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 PUP Libraries

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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.

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 (PUP) libraries. A study by Serworno (2024) defines the application of digital platforms in higher education and identifies how these platforms support student learning while also highlighting the challenges associated with their use. It emphasizes the need for digital literacy programs to enhance the effective utilization of such platforms.

The Sustainable Development Goals (SDG), particularly SDG 4: Quality Education, emphasize universal access to education, improved learning materials and outcomes, and the reduction of educational disparities. This goal promotes the creation of systems that are inclusive, equitable, and capable of addressing both current and future challenges.

SALIKSIK will incorporate key features such as advanced search functionality, integration with digital databases, accessible user interfaces, real-time resource availability updates, and a borrowing feature that allows users to request and manage the borrowing of books and other materials through the platform. This borrowing system streamlines the loan process, enhances user convenience, and ensures better tracking and accountability of library resources.

According to Budney (2019), web-based platforms are powerful tools for sharing research. By combining the reach of mass media with personal communication channels, these platforms can raise awareness and encourage the adoption of evidence-based practices (EBPs). Digital dissemination strategies can enhance traditional methods, making it easier for stakeholders to access clear, actionable information and helping translate EBPs into real-world applications.

The development of SALIKSIK is a major step in modernizing PUP's library system. It is designed and implemented to meet the changing needs of the academic community and create a more dynamic and efficient learning environment. Students and faculty will benefit from this platform not only by accessing academic resources more easily but also by borrowing them in a more organized and user-friendly manner, ultimately improving research capabilities and the overall quality of education at the Polytechnic University of the Philippines.

Theoretical Framework

The theoretical framework for this study is based on the Unified Theory of Acceptance and Use of Technology (UTAUT), which aims to identify the factors influencing the acceptance and usage of SALIKSIK: A Digital Research Platform for Enhancing Academic Resource Access in the Polytechnic University of the Philippines - Parañaque Campus Library. The UTAUT model outlines four primary constructs that influence user behavior: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. These constructs are key in understanding the adoption and usage of the system by students, faculty, and library staff.

Performance Expectancy: Refers to the degree to which an individual believes that using the system will enhance their ability to perform academic tasks, such as finding, accessing, and borrowing academic resources. In the context of this study, users who perceive the system as beneficial for improving their research process including a simplified and efficient borrowing system are more likely to adopt it.

Effort Expectancy: The degree of ease associated with the use of the system. A system that is perceived as easy to use, intuitive, and straightforward will encourage higher levels of adoption. With SALIKSIK, if users find the system easy to navigate not only for searching resources but also for managing borrow requests and tracking borrowed items, their likelihood of continued use increases.

Social Influence: Refers to the degree to which individuals perceive that others (e.g., peers, faculty, and library staff) believe they should use the system. Social influence plays a significant role in technology adoption, especially in a university setting

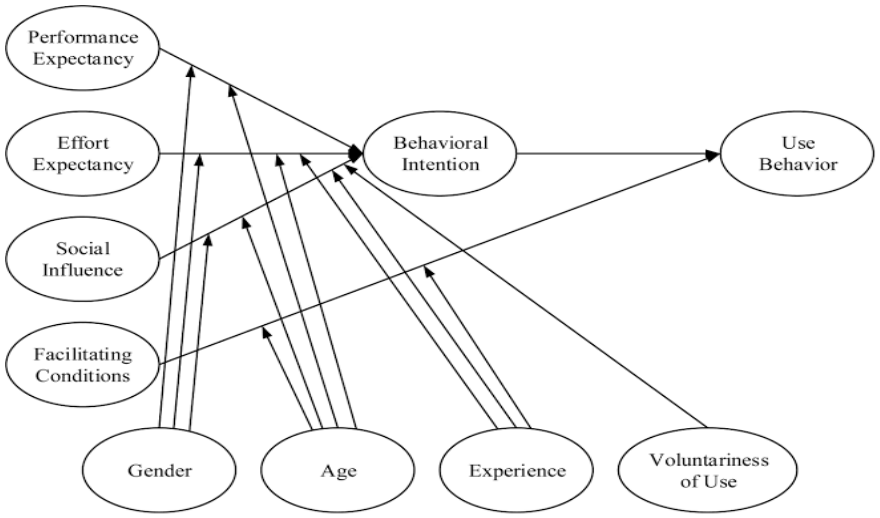
where faculty recommendations and peer usage such as borrowing and returning materials through SALIKSIK can strongly impact an individual's decision to use the system.

