

**SCHOOL OF ICT**  
**DEPARTMENT OF INFORMATION SYSTEMS**

***Proposed title: “DEVELOPING A UNIVERSITY DOCUMENTS REQUEST  
SYSTEM”***

*A research proposal submitted in partial fulfillment of the requirements for the degree of Bachelor of  
Information Systems*

***Submitted by:***

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**Wednesday, June 18, 2025**

## DECLARATION

We, Kyasimire kaitesi Joan, Pacifique Mbonimana and Umutoniwase Lynda fourth year students at the University of Rwanda, College of Science and Technology, Nyarugenge Campus, School of ICT, Department of Information Systems, hereby declare that the content of this final project, titled " **DEVELOPING A UNIVERSITY DOCUMENTS REQUEST SYSTEM** " is our original work. This project is submitted in partial fulfillment of the requirements for the award of a bachelor's degree in information systems. We affirm that, to the best of our knowledge, this work is original and has not been previously presented for any academic qualification. Furthermore, it has neither been submitted concurrently nor previously for any other degree or award at the College of Science and Technology, University of Rwanda. This project is developed by us under the guidance of Dr. Pierre BAKUNZIBAKE.

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## **CERTIFICATION**

This is to confirm that the project work permitted “DEVELOPING A UNIVERSITY DOCUMENTS REQUEST SYSTEM” is a record of the original remarkable work done by Kyasimire kaitesi Joan, Pacifique Mbonimana and Umutoniwase Lynda in fulfillment of the requirement for the award of bachelor’s degree in information system, College of Science and Technology.

Supervisor: Dr. Pierre BAKUNZIBAKE.

Signature: .....

Date: .... / .... /2025

Head of department: KURADUSENGE MARTIN

Signature: .....

Date: .... / .... /2025

## **DEDICATION**

We dedicate this project report to the Almighty God who gave us life and strength during the project.

We are grateful to our parents for supporting us in all our endeavors, for their caring and upbringing.

We are grateful to our supervisor for teaching us how to improve our project and for providing us with suggestions, support, and guidance while we implemented the project.

We are grateful to our lecturers as well since they have imparted knowledge to us that we may use outside of the context of our studies.

We would like to express our gratitude to our classmates and friends for their support throughout the four years of academics, and we hope that our cooperation will continue to be strong outside of the context of higher education.

## ACKNOWLEDGEMENT

We would like to express our heartfelt gratitude to the many individuals whose support and contributions made this project possible.

Firstly, we extend our sincere thanks to our friends and fellow students. Your unwavering support, insightful feedback, and encouragement throughout the development of this project have been invaluable.

Your collaboration and shared knowledge greatly enhanced the quality and scope of our work. We also acknowledge the contributions of other key individuals involved in this project.

To the staff and faculty at the university of Rwanda, department of information systems, particularly those who participated in interviews and provided critical insights into the existing manual process your input was crucial in shaping the requirements and functionalities of the new system.

Special thanks to the head of department, whose guidance and willingness to facilitate direct observations and document analysis were instrumental in our data collection and system design. Your support and feedback have been essential throughout the project's development.

Finally, we are grateful to all the students who participated in our online surveys. Your responses and valuable perspectives helped ensure that the system addresses the actual needs and challenges faced by users.

Together, these contributions have enabled us to develop a University Document Request system that aims to enhance efficiency, accuracy, and accessibility, benefiting both students and Information system department. We hope that this system will not only improve the current process but also serve as a scalable model for other departments in the future.

## ABSTRACT

This project presents the development of the University Documents Request System (UniDoc), a web-based platform designed to simplify the process of requesting academic documents at the University of Rwanda. The current manual process is slow and unclear, causing delays and communication issues. UniDoc will allow students to submit requests online, track progress, and receive notifications, while staff can efficiently review and process requests through a role-based system. Built using React.js, Node.js, and PostgreSQL, and developed using the Agile methodology, the system will first be deployed at the College of Science and Technology in the department of Information System. The goal is to improve efficiency, transparency, and service delivery for students and staff.



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### **List of Abbreviation**



## CHAPTER I: GENERAL INTRODUCTION

Academic institutions often require students to obtain official documents such as transcripts, recommendation letters, and certificates for various purposes including job applications, internships, and further studies. At the University of Rwanda, College of Science and Technology, the process of requesting these documents is still mostly handled manually. This leads to several challenges, including delays, lack of transparency, unclear procedures, and limited communication between students and administrative staff. As final-year students in the Department of Information Systems, we identified the need for a digital platform that could make this process more efficient and user-friendly. Our focus is on developing the UniDoc Request System designed to streamline the academic document request process. The system will allow students to submit requests online, track the progress of their applications, and receive notifications, while staff can manage and approve requests through a structured and centralized interface. This project not only aims to improve service delivery but also supports the university's efforts toward digital transformation by replacing outdated manual processes with an automated solution.

## **1.1 BACKGROUND**

At the University of Rwanda, College of Science and Technology, Information system students frequently need academic documents such as transcripts, recommendation letters, To WHOM and graduation clearance form for various academic and career-related purposes. However, the current process for requesting these documents is largely manual, slow, and lacks transparency. Students often experience delays, unclear procedures, and difficulty following up on their requests. As students from the Department of Information Systems, we identified this challenge and proposed a digital solution to improve efficiency and service delivery. Our project focuses on developing a system called Developing UniDoc Request system, which allows students to request academic documents online, track the progress of their requests, and receive timely updates. The system also helps university staff manage, approve, and issue documents more efficiently. This project applies technology to solve a practical problem within our university environment, with the goal of improving communication, reducing processing time, and enhancing the overall experience for both students and administrative staff.

