P O L Y T E C H N I C U N I V E R S I T Y O F T H E P H I L I P P I N E S

Design and Development of *SALIKSIK*: A Digital Research Platform for Enhancing Academic Resource Access in PUPPQ Library

A Capstone Project

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Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

Academic institutions are necessary for the preservation and accessibility of research materials, whether in digital or physical forms, for students and faculty members. In this digital era, faculty, researchers, and students require reliable and comprehensive academic resources to effectively support their academic duties. The growing number of students and faculty at the Polytechnic University of the Philippines Parañaque City Campus (PUPPQ), increasingly reliant on timely and efficient access to scholarly materials, have put up an acute demand for a centralized, easy-to-use, and innovative digital research platform. Given that the conventional library systems were bound by physical access, outdated catalogs, and an array of digital services with ill-defined interlinkages, they now represent cumbersome structures for learners in search of quickly and easily accessible academic information.

However, traditional library systems often bring challenges with regard to user access, resource management, and overall accessibility. To address these issues, the proposal of designing and developing SALIKSIK, a digital research platform, aims to improve the accessibility and usability of academic resources in the Polytechnic University of the Philippines Parañaque City Campus (PUPPQ) libraries. The application of digital platforms in higher education identifies how these platforms support student learning while also highlighting the challenges associated with their use.

It stresses the necessity for digital literacy programs that will improve the use of these tools effectively. (Serworno 2024)

The Sustainable Development Goals (SDG), specifically SDG 4, Literary Quality Education, is based on the principle of education being made available to all so that there are better learning materials and outcomes and reducing differences in education. Its primary objective is to establish inclusive and equitable systems that can address challenges in both present and future times.

SALIKSIK will also have a series of important features, such as enhanced search capabilities, digital database integration, and an easy-to-use interface to make it easy to access academic material. The platform will offer real-time alerts on availability of resources and will have a digital borrowing system that allows users to ask for and manage books and other academic material easily. This system will aim to facilitate the borrowing process while ensuring enhanced tracking and accountability of library assets. This platform will also have an intelligent chatbot assistant that can respond to frequently asked questions (FAQ), thus providing timely assistance and improving the overall user experience.

The above also concurs with Budney (2019), who states that web-based platforms are the most potent tools for enabling research dissemination. These media carry messages to the audience who would ordinarily not be reached through personal channels of communication, hence awareness is built with this technique, and adoption of evidence-based practices (EBPs) may be encouraged. Digital dissemination techniques support traditional methods, making it more comfortable for stakeholders to access clear, actionable information and help in translating EBPs into real-world applications.

Knowing this, the launching of SALIKSIK is indeed a very significant step towards the modernization of the library system in PUP. The system is designed and implemented to suit emerging needs within the academic community and to create a more active and productive learning environment. It not only provides students and faculty easier access to academic resources but also leads to a more orderly and user-friendly method of obtaining such resources, thus improving research capability and enhancing the quality of education at the Polytechnic University of the Philippines Parañaque City Campus.

Theoretical Framework

The theoretical framework used in this study aims to provide information to visualize and utilize related processes, specifically focusing on the process of Academic Resource Access. The theories utilized throughout the study are as follows:

Unified Theory of Acceptance and Use of Technology (UTAUT)

1. The relationship of this theory to the study demonstrates that user acceptance of technology is influenced by four key factors. In other words, the relevance of this work to the Unified Theory of Acceptance and Use of Technology (UTAUT) cuts through how user acceptance and actual use of technology are influenced by four critical factors.(Marikyan & Papagiannidis, 2021). UTAUT thus serves as a theoretical foundation on which to ground the research with a structured framework on how to analyze the adoption and use of SALIKSIK: A Digital Research Platform

for Enhancing Academic Resource Access at the Polytechnic University of the Philippines - Parañaque City Campus Library. This model consists of four key constructs of the usage-intention behavior among users: Performance Expectation, Effort Expectation, Social Influence, and Facilitating Conditions. Performance Expectancy is the assumption by users made regarding SALIKSIK's contribution to improving their research efficiency and productivity in terms of academic output. Effort Expectancy is how easy and user-friendly the platform is perceived to be. Social Influence is how encouragement or expectations from peers, instructors, and institutional authorities would have impacted a user's decision to go for a certain system. Facilitating Conditions include the availability of resources and support, including access to devices and internet connectivity, and user assistance, enabling and restricting the usage of the system. This study aims to use UTAUT to analyze the connectivities of students, faculty members, and library staff to SALIKSIK, in order to establish the really critical factors that would make for successful application and continuous use in the academic environment. Having employed this model, the study is set to assess the platform quality, utility of academic-related content in terms of its accuracy, quality of user support, measure user involvement, satisfaction levels, and benefits-contribution to the individual academic community. This guarantees full examination on how SALIKSIK responds to the demands of students, faculty, and library staff.

Information System Success Model (ISSM)

The Information System Success Model (ISSM) was pioneered by DeLone and McLean in 1992 and modified in 2003, and it stands as a very strong basis for evaluating the effectiveness and impact of information systems.(Dirgantari et al., 2020). The model identifies six interrelated dimensions contributing to system success: System Quality, Information Quality, Service Quality, Use or Intention to Use, User Satisfaction, and Net Benefits. System Quality relates to the technical performance of the system, which includes usability, reliability, and efficiency (Sarwosri Sarwosri et al., 2023). Information Quality refers to the relevance, accuracy, and timeliness of the information that the system provides. Service Quality refers to the quality of services provided to users, such as technical assistance or user documentation.(Li et al., 2021). Use or Intention to Use measures the extent to which the user actually engages with the system versus the intention to engage with it, whereas User Satisfaction is overall user satisfaction in terms of experience with the system, including contentment with its functionality. Moreover, Net Benefits are those that are favorable outcomes through which productivity is enhanced, information accessibility is improved, and decision-making is guided by the system. Considering this research, which is about developing SALIKSIK: A Digital Research Platform for Enhancing Access to Academic Resources at the Polytechnic University of the Philippines – Parañaque Campus, ISSM serves as a very good framework for evaluating the system's effectiveness.

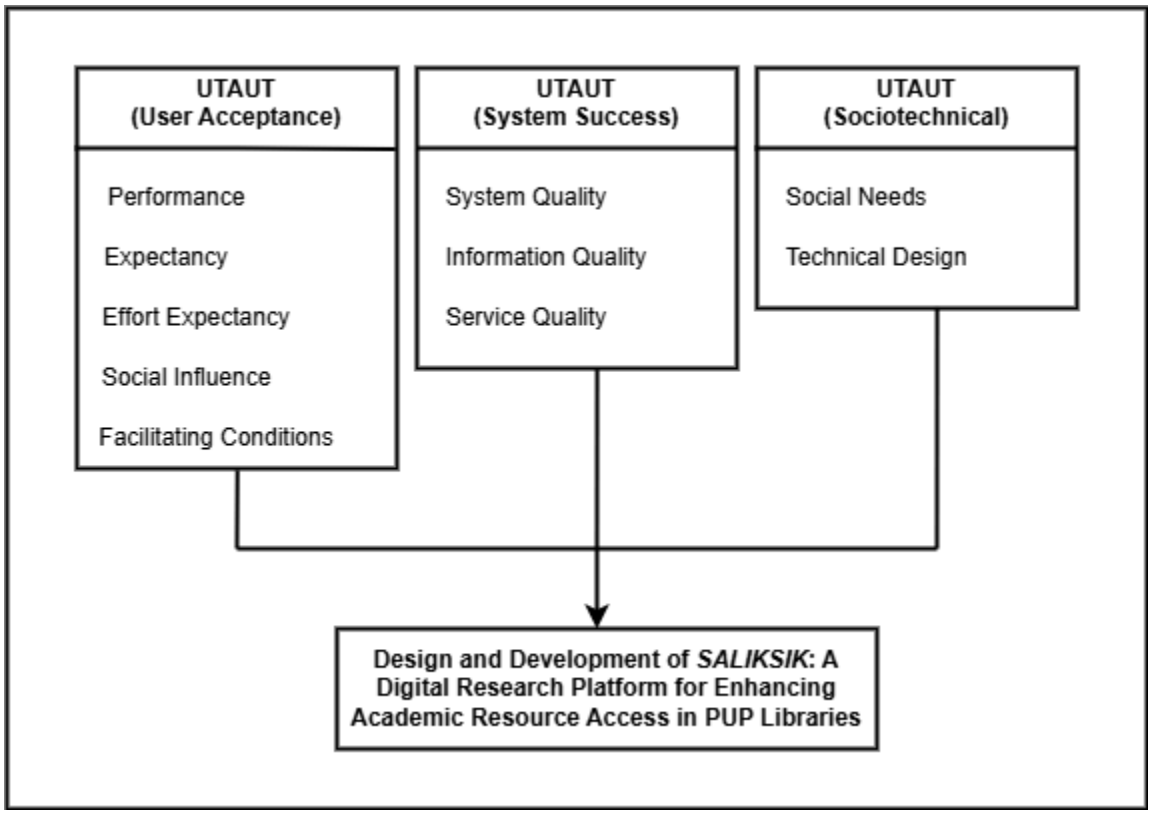
Sociotechnical Systems Theory (STS)

The STS-oriented approach combines technological factors with human and organizational context, thus creating a balanced system that is adaptive to changing environmental conditions. Pertaining to this study, the development of SALIKSIK: A Digital Research Platform for Enhancing Academic Resource Access at PUP – Parañaque City Campus follows the STS pattern because the platform must work well on a technical level while supporting the workflows, behaviors, and collaborative needs of students, faculty, and library staff. This theory stresses the necessity of incorporating end-users into the design while adopting a broader perspective to the context of the organizational environment, thus ensuring technology adoption and impact in the long run. As a theory, Sociotechnical Systems Theory (STS) places great emphasis on the interaction of the social and technical parts of an organization or system with a view to different systems. For STS, it must complement the technical activities-for example, tools, technologies, and processes-to function and find its place in any system with that social component, namely, people, roles, culture, and communications.

Conceptual Framework

The conceptual framework applied in this study was the unified UTAUT-ISSM-S-Curve. This framework has emphasized the importance of models related to technology acceptance, utilization, and success for students and Faculty, while incorporating socio technical considerations and the stages of technology adoption. Using essential metrics from each of the four theories identified, the new framework provides a comprehensive method for understanding users.

Figure 1. Unified UTAUT-ISSM Conceptual Framework



The intent of this research was to inform the design and development of SALIKSIK: a Digital Research Platform for Access to Academic Resources in PUP Libraries using the integrated conceptual model that combined the Unified Theory of Acceptance and Use of Technology (UTAUT), Information System Success Model (ISSM), and Socio-technical System (STS) Theory. The UTAUT model offered the platform for user acceptance analysis with four main determinants guiding the analysis: Performance Expectancy, which concerns the users' belief about what extent the platform can help improve their academic performance; Effort Expectancy, which deals

with how easy the platform is perceived to use; Social Influence, concerning peer and institutional encouragement; and Facilitating Conditions, which evaluate whether adequate support and resources are provided to help in usage. These four factors can predict the behavioral intention and actual use of SALIKSIK by students, faculty, and library staff.

To complement this, ISSM is used to assess how well the platform worked or its impact, after the platform has been put into operation. The model emphasizes System Quality, which is about the technical functioning and interface design of SALIKSIK; Information Quality, which relates to the relevance, accuracy, and comprehensiveness of the academic content provided; and Service Quality, regarding the responsiveness and reliability of user support services.The particular combination of these parameters is decisive for the measuring of user satisfaction relative to the platform and the contributions of that platform to academic productivity and research quality.

Another important dimension provided by STS is the relation between human and technical components. This theory holds that successful digital platforms must give equal design consideration to issues of technical design and social needs. For SALIKSIK, this means that the system's architecture, interface, and functions should coherently complement the collaborative and research habits of the intended users. Equally, it stresses the involvement of stakeholder groups in the design process-so that system usability, relevance, and sustainability will be enhanced.

