenging due to the complexity of educational environments and varying stakeholder perspectives. Finally, the system must be flexible enough to accommodate dynamic educational needs, which may evolve over time, requiring continuous updates and improvements. By understanding these scope and limitations, the study aims to provide a realistic and comprehensive foundation for developing a transformative Faculty Academic Requirements Management System at PUP-Taguig.

1.7 Significance of the Study

This study is crucial as it addresses the urgent need for an efficient Faculty Academic Requirements Management System Taguig at the Polytechnic University of the Philippines – Taguig (PUP-Taguig). The new system aims to centralize, streamline, and enhance the management of academic documents, significantly benefiting the university, faculty, administrative staff, future researchers, and the researchers.

1. **Polytechnic University of the Philippines – Taguig (PUP-Taguig):** The modernized system will centralize academic document management, making all files easily accessible and well-organized. This improvement will support the university's goal of providing high-quality education and improve operational efficiency.

2. **Faculty Members:** The new system will provide a unified platform for managing academic requirements, saving time and reducing administrative burdens. Faculty members will benefit from easier access to and management of documents, allowing them to focus more on teaching.

3. **Administrative Staff:** A centralized platform will streamline document submissions, approvals, and updates, increasing efficiency and accuracy. This will reduce the manual workload and improve coordination among administrative staff.

4. **Future Researchers:** This study will offer valuable insights into the challenges and solutions of transitioning from manual to automated academic management systems. It will serve as a reference for developing similar systems in other educational institutions.

5. **The Researchers:** By developing and implementing this system, the researchers will contribute significantly to improving academic management at PUP-Taguig and provide a framework for other institutions. Their findings will advance the field of educational administration and technology.

1.8 Definition of Terms

Administrative Permissions: The access rights granted to administrative staff and faculty members for managing and updating academic requirements. The study discusses the need for a more inclusive approach to administrative permissions to improve system flexibility and responsiveness.

Centralized System: A method of managing and storing information in a single, central location. This approach improves accessibility, consistency, and efficiency in managing academic requirements by reducing the inefficiencies associated with decentralized file storage.

Collaborative Teaching Methods: Teaching approaches that involve faculty members working together to share resources. The proposed system aims to foster a collaborative culture to enhance the overall quality of instruction at PUP-Taguig.

Decentralization: The current method of storing academic requirements across multiple locations leads to inefficiencies and difficulties in accessing and managing these requirements. The proposed system aims to address these challenges by centralizing the storage of academic documents.

Storage Capacity: The amount of digital space available for storing academic documents and requirements. The study highlights the challenges posed by insufficient storage capacity and the need for adequate storage solutions within the proposed system.

Chapter 2

REVIEWS OF RELATED LITERATURE AND STUDIES

This chapter includes the ideas, finished thesis, generalization or conclusions, methodologies, and others. Those that were included in this chapter help in familiarizing information that is relevant and similar to the present study.

LMS Adoption in Higher Education

Learning Management Systems (LMS) have revolutionized higher education, providing integrated tools for online instruction, and enhancing learning experiences. This section explores factors influencing LMS adoption among faculty members, employing the Extended Technology Acceptance Model (TAM).

LMS platforms like Moodle, Blackboard, and Brightspace D2L support diverse instructional strategies and promote collaboration among students and faculty members (Kasim & Khalid, 2016; Fathema et al., 2015; Walker et al., 2016).

Davis' (1989) Technology Acceptance Model (TAM) posits that perceived usefulness and ease of use significantly influence users' attitudes and intentions towards technology adoption (Venkatesh & Davis, 2000). Fathema et al. (2015)

extended TAM to include system quality, perceived self-efficacy, and facilitating conditions, emphasizing their roles in LMS adoption among faculty.

The study underscores the importance of considering system quality, perceived self-efficacy, and facilitating conditions in promoting LMS adoption among faculty members (Fearnley & Amora, 2020). Understanding these dynamics is crucial for designing effective strategies to enhance faculty engagement with educational technologies like LMS, thereby improving teaching practices and student learning outcomes.

In the Philippines, the integration of Learning Management Systems (LMS) into higher education has become imperative, especially with the onset of the COVID-19 pandemic, prompting a rapid shift towards online education. Isabela State University-Ilagan Campus (ISU-Ilagan) has navigated this transition, exploring various LMS platforms to sustain educational continuity and adaptability.

Prior to the pandemic, educational institutions across the Philippines, including ISU-Ilagan, utilized a range of LMS solutions such as Google Classroom, Edmodo, and Schoology among others. These platforms served as precursors to the formal adoption of a centralized LMS, facilitating ease of transition and familiarity among faculty and students alike (Paguirigan, 2023).

In the local context, the Commission on Higher Education (CHED) supports the autonomy of universities in selecting LMS that align with their specific needs and resources. This flexibility has empowered institutions like ISU-Ilagan to conduct

thorough needs assessments, evaluating factors such as existing ICT infrastructure, faculty readiness, and financial capabilities to implement effective online learning solutions (CHED, 2021).

Recent local studies underscore the effectiveness of open-source LMS platforms like Moodle in enhancing pedagogical practices and student engagement within Philippine universities. For instance, research conducted at the University of the Philippines Open University (UPOU) highlighted Moodle's versatility in promoting interactive learning environments through its robust features and user-friendly interface (Secreto, 2013).

Moreover, initiatives at other local institutions, such as the University of Santo Tomas and De La Salle University, have demonstrated successful integration of Moodle-based LMS to support diverse academic programs and facilitate collaborative learning environments amidst the challenges posed by the pandemic (UST, 2022; DLSU, 2022).

In summary, the local literature emphasizes the strategic importance of selecting an appropriate LMS, such as TelEducation based on Moodle, tailored to the specific needs and capabilities of ISU-Ilagan. This approach not only supports the university's commitment to quality education in the new normal but also ensures sustainable development of its educational resources and infrastructure (CHED, 2021).

Digital Technology Integration and Academic Performance

According to Abdullatif and Gameil's article "The Effect of Digital Technology Integration on Students' Academic Performance through Project-Based Learning in an E-learning Environment," the integration of digital technology in teaching and learning is linked to improving the effectiveness of knowledge construction and distribution, and thus improving academic performance. They do indicate however, that if digital technology is not effectively and systematically integrated into education, its influence may fall short of expectations. The linked literature has mostly focused on investigating the possible use of various digital technologies to facilitate, extend, and improve learning attainment, consequently improving students' overall academic performance.

Technology Integration in Schools

In Davies and West's article, "Technology Integration in Schools," technology integration is described as the effective deployment of educational technology to

accomplish desired learning outcomes. Educational technology, which includes tools, equipment, or technologies, whether electronic or mechanical, strives to help students achieve certain learning objectives. This category includes instructional technologies, which are used by teachers to provide instruction, and learning technologies, which are utilized by students to attain specific learning goals.

Even though schools have enough access to educational technologies, their use for instructional purposes by instructors and students is not always consistent. Efforts to improve technology use have mostly focused on providing professional development for instructors. Furthermore, both social and moral ethical concerns have been expressed. Choy, Wong, and Gao (2009) discovered, for example, that student teachers who received technology integration training were more likely to employ technology in their classes. However, they tended to use technology for teacher-centered functions rather than more successful student-centered pedagogies.

Collaborative Learning

According to Valamis (2023), collaborative learning involves using groups to enhance the learning process by working together. Learners actively engage in processing and synthesizing information, moving beyond rote memorization of facts and figures. Working on projects, learners collaborate to understand presented

concepts, defending positions, reframing ideas, and articulating points, leading to a more comprehensive understanding as a group than as individuals (Valamis, 2023)

Management Systems

According to Trosset and Weisler (2018), management system is a system that is comprised of various components that work hand in hand with each other in order to make the organization under which they exist operate at its best. To accomplish its goals, an organization needs several key elements, namely synergy, interdependence, and interrelations between an assortment of its subsystem. System, therefore, holds one of the key answers to anticipating changes from within and outside the organization to make it more agile (Annannab, Bakar, & Mohd Khan, 2022).

Academic Management Systems in the Philippines

The adoption of academic management systems in educational institutions in the Philippines has been explored in several studies. According to De Guzman and Fernando (2018), implementing centralized academic management systems significantly improves the efficiency of administrative tasks and enhances the accessibility of academic records. Their study on a Philippine university highlighted the reduction in processing time for academic requirements and improved accuracy in record-keeping (De Guzman & Fernando, 2018).

Santos and Reyes (2019) examined the impact of digital platforms on faculty performance and administrative efficiency in higher education institutions. Their findings indicated that the integration of technology streamlined the submission and review of academic requirements, leading to more timely and organized academic processes (Santos & Reyes, 2019).

Chapter 3

RESEARCH METHODOLOGY

The research methodology for developing a Faculty Academic Requirements Management to enhance learning at PUP Taguig is designed to establish a robust and systematic approach, ensuring the credibility and validity of the study. The overarching goal is to provide a clear and detailed roadmap for conducting the research, thereby contributing to the enhancement of learning at PUP Taguig.

3.1 Research Design

The research study adopts a method based on quantitative research, emphasizing the systematic gathering and analysis of numerical data to assess the impact of developing a Faculty Academic Requirements Management System at the Polytechnic University of the Philippines Taguig. The researchers will use survey questionnaires precisely built to correspond with the functions of the system to gather thorough information, collecting feedback from both faculty members and administrative staff. The gathered numerical data will be processed and evaluated using a systematic analysis. The presentation of data will be aided by graphs, allowing for a more detailed evaluation of specific factors related to the performance, efficiency, and user satisfaction of the Faculty Academic Requirements Management System.

