

A WEB-BASED CLEARANCE SYSTEM

CASE STUDY: NAGONGERA CAMPUS BUSITEMA UNIVERSITY

BY

NASSER TWAIFU

BU/UP/2023/1507

+256 703093401/ +256 762984018

twaiFun8@gmail.com

**A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF COMPUTER
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AWARD OF BACHELOR OF INFORMATION TECHNOLOGY OF BUSITEMA
UNIVERSITY**

SUPERVISOR

DR. LUKYAMUZI ANDREW & MR. MULIKA GERALD

DEPARTMENT OF COMPUTER STUDIES

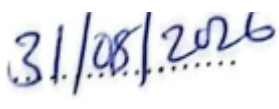
FACULTY OF SCIENCE AND EDUCATION

AUGUST, 2026

DECLARATION

I **NASSER TWAIFU** BU/UP/2023/1507, declare that I have carried out this study in this report.

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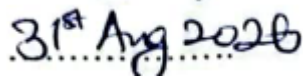
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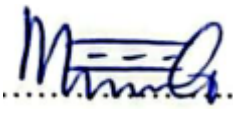
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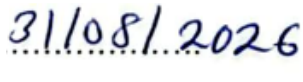
Sign: 

Date: 

DR. LUKYAMUZI ANDREW

Department of Computer Studies, Faculty of Science Education

Sign: 

Date: 

MR. MULIKA GERALD

Department of Computer Studies, Faculty of Science Education

DEDICATION

I thank the Almighty Allah who successfully enabled me to complete with a sound mind and good health. I then dedicate this report to my inspirer of all times my father **TWAIFU KASSIM**. I also appreciate my lovely mother **NABWIRE TOPISTER** and Grandmother **JAMAWA KASSIM** who have been putting me in their prayers. Thank you so much for the support and may the Almighty Allah reward you abundantly.

Special thanks to my dear supervisors **DR. LUKYAMUZI ANDREW** who guided me on the dos and don'ts passed on making this report a success. For if it was not him, maybe I would not shoot the tip of this mountain.

Let me also thank everyone that has put his/her effort in support for my education up to this level including my dear colleagues (BIT/CS class) as well: Owor Joshua and Okello Kitara Emmanuel. I would like to dedicate this report to them too. Since I would not have completed this research without their help. Thank you, my dear friends, May the Almighty Allah bless you.

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With happiness I sincerely thank my fellow students for they indeed helped me so much to attain this great level through encouragements, discussions, and a lot more. If it wasn't you my dear ones, I think I would not climb this mountain

Never the less, I acknowledge all my friends in the whole community of this great institution that made my life a success at **NAGONGERA CAMPUS (BUSITEMA UNIVERSITY).**

May God bless you all abundantly?

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LIST OF ACRONYMS

API – Application Programming Interface

CSS – Cascading Style Sheets

HTML—Hypertext markup language

HTTP - Hyper Text Transfer Protocol

HTTPS - Hyper Text Transfer Protocol Secure

JSON – JavaScript Object Notation

PWA - Progressive Web Application

RAD – Rapid Application Development

RDBMS - Relational Database Management System

MySQL – My Structured Query Language

SSADM - Structured Systems Analysis and Design Methodology

ABSTRACT

The clearance process at Busitema University, Nagongera campus, has been traditionally using a manual, paper-based approach that requires students to physically move across multiple departments to obtain approvals, this has proven to be inefficient, time-consuming, and prone to errors such as document loss and lack of transparency in tracking clearance progress (Jonathan et al., 2019; Emmanuel Ifeanyi, 2013). As a result, students experience delays in completing their clearance while staff face difficulties in record management and monitoring of departmental activities.

This study focused on design and implement a Web-Based Clearance System aimed at improving the efficiency, transparency and reliabilities of clearance process. Drawing on best practices from existing online clearance systems (Agbo-Ajala & Makinde, 2015), the proposed system enables students to submit clearance requests digitally, track their progress in real-time, and receive automated notifications regarding approvals or rejections. Department officers can process clearance requests through dedicated dashboards, while administrators can monitor the entire process, generate reports, and manage user accounts.

A mixed-methods approach was used, combining interviews and questionnaires to gather system requirements from administrators, lecturers and students. The system was developed using the Rapid Application Development (RAD) approach within Structured Systems Analysis and Design Methodology (SSADM) framework. Implementation was carried out using XAMPP, PHP, MySQL, HTML, CSS, and JavaScript.