Facilitating Conditions: This component includes the resources and infrastructure available to the use of the system, such as access to computers, internet connectivity, and technical support. It also involves institutional support for features like the borrowing process, such as timely approval of borrow requests, notification systems for due dates, and guidance on using the borrowing functionality. The availability of these resources will influence whether users feel confident and capable of using the system effectively.

Intention to Use: Refers to the individual's willingness to use the system. It is influenced by the four aforementioned constructs (Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions). If users find the borrowing feature useful and reliable, it will contribute positively to their intention to use the system consistently.

Usage Behavior: Refers to the actual use of SALIKSIK: A Digital Research Platform for Enhancing Academic Resource Access. It reflects the extent to which users engage with the system to locate theses and narrative reports, as well as to borrow academic materials and manage their borrowed resources digitally, marking a shift from manual to streamlined library transactions.

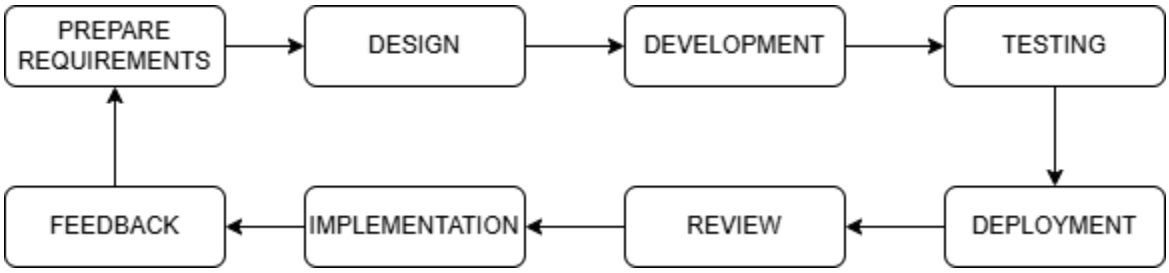
Figure 1. ***Unified Theory of Acceptance and Use of Technology (UTAUT)***



This theoretical framework, grounded in the UTAUT model, provides a structured approach to understanding the factors that influence the adoption and use of SALIKSIK: A Digital Research Platform to revolutionize academic resource access including the borrowing of materials among students, faculty, and library staff at the Polytechnic University of the Philippines - Parañaque Campus. By examining key constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions, this framework highlights how users perceive, interact with, and ultimately integrate the platform's features including its streamlined borrowing system into their academic routines.

Conceptual Framework

Figure 2. ***Agile Software Development***



The iterative Agile Software Development process will be used in the design of the digital research platform *SALIKSIK*. The requirements gathering, design, development, testing, deployment, review, implementation, and feedback phases are all included in this technique. The circular form of the process highlights its ongoing and cyclical character. By using this iterative cycle, the platform can be continuously improved and made to adapt to user input and shifting needs. Therefore, Saliksik will be regularly updated to meet the demands of its users and the ever-changing research landscape.

Agile development principles will make *SALIKSIK* adaptable and user-responsive, facilitating the quick delivery of major updates and enabling the seamless integration of new technologies. This approach ensures that the platform stays effective and user-focused, which contributes to improved research capabilities.

Statement of the Problem

One of the essential components of efficient research and education is having access to academic materials. However, finding relevant and reliable research materials remains a constant challenge for both faculty and students at the Polytechnic University

of the Philippines (PUP). These difficulties are caused by a lack of digital integration, outdated library systems, ineffective search engines, and restricted accessibility. The growing need for a more modern, centralized, and user-friendly academic resource platform frequently exceeds the value of traditional library services.

This study suggests creating *SALIKSIK*, a digital research platform that will improve the PUP community's access to academic resources, in order to address these issues. The platform will include a digital book borrowing system in addition to better digital research tools, giving users a single interface to borrow, and track both digital and physical books. By improving the borrowing process, this feature aims to cut down on the typical delays and misunderstandings that come with manual library transactions.

Specifically, the study aims to answer the following questions:

1. What are the challenges faced by students and faculty in accessing academic resources in PUP Libraries?
2. How can the "SALIKSIK" platform be designed to provide an efficient, centralized, and user-friendly digital research experience?
3. What key features and functionalities including book borrowing are necessary to improve academic resource access through the proposed platform?
4. How effective is the "SALIKSIK" platform in addressing the existing challenges in academic research accessibility within PUP?

By addressing these research questions, this study aims to contribute to the modernization of library services, fostering a more innovative and accessible academic environment for the PUP community.