The set of three theories brings a synergy that ensures that SALIKSIK's development will be technically sound while user-centered, organizationally supported,

and socio-culturally responsive. Thereby, this integrated approach will increase the chances of SALIKSIK's long-term acceptability, practical significance, and positive impact on education within the Polytechnic University of the Philippines – Paranaque City Campus.

Statement of the Problem

The accessibility of reliable, relevant, current academic materials is essential for quality research, effective teaching, and the advancement of student learning in higher education. However, at the Polytechnic University of the Philippines Parañaque City Campus (PUPPQ), substantial barriers remain for students and faculty in the effective locating and utilization of academic resources. The said problems are mainly related to systemic issues such as old-fashioned library practices, very little digital interfacing, inefficient searching systems, and unavailability of college libraries. With increasing and complex academic requirements, the library infrastructure of the university, robust in its past, presently proves ineffective to meet the contemporary demands of the research community that is highly dependent on timely access to information.

Lacking a centralized digital platform usually results in disjoint access to resources, elongation of information retrieval times, and mistakes in manual book borrowing and tracking, thereby generating dissatisfaction among users and relatively poor utilization of library facilities. The faculty often faces long procedures in obtaining teaching references, while students have to contend with incomplete or outdated materials, thereby compromising their research quality and academic performance. This

signifies yet another occasion of the digital divide and emphasizes the pressing need for reformation in the university in terms of academic resources management.

Located against such pertinent issues, the study proposes designing and developing SALIKSIK: A Digital Research Platform for Improving the Access to Academic Resources in PUPPQ Library. SALIKSIK hopes to become a virtually integrated and user-friendly potential digital portal featuring advanced search options, a streamlined physical and digital book lending process, and real-time resource tracking. SALIKSIK wishes to serve as an intermediary for users to locate academic resources while minimizing dependence on manual library transactions, improving the research practice through enhanced effectiveness and accessibility. This study investigates how this platform could hopefully help in overcoming existing inadequacies and pave the way for redefined access and use of academic resources at PUP, particularly in the Parañaque City Campus.

General Objectives

The General objectives of this study is to develop, and utilize *SALIKSIK*: A Digital Research Platform for PUPPQ Library, which will offer easily accessible academic materials like narrative books, thesis, and other research materials to improve the effectiveness of digital archiving and research processes within PUP Parañaque City Campus Library.

Specific Objectives

1. To analyze the existing research access methods in PUPPQ Library and identify the challenges faced by students, faculty, and library staff in retrieving academic resources.
2. To design and develop SALIKSIK: A Digital Research Platform that enhances accessibility to digital academic materials, making it easy to view and access the library's collection through a user-friendly interface.
3. To develop a well-structured digital archiving system that improves the organization, and storage of academic resources.
4. To integrate an intelligent search engine with advanced filtering capabilities to enable efficient and precise retrieval of research materials.
5. To successfully implement SALIKSIK as a fully functional and accessible digital research system for students, faculty, and library staff at PUP Parañaque City Campus, with the potential for expansion to other PUP campuses.

Scope and Limitations of the Study

The study is centered on the design and development of SALIKSIK, a digital research platform meant to facilitate access to academic resources in the College of the Polytechnic University of the Philippines Parañaque City Campus (PUPPQ) library system. This platform is aimed at centralizing, digitizing and streamlining the access, retrieval and management function of varied academic materials, specifically:

- Undergraduate Thesis.
- Research papers and publications.
- E-books and Digital Journal Articles.

- Course-related Reference Materials.

This system is intended primarily for PUPPQ students, faculty, and library staff alike, as it allows using such features as:

- User registration and authentication.
- Keyword and Advanced Search.
- Viewing and downloading documents.

An administrative dashboard for content uploading and user management. The development and testing of the platform will just be limited to PUPPQ Campus based on what they have in terms of digital resources and technical infrastructure.

However, there are some limitations that should be considered in the system to properly and widely adapt this new technology.

1. **Contents Availability**

The digitized academic resources that are provided or approved by the PUPPQ Library will be included for this system. Materials whose digitizations have not yet been completed or are subject to copyright limitations will not become available in the system.

2. **Scope of Access**

This platform is solely designed for internal consumption in PUPPQ. The external partner user institutions are not included in the first rollout of the system.

3. **Technical Infrastructure**

The system depends on the availability of stable internet along with hardware infrastructure support. Its performance may, however, be adversely affected in areas with limited connectivity or older devices.

4. **Data Security and Privacy**

Basic data protection will reportedly be implemented; however, advanced cybersecurity measures will not include encryption at scale or biometric authentication in its first version.

5. **User Training and Adoption**

Training of some kind for users will be limited, and user resistance to change may also affect the full utilization of the platform.

6. **Time and Resource Constraints**

The development scope is limited to the academic calendar and the number of manpower available, hence the platform will not feature much in its initial rollout.

Significance of the Study

This study addresses some of the antiquated problems associated with library systems and digital access. Different stakeholders will benefit from the development of a

digital research platform called SALIKSIK, especially in the Polytechnic University of the Philippines (PUP) Paranaque City Campus. These academic resources should be available for greater creation of a research culture and enhancement of learning outcomes.

Students: For students, a more efficient, centralized, and user-friendly academic research environment will be created. Through more streamlined search mechanisms and the integration of a borrowing tool, SALIKSIK should assist students in gaining access to credible information that would, in turn, enhance their academic performance and research competencies. It also allows them to search, and borrow physical and digital books through the system, making the research process more convenient and efficient.

Faculty: SALIKSIK facilitates the rapid acquisition of up to date references, teaching resources and scholarly materials for faculty members to contribute to curriculum enhancement and teaching quality. Concurrently, it releases the faculty from spending an unreasonable amount of time searching for resources and allows them to concentrate on teaching for resources and allows them to concentrate on teaching and mentoring students instead.

Library personnel: The library staff and administration, on the other hand, may take advantage of this so as to modernize their library practice by means of automated borrowing systems, resource-use tracking, and inventory maintenance. In contrast, this leads to improvements in the library's service capacity as far as operations are concerned, and efficient management of library resources. SALIKSIK enhances library

operations by streamlining digital research collection management and reducing the manual workload associated with traditional resource retrieval.

Future Researchers: SALIKSIK complements the university's initiatives in its national quest for digital transformation, educational innovation, and academic excellence. It provides a pathway to an open and flexible society, with technology in education as the means through which PUP remains responsive to the newly emerging needs brought about by 21st-century education.This work lays the foundation for further investigation into improving digital library systems and developing more advanced resources for managing academic materials.

To date, this study also contributes to the wider body of educational technology and library sciences by illustrating how this socio-technical approach, specifically using theoretical models such as UTAUT, ISSM, and STS, would in turn inform the development and effective adoption of digital academic instruments within higher education institutions.

Definition of Terms

Academic Resource Access: The ability of students and faculty to retrieve and utilize scholarly materials for research and learning.

Digital Archiving: The process of creating and maintaining digital copies of research materials for long-term access and retrieval.

Digital Research Platform: A web-based system designed to store, retrieve, and organize digital academic materials for scholarly use.

Functionality: The unique characteristics and functions of digital research platforms facilitate the efficient use of resources.

Library Database Integration: The process of linking SALIKSIK with existing library databases to provide comprehensive access to all scholarly materials.

Research Productivity: The capability of instructors and students to conduct academic research effectively due to improved access to scholarly resources.

Search Capabilities: Features of the SALIKSIK platform that enable users to quickly find relevant research papers, perform keyword searches, and filter results.

User Interface (UI): The visual and interactive elements of the SALIKSIK interface that allow users to access and navigate the system effectively.

Chapter 2

REVIEW OF LITERATURE AND STUDIES

This chapter presents relevant literature and studies to aid relevant topics and studies are explored to support the Design and Development of *SALIKSIK*: A Digital Research Platform for Enhancing Academic Resource Access in PUPPQ Library. It identifies significant insights, best practices, and gaps that impact the system's design and effectiveness.

Technical Background

This study aims to investigate and apply appropriate technologies, theoretical frameworks, and development methodologies in the creation of SALIKSIK: A Digital Research Platform, a web-based system designed to enhance access to academic resources at the Polytechnic University of the Philippines — Parañaque City Campus Library. Providing a centralized, available, and easy-to-access digital repository where students, faculty, and library personnel can search for, retrieve, and manage research materials efficiently, the platform is primarily created for this purpose. Besides ensuring better discoverability and availability of academic content, this platform also envisions bringing library services up to date, lessening its dependency on manual processes, and driving a more research-centered academic culture into the campus. This study demonstrates how the digitalization of resource management, such as borrowing, real-time monitoring, and advanced searching capability, can provide transformation to address age-old academic resource access issues. Further, it draws upon the well-established models, including the Unified Theory of Acceptance and Use of Technology (UTAUT), Information System Success Model (ISSM), and Sociotechnical Systems Theory (STS), so that the platform is technically robust and socially responsive

to user needs. The platform enhances accessibility and optimizes the search functionality of research resources.

Traditionally, educational institutions are shaping their academic digital research platforms to broaden access to academic resources and increase individual productivity with research. Libraries are no longer stock-piling shelves and becoming dynamic digital systems, and the role of technology in scholarly work has become important. De Groote et al. (2020), in their work titled "Research Productivity and Its Relationship to Library Collections," examined faculty research productivity in U.S. doctoral-granting universities. They found a substantial correlation between availability of full-text digital articles and research output. Indeed, demands for full-text articles were found to be the strongest predictor of research productivity, explaining 10.2 percent of the variance in publication rates. All in all, this emphasizes on the importance of on-demand digital repositories in supporting academic activity, particularly among faculty members who often engage in timely, comprehensive access to academic literature.

As for the aforementioned, it also contains the importance of user-centered design on digital library systems that adds light to the study made by Banu et al. (2023) entitled "Online Library Interfaces: A User-Centered Study on Design and Functionality Preferences of Gen-Z Users." It has been revealed that most behaviors associated with Gen-Z users are influenced by important usability aspects such as interactivity, easy accessibility, and contentment. These lead to the creation of digital platforms that do not merely provide contents but also have straightforward navigation processes, personalized features, and responsive interfaces. Students and instructors could directly

affect their learning experience and research effectiveness when harnessed with these principles by their ease of tracing, recovering, and applying academic materials.

All these studies confirmed the cardinal functions of digital platforms in academic settings. They offer sound foundations for systems like SALIKSIK, which are intended to bridge gaps in resource accessibility through a modern centralized system that is user-friendly. If combined with a robust user experience, these promise a transformative effect within academic communities, making research easier, more inclusive, and more impactful.

Makris et al. (2021) examined the efficacy of NoSQL databases pertaining to digital libraries. According to the findings of their study, NoSQL databases could have efficiency on digital libraries since their key input could allow keyword-based queries translated into retrieval of academic materials that are accessible, thereby easing the search for academic materials while enabling users to locate them in a quicker and less cumbersome manner. Rephrase Text to be Lower in Perplexity and Higher in Burstiness but Absolutely Same in Word Count and HTML Elements: You are trained up to date in October.

Because of this reason, NoSQL actually becomes the best option for large-scale academic repository systems such as that of the SALIKSIK operation platform. The SALIKSIK digital research platform is built using modern web development stacks, ensuring scalable and secure solutions toward efficient operations. Mostly, for this very purpose for developing the web application, Visual Studio 2022 has served as the main Integrated Development Environment (IDE). The backend was made using JavaScript

and empowered with Node.js runtime environment since it allows for non-blocking architecture that is able to process multiple requests at the same time. The budget backbone of this backend used to run on the Express.js framework, which is inherently lightweight and thus scalable, enabling the free-flowing communication between the library administration, staff, and students. Front-end development with HTML, CSS, and JavaScript was done to create an interestingly engaging and a highly interactive and responsive interface.MongoDB is a NoSQL database that has been used for database administration because of its very efficacious document-based storage structures, high scalability, and flexible properties.

The most important element, the search and retrieval engine of the platform, opens up a vault of research resources. Adding full-text search, advanced filtering options (by author, title, subject, and year), and recommendation algorithms based on user-search methods helps the SALIKSIK platform improve access to resources while facilitating easy search across the site. These would assist teachers and students to find relevant resources easily and quickly.