## **1.2 PROBLEM STATEMENT**

At the University of Rwanda, College of Science and Technology, the current process of requesting academic documents such as transcripts, recommendation letters, and certificates is manual, slow, and lacks transparency[1]. Students face challenges including unclear procedures, delays in processing, lack of status updates, and difficulty in communicating with responsible staff. These issues not only frustrate students but also create inefficiencies for administrative staff who handle requests without a structured system[2]. There is a need for a digital solution that simplifies and streamlines the document request process by enabling online submissions, tracking, and communication[3]. This project aims to address these challenges by developing the UniDoc Request System, which will enhance service delivery, improve transparency, and reduce turnaround time for both students and staff[4].

### **1.3 SIGNIFICANCE OF THE STUDY**

This study is significant because it seeks to replace the time-consuming and error prone manual academic documents generation process in the department of information systems with an automated system.

### **1.4 PROJECT OBJECTIVE.**

#### **1.4.1 Main Objective**

The general objective of this project is to Design and develop a web-based UniDoc Request System that streamlines the process of requesting academic documents at the University of Rwanda, College of Science and Technology.

#### **1.4.2 Specific Objectives**

- To include a notification system for timely communication
- To design and implement an online platform that allows students to request academic documents
- To enable real-time Monitoring and status updates of these requests
- To ensure data security and user authentication for protecting sensitive information.

### **1.5 Scope of the project**

The scope of this project is limited to the Department of Information Systems at the University of Rwanda, College of Science and Technology. It focuses on providing final-year students and staff with a digital platform to request and manage academic documents efficiently.

## 1.6 Project schedule (Gant chat)

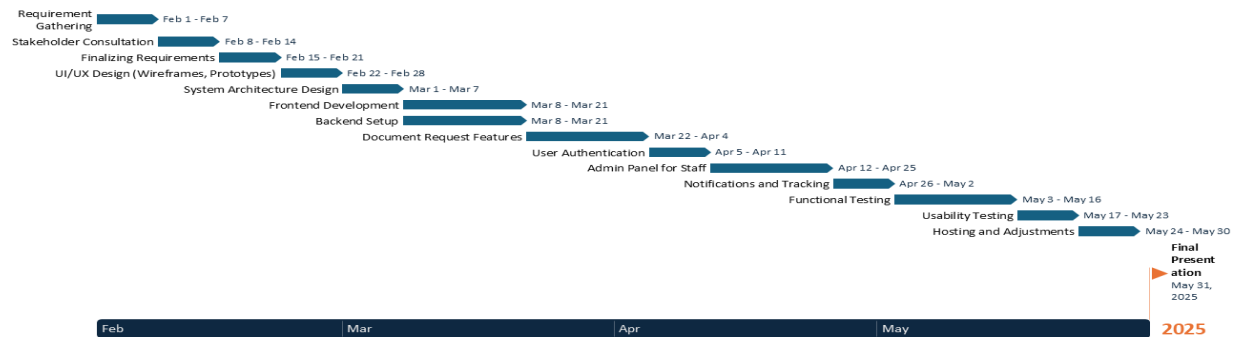


Figure 1:Gannt chart

## 1.7 Hypothesis

The implementation of an UniDoc Request System will result in several positive outcomes. Firstly, it is hypothesized that the system will improve efficiency by reducing processing times for generating academic documents. Secondly, the system will enhance accessibility for students by allowing them to request documents online and receive timely communication. Additionally, the system will ensure accessibility through prompt request status notifications. Furthermore, cost savings will be achieved through the reduction of transportation expenses and other related expenses. Finally, the system will facilitate the tracking and viewing process of reports, thereby providing valuable insights into documents management processes.

## 1.8 Case Study

This study specifically focuses on the Department of Information Systems at the College of Science and Technology (CST), University of Rwanda. This department has been selected as a case study because it includes a significant number of undergraduate and post-graduate students who frequently request academic documents, making it an ideal environment for testing and evaluating the proposed system.

## **1.9 ORGANIZATION OF STUDY**

This research is made up of chapter one, two, three, four and five whereby a brief explanation on each chapter is given below:

### **Chapter one: Introduction**

This chapter one is the general introduction and explains the project work. It tells about the problem statement, the objective of the study (General objective and specific objectives), scope of the study, expected results, hypothesis, case of the study and organizational of the study.

### **Chapter two: Literature review**

This second chapter is about the literature review where many theories that have been done before by other people, however these theories are related to our project.

### **Chapter three: Research Methodology**

The third chapter encompasses a research methodology, which describes the iterative model as well as the identification of the Requirement to the System.

### **Chapter four: System analysis, Design, and Implementation**

This chapter provides the results obtained from the project work done and a discussion to provide the project work in detail. It shows in detail the account of how the system was done and completed depending on the system design.

### **Chapter five: Conclusion and Recommendation**

This part includes the conclusion whereby we talk about the summary of the main findings of the project as whole. The recommendation part talks about what should be done as an improvement, and lastly the further work.