General Objectives

The objective of this system is to create, develop, and utilize *SALIKSIK*: A Digital Research Platform for PUP Libraries, which will offer easily accessible academic materials like narrative books, theses, and other research materials. It aims to improve the effectiveness of digital archiving across all PUP branches and improve the research process. By making it easier to search for, borrow, and manage academic content, the platform aims to provide library staff and students with a well-integrated, user-friendly system that will ultimately promote a more accessible, well-organized, and productive research environment.

Specific Objectives

1. To analyze the existing research access methods in PUP Libraries 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 such as theses, narrative reports, and reference books.

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 Campus, with the potential for expansion to other PUP campuses.

Scope and Limitations of the Study

The design and development of SALIKSIK, a digital research platform intended to improve academic resource access within PUP Libraries, was the main focus of this study. By developing a web-based system that enables educators and students to effectively search for, access, and manage digital research materials, this study aims to address the difficulties presented by conventional research access methods. To provide a thorough and efficient research experience, the platform has an intelligent search engine with significant filtering capabilities, a user-friendly interface, a well-organized digital archiving system, and seamless integration with current library databases. The system also includes features like document classification, user verification, and personalized recommendations to further improve the research experience.

Scope

This study covers the design, development, testing, and evaluation of the *SALIKSIK* platform at the PUP Parañaque campus. It focuses on assessing the platform's usability, functionality, security, scalability, and overall impact on academic research accessibility. *SALIKSIK* will provide digitized access to theses, narrative reports, biographies, and reference materials, making them available both online and within the campus library for PUPian students and faculty. The system also includes a digital book borrowing feature, allowing users to search, reserve, and monitor the status of physical and digital books through the platform. The primary aim is to reduce dependence on physical research materials, improve access to academic resources, and enhance learning efficiency and productivity within the university.

Limitation

The initial focus of this study is the PUP Parañaque Campus. To guarantee efficient functioning, the platform's features—such as its search capabilities, digital archiving, book borrowing feature, database capacity, and server performance will be evaluated on this campus. The system does not cover the entire physical lending process outside of the platform, such as manual borrowing transactions or the logistics of in-person book circulation, even though

it has a digital book borrowing feature for managing both digital and physical resources.

The administrative, financial, and policy aspects of managing academic resources in PUP Libraries as a whole, as well as non-digital archival materials, are also not covered in the study. To get early feedback, a small user group made up of faculty, students, and librarians will be used to evaluate the platform. Through user feedback and analytics, the system's effectiveness, usability, and performance will be evaluated in order to improve it for future expansion to additional PUP campuses.

Significance of the Study

The development of SALIKSIK is significant for various stakeholders within the PUP academic community.

Students: This platform provides students with easy access to digital research materials, enabling them to quickly locate and utilize academic resources for their studies and research projects. It also allows them to search, and borrow physical and digital books through the system, making the research process more convenient and efficient.

Library personnel: SALIKSIK enhances library operations by streamlining digital research collection management and reducing the manual workload associated with traditional resource retrieval.

University Administration: By facilitating the digital transformation of the university library system, the platform supports the institution's objectives of modernizing academic services and fostering research productivity.

Future Researchers: This work lays the foundation for further investigation into improving digital library systems and developing more advanced resources for managing academic materials.

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.

PUP Libraries: The library system of the Polytechnic University of the Philippines, responsible for the maintenance and access to learning resources.

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.

Usability: Ease of use and interaction with the SALIKSIK platform.

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 PUP Libraries. It

identifies significant insights, best practices, and gaps that impact the system's design and effectiveness.

Technical Background

This study aims to explore the technologies, frameworks, and methodologies used to develop the SALIKSIK Digital Research Platform, a web-based system to enhance access to academic resources at the Polytechnic University of the Philippines–Parañaque Campus Library. The platform is designed to enhance access to research resources and provide a centralized digital repository that is accessible, efficient, and user-friendly for the retrieval of research resources. The platform enhances accessibility and optimizes the search functionality of research resources.

In the digital age, educational institutions have begun to turn to digital research platforms to enhance access to academic resources. According to De Groote et al. (2020), "Research Productivity and Its Relationship to Library Collections," faculty research productivity at US doctoral-granting universities has been studied in relation to library collections. According to the study, full-text article requests were the best predictor of research productivity, accounting for 10.2% of the differences in publication. This emphasizes the value of digital repositories that provide faculty and students with on-demand access to academic resources, thereby improving the research outcomes.