The system was tested through unit, integration, functional, and user acceptance testing. The results from validation indicated improved efficiency, reduced progressing time and increased user satisfaction. The findings confirm that the proposed system effectively address the limitations of the manual clearance process and support digital transformation in university administration. Future work should focus on hosting the system on a commercial cloud platform and extending it to a Progressive Web Application (PWA) for enhanced mobile accessibility.

CHAPTER ONE: INTRODUCTION

1.1 Background of study

Around the world, many universities and organizations have adopted web-based systems to improve efficiency, accuracy, communication, and accessibility in administrative processes. Web-based systems help reduce paperwork, improve record management, enhance monitoring, and provide faster access to information.(Adamu, 2022; Crockett et al., 2018; Ojukwu Emmanuel Ifeanyi, 2013).

Clearance is a mandatory process that all graduating students must undergo before they can officially exit an educational institution. It serves as a formal certification that a student has fulfilled all academic, financial, and administrative obligations, including payment of tuition and library fees, return of borrowed materials, settlement of hostel dues, and completion of departmental requirements (Jonathan et al., 2019; Agbo-Ajala & Makinde, 2015).

The manual clearance process, which is still prevalent in many institutions, is time-consuming and stressful. Students are required to visit multiple offices—often including the library, bursary, academic department, faculty, student affairs, health center, sports department, and hostel—to obtain signatures and stamps on a physical clearance form (Ifeanyi, 2013).

Several researchers have developed online clearance systems to address these challenges.(Agbo-Ajala & Makinde, 2015) developed a web-based database-driven student clearance system using PHP and MySQL to eliminate delays associated with the manual process. However, their interface was not user-friendly, making it difficult to navigate.

The proposed Busitema University Online Clearance System aims to address the gaps identified in both the manual process at Nagongera Campus and the limitations of existing online systems. Unlike fragmented solutions, this system uniquely combines several best practices: a centralized MySQL database for secure data storage, role-based dashboards for students, department officers, and administrators, real-time status tracking for students, and administrative reporting tools. The system is built using PHP (server-side scripting), MySQL (database), HTML/CSS (frontend styling), and JavaScript (client-side interactivity). This web-based solution will eliminate the need for physical movement, reduce paperwork, enhance transparency, and provide administrators with the tools needed for effective monitoring and decision-making.

1.2 Problem statement

Manual clearance system at Busitema University is paper-based which is inefficient, time-consuming, and limit transparency and accountability. Students face challenges such physical movement across multiple departments leading to time wastage and transportation costs, Loss or misplacement of clearance forms requiring students to restart the process, Department officers struggle with paper-based record-keeping that is difficult to manage and retrieve, Lack of centralized information about student obligations and Administrators face challenges with Limited oversight of the clearance process across departments, Inability to identify bottlenecks in the clearance workflow, Difficulty in generating reports on clearance completion rates, No centralized data for decision-making and process improvement.

The lack of a centralized and secure digital system hinders efficient monitoring of clearances, delays feedback, and compromises decision-making. There is therefore a critical need for a web-based Online Clearance System which will automates and easy the workloads on the administration and address.

1.3 Main objective

To develop a web-based Online Clearance System for Busitema University that will enables students to apply for clearance digitally, allows department members to process clearances efficiently, provides transcript request functionality, and offers administrators tools for monitoring, clearance, and decision-making.

1.4 Specific objectives

- 1) To review literature and determine requirements for a university online clearance system.
- 2) To design a web-based clearance system based on identified requirements and user needs.
- 3) To implement the proposed system using suitable modern technologies (XAMPP, PHP, MySQL, HTML, CSS, JavaScript).
- 4) To test and validate the web-based clearance system to ensure usability, reliability, security, and accuracy.