3.1.1 Quantitative Measures:

The research design involves the quantification of key variables through structured surveys and questionnaires. Participants, including Head of Academic Programs (HAP) and faculty members, will provide numerical responses using Likert scales and closed-ended questions. The survey instruments are designed to capture quantitative data on user satisfaction, perceived system efficiency, and overall feedback on the enhanced features.

3.2 Research Instrument

In this study, the research instrument is crafted in accordance with the ISO 25010 standard, a comprehensive framework for evaluating software product quality and system performance. ISO 25010 outlines a set of quality characteristics and sub-characteristics crucial for assessing the efficiency, usability, and reliability of software systems. Specifically, the research instrument employed in this study takes the form of structured surveys and questionnaires. These instruments are designed to align with internationally recognized criteria for software quality, as outlined in the ISO standard, ensuring a systematic and rigorous evaluation of the targeted aspects of software performance.

3.2.1 ISO 25010 Quality Characteristics:

The research instrument will focus on the following ISO 25010 quality characteristics, tailored to the specific context of the enhanced Polytechnic University of the Philippines (PUP) Faculty Loading and Scheduling System:

1. Performance Efficiency:

· Aspect of Focus: Evaluation of system performance metrics, including response time and resource utilization.

· Instrumentation: Automated tracking of response time, system-generated metrics related to efficiency, and participant feedback on perceived system speed and responsiveness.

2. Usability:

· Aspect of Focus: Assessment of user interface design, accessibility, and overall user experience.

· Instrumentation: Structured surveys and questionnaires based on ISO 25010 sub-characteristics such as learnability, operability, and user satisfaction.

These instruments will gather quantitative data on user perceptions of the system's usability.

3. Reliability:

· Aspect of Focus: Evaluation of system stability, accuracy, and error handling.

· Instrumentation: Automated collection of system-generated data on error rates and reliability. Surveys will also include questions related to users' experiences with system reliability.

3.2.2 Data Collection Methods:

The research instrument employs a combination of automated system metrics and participant responses through surveys and questionnaires. The system will automatically generate data related to performance and reliability, while structured surveys will capture user perceptions aligned with the ISO 25010 usability characteristics.

3.2.3 Structured Surveys and Questionnaires:

Structured surveys and questionnaires will be designed based on ISO 25010 guidelines to gather quantitative data from participants. These instruments will include Likert scales and closed-ended questions, enabling participants to provide numerical feedback on specific aspects of system performance, usability, and reliability.

By adopting ISO 25010 as the foundation for the research instrument, this study ensures a systematic and internationally recognized approach to assessing the enhanced PUP Faculty Loading and Scheduling System. The chosen quality

characteristics guide the instrument development, facilitating a comprehensive evaluation of the software product's performance and user satisfaction.

3.3 Data Gathering Procedures

The data gathering procedure involved distributing a survey questionnaire to faculty members and administrative staff at the Polytechnic University of the Philippines Taguig via Google Forms. The questionnaire consisted of three sections: demographic information, system performance, and user satisfaction.

An email with a cover letter explaining the study and instructions for completing the survey was sent to all participants. They were given two weeks to respond, with reminder emails sent after one week. The responses were collected through Google Forms, ensuring confidentiality and privacy.

The data was automatically processed by Google Forms, providing numerical results for analysis. Statistical techniques were used to identify trends and patterns, with measures of central tendency and dispersion calculated to summarize the data. The findings were presented using graphs and charts, allowing for a detailed evaluation of the system's performance and efficiency. A summary report was prepared, documenting the data analysis, implications, and recommendations for improving the Faculty Academic Requirements Management System at PUP-Taguig.

3.3.1 Sampling Method

The study employs a **stratified purposive sampling** method to ensure a well-balanced representation of participants with specific expertise and roles within the academic community of the **Polytechnic University of the Philippines (PUP)**. **Stratified sampling** is used to divide the population into distinct subgroups or strata such as **Campus Director, Head of Academic Programs Staff, and Faculty Members** based on their roles in the faculty academic requirements management system. Within each stratum, **purposive sampling** is applied to deliberately select individuals with in-depth knowledge and experience relevant to the system.

A total of **23 participants** will be selected across these strata to ensure diverse yet targeted insights into the system's functionality and the enhancements being implemented. This combined approach enhances the reliability and relevance of the study by capturing perspectives from different hierarchical levels while maintaining a focus on expertise and experience.

Expertise and Experience:

The primary objective of this research is to gain insights from individuals who hold key roles in the academic administration and faculty at PUP. Academic

administrators, responsible for overseeing faculty requirements, and faculty members, who directly engage with the faculty academic requirements management system, possess critical expertise and experience relevant to our study. Stratified purposive sampling allows us to intentionally target individuals with specific knowledge about the existing system and, if applicable, those who will interact with the enhanced system.

Targeted Perspectives:

The use of stratified purposive sampling ensures that the study gathers perspectives from individuals with direct expertise in faculty academic requirements management at PUP. By selecting participants from different hierarchical levels Campus Director, Head of Academic Programs Staff, and Faculty Members the study captures a well-rounded view of the system's functionality and potential improvements. This approach not only enhances the credibility of the findings but also ensures that insights come from those most familiar with the system's challenges and opportunities.

Conclusion:

By strategically selecting knowledgeable participants, the study ensures that its findings are both relevant and actionable. The combination of stratified and purposive sampling strengthens the research by integrating diverse yet expert

perspectives, ultimately providing a comprehensive understanding of the faculty academic requirements management system at PUP.

Sources of Data

The source of data for this research will be survey questionnaires distributed to both faculty members and administrative staff at the Polytechnic University of the Philippines Taguig. These surveys will be conducted in accordance with the system's design and functionality. The data gathered from these surveys will provide measurable information about various aspects of the Faculty Academic Requirements Management System, such as its performance, efficiency, and user satisfaction.

Additionally, other analytical information, such as system logs, usage statistics, and performance metrics generated by the management system, may also be utilized by the researchers. These data sources will aid in the systematic collection and analysis of numerical data, allowing researchers to evaluate the impact of the management system.

By employing these data sources, the study aims to gather comprehensive and relevant data to inform the development and refinement of the Faculty Academic Requirements Management System. This approach ensures that the system meets the needs and expectations of its users, ultimately enhancing the management of academic requirements at PUP Taguig.

3.4 Ethical Consideration

In upholding ethical standards for this study, the researchers have sought explicit permission from potential respondents before their inclusion. To facilitate the research process and ensure the accuracy of participant information, the project team has collaborated with the appropriate administrative bodies responsible for student records within the context of Developing a Faculty Academic Requirements Management system to Enhance Learning at PUP-Taguig.

It is crucial to underscore that all personal information collected during the research will be treated with the utmost confidentiality, aligning with the provisions set forth in the Republic Act No. 10173, commonly known as the Data Privacy Act.

Participation in this study is entirely voluntary, emphasizing the principle of autonomy. Individuals who choose to participate initially retain the unequivocal right to withdraw from the study at any point without facing consequences. Moreover,

participants have the right to refuse to answer specific questions or engage in particular procedures, thereby ensuring their autonomy and comfort throughout the research endeavor. This commitment to voluntary and informed participation reflects the ethical foundation governing this study.

Statistical Data Analysis

The statistical method employed involves calculating measures of central tendency, specifically the mean. In this process, responses from completed survey forms are accumulated and computed. The calculation entails adding up all responses within each category and then dividing the total for each category by the number of respondents. The averages for each category are summed, and the total is divided by the number of categories to obtain an overall average.

3.5 Proposed System Architecture

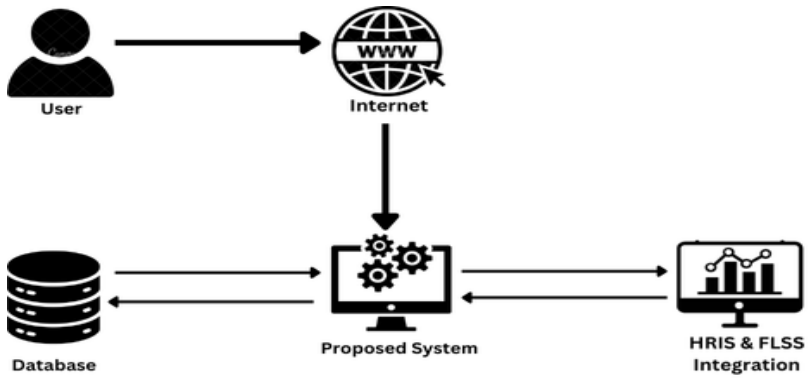

Figure 3. System Architecture

This illustration depicts the interaction between users (faculty members, Director or Dean and administrative staff) and the proposed Faculty Academic Requirements Management System with integration in HRIS and FLSS. Users access the system via the internet. The system interfaces with a database to manage academic requirement data,

enhancing its functionality. The database ensures that all necessary information is properly stored and managed, and it provides capabilities for academic record management. Faculty members and administrative staff can efficiently access and manage academic requirements through this centralized system.

Integration with FESR

The FESR OAuth implementation provides a secure and standardized authentication mechanism for integrating with the Faculty Academic Requirements Management System (FARM). Leveraging the OAuth 2.0 protocol, it ensures secure user authentication, authorization, and seamless data exchange. The integration supports real-time faculty data synchronization and prioritizes security and scalability through tokenized communication and robust consent management.