Additionally, Banu et al. (2023) investigated how user-centered design elements affect the behavioral engagement of Gen-Z library users in their study "Online Library Interfaces: A User-Centered Study on Design and Functionality Preferences of Gen-Z

Users." The study found that user engagement with digital library platforms is greatly influenced by interaction, accessibility and satisfaction. According to this research, integrating modern digital library features can improve academic resources' usability and accessibility for students as well as instructors.

Makris et al. (2021) addressed the effectiveness of NoSQL databases in digital libraries. According to their study, NoSQL databases enhance the effectiveness of digital libraries by structuring keyword-based searches, allowing users to locate academic materials more quickly and easily. Because of this, NoSQL is a great option for managing larger academic repository systems, like the SALIKSIK platform.

The SALIKSIK Digital Research Platform was developed using a modern web development stack that ensures scalability, security, and efficiency. The main Integrated Development Environment (IDE), which facilitated the development of the web-based application, was Visual Studio 2022. The backend was developed in JavaScript and runs on Node.js, which was chosen for its non-blocking architecture that can handle multiple requests at the same time. The Express.js framework forms the basis of the backend system, providing a scalable and lightweight platform while facilitating smooth communication between library administration, staff, and students. The front end was built using HTML, CSS, and JavaScript to provide a user-friendly and responsive experience. MongoDB is a NoSQL database used for database administration because of its efficient document-based storage structure, scalability, and flexibility.

The search and retrieval engine of the platform is an essential feature that ensures easy access to research resources. The SALIKSIK platform seeks to increase search efficiency by integrating full-text search capabilities, advanced filtering choices (by author, title, subject, and year), and recommendation algorithms based on user-search methods. These capabilities make it easier and faster for teachers and students to find relevant resources.

Securing academic material is an important aspect of the SALIKSIK platform. In an article titled ‘Cybersecurity and Data Breach Harms: Theory and Reality’," Opderbeck (2021) discussed the possible consequences of cybersecurity and data breaches in academic institutions. This study highlights how data breaches may compromise the integrity of research and academic institutions' authority, emphasizing the importance of strong cybersecurity measures. The SALIKSIK platform employs encryption for confidential academic information, backup procedures for data storage in case of system failure, and Role-Based Access Control (RBAC) to limit authorizations according to user roles (students, faculty, and administrators) to prevent unintended access.

The integration of cloud-based storage solutions into the SALIKSIK platform improves accessibility and scalability. In their research on "Leveraging Emerging Technologies to Expand Accessibility and Inclusion in Exercise and Rehabilitation," Smith and Thompson (2023) described how cloud infrastructure greatly enhances digital library accessibility by allowing users to access academic materials from many different types of devices, including computers, tablets, and smartphones. This feature makes

studying more flexible and convenient by allowing PUP instructors and students to access academic materials from anywhere at any time.

Through the use of cutting-edge web development frameworks, sophisticated search technologies, and secure data management techniques, the SALIKSIK Digital Research Platform seeks to transform the PUP Parañaque Campus academic resource access. It is anticipated that the system will increase user involvement, enhance research efficiency, and offer a scalable digital archive that can adapt to the changing demands of the academic community.

Challenges in Traditional Library System

The majority of library systems have had difficulty adapting to the digital age, especially in the Philippines. According to research by Bulacan State University (2021), students studying library and information science encountered difficulties during the pandemic, including restricted access to physical resources and insufficient digital infrastructure, which hindered their ability to learn. A comparable study at Mountain Province State Polytechnic College (2021) found that inadequate electronic materials, internet service issues, and a lack of classroom spaces all emphasized the need for modern library facilities.

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

RESEARCH METHODOLOGY

Research Design

The study employed a quantitative research design to assess the functionality and effectiveness of the SALIKSIK digital research platform in enhancing academic resource access at the PUP Libraries. A descriptive-correlational design was used, focusing on quantifiable data such as user satisfaction, frequency of use, and the perceived ease of access to resources.

Research Respondents

The study focuses on the Polytechnic University of the Philippines Parañaque City Campus Library. The researchers will be conducting a survey and interviewing PUP students as well as librarians.

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 Campus Library (PUPPQ) 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

The researchers will allow users to interact with the SALIKSIK before conducting a survey to assess its usability, effectiveness, and efficiency. Respondents were given the chance to independently explore the platform after being provided an overview of the system and its capabilities.