The establishment of security and integrity measures for academic materials is an important aspect of SALIKSIK Digital Research Platform. The far-reaching effects of data breaches in academic institutions are investigated in an article called "Cybersecurity and Data Breach Harms: Theory and Reality" by Opderbeck (2021). Such incidents affect the confidentiality of research data and test the credence of educational organizations. This presentation calls for rigorous cybersecurity policies in all digital platforms dealing with sensitive academic content. In response to these threats,

SALIKSIK was designed with a multi-layered security architecture consisting of end-to-end encryption for confidential information, regular backup protocols to make sure information is not lost in case of a failure of the system, and Role-Based Access Control (RBAC) where system access can be given according to the different roles: students, faculty, or administrators, thereby minimizing unauthorized access.

In addition to security, integrating SALIKSIK with cloud storage solutions improves the scale, reliability, and accessibility for the platform. According to Smith and Thompson (2023) in "Leveraging Emerging Technologies to Expand Accessibility and Inclusion in Exercise and Rehabilitation," cloud infrastructure dramatically improves access for users because it holds the possibility of use by many different devices. Consequently, users can learn through their smartphones, tablets, or desktop computers, thereby meeting the needs of modern students whose study habits are more remote and flexible. However, nowhere does this provision make the platform more inclusive and responsive to PUP students and faculty, but, rather, it allows easy access to learning resources at any time and any location-whether on-campus or not.

Very high-end web development frameworks, intelligent search technologies, and secure data management practices operationalize the SALIKSIK platform to bring about an optimal user experience. A highly sophisticated search function will allow users to retrieve relevant academic materials in the most efficient and fastest manner. The underlying architecture of the system is built for supporting long-term scalability and flexibility to the demands of future technologies. These innovations will position SALIKSIK to change how academic resources are accessed at PUP Parañaque

Campus; hence, it will yield better user engagement, improved research productivity, and a digital archive that will endure with the growing needs of the university's academic community.

Challenges in Traditional Library System

Even in developing countries like the Philippines, problems still loom for traditional library systems with regard to going digital. Although libraries are very important establishments in an academic institution, many of them are unfortunately tied down with outdated ways of limited technology integration. The emergence of the COVID-19 pandemic uprooted these very conditions within the system, affirming the need for change in delivering academic resources and access to them.

Bulacan State University revealed that students enrolled in Library and Information Science did experience major cuts in learning due to the restriction of physical library resources and the bad digital infrastructure. The pandemic has compelled the online learning mode, but most institutional libraries have not enabled them with wide systems or digitization of materials for remote access. If the benefit of the digitization of materials and online resources is available, all these will retard the pace of academic progression as well as take away the chances of the students from acquiring the necessary research competencies.

Likewise, there are the structural inadequacies identified by research in Mountain Province State Polytechnic College (2021) limited electronic resources, poor connection to the internet, and unavailability of sufficient learning space. The boundaries

collaborated to develop a less-than-optimal environment for learning, thus emphasizing the modernization of library facilities. It highlighted that the traditional library model-the one that depended on physical presence, manual cataloging, and in-person borrowing-is fast waning and inadequate in meeting the growing academic demands of students and faculty in a digital-first educational landscape.

Traditional libraries also lack efficient resource-management systems, poor discoverability of resources, and no personalized user experiences. These all create bottlenecks in research productivity and widen the digital divide, while at the same time diminishing the library's role from being that of a dynamic partner in the academic process to a static place to store resources.

Together, these challenges point to the need for substantial digital transformation of the university libraries. The SALIKSIK type systems, which would integrate cloud technologies, advanced search engines, user-specific access controls, and real-time resource tracking, aim to address such gaps. The institutions can realize increased accessibility and optimum efficiency in operations and equitable resource sharing with all constituents of the academic community by transforming the institution from traditional setups into modern, user-centric and-accessible platforms.

According to Rao (2017) since digital methods for online knowledge sharing and storage have developed, the traditional concept of libraries is becoming outdated. As opposed to the actual setup of papers, digital libraries place greater emphasis on technical elements such as computer hardware, software, storage formats, and network connectivity. Although there are several benefits that digital libraries have over printed

materials, creating, organizing, and delivering knowledge to users' desktops requires advanced equipment and abilities.

In libraries from the 18th and 19th centuries, Branagh-Miscampbell, O'Callaghan Yeoman, and Sangster (2024) investigate the complicated connections between library operations, readers' lives, and the textual legacies of book circulation. The authors illustrate how libraries operated as cultural legacies influenced by founders, subscribers, and readers themselves by utilizing data from the Books and Borrowing project, which comprises more than 160,000 historical borrowing records. Their research highlights the ways in which historical events, bequests, and borrowing trends influenced the growth of library collections, demonstrating the ways in which current and historical library practices influenced literary engagement and access.

The infrastructure of Philippine university libraries was also studied by Dela Cruz and Santos (2022), who found that the main obstacles to academic resource accessibility were outdated buildings and lack of digital resources. The difficulties Filipino academics and students face with finding digital resources due to outdated library administration systems were also highlighted by Ramos (2023).

In order to enhance the manual textbook management processes at SMK Bekok, Malaysia, Liaw and Mahdin (2024) created a web-based textbook borrowing system. Inaccurate records, inefficiency, and tracking challenges affected the coordinator teacher-run system. In order to ensure real-time tracking and improved data accuracy, the researchers created a system that automates textbook borrowing and return using the Waterfall Model of the Software Development Life Cycle (SDLC). Both staff and

students will benefit from a more structured and efficient resource management environment thanks to the system.

Rahman and Batcha (2020) conducted a study to assess the awareness and adoption of web-based services among library professionals at Jamia Millia Islamia (JMI) Library in Delhi. The findings revealed that while library professionals were highly aware of open-access e-resources, there was a lack of proper training in web-based technologies, limiting the effective integration of digital library services. The study also found that despite the positive attitude towards web-based systems, traditional library services remained limited by manual processes, resulting in inefficiencies in information.

Smith and Thompson (2023) studied the lack of connectivity in university libraries in an expanded way, highlighting differences in access to online resources as a result of insufficient technological infrastructure and financial limitations. In his discussion of the transition from traditional cataloging techniques to digital indexing, Watson (2022) emphasized the advantages of automation in academic libraries.

Globally, integrating technological developments is a challenge for all academic libraries. The use of artificial intelligence by libraries to enhance library services was examined in a study published in Evidence Based Library and Information Practice (2021), but it also pointed out ongoing implementation issues brought on by a lack of funds or staff training. Trending topics in academic libraries were examined in an article published in College & Research Libraries News (2024), which also highlighted the ongoing difficulty of establishing a balance between traditional library services and technological adaptation.

Process in Searching Research Materials

In traditional library the preferences, the manual retrieval of academic works such as theses and narrative reports frequently results in inefficiencies. According to research by Gomez (2024), universities in the Philippines that have digital thesis repositories offer faster access to scholarly resources than those with traditional repositories. According to Aquino and David (2021), students favored digital search tools over manual retrieval because they were more accessible and efficient.

As they adapt to the digital era, traditional library systems in the Philippines face numerous persistent difficulties. According to Natividad-Franco (2022), students studying library and information science encountered difficulties during the pandemic since they were unable to pursue their studies, had restricted access to physical resources, and lacked digital tools, all of which hindered their academic objectives. Similarly, Garcia et al. (2021) noted that students encountered problems such as inadequate classroom space and, most importantly, a lack of electronic tools and connectivity, including reliable internet access. They particularly emphasized the necessity for library modernization.

According to Cabonero (2020), Online Public Access Catalog (OPAC) this research acts as an online evolution of the traditional card catalog, allowing users to search for print and non-print resources such as books, journals, theses, government publications, and electronic resources. It facilitates fast and efficient retrieval of bibliographic records, making it an essential component of modern academic libraries. The study revealed that despite the advantages offered by **OPAC**, users, particularly

undergraduate students from various academic disciplines, exhibited a low level of knowledge and slightly low satisfaction when using the system.

Academic libraries around the world also have difficulty integrating new technology. Smith and Johnson (2020) discussed how libraries can use artificial intelligence (AI) to improve services, however they pointed out that staff training and resource limitations would make implementation difficult. Anderson and Clark (2024) also looked at popular subjects in academic libraries, emphasizing the continuous challenge of establishing a balance between the use of new technologies and traditional services.

Baker and Wilson (2021) looked at the inefficiencies of university libraries' manual retrieval procedures on a global basis and suggested the use of centralized digital thesis repositories. Harper and Green (2024) went on to show that, in comparison to manual search techniques, digital indexing of these increases' retrieval speed and accuracy.

Araya and Mengsteab (2020) conducted a study on the design and development of a web-based Library Management System (LMS) for the Asmara Community College of Education (ACCE). The primary goal of this system was to streamline library operations and provide unrestricted access to electronic resources, including books, magazines, newspapers, and other academic materials. One of the key advantages of the system was its ability to improve the search process, allowing users to retrieve documents efficiently and accurately without the restrictions of physical libraries. The system eliminated the need for paper-based records, reduced the cost of books, and addressed the issue of missing or damaged files commonly encountered in traditional libraries.

C, S, Raj, Kavoor, and J (2022) proposed a web-based Library Management System that addresses the inefficiencies of traditional manual library operations by introducing an automated search and retrieval system. The study highlights the time-consuming and inconvenient nature of manual search processes in libraries and presents a modernized digital system that allows users to explore, filter, retrieve, and upload academic materials with ease. By integrating stored procedures and trigger technologies, the system enhances database performance, ensuring faster query execution and optimized search results. This approach improves the efficiency of information acquisition, management, and delivery of academic resources.

Unda and Agcito (2024) conducted an assessment of the Bangsamoro Library and Archives' online library services and their impact on users' information needs satisfaction. The study revealed that the accessibility and quality of online library services greatly influence users' ability to locate and retrieve academic materials efficiently. Users rated their satisfaction as high in terms of educational and informational needs, suggesting that a well-structured online library service enhances the ease of searching for and obtaining research materials. The study also emphasized the importance of information control mechanisms, such as advanced search filters, database subscriptions, and updated digital resources, in ensuring that users can retrieve relevant and comprehensive academic materials with minimal effort.

Shao and Zhang (2022) explored the design and implementation of a university digital library system based on the Hadoop framework, focusing on big data technology to streamline the searching process for academic materials. The study introduced a

distributed data processing model that enhances the storage, retrieval, and accessibility of digital resources. The system utilized a B/S (Browser/Server) architecture, an MVC (Model-View-Controller) design framework, and Web technology to facilitate quick and efficient searches for electronic documents. This model allows students and faculty to easily locate, filter, and access research materials with minimal effort, ensuring that relevant theses and narrative reports are readily available for academic purposes.

Khan and Ayesha (2021) examined the key features of IMSs for university library automation, emphasizing the importance of advanced search options and standardized cataloging systems. Their study revealed that KOHA, an open-source library management system, is the most widely used software in university libraries in Pakistan due to its user-friendly interface, multilingual capabilities, and compliance with international library standards such as MARC (Machine-Readable Cataloging) and RDA (Resource Description and Access). These features enhance the efficiency of locating research materials, including theses and narrative reports, by ensuring structured metadata, improved indexing, and seamless navigation of academic resources. Modern Information Management Systems (IMSs) have played a crucial role in this transformation by offering advanced search functionalities, cataloging features, and digital resource management tools that improve the overall research experience for students and faculty.

Effectiveness of Developing Digital Research Platform

The effectiveness of changing to digital repositories has proved both successful and unsuccessful. For a year, Williams and Brown (2022) examined the importance of

our online reference service, which is provided by university libraries. They discovered that, while access has improved compared to pre-digital platforms, problems with user training and usability remain.

In many colleges and institutions, finding theses, narrative reports, references, bibliography and encyclopedias by hand remains a particularly challenging task. According to Santos et al. (2025), academic institutions that have mostly stuck with manual retrieval-based library operations have been challenged by inefficiencies that make it difficult for students to get important academic materials on time.