1.5 Significance of the study

The need for a web-based clearance system at Nagongera Campus Busitema University is clear due to the limitations of current manual clearance system for helping students apply and submit request for clearance with departments and administrators. The present reliance on paper records results in poor student's record keeping, limited ability to monitor, track and report processed clearance by Department officers. Administrators also face limited oversight of the clearance workflow, inability to identify bottlenecks, and lack of data for strategic decision-making. These inefficiencies result in frustrated students, overworked staff, delayed graduations, and an institutional image that does not reflect the university's commitment to digital transformation and quality service delivery. This gap contributes to the growing problem of manual clearance systems in universities in Uganda. The successful completion of this study provided several important benefits: online Clearance Application and Submission where by Students apply and submit clearance request digitally with required documents , Real-Time Multi-Department Status Tracking where the system provides students with live visual dashboards, Department-Specific Processing Workflows where Each department officer has access to a dedicated dashboard displaying pending clearances for their department only, Automated Email Notification System where The system automatically sends email notifications to students and relevant officers at every stage of the clearance process including application submission, department approvals, rejections with reasons, and final clearance completion, ensuring all stakeholders stay informed without manual follow-up, Integrated Transcript Request Management where Students can submit online transcript requests specifying purpose, Comprehensive Administrative Dashboard and Reporting where Administrators have access to system-wide statistics, department performance metrics, Automated Certificate Generation and Audit Trail where by Upon completion of all departmental clearances, the system automatically generates a digital clearance certificate with a unique certificate number, timestamp, and complete audit trail documenting every action taken on the clearance request.

1.6 Scope of the study

1.7.1 Geographical Scope

The study was conducted at Nagongera campus Busitma University, located in Nagongera Town Council in Tororo District about 17 kilometers from Tororo town along Tororo-Busolwe road.

1.6.2 Content Scope

A web-based clearance system provides a complete digital platform designed specifically for student's clearance at Nagongera campus Busitema University. The system allows students to apply and submit clearance request to intended departments. Instead of focusing on precise measurements, the system uses a custom database of clearance to identify clearance patterns.

The system features multiple user roles, including students, departments, and administrators. Core functionalities of the system include clearance request submission, progress status tracking, feedback provision, approval and rejection of clearance request.

Administrators are responsible for system management tasks such as user registration, Departments allocation, milestone tracking, approvals, and overall system monitoring. Students are responsible for logging into the system, submitting clearance request, and tracking clearance progress. Departments review request, provide feedback, and approve or reject milestones and reports.

In addition, the study will examine best practices in the implementation of Clearance Systems from other educational institutions and organizations. Particular attention will be given to the effectiveness of existing clearance tools, identification of gaps in user engagement, and the potential benefits of a centralized platform for managing learning and assessment processes.

1.6.3 Time Scope

The study was conducted over a period of three (3) months, beginning from 1st January 2026 to 30th March 2026.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This literature review examines existing research and implemented systems related to web-based clearance management system. The review synthesizes findings from multiple studies conducted across various higher education institutions.

2.2 A Web-Based Database-Driven Students' Clearance System.

(Agbo-Ajala & Makinde, 2015) defined clearance as a certificate giving permission to disengage from an institution, noting that final year students who have satisfied the academic requirements to graduate must undergo a clearance process before they disengage from the university.

The study identified that the process of clearing involves the student's academic department, faculty, bursary, student affairs, library, hostel, sport department, health Centre, and registry (exams and records). A student is allowed to collect his/her graduation certificate only after he/she has been cleared or something to be done. The authors stated that currently, the student's clearance process is done manually in institutions.

The authors identified problems with the existing system including lack of database management, lack of good user interface, slow in processing information, information subject to mutilation and dampness, characterization by the use of pen and paper, and increased stress and work rate for administration staff. The proposed system was expected to be better than existing ones in terms of speed and features. All criticized points (limitations) in the existing systems were to be handled.

The systems analysis methodology for developing and implementing the student's clearance system was adopted from the software engineering project models derived from the traditional System Development Life Cycle (SDLC), broken down into requirement gathering, design, programming, implementation and testing, and maintenance. The functional requirements for the student clearance system included administration of users (three types of users: unit clearance officer, student users, and system administrator) and user authorization. Non-functional requirements included usability which the authors stated that The system must be errorless in the most common web browsers such as Chrome, IE 8 and 9 , Firefox, Opera, and Safari and then

reliability which the authors stated that The system must not contain errors making some system functionalities unavailable or errors disturbing the user while working with the system.

The system was implemented on a HP laptop running a WAMP server 4.2 on Windows 8, MySQL 5.00, and PHP 5 and the Hardware Requirement: The minimum hardware requirement is a Pentium 4 computer system with processor speed of 233 MHz, RAM 256MB and hard disk of 1GB running either Windows 7 (and above) or Linux Operating systems. The main modules of the clearance system included Login Module, Main Module, Clearance Registration Module, Cleared/Not Cleared Module, and Administer Module.