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

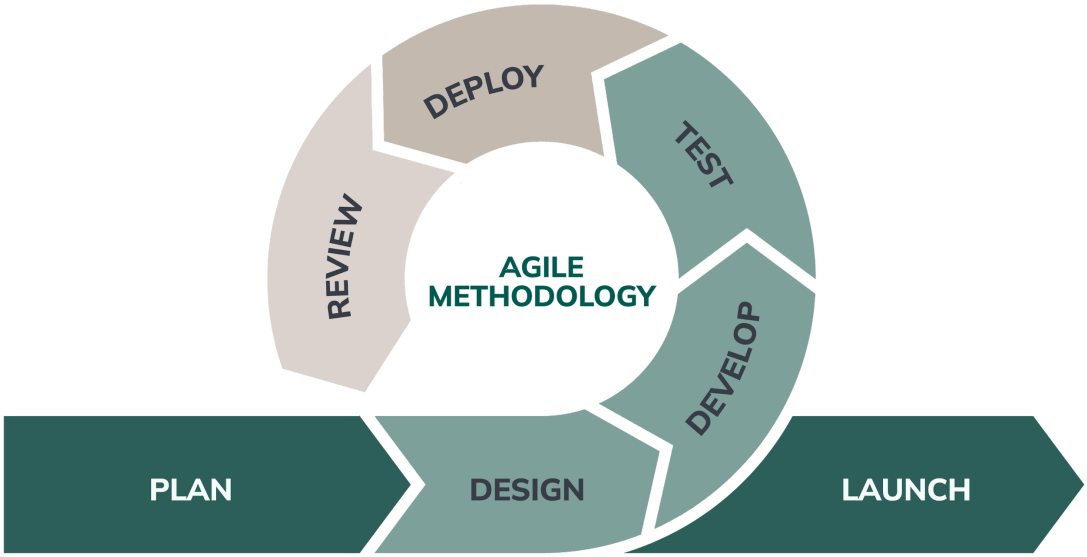
of this study. Participants were fully informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without any consequences. In addition to obtaining informed consent from participants, permission is also requested from the Librarian of 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.

Software Methodology

Figure 3.



Agile Software Development is a way of creating software that focuses on flexibility, teamwork, and regular improvement. Instead of building everything at once and releasing it at the end, Agile breaks the project into smaller parts. Each part is built, tested, and improved over short periods of time called iterations or sprints. This process helps the team make sure they're always working on what users really need. It also means the software can be updated regularly, instead of waiting for one big launch.

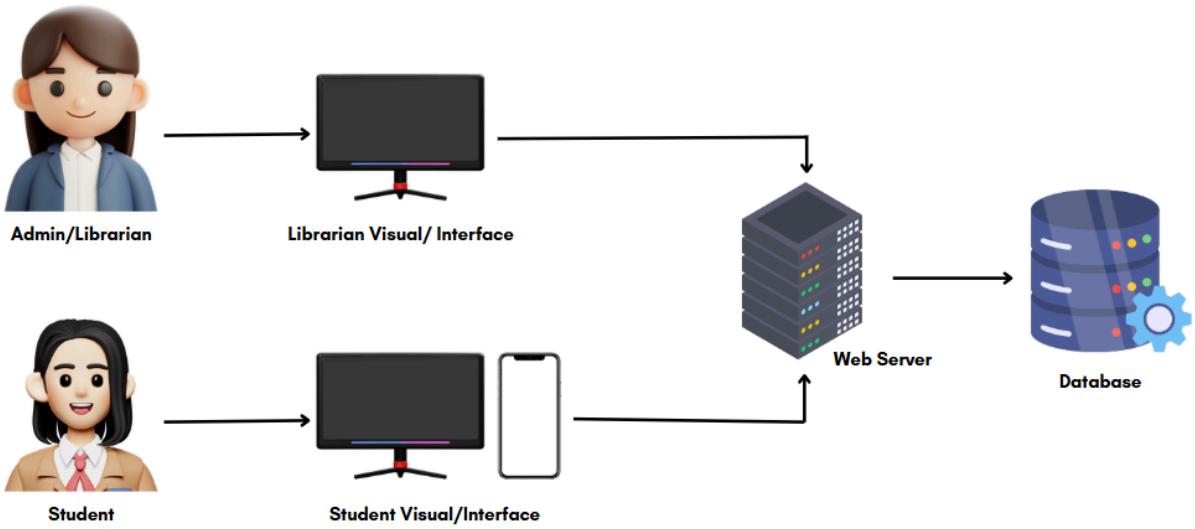
Let's take SALIKSIK, a digital research platform, as an example. Using Agile means SALIKSIK will be built step-by-step, with new features added and improved based on feedback from users. If researchers suggest changes or new tools, the team can quickly adjust and release updates without starting over. Agile helps make sure the platform stays useful, modern, and responsive which is especially important in research, where tools and needs are always changing.