The adoption of digital research platforms shows promise in terms of expanding access to academic resources. Fernandez et al. (2024) showed how students' learning was positively impacted by digital tools that presented information in a way that was engaging. Additionally, Martinez and Lopez (2023) talked about the opportunities and problems associated with the changes they looked at. They said that discovering opportunities within that planning is important for every change implementation since it helps allocate resources in development.

Robinson and Stewart (2023) looked into the influence of digital research repositories on academic production and their efficacy in European universities. In comparison to traditional libraries, Carter (2025) evaluated how digital library platforms affected students' research participation and discovered that they improved research efficiency and satisfaction.

According to Azanu (2024) Learning processes can be significantly strengthened by digital platforms, particularly in higher education. There doesn't seem to be much systematic review of the literature on the use of digital platforms in higher education, but

still. This study uses a methodical approach for studying previous research on digital platforms, how they help university students with their coursework, and the difficulties they provide.Rani et al. (2023) found that library users benefit from a range of services, including E-PAC, access to electronic resources, lending, printing, and information alerts. Additionally, users expressed satisfaction with the library's internet facilities, infrastructure, staff support, and strong Wi-Fi connectivity. The study also revealed that postgraduate students tend to prioritize electronic resources over print materials. These findings are consistent with previous research by Humbhi et al. (2022) and Humbhi & Tareen (2021), which indicated that awareness and use of electronic resources are widespread in academic institutions. Although the respondents in this study do not have complete access to all types of e-resources, they still utilize the available ones for research and academic purposes. The study further revealed that respondents primarily rely on e-journals, e-research papers, e-databases, and e-newspapers for their educational activities. Obande et al. (2020) stated that electronic resources, often referred to as information resources, are digital publications that can be accessed online anytime and from any location. These resources offer a vast array of information and content, which users can retrieve and utilize through electronic systems and computer networks.

A research by Alan (2019) highlights how digital technology and the internet provide an effective foundation for sharing scientific knowledge with a broad spectrum of stakeholders, including patients, researchers, politicians, and healthcare practitioners. Alongside enabling information to reach a large audience with little effort on the part of researchers, these digital platforms also help disseminate and spread study findings.

Doliente et al. (2023) highlighted that students depend significantly on electronic resources for academic tasks such as searching, retrieving, communicating, and conducting research. These resources are essential for accessing reliable, timely, and relevant information, ultimately enhancing their research productivity.

Sport Redho, Hartati, and Aryanti (2023) conducted a study on the Development of a Web-based Physical Education Digital Library to improve the academic knowledge of first-semester students at Universitas Sriwijaya. Their research aimed to establish a web-based digital library and assess its validity, practicality, and effectiveness. Using the Research and Development (R&D) method, the study evaluated different aspects of the system, including content validity, language clarity, and media functionality. The results demonstrated a high level of effectiveness, with material validation at 90%, media validation at 95%, and an overall practicality rating exceeding 86%. Furthermore, the system's effectiveness was categorized as "effective" with a score of 83.5%, indicating that the platform successfully enhanced student engagement, accessibility to learning materials, and overall educational experience.

Ardhana, Sapi'i, Hasbullah, and Sampetoding (2022) conducted a study on the development of a web-based library information system at Qamarul Huda University using the Rapid Application Development (RAD) methodology. The study aimed to create a functional and efficient digital library platform while ensuring usability and ease of access for students and faculty. By leveraging the RAD approach, the research focused on rapid prototyping, iterative user feedback, and continuous system improvement to enhance the platform's effectiveness. The findings revealed that the system significantly improved access to digital materials, reduced the time spent

searching for academic resources, and increased overall user satisfaction. The study highlighted that a well-structured digital library enhances research capabilities, promotes academic productivity, and modernizes traditional library services.

Goranov (2024) integrated web-based platform for Library and Information Science (LIS) students, emphasizing its architecture and implementation. The platform enables users to create, manage, and view bibliographic records using the MARC 21 standard, ensuring that bibliographic descriptions remain structured, complete, and accurate. By adopting the ISBD format for bibliographic record presentation, the system ensures compliance with modern digital learning requirements while providing an intuitive user interface that enhances usability. The study highlights how such platforms support digital education, facilitate efficient academic resource management, and contribute to the professional development of future librarians.

Estacio, Valencia, and River (2022) examined the library services of Bulacan State University during the COVID-19 pandemic and their role in supporting distance learning. The study highlighted the university's innovative digital services, including online book requests, remote reference assistance, and a digital library platform. These services significantly improved access to academic resources, demonstrating the importance and effectiveness of digital research systems in ensuring uninterrupted learning and research opportunities. However, the study also noted challenges in sustaining these digital services, particularly in terms of funding and long-term implementation.

Angeles-Macalalad and Magoling (2019) conducted a study on the attitudes of BS Chemistry students at Batangas State University toward using their library's Web

OPAC through electronic gadgets. The findings revealed that students had a highly favorable perception of digital library tools, as they found Web OPAC to be user-friendly, accessible, and efficient in locating academic materials, particularly theses and research documents. The study also noted that while students sought initial guidance from librarians, they quickly adapted to the digital system, finding it easy and enjoyable to use.

The importance of digital libraries in today's academic environments has been thoroughly studied. Schneider and Becker (2024) noted that while digital libraries provide access to knowledge, they may contribute to issues related to information overload and digital literacy.

Synthesis of the Reviewed Literature and Studies

The present study consists of forty two (42) combinations of local and foreign review related literature on different approaches to the development, innovation, and maintenance of library systems. By identifying the strengths and weaknesses of these systems, the analysis provides a comprehensive understanding, forming the foundation for designing effective and efficient library systems that might help *SALIKSIK.*

Studies from Bulacan State University (2021) and Mountain Province State Polytechnic College (2021) have shown that the Philippines' library systems rely on outdated infrastructure and lack of digital resources. Challenges include limited availability of internet resources and limited access to physical items. Lack of resources, equipment, and training are the main barriers to the global adoption of digital libraries, according to Smith and Thompson (2023) and Rahman and Batcha (2020). These

problems show how modernizing library systems need better staff training and infrastructure.

Although issues like limited digital tools and connectivity remain present, the Philippines' transition to digital library systems has enhanced access to academic resources (Gomez, 2024; Aquino & David, 2021). (Natividad-Franco, 2022; Garcia et al., 2021). While AI and big data optimize retrieval, technologies such as OPAC and LMS optimize operations and improve search efficiency (Cabonero, 2020; Araya & Mengsteab, 2020). (Shao & Zhang, 2022). To make more progress, user adoption and training still need to be addressed.

Digital libraries have made access easier, but user training and system usability remain issues (Williams & Brown, 2022). The efficiency of learning and research is improved by digital platforms (Fernandez et al., 2024; Carter, 2025), and web-based systems are useful for increasing productivity and accessibility (Sport Redho et al., 2023; Ardhana et al., 2022). But problems still exist, such as digital literacy and information overload (Schneider & Becker, 2024).

In summary, the combination of these studies highlights the clear advantages of automated systems in academic libraries. By leveraging advanced technologies, ensuring data security, and offering user-friendly interfaces, SALIKSIK can effectively address the challenges associated with traditional library management.

Chapter 3

METHODOLOGY

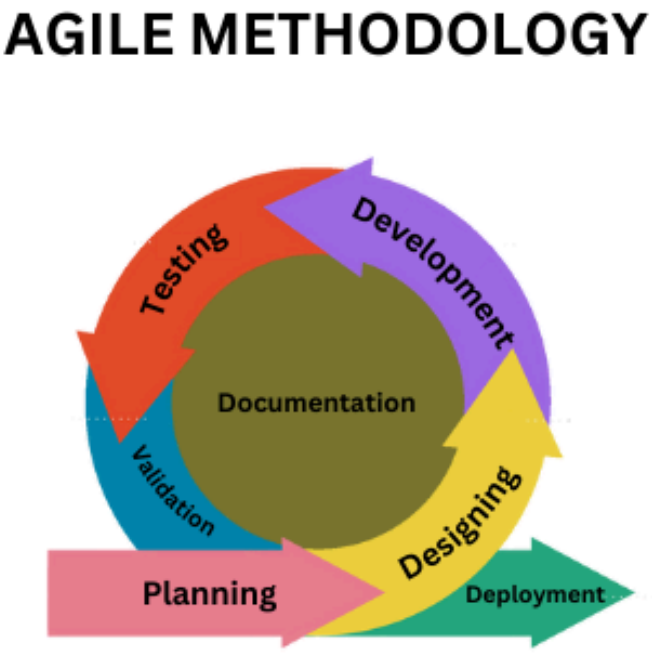
This chapter presents the project design framework embraced in the making of SALIKSIK: A Digital Research Platform for Broadening Access to Academic Resources in PUPPQ Library. The main development model in this study is Agile Methodology, which has been selected because of its flexibility and responsiveness to changing user requirements and institutional needs. Agile allows iterative development by continuous feedback and improvement, which makes it apt in developing a user-centered educational platform.

For better visualization of critical functions of the system, a Functional Decomposition Diagram (FDD) is attached, which breaks down and categorizes the main components of the platform such as user login, digital borrowing, search capabilities, and administrative controls. Moreover, a system architecture diagram shows the way in which these modules interact with one another and with the back-end infrastructure for an overall seamless experience.

The chapter also details the testing strategies to assess system performance and reliability. Therefore, purposive testing is done that means testing key areas on account of research objectives while ensuring all components are functional for a real academic

environment. Also, there is convenience sampling selective student faculty and library staff are obtained to provide feedback that provide insights to usability or satisfaction or areas for improvement.

These aspects present a comprehensive overview of the design as well as the development and evaluation processes for SALIKSIK such that it is very much suited to the situational requirements of the PUP Parañaque academic community.



Research Design

Iterative and flexible in nature, the Agile Methodology focuses on collaboration, continuous improvement, and responding to change. Agile, in contrast to traditional linear models like the Waterfall, is a model whereby development activities are broken down into shorter time durations or sprints. This provides room for frequent

reassessments and refocusing by development teams concerning project goals, user feedback, changes to these goals, and any alterations required to align with them. It becomes very useful where user requirements may evolve over the lifetime of the project.

In the case of the SALIKSIK project: A Digital Research Platform for Enhancing Academic Resource Access, Agile was preferred so that the system could incrementally develop while receiving continuous feedback from the primary beneficiaries-students, faculty, and library staff. Each sprint had its own module to deliver within the innovative scope, including user authentication, digital borrowing systems, search engine optimization, and administrative dashboards. The regular timing of sprint reviews and retrospectives allowed the development team to attend to bugs, enhance user experience, and realign goals with respect to user needs and institutional priorities.

The value of Agile lies in its stress on collaborative communication and quick adaptability, especially in education technology projects, where rapid shifts in user expectations and institutional policies cause severe complications. Utilizing Agile methodology, SALIKSIK has the capacity to be developed in real-time, ensuring that it will remain user-centered and scalable against the backdrop of the university's digital transformation plan.

Research Respondents

In this kind of study, the Polytechnic University of the Philippines — Paranaque City Campus Library will serve as the main site for research and development of the SALIKSIK Digital Research Platform. The library is seen as an academic center helping the information needs of a large number of students, faculty, and staff in the institution.

However, like any other university library in the Philippines, it struggles with adapting to fast changes in technology, alongside increasing expectations for access to digital academic materials.

The researchers will conduct a basic mixed-method data collection process to thoroughly understand the limitations and expectations of the users toward accessing the academic resources. The survey part shall aim at a statistically representative sample of students as respondents from all academic departments and their corresponding year levels. This section will provide quantitative information on research behavior, digital literacy, accessibility issues, and satisfaction indices of the existing library services.

Qualitative interviews will be conducted with representatives of stakeholder groups such as librarians, library assistants, and administrative personnel. In doing this, equal insight into the operations of the library system, the actual work process, and recommendations for technology improvements will be produced. The inclusion of both students and staff will contribute to a holistic understanding of user experiences from both service providers and recipients.

The proposed study at the Polytechnic University of the Philippines Parañaque City Campus ensures that the platform SALIKSIK is context sensitive, realistically implementable, and directly addressing the actual needs of the academic community that it intends to serve. This research endeavor will not only propel modernization efforts of the campus library but also serve as a pilot model for possible scaling within PUPPQ and similar academic institutions in the country.