FESR O-AUTH TECHNICAL OVERVIEW

1. Authentication Flow:

o The process begins when a faculty user initiates login via the FARM Frontend, which redirects them to the FESR login page. The redirection includes the client_id, redirect_uri, and state parameters, ensuring secure and traceable communication.

o After the user enters valid credentials, the FESR Backend authenticates the user and generates an authorization code, which is returned to the FARM Backend.

2. OAuth Token Exchange:

o The FARM Backend exchanges the authorization code for an access token by sending a request to the FESR Backend, including the client_secret for secure verification.

o Upon successful verification, the FESR Backend returns an access token along with the faculty user's data.

3. Data Synchronization:

o The faculty data retrieved during the token exchange is processed by the FARM Backend and stored in the system. A session token is generated to enable user access to the FARM system.

o To maintain data consistency, subsequent updates to faculty information in the FESR are sent to the FARM via webhooks. These webhooks are signed with a shared secret to ensure integrity and authenticity.

4. Security and Scalability:

o OAuth 2.0 ensures secure authentication by isolating access token handling and relying on encrypted communication channels.

o The shared secret used in webhook signatures adds an additional layer of security by validating the origin and content of webhook requests.

o The modular architecture supports scalability, allowing new features or systems to integrate without significant redesign.

Integration with FLSS

The integration between the Faculty Load Scheduling System (FLSS) AND THE Faculty Academic Requirements Management System (FARMS) ensures secure and efficient delivery of course schedule data through a RESTful API. This integration leverages real-time data retrieval, robust security measures, and structured JSON responses to maintain data accuracy and synchronization. Scalable architecture and detailed error handling make this integration reliable and effective.

FARMS API CALL TECHNICAL OVERVIEW

1. Real-Time Data Delivery

· Course schedules are retrieved dynamically from the FLSS backend whenever FARMS requests them. This eliminates the need for manual synchronization, ensuring schedules are always accurate and up-to-date.

2. Secure Authentication

· HMAC (Hash-based Message Authentication Code) middleware authentication requests using a shared secret.

3. Optimized Data Retrieval

· Efficient queries fetch active semester schedules, joining faculty, courses, and additional details. This reduces database load while ensuring accurate data delivery.

4. Structured Data Response

· Course schedule data is formatted into a JSON response, grouped by faculty. Each schedule includes details such as academic year, semester, day, time, room, and course-specific information.

5. Error Handling

· Specific error responses guide FARMS in managing potential issues:

§ 404: No active semester or schedules found.

§ 401: Invalid HMAC signature.

§ 500: Internal server errors.

6. Scalability

The system handles high request volumes efficiently using asynchronous request processing and optimized database operations.

3.5.1 System Flowchart

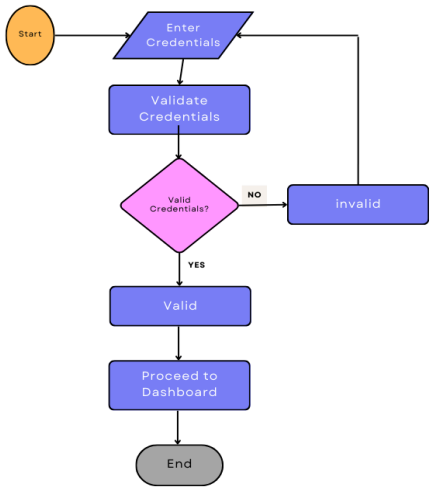

Figure 4. Flowchart for authentication

This flowchart illustrates how the module handles user login. It begins with the user entering their credentials. The module then verifies these credentials, likely by referencing a database of authorized users. If the validation is successful, the user is granted access to the system, often depicted as a dashboard. Conversely, if the credentials are invalid, access is denied, and the process concludes.

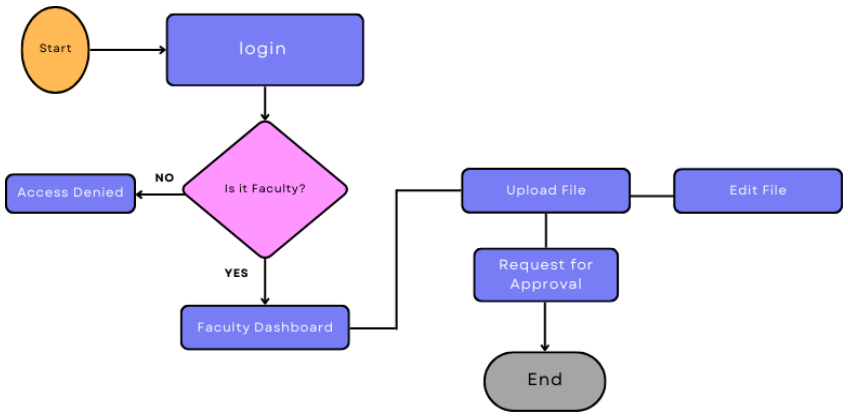

Figure 5. Flowchart for faculty

This flowchart outlines how the module serves faculty members. It begins with the user logging in using the credentials that came from integration with HRIS. The system will then validate whether the user is a faculty member or an administrator. If the validation is unsuccessful, access is denied. Upon successful verification, the user is directed to the faculty dashboard. This dashboard acts as a launchpad for various functionalities, such as uploading and editing files. The flowchart also indicates that faculty members can initiate approval requests, although the specific nature of these requests is not detailed.

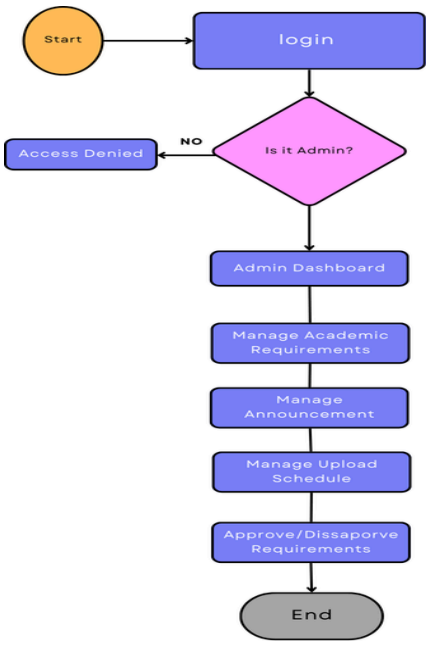

Figure 6. Flowchart for admin

This flowchart illustrates how the administrative module grants access and functionalities to authorized users. After logging in using the credentials that came from integration with HRIS, admins can review the

academic requirements and announcements and approve or disapprove the submitted files from faculty.

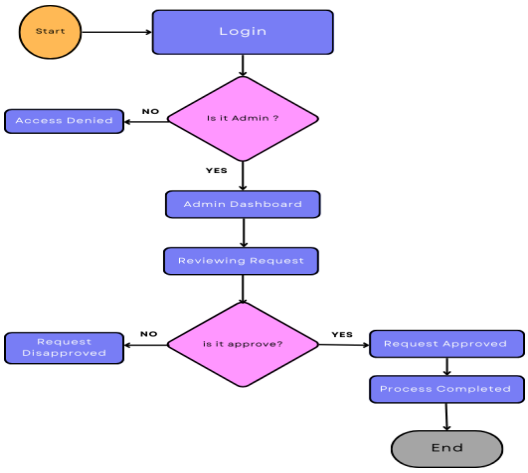

Figure 7. Flowchart for admin's request approval

This flowchart provides a visual guide for administrative staff navigating the request approval process within the module. It outlines the steps involved in reviewing submitted requests, including the ability to grant or deny them based on specific criteria.

3.5.2 Entity Relationship Diagram is a visual representation of data within a system. It shows the different entities (like objects or concepts) that you want to store information about, and the relationships between them.

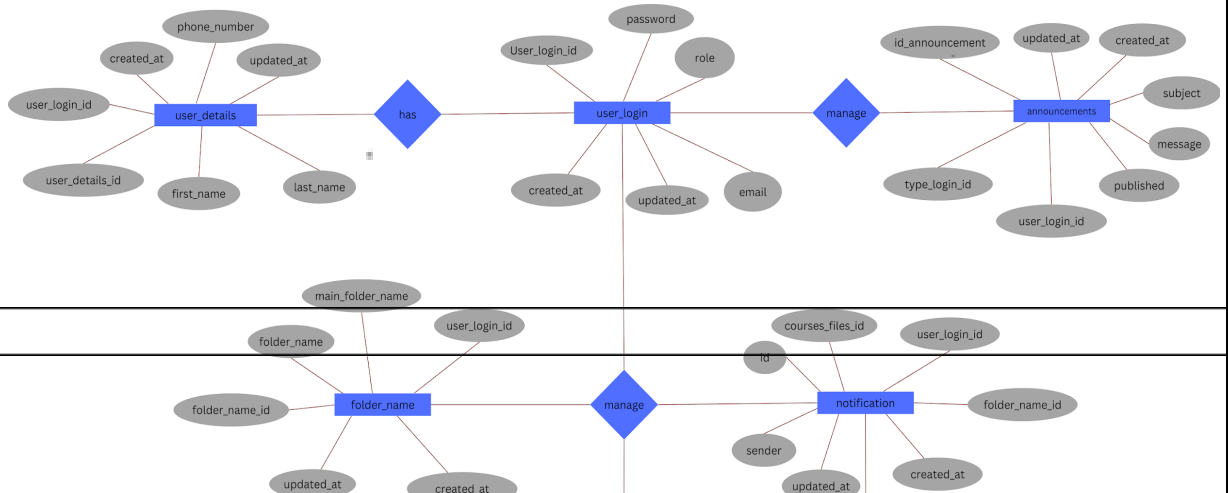

Figure 8. ERD of PUP-T FARM System

This Entity-Relationship Diagram (ERD) outlines the database structure for a system that manages faculty-related activities, including announcements, course files, and user management. The key entities in the diagram are:

1. **Announcements**: This table stores information about announcements, including the deadlines, and reminders.
2. **Courses Files**: This entity manages the files associated with courses. It includes information like the file name, semester, status, and links to the user who uploaded the file and the folder it belongs to.
3. **Folder Name**: This table organizes files into folders, storing details about folder names and their associated user.