## Chapter II: Literature Review

### 2.1. Introduction

This chapter explores the existing body of work relevant to the development of a University Document Request System. It provides insights into similar systems, highlights their strengths and weaknesses, identifies gaps that this project aims to address, and outlines the expected outcomes[5]. By synthesizing previous research and practical implementations, this review lays a strong foundation for crafting a practical, user-focused solution. Document management systems (DMS) play a critical role in efficiently handling academic and institutional processes[6]. The increasing digitization in academia has emphasized the need for robust, user-friendly systems for managing electronic documents. This chapter examines existing systems, identifies gaps, and outlines the expected outcomes of a proposed project.

### 2.2. Terms and definitions

**Academic Documents:** Official documents issued by an academic institution, including transcripts, recommendation letters, and certificates. These are the primary focus of UniDoc's request and management functionality[5].

**Agile Methodology:** An iterative approach to software development emphasizing flexibility, user feedback, and incremental delivery. UniDoc was developed using Agile, allowing for continuous improvement[6].

**Digital Transformation:** The integration of digital technology into all areas of an institution, fundamentally changing how it operates and delivers value. UniDoc contributes to the digital transformation of the University of Rwanda's document processing.

**Document Management System (DMS):** A software application used to track, manage, and store documents. In this project, the DMS facilitates the digital handling of academic document requests such as transcripts and recommendation letters.

**Notification System:** A feature that sends alerts or updates to users. In UniDoc, it is used to inform students and staff of request statuses or required actions

**Request Tracking:** The ability to monitor the status and progress of a submitted request. UniDoc allows users to view real-time updates on their document requests.

**Role-Based Access Control (RBAC):** A security approach that restricts system access based on users' roles. UniDoc uses RBAC to provide different privileges to students, staff, and administrators.

**System Efficiency:** The ability of a system to perform tasks with minimal waste of time and resources. UniDoc aims to improve system efficiency by automating manual processes and reducing delays.

**User Authentication:** A security process to verify a user's identity before granting access. In UniDoc, this ensures that only authorized students and staff can access and manage document requests.

**Web-Based System:** A system that operates on web technologies and is accessed through a browser over a network. UniDoc is a web-based system that enables students and staff to interact online for document requests

**Transcript:** An official academic record showing a student's courses, grades, and academic achievements. In the UniDoc system, students can request their transcripts digitally.

**Automation:** The use of technology to perform tasks with minimal human intervention. The UniDoc system automates academic document requests, reducing manual work and errors.

**Real-Time Updates:** Instant notifications or system responses to changes or actions. In UniDoc, students receive immediate status updates about their document requests.

**Role-Based Access Control (RBAC):** A security model where access rights are assigned based on a user's role (e.g., student, HOD, registrar). The UniDoc system ensures that only authorized users can perform certain actions[1].

**Agile Methodology:** An iterative approach to software development focusing on collaboration, flexibility, and customer feedback. UniDoc uses Agile for planning and implementing features in sprints.

**User Interface (UI):** The visual part of the application that users interact with. UniDoc aims to provide a user-friendly interface to make requesting documents simple and intuitive.

**PostgreSQL:** A powerful open-source relational database used to store data. In UniDoc, PostgreSQL will store user profiles, document requests, and tracking statuses.

**Document Workflow:** The step-by-step process that a document follows from request to approval and delivery. UniDoc digitizes this workflow to increase efficiency.

**Digital Transformation:** The integration of digital technologies into everyday processes to improve efficiency and service delivery. The UniDoc system contributes to the digital transformation of university services.

**System Integration:** The process of linking different computing systems and software applications. UniDoc has potential for integration with other university platforms (e.g., student management systems).



## 2.3. EXISTING SIMILAR AND RELATED WORKS

### 1. Design and Implementation of an E-Transcript System using Web services

The article titled *"Design and Implementation of an e-Transcript System using Web Services"* by Ramani Garikipati and Billy B. L. Lim discusses how modern Web Services technologies can be applied to automate and secure the academic transcript transmission process[1]. The study is motivated by the inefficiencies of traditional paper-based transcript systems, which are time-consuming and lack interoperability[1]. The authors adopt a Service-Oriented Architecture (SOA) approach, employing technologies like WS-Security, WS-Policy, WS-Trust, and WS-Secure Conversation to ensure secure and standardized communication between institutions[1]. The methodology centers on creating a loosely coupled, firewall-friendly system that can work across diverse platforms using HTTP. Their findings indicate that Web Services provide an efficient and scalable solution for transcript exchange, especially for B2B (Business-to-Business) interactions[1]. However, the paper lacks real-world implementation details, user feedback, and integration with existing institutional systems. Despite this gap, the study offers a strong technical foundation for future development of secure, interoperable e-transcript platforms[1].

### 2. Streamlining Academic Document Requests: Leveraging an Online Management System

The paper "Streamlining Academic Document Requests: Leveraging an Online Management System" by Marienel N. Velasco et al. addresses the inefficiencies in manual document request systems within Philippine universities[2]. It presents the development of a web-based document tracking and request system for the Registrar's Office of PUP Sto. Tomas using the System Development Life Cycle (SDLC) and technologies such as PHP, MySQL, and HTML. The study employed quantitative methods with a structured questionnaire, assessing the system using ISO/IEC 25010 standards[2]. A critical gap identified is the reliance on physical processes that limit transparency, efficiency, and accessibility for students and alumni[2]. The new system introduced features like real-time tracking, admin analytics, and automated request processing. Results showed high user satisfaction, with the system rated "excellent" across all ISO categories. This highlights its effectiveness in improving academic record management and digital transformation in higher education[2].