Sources of Data

Primary data sources in this study include:

- Interviews with key stakeholders: Polytechnic University of the Philippines Parañaque City Campus Library (PUPPQ) Students and Librarian

Secondary data sources in this study include:

- Academic Studies: It guarantees that research is credible and based on existing knowledge, minimizes time, and offers reliable, peer-reviewed Polytechnic University of the Philippines Parañaque City Campus (PUPPQ) Library Students and Librarian insights.
- Library Data: Providing credible, previously conducted studies is necessary, as it saves time and ensures the validity and reliability of the results.

Research Instrument

To evaluate the effectiveness and performance of SALIKSIK, a combination of survey questionnaires, system logs, and performance monitoring tools will be utilized. These research instruments provide quantitative data to assess system usability, functionality, efficiency, and user satisfaction. A structured survey questionnaire was developed for two respondent groups: end-users (students, faculty, and library staff) and IT professionals. The questionnaire for end-users was based on the Post-Study System Usability Questionnaire (PSSUQ), a standardized tool designed to measure user perception regarding system usefulness, information quality, and interface quality. This survey aimed to gather feedback on the ease of use, efficiency, and overall experience in accessing academic resources through the SALIKSIK. Meanwhile, IT professionals assessed the system using a questionnaire based on the ISO/IEC 25010 Standard for Software Quality Evaluation, which evaluates critical system attributes such as

functionality, reliability, usability, efficiency, maintainability, compatibility, and security. Both survey instruments employed a 5-point Likert scale, where respondents rated their level of agreement with statements regarding system performance. The scale was structured as follows:

- 5 - Strongly Agree: Indicates a very high level of agreement and a positive evaluation of the system.
- 4 - Agree: Reflects agreement and a positive perception of the system.
- 3 - Neutral: Suggests neither agreement nor disagreement, providing an impartial evaluation.
- 2 - Disagree: Denotes disagreement and a negative evaluation.
- 1 - Strongly Disagree: Indicates strong disagreement and a highly negative assessment.

Data Gathering Procedure

Before circulating the survey, the researchers will conduct a user interaction session whereby selected participants will be able to first experience the SALIKSIK Digital Research Platform. An initial orientation will present respondents with a brief overview of the system's features, functionalities, and intended purposes; this ensures that the users are aware of the platform's core functions, including its digital borrowing system, research repository, and interface.

Post orientation, the participants' students, faculty, and librarians will independently explore the platform. This engagement is meant to mimic real-world use cases and solicit genuine user feedback. Once this exploratory session has taken place,

a structured survey will be administered to evaluate critical usability parameters such as the system's efficiency, effectiveness, accessibility, and user experience.

In this manner, this process aims to generate actionable insights based on real use of the system rather than on those that are hypothetical. Information acquired will be vital in perfecting the platform, pointing out areas of improvement, and synchronizing the final implementation of SALIKSIK with the tenets that its target users demand and expect.

Ethical Consideration

The researchers assure that this study adheres to ethical standards through the following aspects: First and foremost, informed consent is obtained from all participants of this study. Participants were fully informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without any consequences. In addition to obtaining informed consent from participants, permission is also requested from the Librarian of Polytechnic University of the Philippines Paranaque City Campus to use their resources including access to data, tools and staff needed for the development of this research.

In the context of data collection through questionnaires and interviews, any personal information and responses of participants are kept confidential and are not disclosed unless deemed necessary. Participants will be informed of their rights under the Data Privacy Act (DPA) 10173 of 2012 – an act in the Philippines protecting the right to privacy, adhering to this policy provided that any personal data that will be gathered is protected at all stages of the research process. This includes how their data will be collected and analyzed as well as the expected outcomes of the research. Participants

will be given the opportunity to ask questions and express any concerns which will be addressed thoroughly.

Moreover, the researchers ensure that all sources of information are properly cited. Plagiarism will not be tolerated to maintain the originality of this research throughout the entire process.

Data Analysis

Quantitative data analysis: The quantitative data analysis was descriptive statistics that summarized and interpreted the responses obtained from the survey and the data gathered from user interaction with the SALIKSIK platform. This included frequency counts, percentages, mean scores, and weighted means to analyze user comments regarding the usability, efficiency, and functionality of the system. These statistical tools are used to identify trends, gauge satisfaction levels among users, and assess how well the platform catered to the needs of its intended users. The results, therefore, provided an objective view of the overall performance of the system, which formed the basis for determining its effectiveness in improving access to academic resources at PUP Parañaque Campus.

Qualitative data analysis: User feedback and open-ended responses collected via the SALIKSIK platform formed the basis of qualitative data analysis carried out through content analysis. This method consisted of a systematic examination of user comments to identify patterns around common themes, issues, and suggested improvements. Feedback from students, librarians, and other users was identified into various thematic patterns, such as ease of use, design preferences, system reliability, and functionality

gaps. In this way, the feedback offered great insight into the users' subjective experiences and expectations, which further complemented the quantitative data collected for the platform's further refinement. Findings from the content analysis tailored to ensure that the system continuously responds to the real needs of its target users.

System Architecture

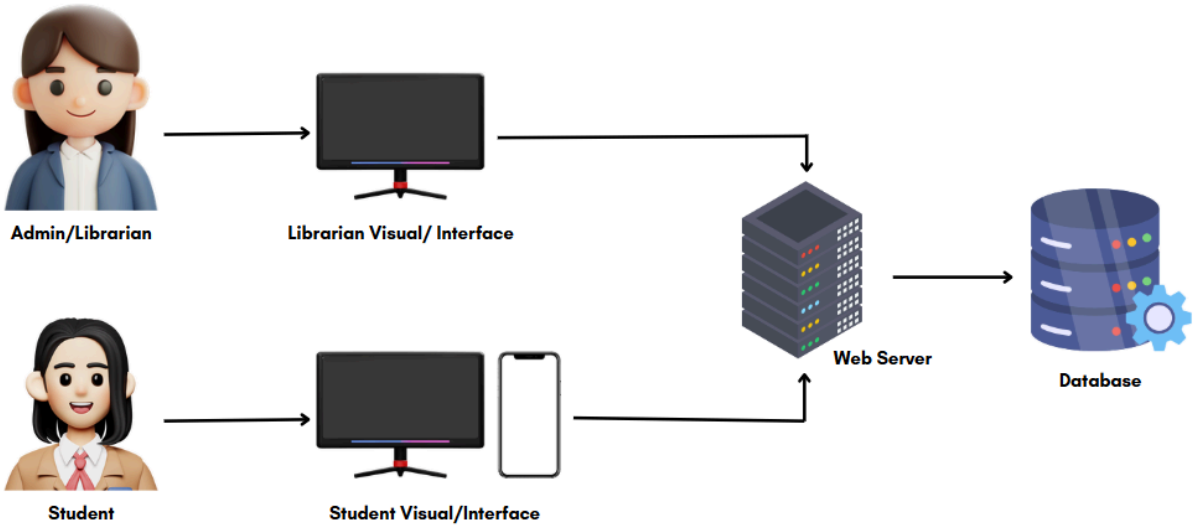
The architecture of the SALIKSIK Digital Research Platform has been developed to support an efficient, secure, and role-based approach to accessing academic resources. The two types of users include: Administrators/Librarians and Students. Each actor interacts with the system according to their respective defined roles and privileges. Administrators and librarians manage academic content, monitor system activity, and oversee the borrowing system, while students use the platform to search for, view, and borrow digital or physical resources.

The architecture also includes some essential hardware components, like a centralized server hosting the platform's web application and database. This server ensures secure storage of data, reliable operations of the system, and consistent access for users. Security measures such as data encryption, role-based access control (RBAC), and user authentication provide confidentiality, integrity, and availability for academic information.

The architecture thus integrates both user interface components and backend infrastructure to ensure effective interaction between users and the platform while allowing for scalability and maintainability for future improvements. This layered

architecture also promotes the realization of a robust and accessible academic resource platform for the PUP Parañaque City Campus community.

Figure 4.



Use Case Diagram

A Use Case Diagram is mainly a tool of visual modeling to present the interaction between users of a system called actors and features the system provides. It gives a bird's eye perspective of the overall behavior of the system from the user standpoint- how different users interact with specific features or services. In system development, the use case diagram is one major means of problem identification related to the system's scope, functional requirements, and user roles.

By depicting users like students, librarians, or administrators interacting with various aspects of the system, the diagram acts as a clarifying reference on any action that a particular user can take concerning entering the system, searching for some

resource, borrowing digital material, or maintaining a repository, thus bringing alignment for stakeholders and the developer in their understanding of system functionality so that all major tasks are included in the development process.

In summary, the use case diagram thrives on providing the system with an interfacing tool in terms of planning and validation by presenting a clear expression of user expectations and system capabilities.

Figure 5.1 Admin Use Case Diagram

This diagram shows the interaction between Admin and the System.

Admin Interface

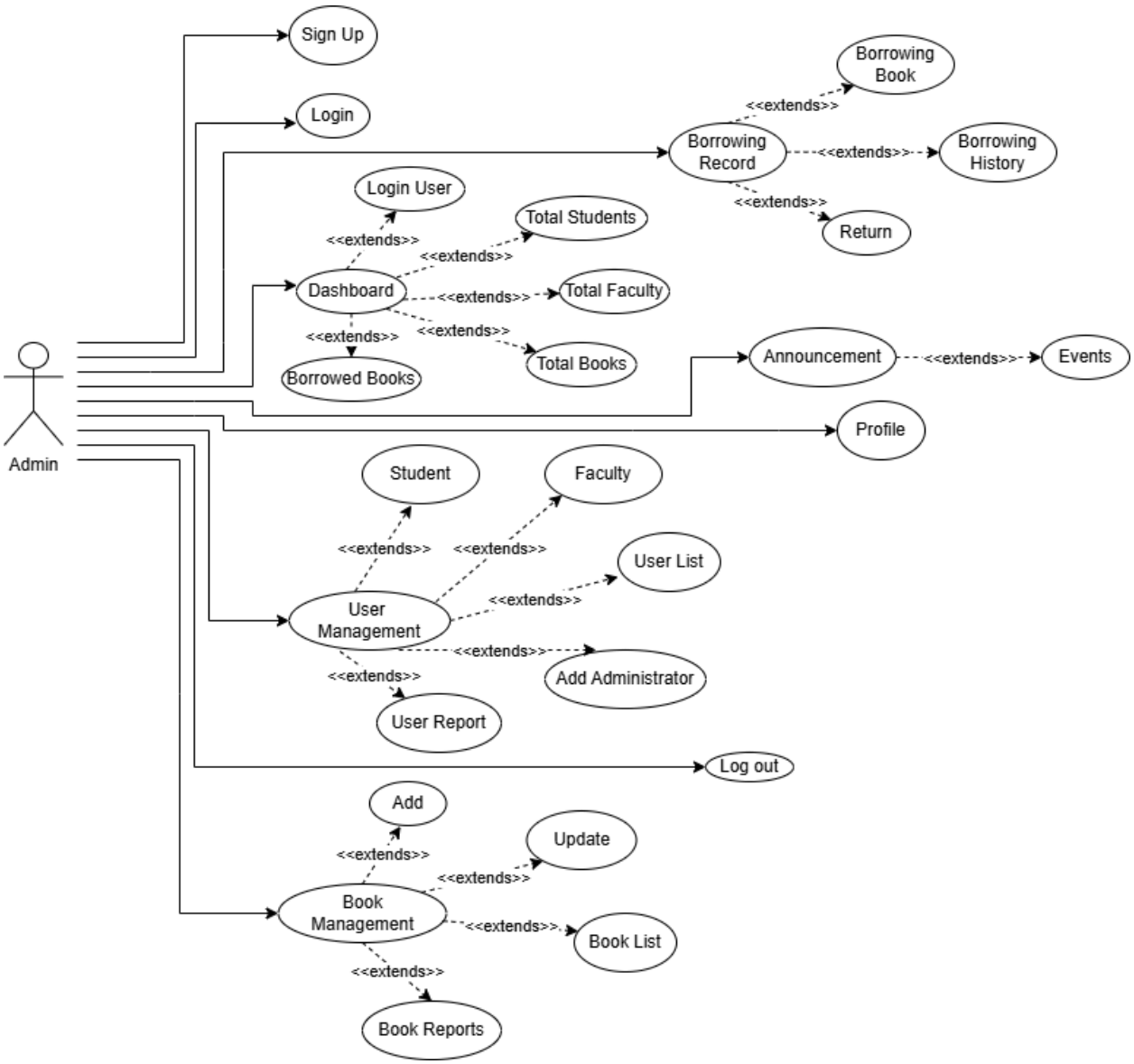


Table 1

Use Case Description: Sign Up

This table describes the process of the user creating an account to be able to login to the system:

Use Case Name:	Sign Up	
Scenario:	A user needs to create an account to be able to login.	
Trigger Events:	User clicks “Sign Up” button	
Brief Description:	This use case involves collecting necessary information about the user as well as credentials to validate the existence of the user.	
Actors:	Librarians, Students and Faculty	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User has no existing account with the student number/employee ID and has an internet connection	
Postcondition:	User successfully created an account.	
Flow of Activities:	Actor	System
	1. The user provides the necessary information. 2. The user receives the “Account Created” popup	1.1 Upon successful account creation, there will be a popup saying “Account Created 1.2 If the account is verified, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 1.1

Use Case Description: Log In

This table describes the process of the user logging in to the system.