4. **Notifications**: This entity handles system notifications, recording messages sent to users, who sent them, and whether the notifications have been read.
5. **User Details**: This table stores personal information about users, such as their first and last names, and phone numbers, with a link to their login credentials.
6. **User Login**: This table contains the login credentials for all users, including their email, password, and role within the system (e.g., admin, faculty, director).

Each table is interconnected through foreign keys, ensuring that data remains consistent and relationships between different pieces of information are maintained. For example, announcements are tied to the user who created them, and files are linked to both the user and the folder they belong to. The diagram provides a clear overview of how data is structured and related in the system. This structured system aims to improve efficiency, security, and accuracy in managing academic documentation.

3.6 Functional Specifications

This section includes the system boundaries of the proposed system which are shown through a use case diagram.

1.6.1 System Boundaries

The PUP-Taguig will employ the Faculty Academic requirements management system, utilizing data and processes compiled by the group. This system is designed to handle administrative tasks and manage details and transactions for both administrators and professors. Use-case diagrams were a vital tool in helping developers define the requirements for the system. It provides insight into how each subsystem communicates and outlines the necessary flow of transactions.

3.6.2 Use Case Diagram

In the educational context of PUP-Taguig, our use case diagram illustrates streamlined interactions within the Faculty Academic Requirements Management System, promoting an efficient and collaborative environment.

1. **Faculty members** - Use the system to manage their academic requirements by logging in to access the functionalities securely. They can upload, access, download, update, and delete syllabi, instructional materials, and other academic documents, ensuring that all necessary materials are available in a centralized location and kept up to date.

2. **Administrative staff** - Focus on oversight and management. She will log in to access all academic requirements, review

submissions, download documents for record-keeping, approve or disapprove, and generate report the submissions based on their review. Admins can also add new academic requirements, allowing the system to adapt to changing needs.

3. **Director/Dean -** Focus on oversight. She will log in to access all academic requirements, download documents, and generate reports for record-keeping.