### **3. Cloud-based Documental Management System: A Bibliometric Review Analysis**

The article "Cloud-based Documental Management System: A Bibliometric Review Analysis" by Duarte Silva and Carlos Coutinho (2024) explores the role of cloud-based Document Management Systems (DMS) in enhancing supply chain management[3]. The study uses a Systematic Literature Review (SLR) method with bibliometric analysis, drawing from the Elsevier Scopus database and filtering down to 494 relevant articles published between 2010 and 2024. The abstract highlights cloud DMS benefits such as improved accessibility, cost reduction, sustainability, and security[3]. Findings show that cloud solutions help reduce paperwork, carbon footprint, and administrative inefficiencies while supporting digital transformation in logistics. The research identifies four key keyword clusters technology, supply chain, sustainability, and cloud computing revealing the interdisciplinary nature of the topic[3]. A notable gap is the lack of in-depth studies on integration standards and cross-industry DMS implementation strategies, suggesting directions for future research[3].

### **4. The System of Computer-Aided Design of Organizational Documentation in The Context of Digitalization of the University.**

The paper *"The System of Computer-Aided Design of Organizational Documentation in the Context of Digitalization of the University"* by I. Muzyleva, A. Gorlach, L. Yazykova, Y. Gorlach, and A. Martynova from Lipetsk State Technical University investigates the automation of Work Program of Discipline (WPD) creation in universities[7]. The Authors highlights the burden on teachers due to repetitive and manual documentation, proposing a partially automated system that minimizes routine work using MS Word and Excel templates[7]. The research employ methodology includes a comparative review of existing systems and the design of a departmental automation method[1], [7]. They find out that to reveal that current systems are costly, unscalable, and lack WPD automation, increasing teachers' workloads. Their proposed approach simplifies WPD generation by structuring reusable inputs, thus reducing duplication. However, a research gap exists in scalable, creative-friendly solutions adaptable across institutions and disciplines[7].

## **2.3 Summary and Motivation for Developing UniDoc Request System**

Several existing systems developed in universities have successfully digitized academic document requests, improving speed and service delivery. However, most of these systems still face challenges such as limited integration with other institutional platforms, lack of user-role management, and scalability issues. These gaps highlight the need for a more flexible and secure solution. Our project, the UniDoc Request System, is motivated by these shortcomings and aims to provide a centralized, role-based, and scalable platform tailored to the needs of students and staff at the University of Rwanda.

## **CHAPTER III: PROJECT METHODOLOGY**

### **3.1 Introduction**

The methodology section outlines the processes undertaken to gather the necessary data for this study. A survey was distributed to students, comprising a series of structured questions aimed at understanding our perspectives and experiences. Additionally, information was gathered through interviews and discussions with concerned staff to provide further insights and context. This approach was selected to ensure a comprehensive understanding of the topic, leveraging the diverse perspectives of both students and staff.

### **3.2 Data collection techniques**

Our research utilized a combination of qualitative and quantitative methods to gather insights into the current process of requesting academic documents such as transcripts, To WHOM, Recommendation and Graduation clearance certificate and expectations for an automated solution. Structured interviews with the Head of Department, direct observations of the manual academic document processing, document analysis of existing academic records, and an online survey with students were conducted to provide comprehensive data for system development.

#### **3.2.1 INTERVIEWS FINDINGS**

The structured interviews with the Head of Department provided valuable qualitative insights into the current system for processing academic documents. The Head of Department highlighted several key challenges, including delays in processing requests, difficulties in tracking the status of requests, and the need for improved efficiency and transparency. Additionally, expectations for an automated solution included real-time updates on request statuses, and user-friendly interfaces. system.

### **3.2.2 OBSERVATION RESULTS**

Direct observations of the current manual academic documents processing process revealed several inefficiencies and potential inaccuracies. These included bottlenecks in processing requests, manual data entry errors, and delays in communication between staff like HOD and students. The observations provided valuable qualitative data corroborating the challenges identified during the interviews and highlighted areas for improvement in the new automated system.

### **3.2.3 DOCUMENT ANALYSIS FINDINGS**

Analysis of existing academic records and transcripts within the Information Systems department provided insights into the structure and content of transcript templates. The analysis focused on understanding the specific needs and requirements of the department in developing a digital UniDoc system format.

### **3.2.4 ONLINE SURVEYS**

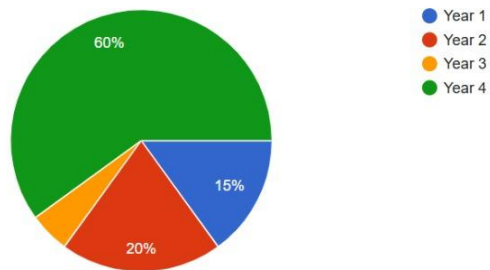
20 students have completed the online survey. No demographic data beside gender were collected. We did not collect any personal identifying data about respondents. All participants enrolled in the College of science and technology, Department of information systems.