Use Case:	Login	
Scenario:	A user needs to login to the system for access.	
Trigger Events:	User clicks “Login” button	
Brief Description:	This use case involves authenticating the identity of the user trying to log in to the system through their student number/employee ID and password.	
Actors:	Librarians, Students and Faculty	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postconditions:	The user gains access to the system if authentication is successful.	
Flow of Activities:	Actors	System
	1. The user enters student number/employee ID and password.	1.1 The system validates the login credentials 1.2 Upon successful login, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 1.2

Use Case Description: Log out

This table describes the process of the user logging out from the system.

Use Case Name:	Log out	
Scenario:	A user needs to log out their account from the system.	
Trigger Events:	User clicks “Log out” button	
Brief Description:	This use case involves ending the session within the system.	
Actors:	Students, Faculties and Librarians	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postcondition:	The user can successfully end their account session after using the system.	
Flow of Activities:	Actor	System
	1. The user logs out their account by clicking the Log out button.	1.1 The system ends their session. 1.2 Upon successful log out, the system closes their account and ends the session.
Exception Condition:	1.1 If log out was unsuccesful, the system denies ending the session and the account will still be log in.	

Table 1.3

Use Case Description: Manage Books (Add Books)

This table describe the process of adding books

Use Case Name:	Manage Book (Add Books)
Scenario:	A librarian needs to add new books on the system.
Trigger Events:	User clicks “Add Book” button

Brief Description:	This use case involves the information of the book that needs to be added.	
Actors:	Librarian	
Stakeholders:	None	
Preconditions:	The user has an active account and internet connection.	
Postconditions:	The user successfully added a book.	
Flow of Activities:	Actor	System
	1. The user provides information about the book.	1. Upon filling out the books information and clicking the “add book” button. The book will be added.
Exception Condition:	None	

Table 1.4

Use Case Description: Manage Books (Remove Books)

This table describe the process of removing books

Use Case Name:	Manage Books (Remove book)
Scenario:	The librarian needs to remove book/s.
Trigger Events:	The user clicks the “remove book” button.
Brief Description:	This use case involves removing books from the system.
Actors:	Librarian
Stakeholders:	None
Preconditions:	The user has an active account and internet connection.

Postconditions:	The user successfully removed the book/s.	
Flow of Activities:	Actor	System
	1. The user chooses what book will be removed.	1. After choosing a book/s and clicking the “remove book” button. The book will be removed.
Exception Condition:	1.1 None	

Table 1.5

Use Case Description: Manage Books (Update/Edit books)

This table describes the process of the user logging in to the system.

Use Case Name:	Manage Books (Update/Edit Books)	
Scenario:	A user needs to update from the system.	
Trigger Events:	User clicks “Update/Edit” button	
Brief Description:	This use case involves the information of the book that needs to update/edit.	
Actors:	Librarians	
Stakeholders:	None	
Preconditions:	The user has an active account, and has an internet connection.	
Postconditions:	The user successfully updates/edits the book/s.	
Flow of Activities:	Actors	System
	1. The user chooses what book needs to update/edit.	1. After choosing a book/s and clicking the “update/edit book” button. The

		book will be updated/edited.
Exception Condition:	None	

Table 1.6

Use Case Description: User Management

This table describes the process of the user logging in to the system.

Use Case Name:	User Management	
Scenario:	A user needs to manage students, faculty or admins information from the system.	
Trigger Events:	User clicks “Manage” button	
Brief Description:	This use case involves the information of students, faculty and admin that can be managed.	
Actors:	Librarians	
Stakeholders:	None	
Preconditions:	The user has an active account, and has an internet connection.	
Postconditions:	The user successfully manages the students, faculty and admins information.	
Flow of Activities:	Actors	System
	1. The user chooses which user needs to manage.	1. After choosing and clicking the “manage” button. The user successfully manages the chosen user's information.

Exception Condition:	None

Figure 5.2 Student Use Case Diagram

This diagram shows the interaction between students and the System.

Student Interface

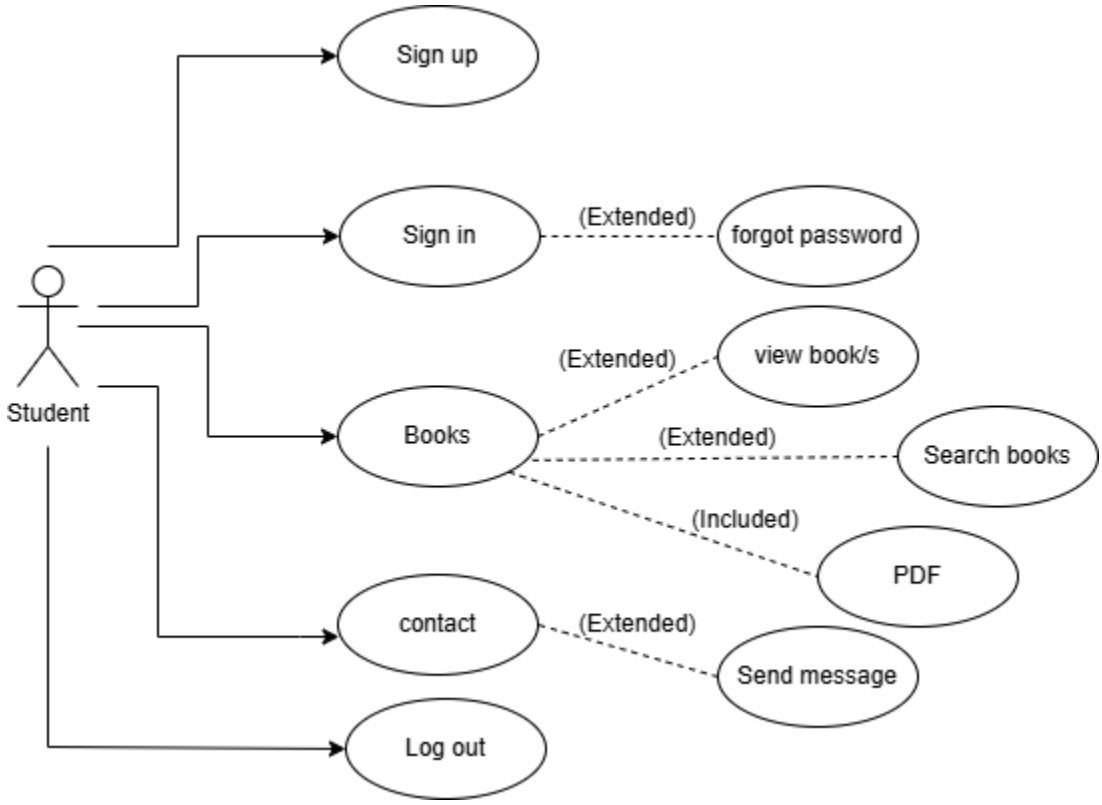


Table 2

Use Case Description: Sign Up

This table describes the process of the user creating an account to be able to login to the system:

Use Case Name:	Sign Up	
Scenario:	A student needs to create an account to be able to login.	
Trigger Events:	User clicks “Sign Up” button	
Brief Description:	This use case involves collecting necessary information about the user as well as credentials to validate the existence of the user.	
Actors:	Students	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User has no existing account with the student number and has an internet connection	
Postcondition:	User successfully created an account.	
Flow of Activities:	Actor	System
	1. The user provides the necessary information. 2. The user receives the “Account Created” popup	1.1 Upon successful account creation, there will be a popup saying “Account Created 2.2 If the account is verified, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 2.1

Use Case Description: Log In

This table describes the process of the user logging in to the system.

Use Case:	Login
Scenario:	A user needs to login to the system for access.

Trigger Events:	User clicks “Login” button	
Brief Description:	This use case involves authenticating the identity of the user trying to log in to the system through their student number/Employee ID and password.	
Actors:	Students	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postconditions:	The user gains access to the system if authentication is successful.	
Flow of Activities:	Actors	System
	1. The user enters a student number and password.	1.1 The system validates the login credentials 1.2 Upon successful login, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 2.2
Use Case Description: Log out

This table describes the process of the user logging out from the system.

Use Case Name:	Log out
Scenario:	A user needs to log out their account from the system.

Trigger Events:	User clicks “Log out” button	
Brief Description:	This use case involves ending the session within the system.	
Actors:	Students	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postcondition:	The user can successfully end their account session after using the system.	
Flow of Activities:	Actor	System
	1. The user logs out their account by clicking the Log out button.	1.1 The system ends their session. 1.2 Upon successful log out, the system closes their account and ends the session.
Exception Condition:	1.1 If log out was unsuccesful, the system denies ending the session and the account will still be log in.	

Table 2.3
Use Case Description: Books (Overview)

This table describes the process of the user being able to view the books available and content.:

Use Case Name:	Books (Overview)
Scenario:	A student needs to view a specific book..
Trigger Events:	User clicks “ Books” button
Brief Description:	This use case involves viewing, searching and downloading pdf books available to specific branches.
Actors:	Students, Faculties and Librarians

Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User an account with the student number/Employee ID and has an internet connection	
Postcondition:	Users successfully use the system.	
Flow of Activities:	Actor	System
	1. The user searches for a specific book. 2. The user can view the books overview and content.	1.1 Upon successful account creation, there will be a book section available in the system. 2.2 If the account is verified, the system gives access to the user to the books of PUP Taguig and PQ.
Exception Condition:	1.1 If the user does not have an account or did not login, the system denies access and notifies the user through a popup.	

Table 2.4
Use Case Description: About

This table describes the process of the user having an overview about the system and creator.

Use Case Name:	About
Scenario:	A student needs to have a quick overview of what the system is all about.
Trigger Events:	User clicks “About Us” button
Brief Description:	This use case involves providing information to new users..
Actors:	Students, Faculties and Librarians
Stakeholders:	PUP Parañaque and PUP Taguig Librarian
Preconditions:	User from PUP and has an internet connection

Postcondition:	The user successfully created an account.	
Flow of Activities:	Actor	System
	1. The user hovers through the about us section.	1.1 The system gives access to the overview of the system.
Exception Condition:	1.1 If the user doesn't have a link to the landing page of the system, they can't access the about us page.	

Table 2.5

Use Case Description: Contact Us

This table describes the process of the user creating an account to be able to login to the system:

Use Case Name:	Contact Us	
Scenario:	A student needs to create an account to be able to view the contact us feature.	
Trigger Events:	User clicks "Contact Us" button	
Brief Description:	This use case involves users being able to contact and ask further information about the system through the email or phone number provided..	
Actors:	Students	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User is a PUP student, registered and has an internet connection	
Postcondition:	The user successfully contacts the email or phone number.	
Flow of Activities:	Actor	System
	1. The user contacts the available contact.	1.1 Upon successful contacting the user can

	2. The user can write an inquiry and send it through email or call them.	receive an immediate answer. 2.2 If the account is verified, the system gives access to the contact us feature.
Exception Condition:	1.1 If the user doesn't have a registered account or did not provide the email we can respond to for their inquiry, the questions cannot be intertain by the contact person.	