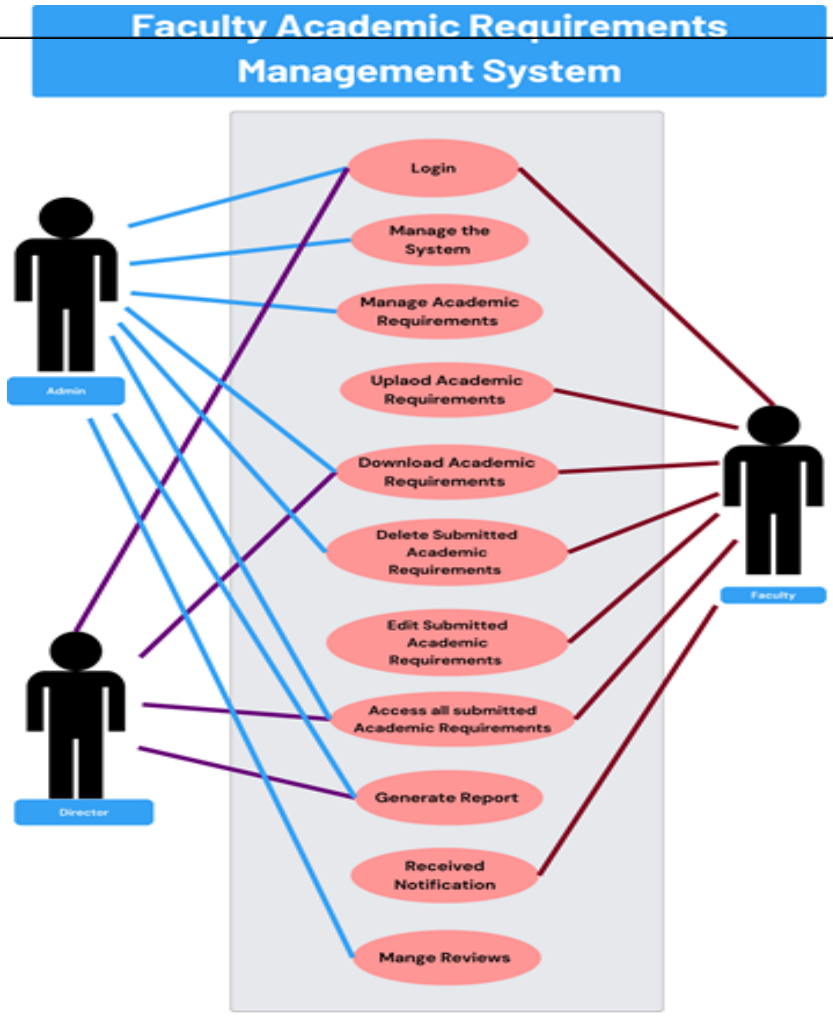

Figure 9 Use Case Diagram

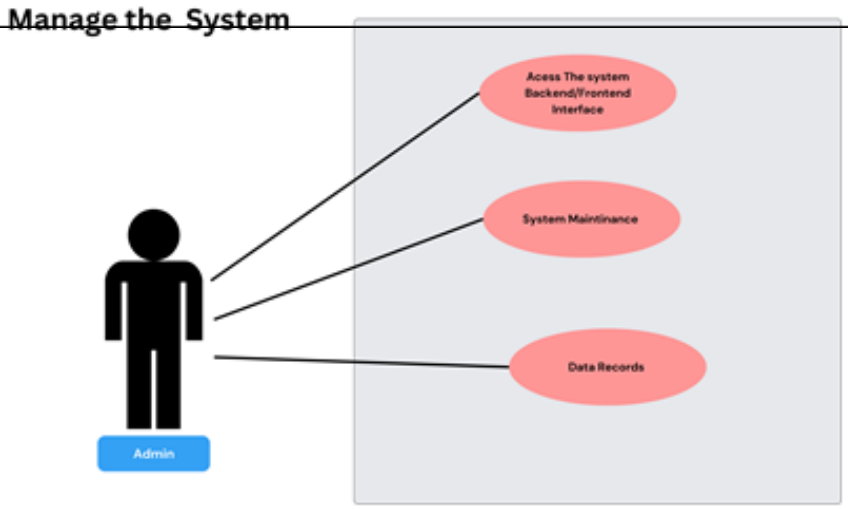

Figure 10. Use Case Diagram for Admin System Management

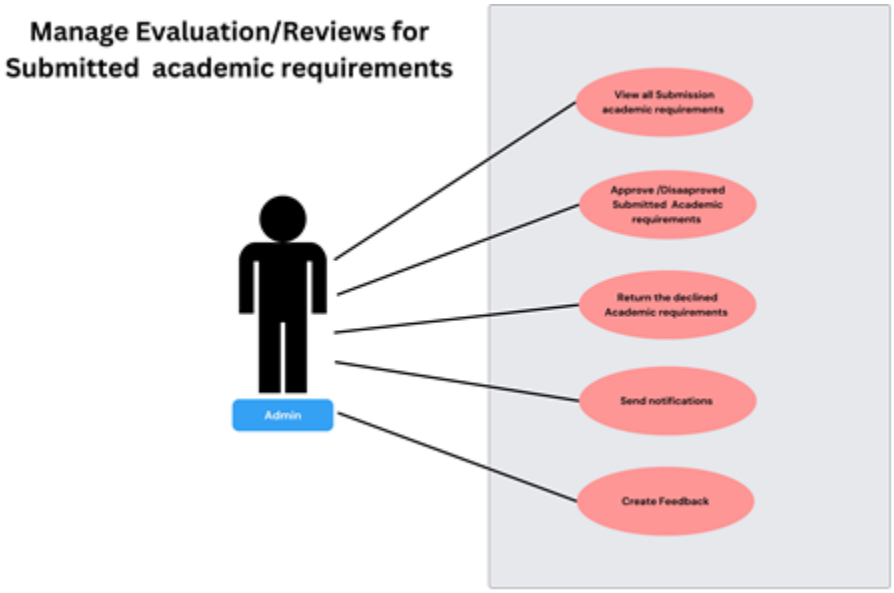

Figure 11. Use Case Diagram for Admin: Managing Evaluations and Reviews

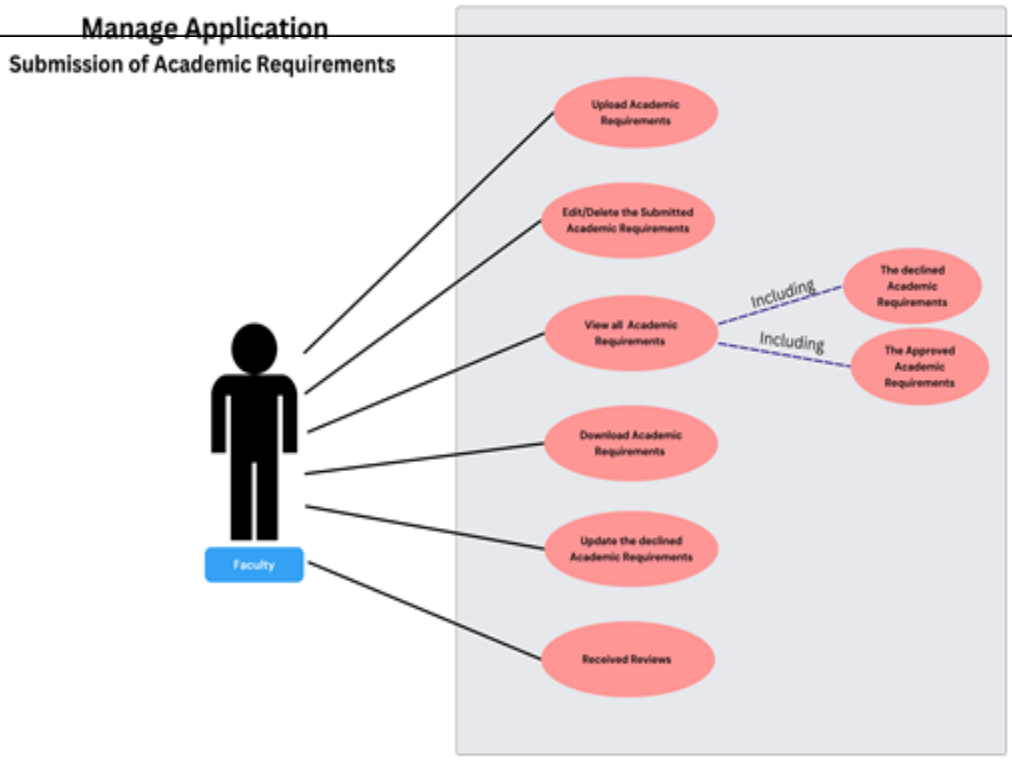

Figure 12. Use Case Diagram for Faculty: Managing Academic Requirement Submissions

3.7 System Development Methodology

In the Agile System Development Life Cycle (SDLC), the process begins with the Requirement phase, where necessary data and client requirements are gathered. It consists of cycles or sprints that repeat, where each cycle includes Requirements, planning, construction, testing, deployment, and review. The team can adjust in each cycle based on feedback and changes in requirements. This is followed by the Planning phase, during which detailed project plans are created. The Construction phase involves developing the system based on these plans. Next, the Testing phase ensures the system's functionality through various testing methods, including functional, user acceptance, and end-to-end testing. After successful testing, the system enters the Deployment phase, where it is

implemented and made operational. Finally, the Review phase involves collecting feedback from clients and target users for continuous improvement, ensuring the system evolves to meet changing needs effectively.

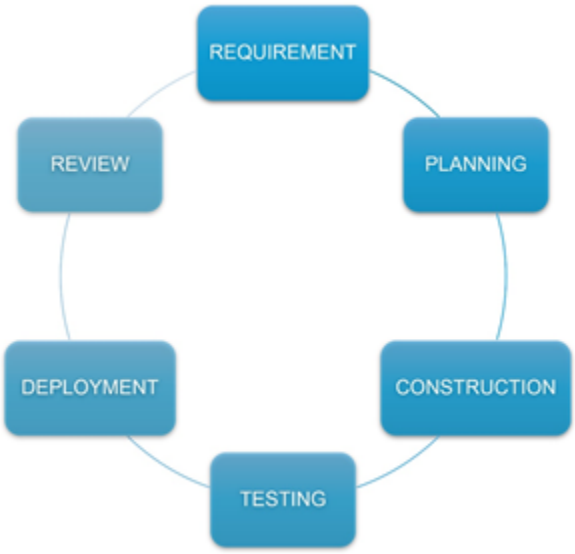

Figure 13. Agile Methodology

Review of Documents:

Verify that the documentation aligns with the system's functions and requirements.

Thoroughly read and review all relevant documents. Check the sources of information used in the documentation. Ensure the accuracy and consistency of all data involved. Documentation accurately reflects the system's requirements and functionality.

Code Review:

Identify and rectify any oversights made during the initial development phase to prevent unstable code. Conduct systematic reviews of the codebase. Identify and correct any errors or inefficiencies. Ensure adherence to coding standards and best practices. Improved code quality and stability, reducing the risk of issues in the system.

System Testing:

Ensure that the system meets the specified requirements outlined in the documentation and operates smoothly as intended. Write detailed test cases to cover all features and functionalities of the system. Execute test cases to validate each feature.

Perform various types of testing, including functional testing, integration testing, performance testing, and user acceptance testing. Confirmation that the system functions as required and is free of defects, ensuring a smooth user experience.

Requirements Phase

The Requirements Phase is the foundational phase of the application development process, where the essential requirements are gathered. During this phase, the researchers collected crucial information regarding the content and

processes that users, particularly faculty members and administrative staff, wish to see implemented in the system. This was achieved through interviews and consultations with the Head of the Academic Program at the Polytechnic University of the Philippines - Taguig.

Environment.

Locale. The system will be deployed online, ensuring that users can access it from anywhere with an internet connection. This online accessibility will guarantee that faculty academic requirements and related information are readily available to all stakeholders, particularly to the Administrative Staff and Faculty Members.

Planning Phase

It is the second phase of the systems development life cycle. In this phase, the team members are identified, resources are allocated, and time sprint for the project are discussed. The researchers also included in this phase some analysis such as the fishbone diagram, for the plotting of the cause and effect of a certain event in conducting the study.

3.7.1 Operational Feasibility.

Fishbone Diagram. The fishbone diagram shows the factors that are causing the problem. These factors arrive at a certain effect in the process of the current system.

Using this diagram, the researchers can arrive at a proposed process to make the process easier.

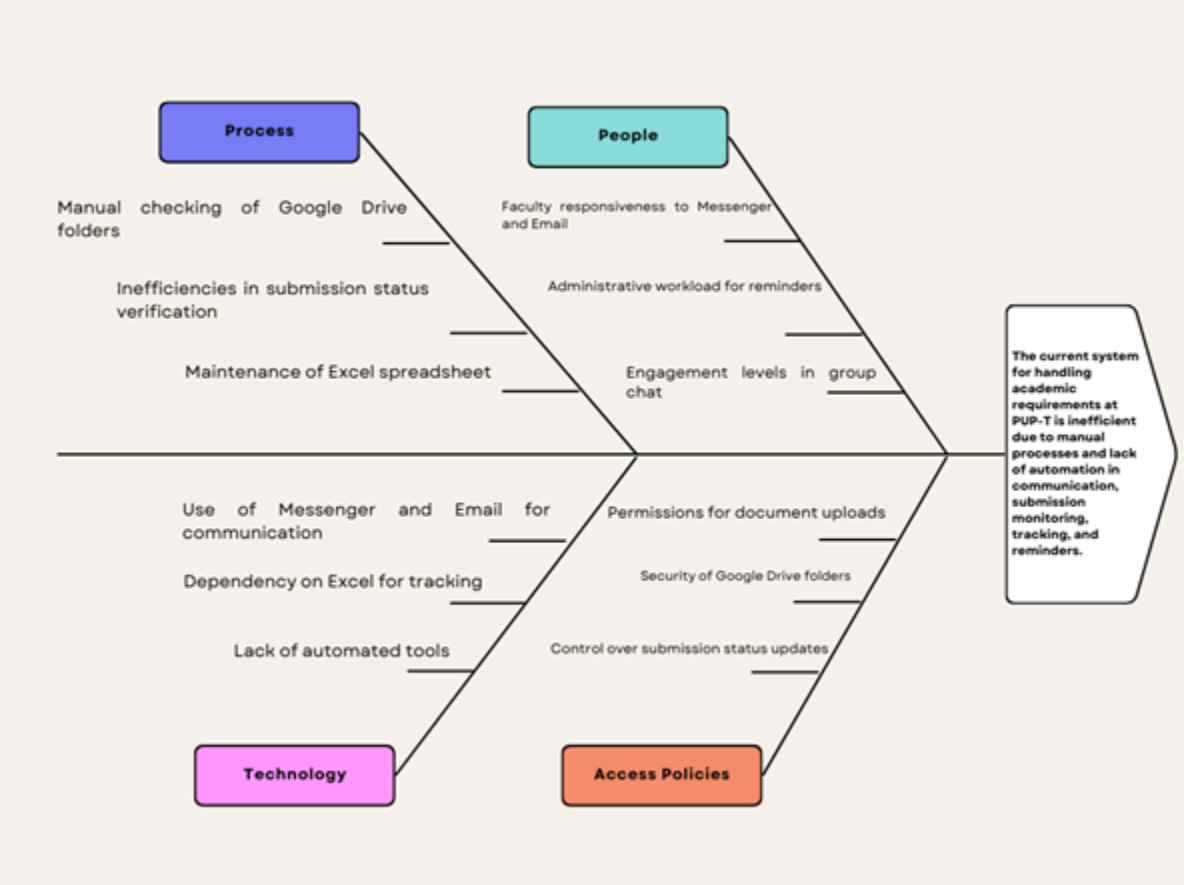

Figure 14. Fishbone Diagram

Functional Decomposition Diagram. The functional decomposition diagram shows the functions of the system. In this diagram, there are two majors services.