The results of the study from the 20 surveyed students are summarized below

1. What is your year of study?

20 responses

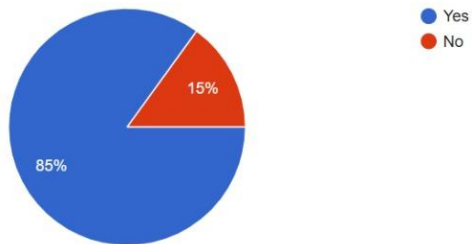
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2. Have you ever requested an academic document from the university?

20 responses

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## Section 2: Current Challenges with Manual Document Requests

Which academic documents have you requested in the past? (Select all that apply)

20 responses

 Copy chart

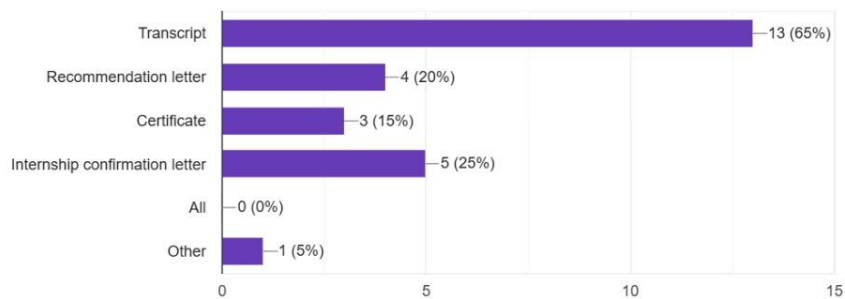
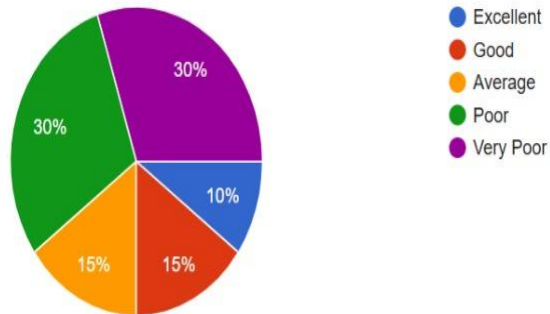


Figure 2: Results of online survey

How would you rate the current manual process of requesting academic documents?

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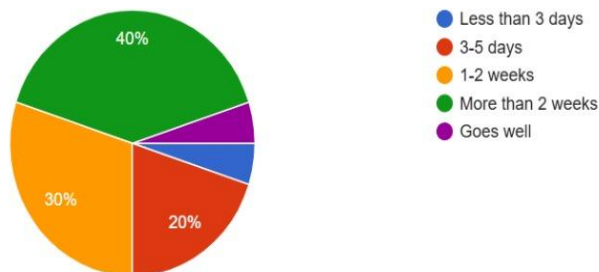
20 responses



How long does it typically take for your requested document to be processed?

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20 responses



### 3.3 DATA ANALYSIS

#### 3.3.1 Addressing Dissatisfaction and Delays:

A notable portion of students, representing approximately 45% of the respondents, expressed dissatisfaction with the current transcript request process. Additionally, about 55% reported encountering delays, indicating room for improvement. An online platform could streamline the process, reducing delays and addressing dis-satisfaction.

### **3.3.2 Enhancing Convenience and Clarity:**

While some students found the current process convenient and instructions clear, a considerable number did not. Developing an online platform could offer a user-friendly interface with clear instructions, enhancing convenience for all students and reducing confusion.

### **3.3.3 Meeting the Demand for Real-Time Updates:**

The majority of students, constituting approximately 81% of respondents, emphasized the importance of real-time updates on the status of their transcript requests. An online platform could provide instantaneous updates, improving transparency and keeping students informed throughout the process.

### **3.3.4 Improving Tracking and Accessibility:**

A significant proportion of students, representing approximately 55%, reported difficulties in tracking the status of their transcript requests. An online platform could offer a centralized tracking system accessible to all students, simplifying the process and ensuring transparency.

### **3.3.5 Responding to Student Preferences:**

More than half of the respondents, representing approximately 55%, expressed a preference for an online platform for transcript requests. Developing such a platform would align with student preferences and enhance their overall experience.



### **3.2.6 Embracing Technological Innovation:**

Most students, constituting a total of 100%, expressed willingness to use a new automated system if it offered improved efficiency and transparency. Introducing an online platform would demonstrate the institution's commitment to leveraging technology to meet students' needs and expectations.

### **Conclusion**

The data highlights a clear demand for an online platform for transcript, To WHOM, Recommendation and Graduation clearance form requests among students. Developing such a platform would not only address current dissatisfaction, delays, and confusion but also align with students' preferences for technological solutions. By providing real-time updates, enhancing convenience and clarity, and improving tracking and accessibility, an online platform would significantly improve the transcript request process for all students

### **3.4 Software Development methodology**

This section outlines the software development methodology employed to guide the creation of the system. The chosen methodology ensures efficient planning, development, and deployment while maintaining flexibility to adapt to changing requirements. For this project, the Agile methodology will be used due to its iterative and collaborative approach, which promotes continuous improvement and stakeholder involvement.