System Architecture

The system architecture includes the Admin/Librarian and Student. The hardware components, such as the server hosting the database, are also included to ensure secure data storage, user access, and system functionality.

System Architecture

Figure 4.



Use Case Diagram

A use case diagram visually represents the interactions between users (actors) and a system, highlighting the system's functionalities from the user's perspective. The diagram helps identify key operations and relationships, aiding in understanding the system's scope and functional requirement.

Figure 5.1 Admin Use Case Diagram

This diagram shows the interaction between Admin and the System.

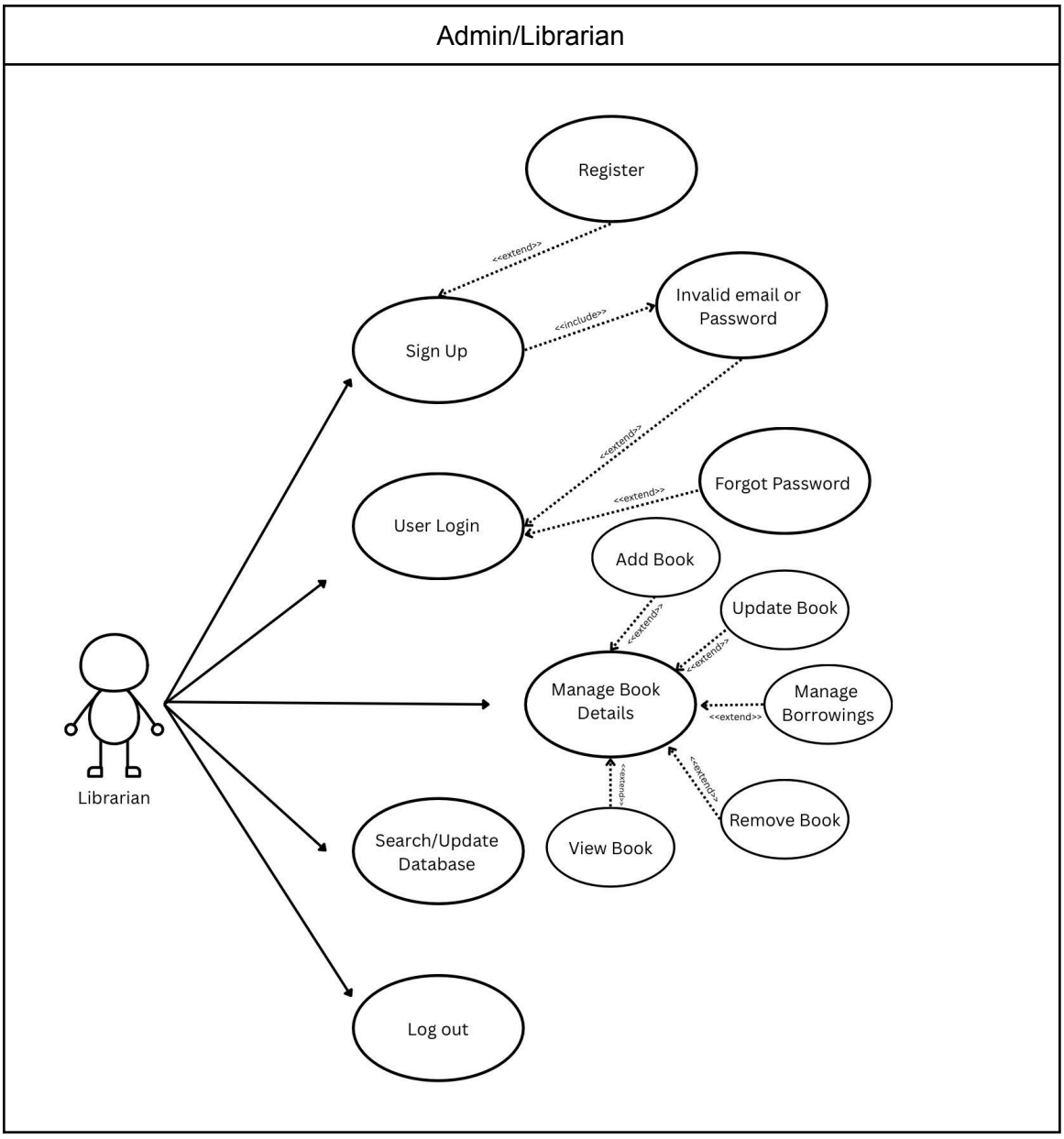


Figure 5.2 Student Use Case Diagram

This diagram shows the interaction between students and the System.