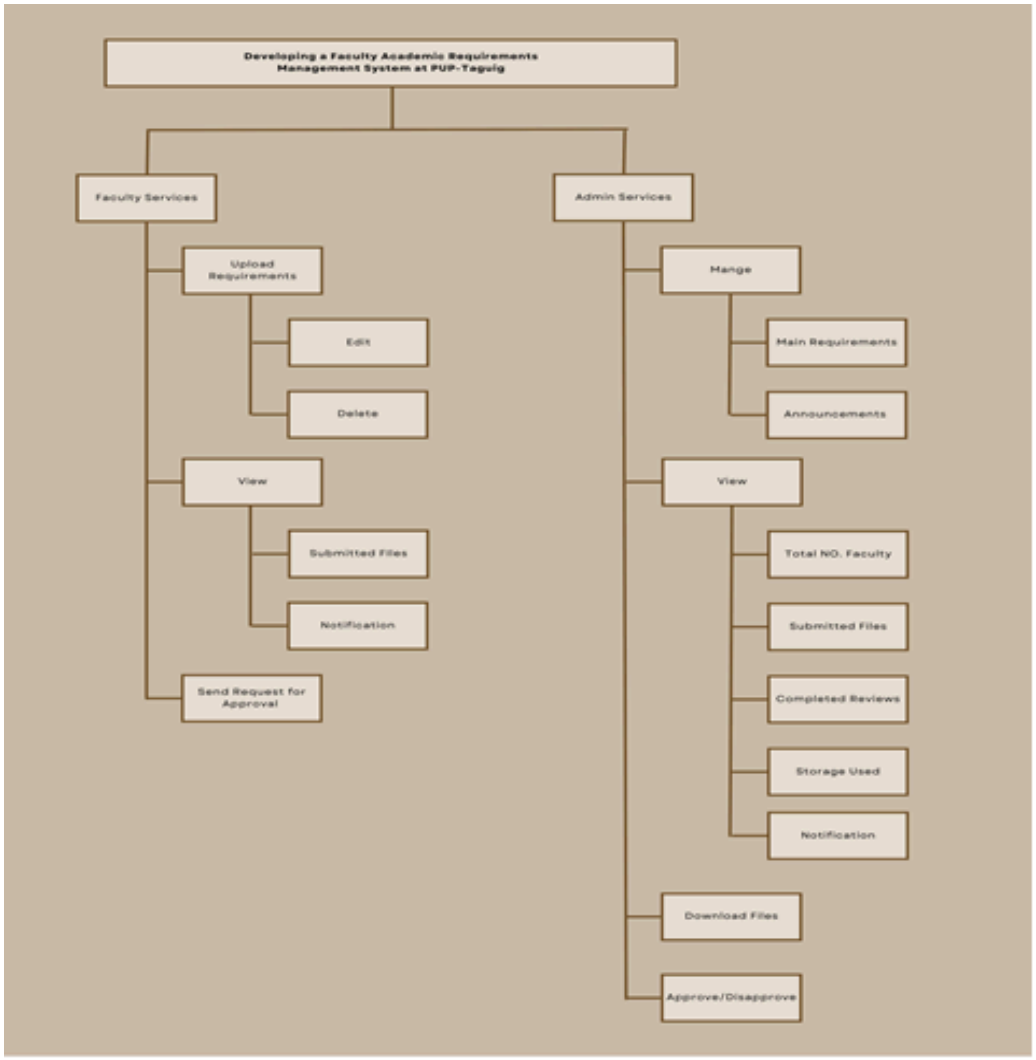

Figure 15. Functional Decomposition Diagram

This Gantt Chart visually plans and tracks the project schedules of the FARM System. It shows tasks on a timeline, with bars representing their duration and position indicating start and end dates.

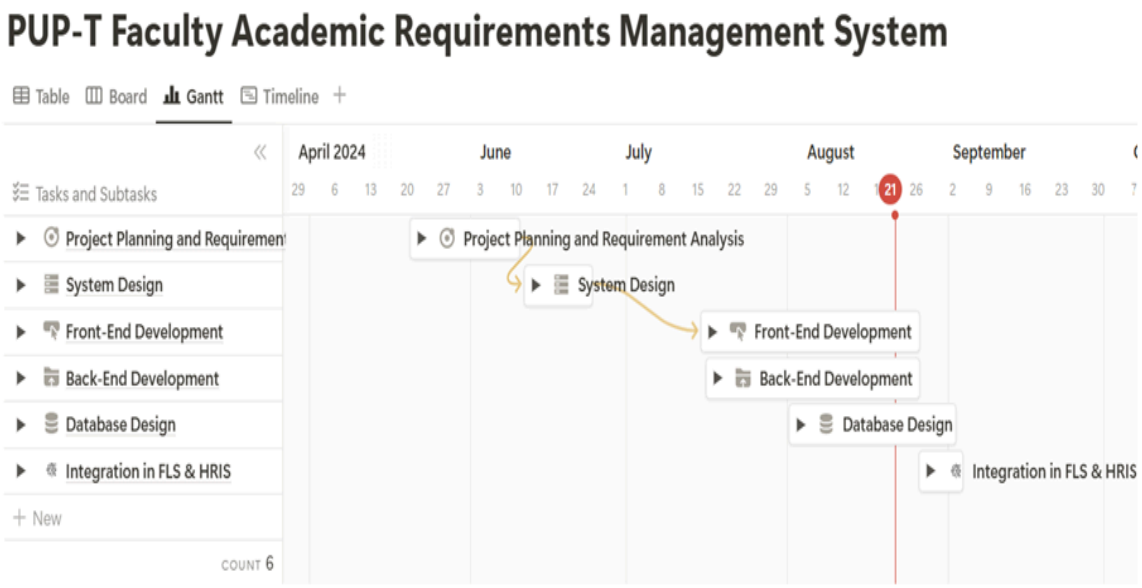

Figure 16. Gantt Chart

Development Tools

The Faculty Academic Requirements Management System will primarily utilize PHP, HTML, and CSS for programming, providing a flexible and well-designed application. MySQL is employed as the relational database system to manage data efficiently. Frameworks and libraries like Laravel and Bootstrap will be used to create responsive and attractive web applications. Visual Studio Code will serve as the development environment, integrated with GitHub for version control to enhance collaboration, track changes effectively, and manage code seamlessly.

XAMPP will be used as the local server environment, and Google Chrome as the web browser for testing and deployment.

PROGRAMMING LANGUAGES	HTML, CSS, PHP
INTEGRATED DEVELOPMENT ENVIRONMENT	VISUAL STUDIO CODE
FRAMEWORK AND LIBRARY	LARAVEL BOOTSRAP
RATIONAL DATABASE MANAGEMENT SYSTEM	PHP MYSQL
SERVER	XAMPP
VERSION CONTROL REPOSITORY	GITHUB
WEB BROWSER	CHROME

CHAPTER 4
RESULTS AND DISCUSSION

This chapter presents the results of the testing, quality assessment, and evaluation plan for the **Faculty Academic Requirements Management System (FARMS)** at PUP Taguig. The research aims to develop and implement a system that streamlines the management of faculty academic requirements. The evaluation process was based on feedback collected during the testing phase, with participants including faculty members, the Director of the School, and the Head of Academic Programs. Their insights were analyzed to assess the system's effectiveness, functionality, and overall user satisfaction.

NUMERICAL RATING	RANGE OF MEAN SCORE	INTERPRETATION
1	1.00 – 1.79	Strongly Disagree
2	1.80 – 2.59	Disagree
3	2.60 – 3.39	Neutral
4	3.40 – 4.19	Agree
5	4.20 – 5.00	Strongly Agree

The user acceptance test questions were based on the ISO 25010 quality plan, which compromises the following criteria: Functional Suitability, Reliability, Performance Efficiency, Usability, Security, Compatibility, Maintainability, and Portability. These characteristics were evaluated by the respondents using a series of designed survey questions. To analyze the outcomes of the system performance during the testing phase, the researchers used the following approach for Central Tendency or Mean computation.

Central Tendency/Mean

The mean is the average of all the survey responses. It is calculated by adding up the scores given by respondents using the Likert Scale and dividing by the total number of responses. The formula for obtaining the mean is as follows:

Equation 1. Formula for Mean

$$\bar{X} = \frac{\sum X}{N}$$

Where:

X = mean
∑ = sum of
X = data points
N = total number of respond

Table 38. Likert Scale Numerical Rating and Interpretation

To assess the quality and performance of the Faculty Academic Requirements Management System, test procedures were conducted using the ISO 25010 model. The test findings are as follows:

A. FUNCTIONAL SUITABILITY			
Indicators		**Mean**	**Verbal Interpretation**
Completeness	**PUPT FARMS meets all specified task and user objective (Natutugunan ng PUPT FARMS ang lahat ng tinutukoy na mga gawain at mga layunin ng**	4.74	Strongly Agree

	gumagamit.) *tinutukoy na mga gawain at mga layunin ng gumagamit.)*		
Correctness	**PUPT FARMS provides the correct results with the needed level of precision.** *(Nagbibigay ang PUPT FARMS ng tamang resulta sa bawat aksyon na ginagawa ng gumagamit.)*	4.65	Strongly Agree
Appropriateness	***PUPT FARMS facilitates the accomplishment of specified tasks and objectives.*** *(Napapadali ng PUPT FARMS ang pagkamit ng bawat gawain ng gumagamit.)*	4.22	Strongly Agree
Overall Mean		**4.54**	**Strongly Agree**

Table 39. Functional Suitability Testing of the PUPT FARMS

The survey results for Functional Suitability, as shown in Table 39, demonstrate a strong positive perception of the PUPT FARMS, with an overall mean score of 4.54 ("Strongly Agree"). Respondents strongly agreed that the system exhibits Completeness (4.74), Correctness (4.65), and Appropriateness (4.22). These scores indicate that the system successfully fulfills its objectives of automating faculty academic requirements management system. While challenges were encountered during development, such as ensuring accurate implementation of complex scheduling rules, the high ratings, particularly in Completeness and Appropriateness, affirm that the PUPT FARM effectively addresses user needs and provides accurate results, ultimately streamlining the faculty academic requirements management system.