# AGILE METHODOLOGY

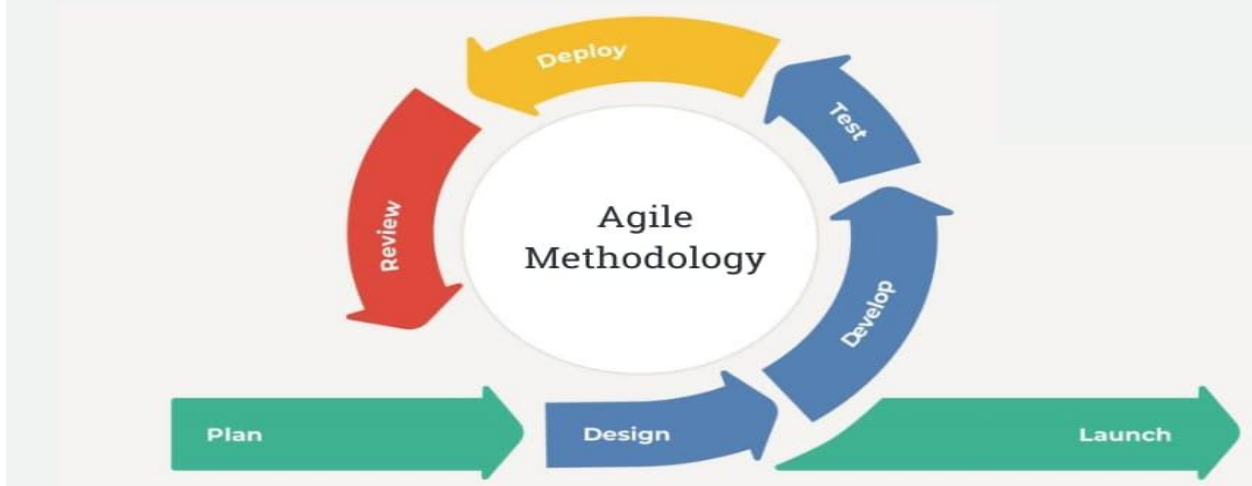


Figure 3: Research methodology

Agile software development is a work philosophy, and a method based on collaboration, iteration and flexibility. It is characterized by iterative and incremental development, adaptive planning, continuous delivery, continuous integration, automated testing and more. Agile fosters close

collaboration between developers, stakeholders, and users, ensuring that the system meets user needs effectively.

## 3.4.1 Development process

### Requirement Gathering:

During this phase, input was gathered from stakeholders, including students and staff, through surveys and interviews. These inputs formed the basis of user stories and system requirements.

**Planning:**

The project will be divided into multiple sprints, each lasting two weeks. Each sprint will focus on delivering a specific set of features, with clear goals and deliverables.

**Design:**

The system architecture and user interfaces will be designed using wireframes and prototypes. This phase ensures that both functional and non-functional requirements are addressed.

**Development:**

Code will be written in JavaScript using React for the frontend and Node.js for the backend, with PostgreSQL as the database. Version control will be managed using GitHub, and development followed best practices to ensure code quality.

**Testing:**

Each sprint will include testing phases, where features are tested for functionality, usability, and performance. Unit testing and integration testing are performed using tools such as Jest.

**Deployment:**

The system will be deployed interactively to ensure feedback from users could be incorporated into subsequent sprints.

**Review and Feedback:**

At the end of each sprint, a review will be conducted to evaluate progress, address challenges, and refine future sprints.

The following tools and technologies will be employed:

- Frontend: React.js
- Backend: Node.js and Express.js
- Database: PostgreSQL
- Version Control: Git and GitHub
- Project Management: Trello for sprint planning and progress tracking
- Deployment: Docker and Heroku for containerization and hosting

By adopting the Agile methodology, the project team will be able to deliver a robust and user-focused system that will meet the requirements of students and staff. The iterative approach will allow for continuous improvement and alignment with stakeholder needs, ultimately ensuring the success of the software development process.

## **CHAPTER IV: SYSTEM ANALYSIS, DESIGN AND IMPLEMENTATION**

### **4.1. SYSTEM ANALYSIS**

#### **4.1.1 SYSTEM REQUIREMENT**

##### **1. Functional Requirements Summary:**

The system facilitates comprehensive user management, allowing students and staff to register and log in using their university credentials, with access governed by their role (Student, Staff, Admin).

Users can submit document requests online such as transcripts and certificates with each request being validated and assigned a unique tracking ID, supporting various document types.

A structured processing workflow enables staff to review and approve or reject requests through multiple stages, with each status (e.g., Submitted, Under Review, Approved) being tracked.

The notification and communication module provides real-time updates via email/SMS, includes a student-staff messaging system, and sends automated alerts for status changes.

The system also supports document generation, automatically producing downloadable PDF files embedded with digital signatures. Finally, reporting features offer management dashboards and analytics for request volume, processing efficiency, and staff performance.

## **2. Non-Functional Requirements Summary:**

The system is designed for high performance, with a maximum 3-second response time, support for up to 100 concurrent users, and capacity to handle 500 requests daily.

Security is ensured through AES-256 encryption, HTTPS/TLS protocols, role-based access control, and daily automated data backups.

To maintain reliability, the system targets 99.5% uptime, with a recovery time not exceeding 4 hours, and includes built-in fault tolerance and robust error handling.

The usability requirements emphasize a responsive, mobile-friendly design with an intuitive interface, support for multiple languages, and full accessibility compliance.

From a technical standpoint, the system will be built with a React.js frontend, Node.js backend, and PostgreSQL database, ensuring compatibility with major browsers and cross-platform deployment.

### 4.1.3. System Architecture

The Architecture Design Diagram provides an overview of the system's architecture, including its components, layers, and dependencies. It illustrates how different modules or subsystems interact and communicate to fulfill the system's requirements. This diagram helps stakeholders visualize the system's structure and organization, guiding decisions related to scalability, performance, and maintainability.