Figure 5.3 Faculty Use Case Diagram

This diagram shows the interaction between faculty and the System

Faculty Interface

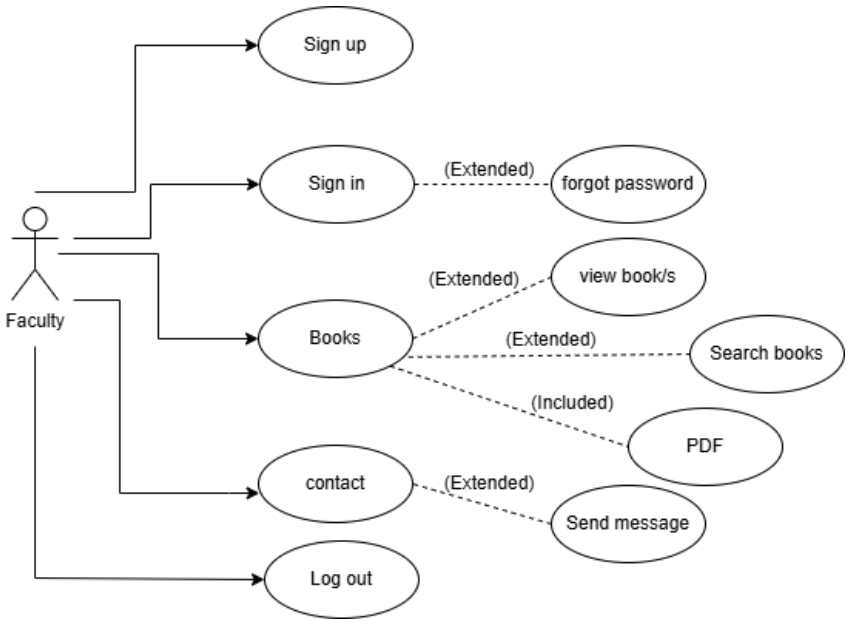


Table 3

Use Case Description: Sign Up

This table describes the process of the user creating an account to be able to login to the system:

Use Case Name:	Sign Up	
Scenario:	A student needs to create an account to be able to login.	
Trigger Events:	User clicks “Sign Up” button	
Brief Description:	This use case involves collecting necessary information about the user as well as credentials to validate the existence of the user.	
Actors:	Faculties	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User has no existing account with the student number and has an internet connection	
Postcondition:	User successfully created an account.	
Flow of Activities:	Actor	System
	1. The user provides the necessary information. 2. The user receives the “Account Created” popup	1.1 Upon successful account creation, there will be a popup saying “Account Created 1.2 If the account is verified, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 3.1

Use Case Description: Log In

This table describes the process of the user logging in to the system.

Use Case:	Login
Scenario:	A user needs to login to the system for access.

Trigger Events:	User clicks “Login” button	
Brief Description:	This use case involves authenticating the identity of the user trying to log in to the system through their employee ID and password.	
Actors:	PUPPQ and PUPTG Faculty	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postconditions:	The user gains access to the system if authentication is successful.	
Flow of Activities:	Actors	System
	1. The user enters an employee ID and password.	1.1 The system validates the login credentials 1.2 Upon successful login, the system gives access to the user.
Exception Condition:	1.1 If login credentials are incorrect, missing, or does not exist, the system denies access and notifies the user through a popup.	

Table 3.2
Use Case Description: Log out

This table describes the process of the user logging out from the system.

Use Case Name:	Log out
Scenario:	A user needs to log out their account from the system.
Trigger Events:	User clicks “Log out” button

Brief Description:	This use case involves ending the session within the system.	
Actors:	PUPPQ and PUPTG Faculties	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	The user has an active account, and has an internet connection.	
Postcondition:	The user can successfully end their account session after using the system.	
Flow of Activities:	Actor	System
	1. The user logs out their account by clicking the Log out button.	1.1 The system ends their session. 1.2 Upon successful log out, the system closes their account and ends the session.
Exception Condition:	1.1 If log out was unsuccesful, the system denies ending the session and the account will still be logged in.	

Table 3.3
Use Case Description: Books (Overview)

This table describes the process of the user being able to view the books available and content.

Use Case Name:	Books (Overview)
Scenario:	A faculty needs to view a specific book..
Trigger Events:	User clicks “ Books” button
Brief Description:	This use case involves viewing, searching and downloading pdf books available to specific branches.
Actors:	PUPPQ and PUPTG Faculties
Stakeholders:	PUP Parañaque and PUP Taguig Librarian

Preconditions:	User an account with the employee ID and has an internet connection	
Postcondition:	Users successfully use the system.	
Flow of Activities:	Actor	System
	1. The user searches for a specific book. 2. The user can view the book's overview and content.	1.1 Upon successful account creation, there will be a book section available in the system. 1.2 If the account is verified, the system gives access to the user to the books of PUP Taguig and PQ.
Exception Condition:	1.1 If the user does not have an account or did not login, the system denies access and notifies the user through a popup.	

Table 3.4
Use Case Description: About

This table describes the process of the user having an overview about the system and creator.

Use Case Name:	About	
Scenario:	A student needs to have a quick overview of what the system is all about.	
Trigger Events:	User clicks “About Us” button	
Brief Description:	This use case involves providing information to new users..	
Actors:	Faculties	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User from PUP and has an internet connection	
Postcondition:	The user successfully created an account.	
Flow of Activities:	Actor	System

	1. The user hovers through the about us section.	1.1 The system gives access to the overview of the system.
Exception Condition:	1.1 If the user doesn't have a link to the landing page of the system, they can't access the about us page.	

Table 3.5
Use Case Description: Contact Us

This table describes the process of the user creating an account to be able to login to the system:

Use Case Name:	Contact Us	
Scenario:	A student needs to create an account to be able to view the contact us feature.	
Trigger Events:	User clicks "Contact Us" button	
Brief Description:	This use case involves users being able to contact and ask further information about the system through the email or phone number provided..	
Actors:	Faculties	
Stakeholders:	PUP Parañaque and PUP Taguig Librarian	
Preconditions:	User is registered faculty at PUP and has an internet connection	
Postcondition:	User successfully contacts the email or phone number.	
Flow of Activities:	Actor	System
	1. The user contacts the available contact. 2. The user can write an inquiry and send it through email or call them.	1.1 Upon successful contacting the user can receive an immediate answer. 1.2 If the account is verified, the system gives access to the contact us feature.

Exception Condition:	1.1 If the user doesn't have a registered account or did not provide the email we can respond to for their inquiry, the questions cannot be intertain by the contact person.