The study concluded that the Student Clearance System was able to manage student clearance processes across all departments and units and eliminated the weaknesses of the manual process which mainly lacked a centralized repository for the clearance process. The clearance application can be used for recording and certifying that a student is cleared to disengage or not, with clearance status determinable at any point in time.

2.3 Design and Implementation of Online Clearance System: A Case Study of Caritas University.

(Ifeanyi, 2013) conducted a study on the design and implementation of an online clearance system using Caritas University as a case study. The study noted that online clearance system is a research work that will help build an effective information management for schools, aimed at developing a system for making clearance after graduation hitch-free. The designed software serves as a more reliable and effective means of undertaking students' clearance, removing all forms of delay and stress as well as enabling understanding of procedures involved in online clearance.

The study identified that the processes of clearing students after their graduation require that students be cleared in various departments and information units including library fines, overdue or lost library materials, departmental dues, infirmary and bookstore charges, residence hall damage charges, return of athletic equipment, student union fee, and bursary and all other charges. For a graduating student to carry out clearance from all these departments, it normally takes a lot of time with many processes and delays.

The objectives included effectively and efficiently processing students' clearance, providing a reliable and transparent system devoid of personal inclinations and interest, providing borderless access, ensuring prompt clearance, and alleviating the problems and stress of travelling and queuing up of students during clearance.

The implementation of the computer-based system was carried out using PHP, CSS, APACHE, and MYSQL for the database. The researcher was able to replace the error-prone manual system with the new automated online clearance system. Data can now be processed with great speed and efficiency. The application has the ability to update records in various files automatically, thereby relieving university staff from the stress of working from file to file, and security of data is ensured.

The study concluded that the effectiveness and efficiency of the new system provides room for further improvements. The online clearance system developed will offer greater opportunities in school management. All transactions or payments with regards to student clearance can be carried out online. Recommendations included that a full portal be developed for effective and wholesome implementation of information management technology, that students' academic records be linked in such a way that non-graduating students will not gain access into the clearance module, that a centralized database system with high data-integrity be adopted, and that commissioned updating be entrenched for real-time record update.

2.4 Online Student Clearance Management System.

(Mangubat et al., 2023) developed an Online Student Clearance Management System to address challenges in the manual process of signing student clearances. The study noted that the transformation of manual processes and transactions into digitized versions is one of the significant capabilities of Information and Communications Technology in bringing efficiency and convenience to academic institutions.

The current process of signing student clearance involves a piece of paper indicating office names, and office heads or representatives must affix their signatures. Students carry this paper and submit it to various offices for signing. The manual process is stressful to students as it requires them to move from one office to another, is time-consuming, makes the clearance form

vulnerable to fraud, clearing officers may be absent causing wasted time and delays, and it is possible to lose documents due to fire or rainfall.

The Waterfall Model was used as the basis for developing this system, adapted as a research design methodology due to its structured and systematic approach. The development also adopted IEEE (Institute of Electrical and Electronics Engineers) recommendations in software engineering, referring to standards and best practices for developing, documenting, and maintaining software projects.

Phases included requirements specification, planning, designing, development/implementation, testing, deployment, and maintenance. The system is a web-based application that enables students to process clearance online and office heads to approve or disapprove clearance. Technologies used included HTML5, PHP, MySQL, JavaScript, and Bootstrap. A use case diagram was created showing that a student can request clearance approval and generate a QR code. The QR code generation feature activates when the entire clearance signing process is completed; this code is then shown to the final office where students settle their final examination bill to acquire a final examination permit.

2.5 Streamlining Student Clearance in Higher Education: A Web-Based Solution

(Eweoya et al., 2025) conducted research on streamlining student clearance in higher education using a web-based solution. The authors noted that the clearance process for graduating students in higher education institutions has traditionally relied on manual, paper-based procedures, which are often time-consuming, prone to errors, and lack real-time communication between departments. These inefficiencies result in delays, misplaced documents, and bottlenecks in the issuance of certificates and transcripts.

According to the authors citing Nneji et al. (2018), academic clearance is a process that grants students access to necessary documents or information, allowing them to complete their graduation requirements and proceed with the graduation procedure. This multi-step process typically involves obtaining approval from various departments such as the library, bursary, academic units, and student affairs. Citing Adamu (2022), the authors noted that traditionally, this process is executed manually, requiring students to physically visit each department to obtain signatures or stamps on a clearance form.