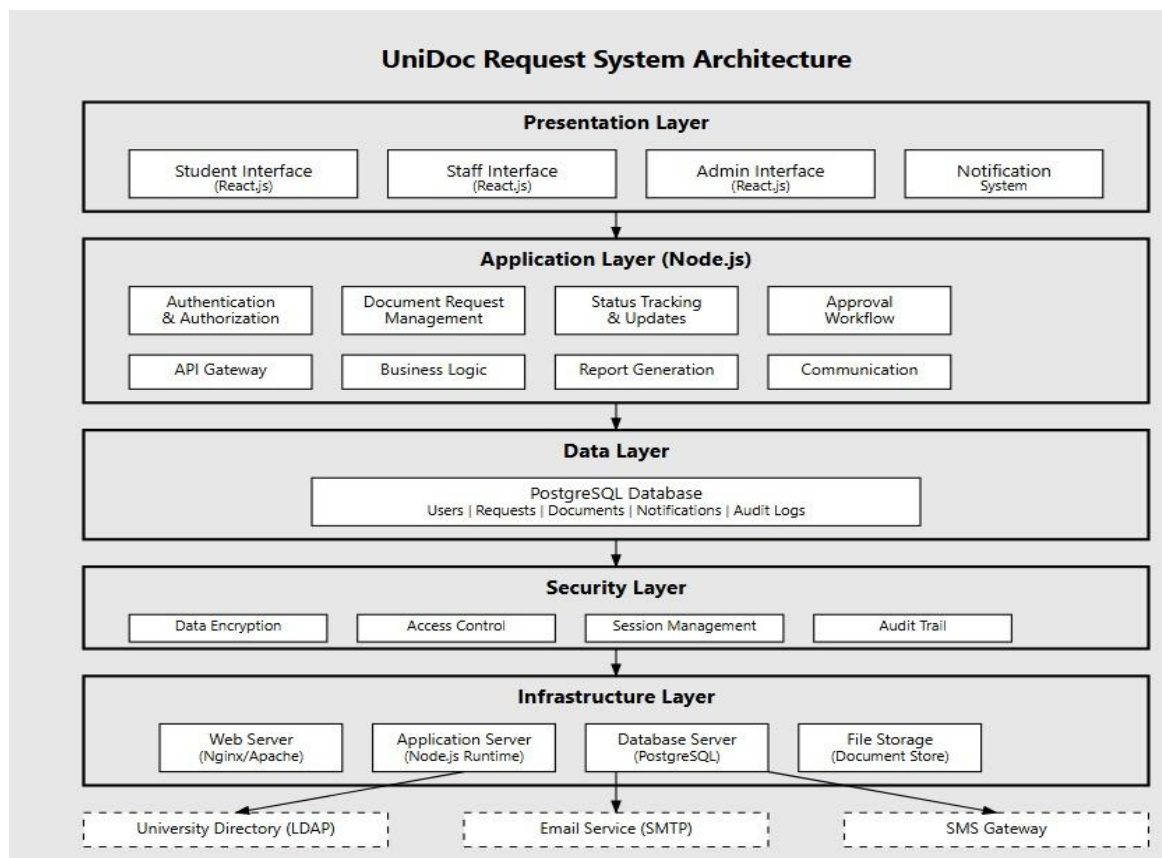


Figure 4: System architecture

### 4.1.3 Flow Chart

The flow chart visually represents the sequential flow of activities or processes within the system. It illustrates the step-by-step progression from input to output, including decision points and branching paths. Flow charts are valuable for understanding the logic and control flow of the system, helping stakeholders visualize the sequence of operations and identify potential bottlenecks or inefficiencies.