Vertical Container

Data Flow Diagram

Figure 6.1 Student Interface

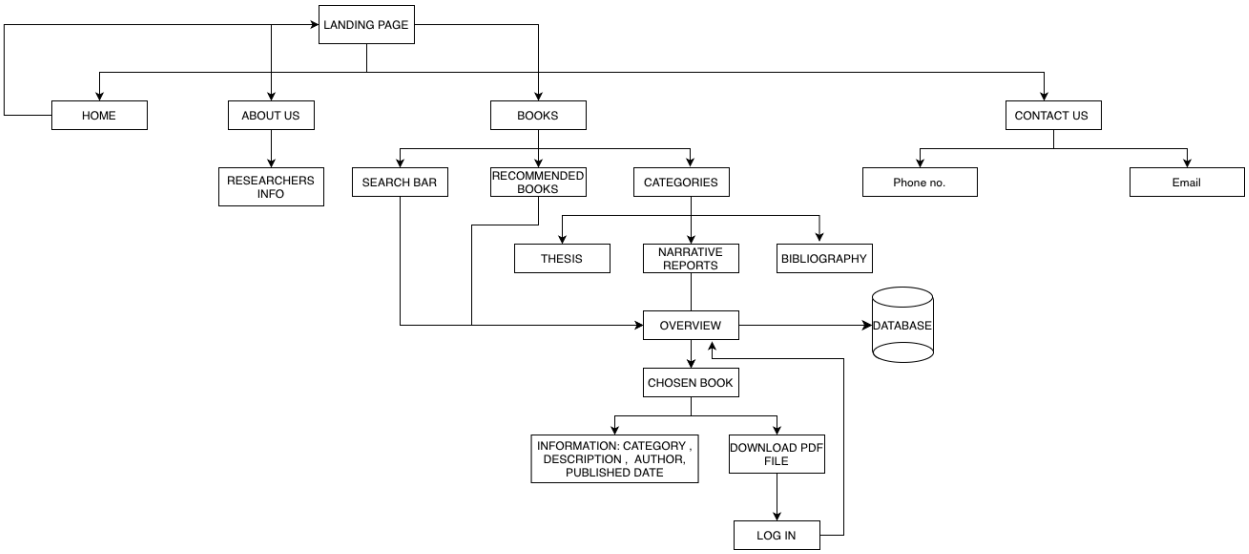
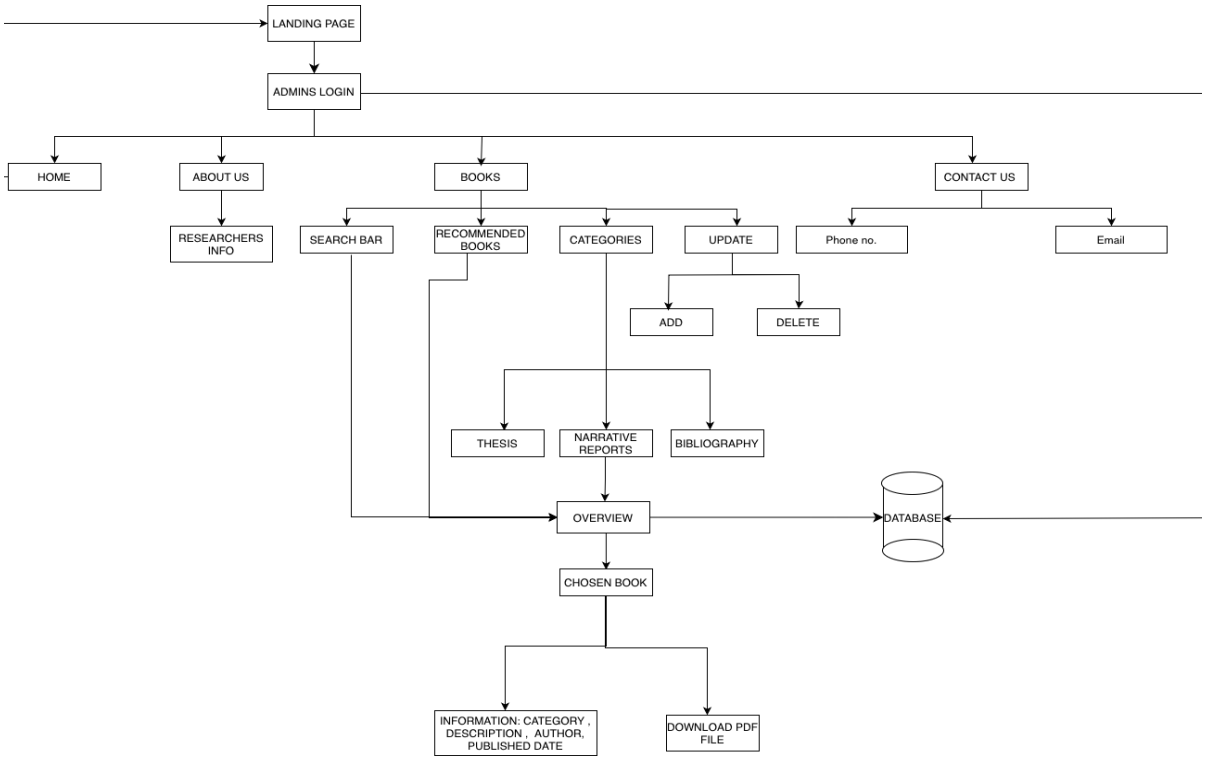