B. PERFORMANCE EFFICIENCY		
Indicators	**Mean**	**Verbal Interpretation**

Time Behavior	***When performing its functions, PUPT FARMS meets the requirements of the response, processing times.*** *(Kapag isinasagawa ang gawain, natutugunan ng PUPT FARMS ang mga kinakailangan ng mga oras ng pagtugon at pagproseso.)*	4.57	Strongly Agree
Resource Utilization	***When performing its functions, PUPT FARMS meets the requirements of the amount types of resource used.*** *(Kapag isinasagawa ang gawain, natutugunan ng PUPT FARMS ang mga kinakailangan ng mga halaga at uri ng mga mapagkukunan na gamit.)*	4.65	Strongly Agree

Capacity	***PUPT FARMS parameter limit meets the requirements.*** *(Ang limitasyong parameter ng PUPT FARMS ay nakakatugon sa mga kinakailangan.)*	4.43	Strongly Agree
Overall Mean		**4.55**	**Strongly Agree**

Table 40. Performance Efficiency Testing of the PUPT FARMS

Table 40 presents the survey results for Performance Efficiency, revealing a strong positive perception of the PUPT FARMS, with an overall mean score of 4.55 ("Strongly Agree"). Respondents strongly agreed that the system demonstrates excellent Time Behavior (4.57), Resource Utilization (4.65), and Capacity (4.43). These findings indicate that the system meets its performance objectives, efficiently completing tasks within expected timeframes, using resources optimally, and handling the required capacity effectively. While challenges such as optimizing database queries for speed and ensuring efficient resource allocation were addressed during development, the high scores, particularly in Time Behavior and Capacity, underscore the system's successful performance in these critical areas.

C. COMPATIBILITY		
Indicators	**Mean**	**Verbal Interpretation**

Co-existence	***PUPT FARMS can perform its required functions efficiently while sharing common environment and resources without detrimental impact.*** *(Nagagawa pa rin ng maayos ng PUPT FARMS ang mga tungkulin nito kahit na may pagbabahagi ng nagaganap sa iba't ibang environment at mapagkukunan ng walang masamang epekto.)*	4.83	Strongly Agree

Interoperabilit y	***PUPT FARMS can exchange information and use the information that has been exchanged****. (May kakayahan ang PUPT FARMS na makipag palit ng impormasyon at gamitin ang mga impormasyon pinagpalit.)*	4.65	Strongly Agree
Overall Mean		**4.74**	**Strongly Agree**

Table 41. Compatibility Testing of PUPT FARMS

Table 41 presents the survey results for Compatibility, revealing a strong positive perception of the PUPT FARMS with an overall mean score of 4.83 ("Strongly Agree"). Respondents strongly agreed that the system demonstrates effective Co-existence (4.24) and Interoperability (4.65). These findings indicate that the system successfully achieves its objectives of integrating with existing university systems and sharing resources without conflicts. While challenges were encountered during development, such as ensuring seamless data exchange and preventing interference with other systems, the high scores, particularly in Interoperability, highlight the system's ability to function effectively within the university's existing technological environment.

D. USABILITY

Indicators		Mean	Verbal Interpretation
Appropriateness Recognizability	***Users can recognize whether the PUPT FARMS is appropriate for their needs***. *(Malalaman ng mga gumagamit kung ang PUPT FARMS ay angkop para sa kanilang mga pangangailangan.)*	4.61	Strongly Agree

Learnability	***PUPT FARMS can be used by specific users to achieve specific goals of learning to use the application with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.*** *(Ang PUPT FARMS ay maaaring gamitin ng mga partikular na user upang makamit ang mga partikular na layunin ng pag-aaral na gamitin ang application ng may bisa, kahusayan sa kalayaan mula sa panganib at kaluguran sa isang partikular na konteksto ng paggamit.)*	4.74	Strongly Agree

Operability	***PUPT FARMS has attributes that make it easy to operate and control.*** *(Ang PUPT FARMS ay may katangian na nagpapadali sa pagpapatakbo at pagkontrol.)*	4.70	Strongly Agree
User Error Protection	**Protects users against making errors.** (Tinutulungan ang mga users sa mga maaaring magawang mali.)	4.43	Strongly Agree

User Interface Aesthetics	***The user interface of PUPT FARMS enables pleasing and satisfying interaction for the user.*** *(Ang user interface ng PUPT FARMS ay nagbibigay daan sa kasiya-siya at kalugod lugod na pakikipag-ugnayan para sa user.)*	4.78	Strongly Agree

Accessibility	**PUPT FARMS can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.** (Ang PUPT FARMS ay maaaring gamitin ng mga taong may pinakamalawak na hanay ng mga katangian at kakayahan upang makamit ang tinutukoy na layunin sa isang tinutukoy na konteksto ng paggamit.)	4.87	Strongly Agree
Overall Mean		**4.68**	**Strongly Agree**

Table 42. Usability Testing of PUPT FARMS

Table 42 presents the survey results for Usability, indicating a highly positive assessment of the PUPT FARMS with an overall mean score of 4.68 ("Strongly Agree"). Respondents strongly agreed that the system is easyto recognize as appropriate for one's needs (Appropriateness Recognizability - 4.61), simple to learn (Learnability - 4.70),

protects against user error (Operability - 4.70), has a visually pleasing interface (User Interface Aesthetics - 4.78), and is accessible to a wide range of users (Accessibility - 4.87. The lower score inUser Error Protection (4.43) suggests some areas for potential improvement in terms of simplifying certain operations or controls. Despite this, and challenges in designing an intuitive and user-friendly interface, the overall high scores demonstrate that the system is considered user-friendly, learnable, and accessible. These results confirm that the system has met its usability objectives, ensuring users can efficiently and effectively interact with the system.

E. RELIABILITY			
Indicators		**Mean**	**Verbal Interpretation**
Maturity	***PUPT FARMS meets the needs for reliability under normal operation.*** (Natutugunan ng PUPT FARMS ang mga pangangailangan para sa pagiging maaasahan sa ilalim ng normal na operasyon.)	4.74	Strongly Agree

Availability	***PUPT FARMS is operational and accessible when required for use.*** *(Ang PUPT FARMS ay gumagana at nagagamit kapag kinakailangan gamitin.)*	4.87	Strongly Agree
Fault Tolerance	***PUPT FARMS operates as intended despite the presence of hardware or software faults.*** *(Gumagana ang PUPT FARMS ayon sa layunin sa kabila ng pagkakaroon ng mga pagkakamali sa hardware o software.)*	4.57	Strongly Agree

Recoverability	***PUPT FARMS, in the event of an interruption or failure, can recover the data directly affected and re-establish the desired state of the system.*** *(Ang PUPT FARMS, kaganapan ng pagkaantala o pagkabigo, ay maaaring mabawi ang datos na direktang apektado at muling itatag ang nais na estado ng system.)*	4.48	Strongly Agree
Overall Mean		**4.67**	**Strongly Agree**

Table 43. Reliability Testing of PUPT FARMS

Table 43 displays the survey results for Reliability, showing a strong positive assessment of the PUPT FARMS with an overall mean score of 4.67 ("Strongly Agree"). Respondents strongly agreed that the system exhibits high Maturity (4.74), Availability (4.87), Fault Tolerance (4.42), and Recoverability(4.48). These results confirm the system's dependability and ability to operate consistently under normal conditions, handle faults effectively, and recover from interruptions. While challenges were encountered in ensuring consistent performance and developing

robust error handling mechanisms during the development phase. The high scores across all indicators, most especially in Availability, demonstrate that the system meets its objective of providing a reliable and stable platform for faculty academic requirements management system.

F. SECURITY			
Indicators		**Mean**	**Verbal Interpretation**
Confidentiality	***PUPT FARMS ensures that data are accessible only to those authorized to have access.*** *(Tinitiyak ng PUPT FARMS na ang datos ay magagamit lamang ng mga awtorisadong tao.)*	4.70	Strongly Agree

Integrity	***PUP-T FARMS stops unauthorized users from accessing or changing computer programs or data.*** *(Hinahadlangan ng PUP-T FARMS ang hindi awtorisadong paggamit o pagbabago ng mga computer program o datos.)*	4.83	Strongly Agree
Non-Repudiation	***PUP-T FARMS can be used to demonstrate its validity, preventing a later rejection of the activities or occurrences****. (Ang PUP-T FARMS ay maaaring gamitin upang ipakita ang pagka-epektibo nito at maiwasan ang rejection sa mga aktibidad o mga pangyayari.)*	4.74	Strongly Agree

Overall Mean	**4.76**	**Strongly Agree**

Table 44. Security Testing of PUPT FARMS

Table 44 outlines the survey results for Security, revealing a strong positive perception of the PUPT FLSS, reflected in an overall mean score of 4.76 ("Strongly Agree"). Respondents strongly agreed that the system demonstrates robust Confidentiality (4.70), Integrity (4.83), and Non-repudiation (4.74). These findings confirm that the system effectively protects sensitive data, prevents unauthorized access, and ensures accountability in operations. During development, incorporating secure authentication, and preventing unauthorized access were some of the challenges encountered. Despite this, the consistently high scores across all security indicators demonstrate that the system meets its objective of providing a secure platform for managing faculty academic requirements management system.