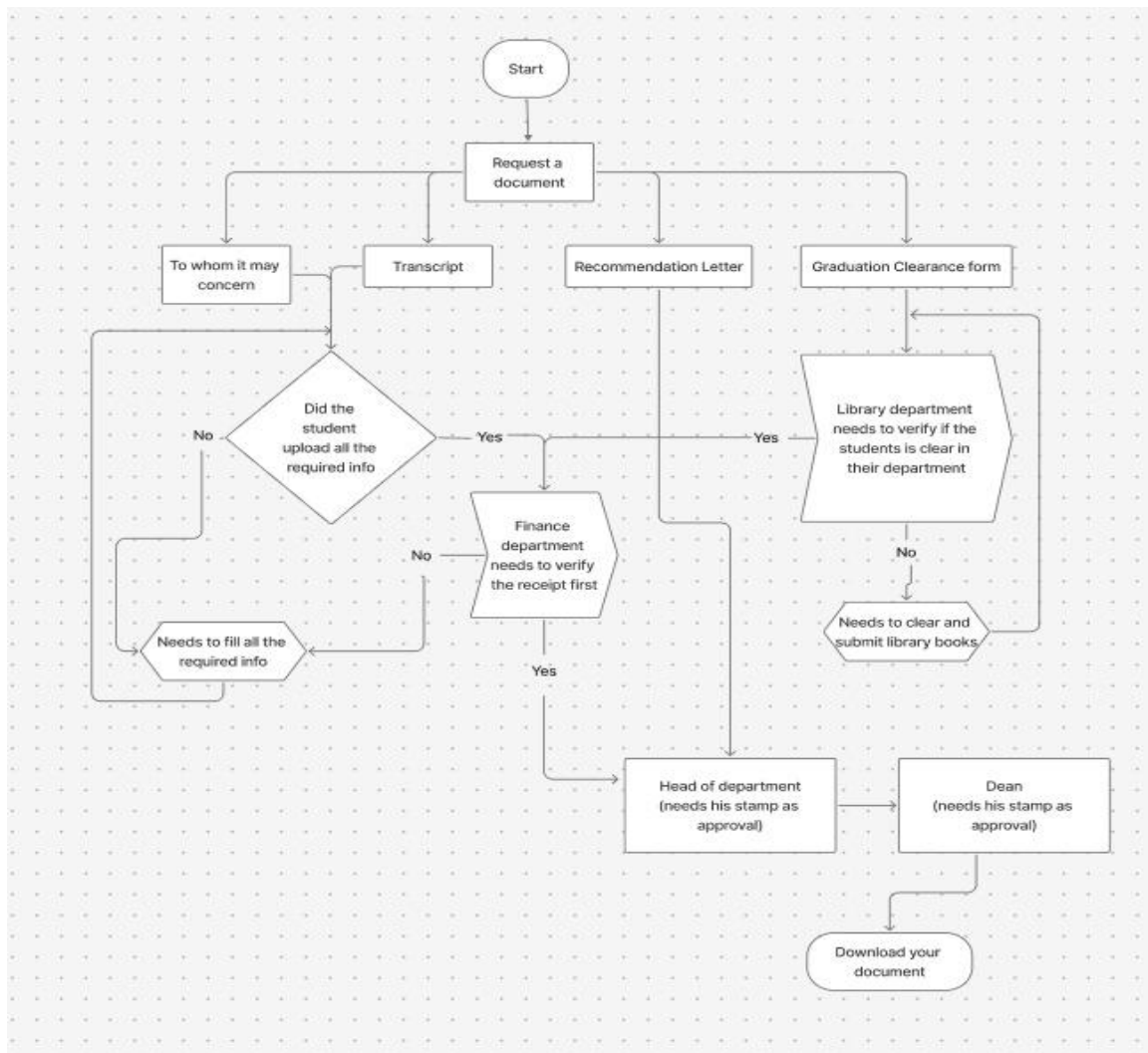


Figure 5:flow chart



## 4.2 SYSTEM DESIGN

### 4.2.1 Use Case Diagram

The Use Case Diagram captures the system's functionalities from the perspective of its users. It represents the interactions between actors (users or external systems) and the system's use cases (functional requirements). Use Case Diagrams help stakeholders understand the system's behavior and how users interact with it to accomplish specific tasks or goals.

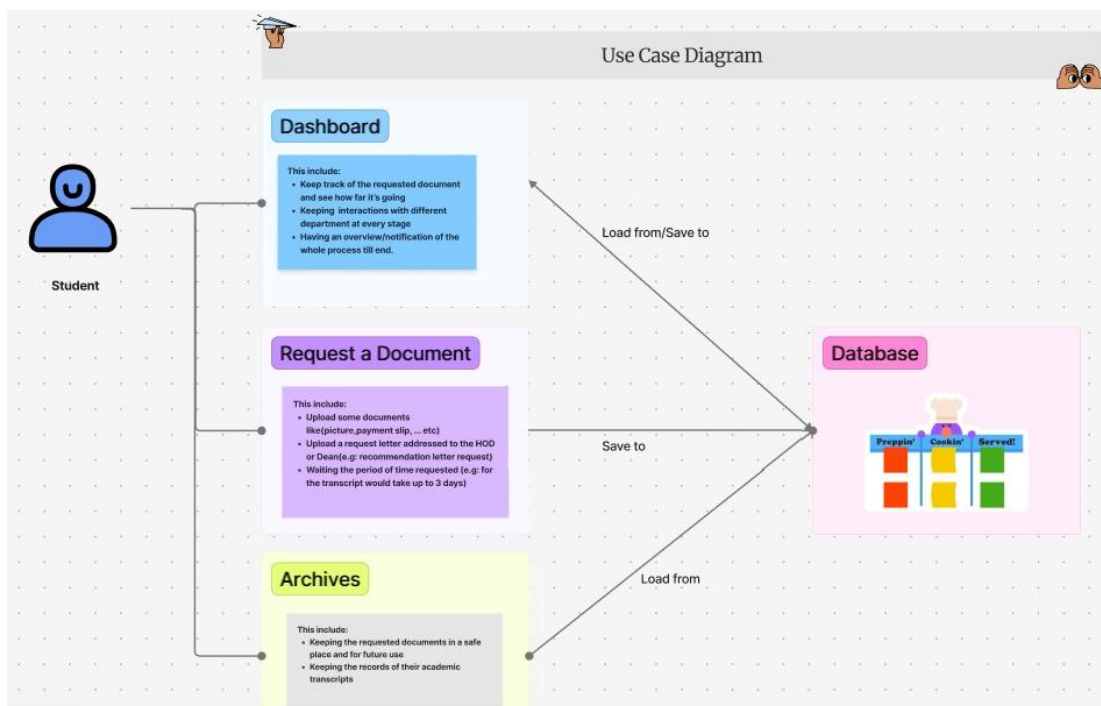


Figure 6: use case diagram

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