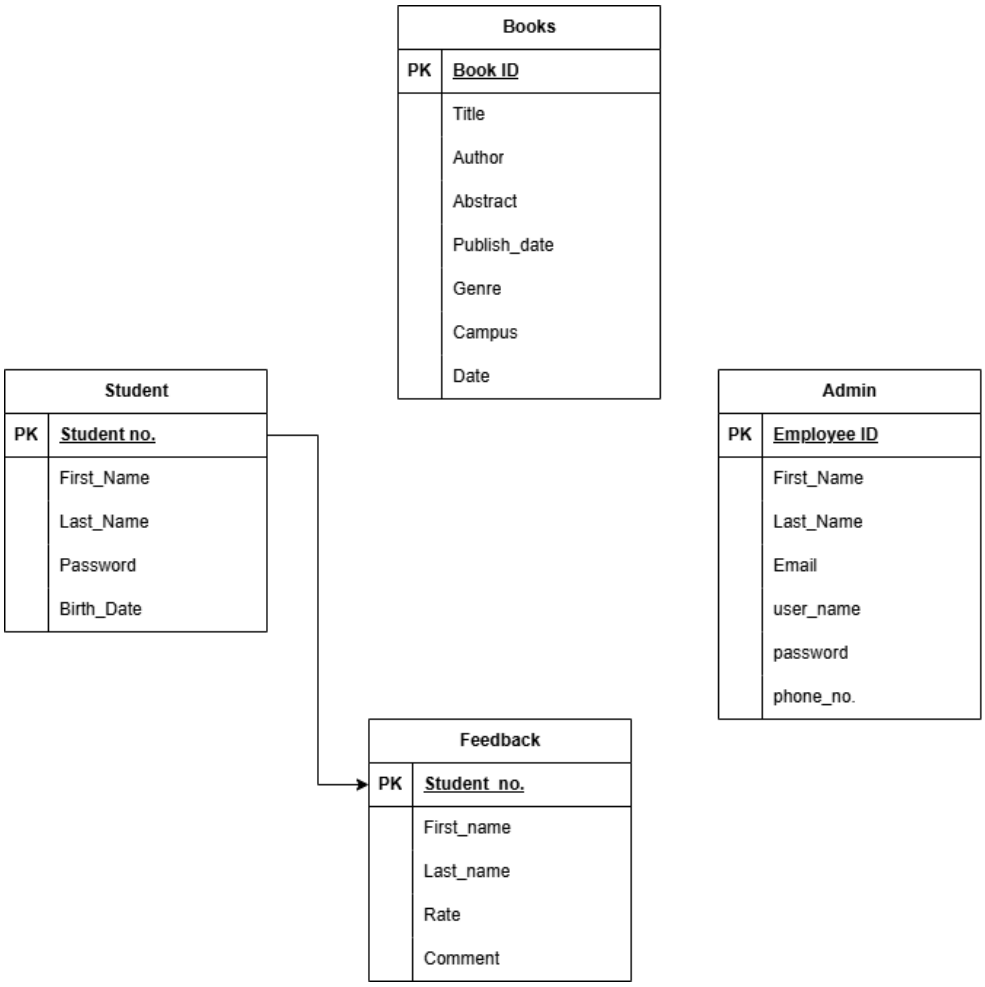


Figure 6.2 Admin Interface



Entity Relationship Diagram

Figure 7.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