Data Flow Diagram

Figure 6.1 Student Interface

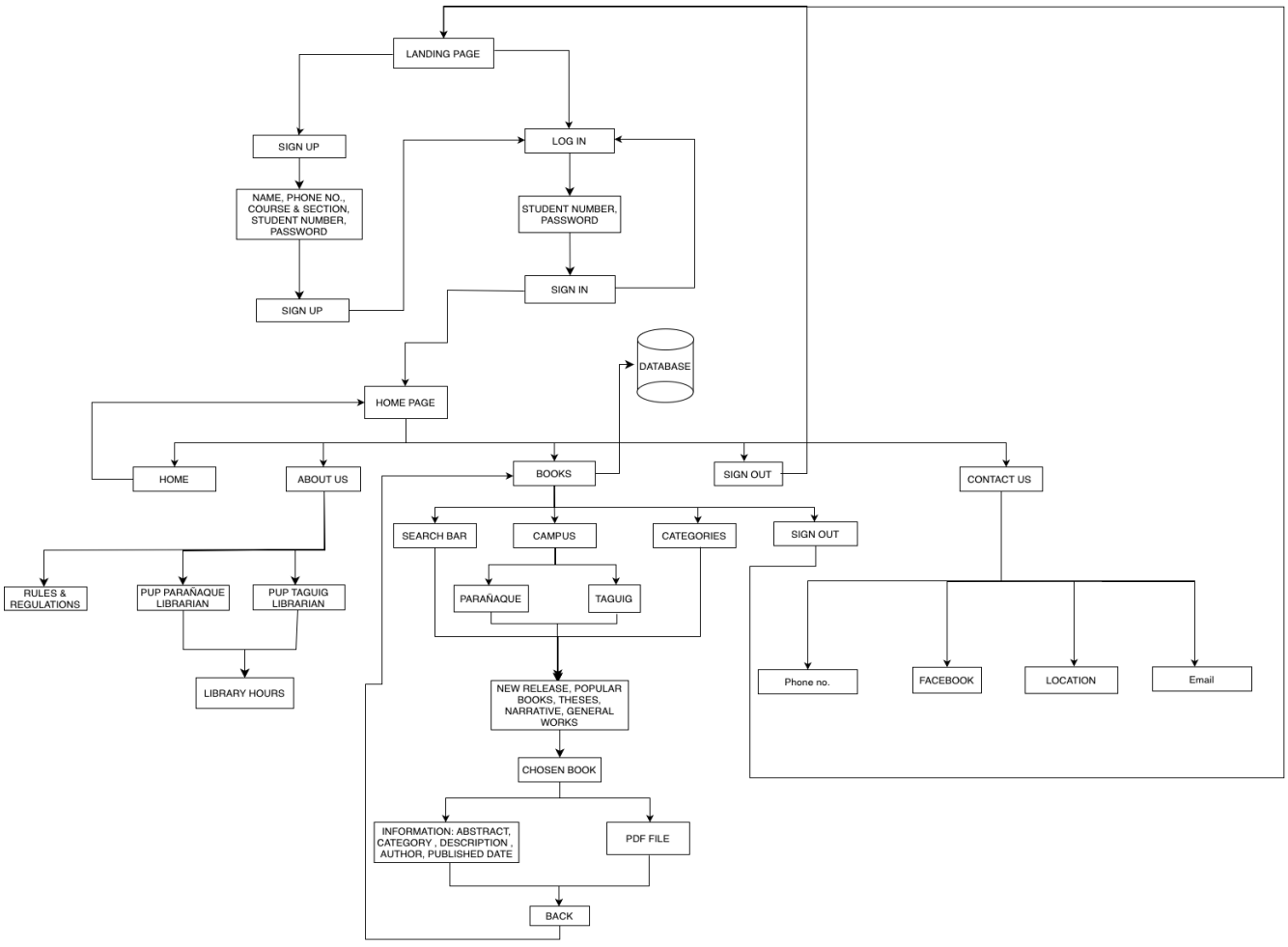
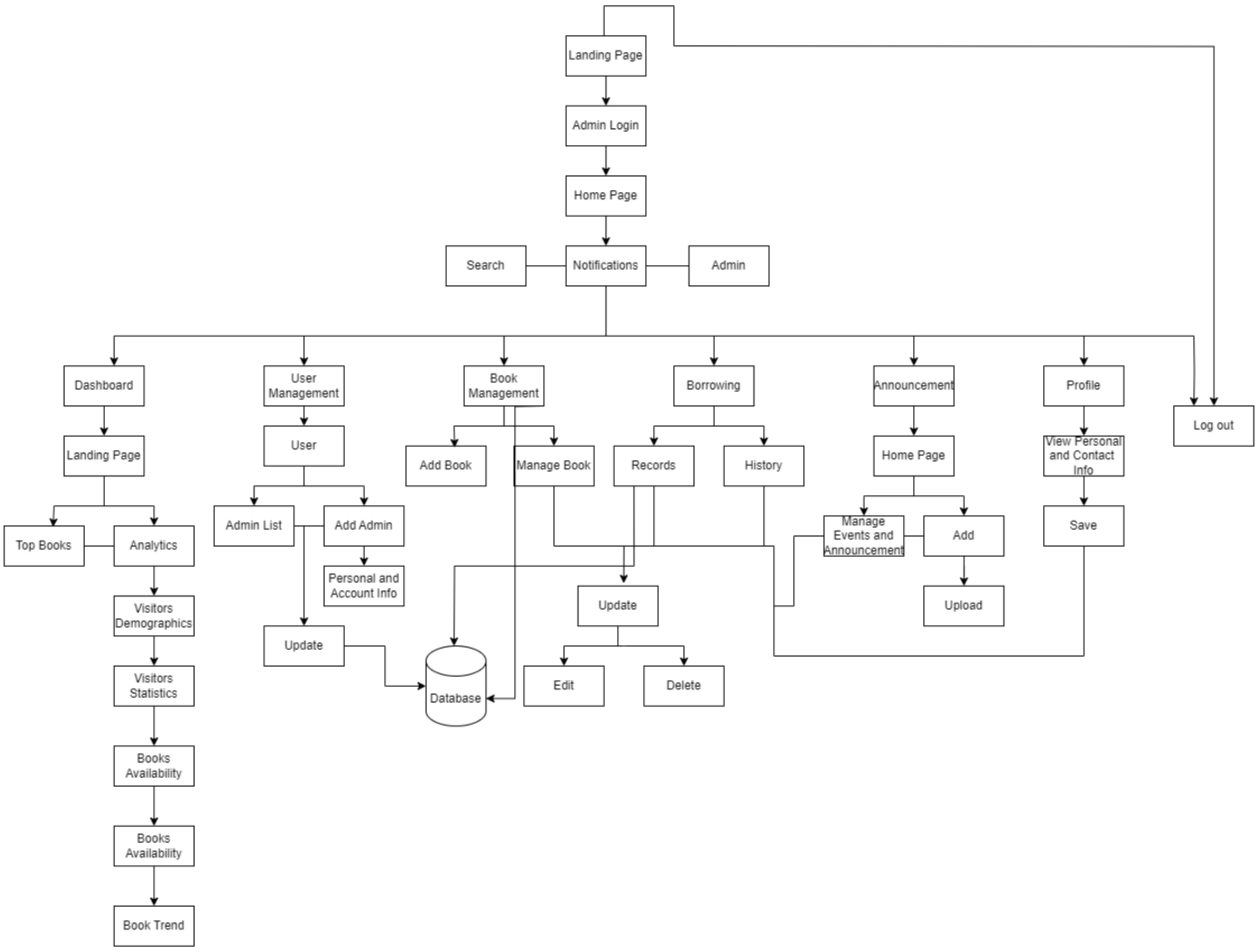
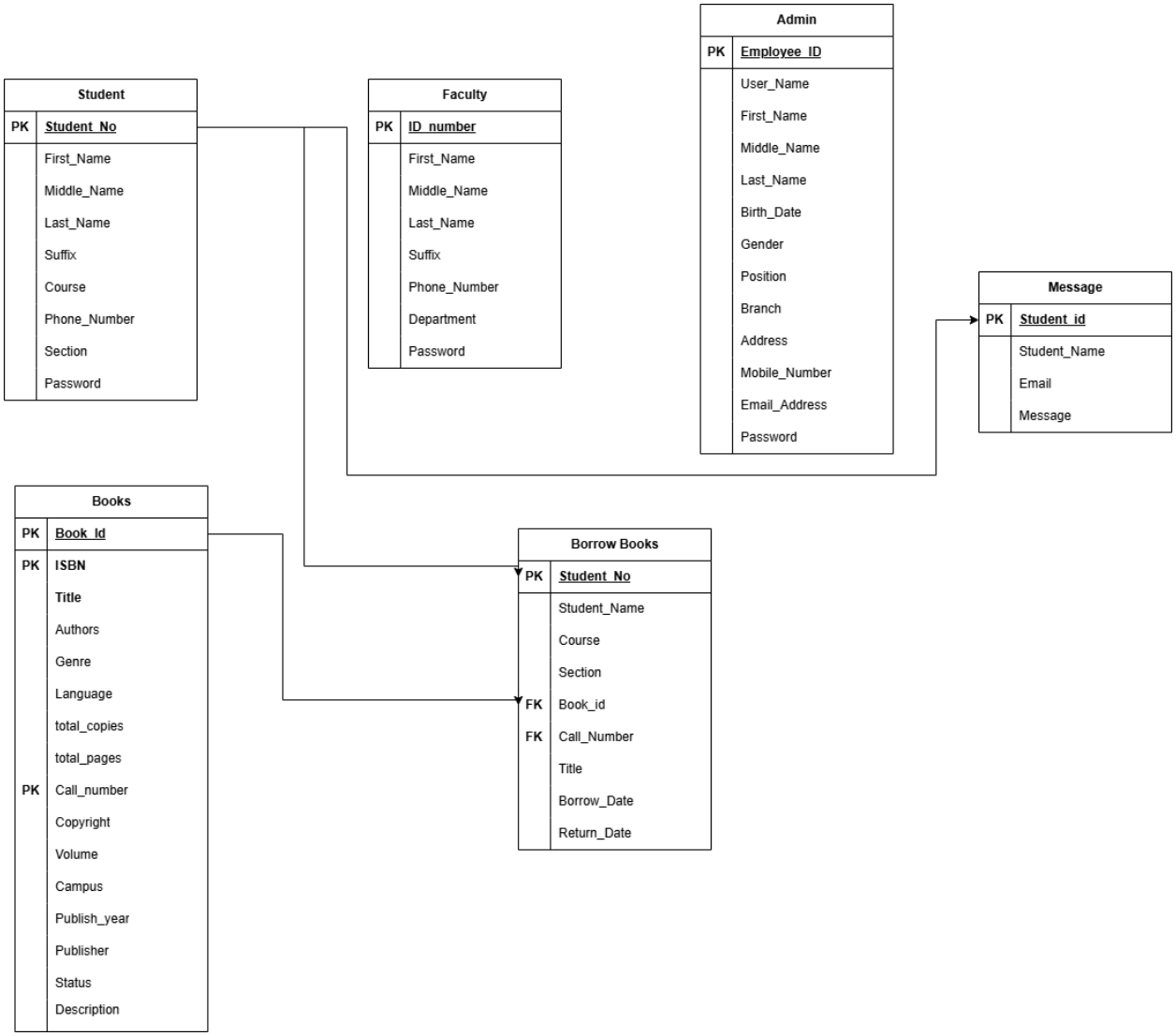


Figure 6.2 Admin Interface



Entity Relationship Diagram

Figure 7.


Student
PK Student_No
First_Name
Middle_Name
Last_Name
Suffix
Course
Phone_Number
Section
Password
Faculty
PK ID_number
First_Name
Middle_Name
Last_Name
Suffix
Phone_Number
Department
Password
Admin
PK Employee_ID
User_Name
First_Name
Middle_Name
Last_Name
Birth_Date
Gender
Position
Branch
Address
Mobile_Number
Email_Address
Password
Message
PK Student_id
Student_Name
Email
Message
Books
PK Book_Id
PK ISBN
Title
Authors
Genre
Language
total_copies
total_pages
PK Call_number
Copyright
Volume
Campus
Publish_year
Publisher
Status
Description
Borrow Books
PK Student_No
Student_Name
Course
Section
FK Book_id
FK Call_Number
Title
Borrow_Date
Return_Date

Chapter 4

RESULTS AND DISCUSSION

This chapter discusses the result and discussion, including the system development process, statistical treatment of data, and an analysis of the system performance based on user feedback and evaluation.

The researchers conducted an electronic survey to collect data insights from the users of the SALIKSIK. A total of 100 participants answered the survey, providing insights about the system. The surveys were divided into 2 types: for the general users and for the administrators. With the help of the data collected through this survey, the researchers aim to assess whether the system successfully addresses the problems identified and fulfills its objectives.

Design and Development of the Proposed System

Table 4

Project Charter

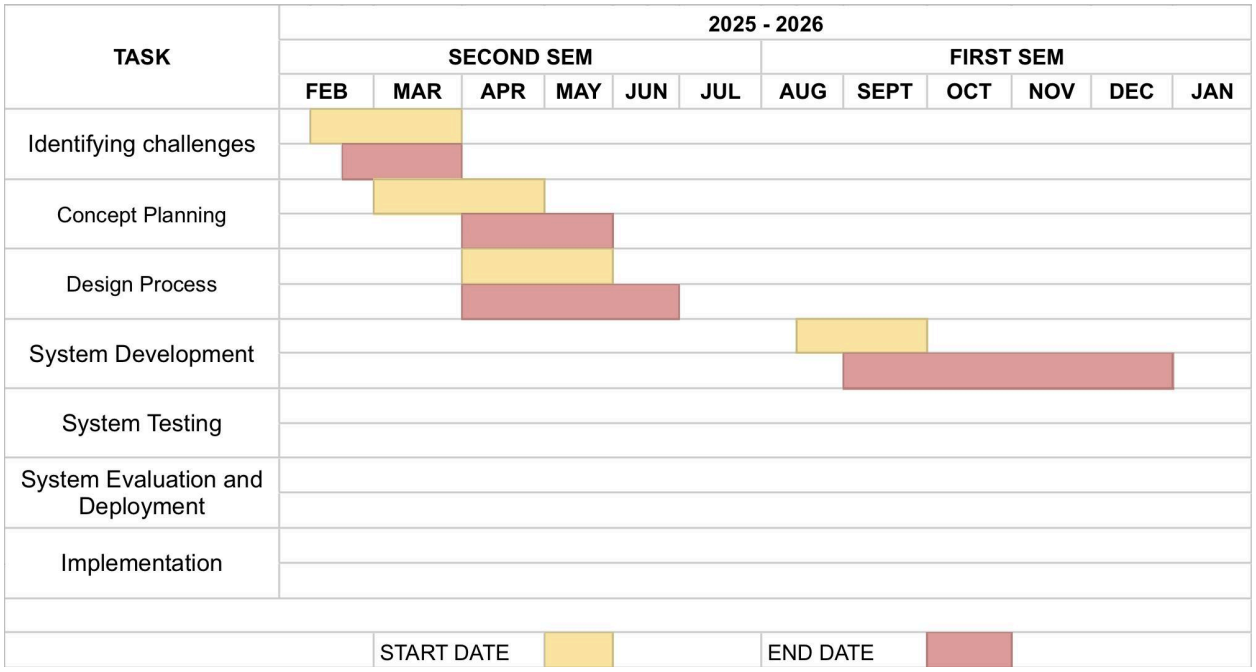
Digital Research Platform for Enhancing Academic Resource Access in PUPPQ Library	
PROJECT CHARTER	
PROJECT NAME	Design and Development of *SALIKSIK*: A Digital Research Platform for Enhancing Academic Resource Access in PUPPQ Library

PROJECT LEADER	Prof. Erwin E. Acorda
PROJECT MANAGER	Mary Jane E. Ugayan
CLIENT	Ms. Ayna Islao, PUPPQ Librarian
PROJECT SPONSOR	Not Applicable
START DATE	February 2025
COMPLETION DATE	
PROJECT DETAILS	
EXECUTIVE SUMMARY	
OBJECTIVE	To offer easily accessible academic materials like narrative books, thesis, and other research materials to improve the effectiveness of digital archiving on PUPPQ library and improve research processes.
EXPECTED BENEFITS	• Faster and easier access to academic materials improves research efficiency for students and faculty. • Better availability of updated resources enhances the quality of teaching and learning. • Digital archiving and smart search tools modernize library management and reduce manual errors.

STAKE HOLDERS AND THEIR RESPONSIBILITIES		
Stakeholders	**Role**	**Responsibility**
Mary Jane E. Ugayan	Project Manager, Quality Assurance Lead, Frontend Developer, Researcher	Planning, Team Coordination, Development, Executing Project
Bernadita C. Torion	Quality Assurance,	UI Design, Documentation,

	Backend and Frontend Developer, Researcher	Development, Resources
Dancris David R. Nerbar	Backend and Frontend Developer, Researcher	UI Design, System Functionality, Development, Resources
Arabella Manco	Quality Assurance, Researcher	Documentation, Resources
Prof. Erwin E. Acorda	Research Adviser	Checking, Monitoring
Ms. Ayna Islao	PUPPQ Librarian	Approval, Feedback, Requirement Specification, Communication, Monitoring

Figure 8. Gantt Chart



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