G. MAINTAINABILITY		
Indicators	**Mean**	**Verbal Interpretation**

Modularity	***PUP-T FARMS can be improved without producing faults or decreasing the quality of the result.*** *(Ang PUP-T FARMS ay maaaring mapabuti nang walang pagkakamali o pagbabawas sa kalidad ng resulta.)*	4.83	Strongly Agree
Modifiability	***PUP-T FARMS can change one element while having little impact on the other elements.*** *(Ang PUP-T FARMS ay maaaring mag-bago ng isang elemento nang hindi nakakaimpluwensya sa iba pang mga elemento sa system.)*	4.83	Strongly Agree
Overall Mean		**4.83**	**Strongly Agree**

Table 45. Maintainability Testing of PUPT FLSS

Table 45 highlights the survey results for Maintainability, indicating a positive evaluation of the PUPT FLSS with an overall mean score of 4.83 ("Strongly Agree").

Respondents agreed that the system exhibits Modularity (4.83) and strongly agreed on Modifiability (4.67), suggesting that the system's design allows for relatively easy updates and modifications. The ability to modify one element with minimal impact on others, a challenge during development to ensure, is a particularly strong point. While challenges were faced in creating a modular and easily modifiable system architecture, these results confirm that the system is designed for maintainability, meeting the objective of long-term adaptability and ease of updates. Both Modularity and Modifiability score, in particular, demonstrates the system's potential for future enhancements and its ability to adapt to evolving needs.

H. PORTABILITY			
Indicators		**Mean**	**Verbal Interpretation**
Adaptability	***The PUP-T FARMS can be moved to other environments.*** *(Ang PUP-T FARMS ay maaaring ilipat sa ibang mga lugar.)*	4.74	Strongly Agree

Replaceability	***PUP-T FARMS can replace another specified product for the same purpose in the same environment.*** *(Ang PUP-T FARMS ay may kakayahang palitan ang ibang produkto na mayroong parehong layunin sa parehong lugar.)*	4.57	Strongly Agree
Overall Mean		**4.66**	**Strongly Agree**

Table 46. Portability Testing of PUPT FARMS

Table 46 showcases the survey results for Portability, revealing a highly positive assessment of the PUPT FARMS with an overall mean score of 4.66 ("Strongly Agree"). Respondents strongly agreed that the system is highly Adaptable (4.74) and Replaceable (4.54). These scores signify that the system can be readily transferred to different environments and that components can be updated or replaced without significant issues. While challenges were encountered during development in making the system adaptable across different platforms, the results, particularly the high Adaptability score, affirm the system's successful design in this aspect. This meets the objective of ensuring the system's portability and its ability to function effectively in diverse settings.

I. OVERALL		
Indicators	**Mean**	**Verbal Interpretation**
I am satisfied with the performance of the PUP-T FARMS. *(Ako ay kuntento sa performance ng PUP-T FARMS.)*	4.70	Agree
The PUP-T FARMS helped eliminate problems that are caused by long lines and extended hours or days of document processing, making it a good replacement for manual processing. *(Ang PUP-T FARMS ay nakatulong na maalis ang mga problema na dulot ng mahabang pila at matagal na oras o araw ng pagproseso ng mga dokumento, kaya't ito ay isang magandang pamalit sa kasalukuyang sistema.)*	4.74	Strongly Agree
Overall Mean	**4.72**	**Strongly Agree**

Table 47. Overall Assessment of PUPT FARMS

Table 47 summarizes the overall assessment of the PUPT FARMS, revealing a positive perception from respondents with a mean score of 4.72 ("Strongly Agree"). Notably, respondents expressed strong agreement (4.70) that the system effectively addressed issues caused by previous templated inputs and serves as a valuable replacement for the old system. While satisfaction with the system's overall performance garnered a mean score of 4.72, indicating

general agreement, the higher score of 4.74 related to the system as a replacement shows that it has met a critical need and significantly improved upon the previous system. These findings, despite the challenges faced during development and implementation, affirm that the PUPT FARMS has largely achieved its objectives and is perceived as a successful and valuable tool by its users.

OVERALL RESULT		
Description	Mean	Verbal Interpretation
ISO 25010		
FUNCTIONAL SUSTAINABILITY	4.54	Strongly Agree
PERFORMANCE EFFICIENCY	4.55	Strongly Agree
COMPATIBILITY	4.74	Strongly Agree
USABILITY	4.68	Strongly Agree
RELIABILITY	4.67	Strongly Agree
SECURITY	4.76	Strongly Agree
MAINTAINABILITY	4.83	Strongly Agree
PORTABILITY	4.66	Strongly Agree
OVERALL MEAN	4.72	Strongly Agree

Table 48. Overall Result of the PUPT FARMS

In summary, the overall evaluation of the PUPT Faculty Academic Requirements Management System, based on ISO 25010 quality characteristics, indicates a highly positive assessment. The system achieved "Strongly Agree" ratings across all criteria, demonstrating exceptional performance in Functional Sustainability (4.54), Performance Efficiency (4.55), Compatibility (4.74), Usability (4.68), Reliability (4.67), Security (4.76), Maintainability (4.83), and Portability (4.66). The system's ability to meet objectives, operate efficiently, integrate seamlessly, provide a user-friendly experience, ensure data security, and adapt to different environments highlights its effectiveness and dependability. With an overall mean score of 4.72, the system has proven to be a reliable and efficient replacement for the previous process.

CHAPTER 5
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

Summary of Findings

The Faculty Academic Requirements Management System (FARMS) was subjected to a 15-day beta testing phase involving the Director, faculty members, and administrative staff at PUP Taguig. The system was evaluated using the ISO 25010 framework, which revealed favorable results across various quality characteristics. Functionality received a mean score of 4.54, indicating a high level of agreement on the system's completeness, correctness, and appropriateness. Performance efficiency, with a mean score of 4.55, highlighted the system’s ability to manage time behavior, resource utilization, and capacity effectively. Compatibility was rated at 4.74, signifying seamless co-existence and reasonable interoperability with other systems. The highest score, 4.83, was for maintainability, reflecting strong user satisfaction with the system's modification, reusability, and testability. Reliability scored 4.67, emphasizing the system’s maturity, availability, fault tolerance, and recoverability. Security achieved a mean score of 4.76, demonstrating robust integrity, confidentiality, accountability, and non-repudiation measures. Usability also scored 4.68, showcasing ease of appropriateness, learnability, user error protection, operability, user

design aesthetics, and accessibility, while portability was rated at 4.66, highlighting adaptability, install ability, and replaceability. Overall satisfaction was rated at 4.72, indicating strong agreement among users on the system's effectiveness and efficiency.

Conclusion

The FARMS system has demonstrated itself to be a highly effective and efficient tool for managing academic requirements at PUP Taguig. Through its high functionality, usability, and reliability, the system has proven to meet the diverse needs of its users, including faculty members and administrative staff. Its robust design and intuitive user interface ensure ease of use, while the secure framework guarantees the protection of sensitive academic data. The system's ability to streamline tasks, automate processes, and provide a centralized platform has significantly enhanced operational workflows, resulting in increased productivity and user satisfaction. Furthermore, its compatibility and maintainability allows for seamless integration with other systems and ensure that future updates and improvements can be implemented efficiently.

Despite these achievements, the study highlights a few areas for improvement to ensure the system's longevity and adaptability. Enhancing interoperability with additional external tools and platforms will allow the system to accommodate evolving institutional needs and integrate with broader digital infrastructures. Additionally, improving the system's recoverability will ensure greater resilience against potential failures, safeguarding the continuity of academic processes. Addressing these aspects will not only strengthen the overall performance of the FARMS system but also ensure its scalability and relevance in meeting the growing demands of PUP Taguig. By focusing on these enhancements, the FARMS system has the potential to become a benchmark for academic management systems in similar institutions.

Recommendation

To optimize the performance and adoption of the FARMS system, it is essential to focus on both technical and user-centered improvements. While the system has demonstrated high functionality and user satisfaction, addressing specific areas can further enhance its effectiveness and long-term usability. Prioritizing seamless integration with

existing and future systems will ensure the system remains adaptable and versatile. Additionally, providing adequate training for users will maximize their efficiency and confidence in using the system. Establishing a robust feedback mechanism will help maintain continuous improvement by addressing user concerns and identifying new opportunities for refinement. Reinforcing the system's security framework will safeguard sensitive data against emerging threats, ensuring trust and reliability. Finally, planning for scalability will guarantee that the system can handle increased demands and data volume without compromising performance or user experience.

- Enhance interoperability by enabling seamless integration with additional external platforms and tools.
- Provide training sessions for faculty and administrative staff to ensure effective and efficient system utilization.
- Establish a feedback mechanism to continuously monitor the system's performance and gather user input for iterative improvements.
- Strengthen security protocols to align with evolving cybersecurity standards, ensuring data integrity and confidentiality.
- Ensure scalability by adapting the system to accommodate future growth in user demand and data volume effectively.

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