The system includes functionality for generating reports on clearance progress and maintaining an audit trail of all user activities. User management is a core feature, with the system supporting role-based access control to define permissions for different user types such as students, department officers, and administrators. Additional features include search and filter options for user records, batch processing of approvals, and data export capabilities in formats like PDF and CSV.

Feedback gathered from students and administrative staff indicated a positive perception of the system's usability and operational efficiency. And the authors recommended institution-wide adoption of web-based clearance systems, integration with existing student portals for seamless user experience, regular staff training on efficient system use, incorporation of user feedback mechanisms for continuous improvement, and scalability to cover other administrative functions such as hostel clearance, alumni tracking, and transcript processing.

2.6 Features of Electronic/Executive Clearance Systems

1. **Centralized Repository:** A single database that stores all student records and clearance statuses, eliminating scattered paper files (Agbo-Ajala & Makinde, 2015; Eweoya et al., 2025).
2. **Role-Based User Modules:** Different interfaces and permissions for students, departmental clearance officers, and system administrators (Agbo-Ajala & Makinde, 2015).
3. **Real-Time Status Tracking:** Students can log in to monitor their clearance progress across all departments (e.g., Library, Bursary, Department) without physical visits (Eweoya et al., 2025; Ifeanyi, 2013).
4. **Online Request & Approval Workflow:** Students submit clearance requests online, and officers approve or reject them digitally. This often includes automated notifications (email or SMS) for updates or pending actions (Eweoya et al., 2025; Mangubat et al., 2023).
5. **Integration Capabilities:** Ability to integrate with existing institutional portals, payment gateways for fee verification, and potentially QR codes for final certificate issuance (Eweoya et al., 2025; Mangubat et al., 2023).

6. Reporting & Analytics: Generation of reports on clearance progress, audit trails of user activities, and dashboards showing departmental performance and bottlenecks (Eweoya et al., 2025).
7. Security Features: Role-based access control, data encryption, and secure login credentials to protect sensitive student data (Agbo-Ajala & Makinde, 2015; Eweoya et al., 2025).

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlines the methods and procedures used to conduct the research. It encompasses system development that involves research design, area of study, population and sampling methods, data collection methods and analysis, design, implementation, testing and validation, and ethical considerations.

3.2 Research design

Given the nature of the data that was to be collected, which included both numerical figures and descriptive responses, the study adopted both quantitative and qualitative approaches to ensure complete data collection and system validation. The qualitative method involved in-depth interviews to gather detailed insights into user needs and system requirements from students, departments and Administrators at Nagongera campus Busitema University. This approach was chosen to capture complicated perspectives on natural preferences and challenges in manual clearance. The quantitative method was used to validate the system through structured testing, measuring user satisfaction, system performance, and adherence to requirements.

3.3 Area of study

The research was conducted at Nagongera campus Busitema University, located in Nagongera Town Council in Tororo District about 17 kilometers from Tororo town along Tororo-Busolwe road.

3.4 Population and sampling method

Population total

The target population for this study comprised of students, departments and the administrators at Nagongera Campus Busitema University. Based on facility records, the total population (N) is approximately 20 students and three departments (3) departments, including three lecturers and one faculty administrator.

<i>Participants</i>	<i>Male</i>	<i>Female</i>
<i>Administrator</i>	1	-
<i>Lecturers</i>	1	2
<i>Students</i>	10	10
<i>Total</i>	12	12

Table 1: participants

3.5 Data collection methods and analysis

Data collection involved in-depth interviews to identify requirements and gaps in existing clearance system. A semi-structured interview was conducted with the departments and administrators to explore challenges faced with the system. 12 semi-structured interview questions were developed to guide data collection. This number was chosen to ensure complete requirement gathering while maintaining data quality.

For data analysis, qualitative data from interviews was examined and organized to identify challenges faced by students, departments and administrators when managing clearance. Quantitative data from system testing was analyzed using descriptive statistics to evaluate user satisfaction. Based on these analyses, the final system requirements were validated.

3.6 System development

The system was developed using Structured Systems Analysis and Design Methodology (SSADM) because it provides a clear, step-by-step approach to system development. Specifically, Rapid Application Development (RAD) was used because of the limited time. The RAD approach followed four key phases: requirements determination, design, implementation, and testing. Eventually, a working prototype was developed which was tested and validated.

3.7 Design

The system design phase involved creation of a blueprint of the web-based Clearance system. The design process steps were as follows;

The development follows the **Rapid Application Development (RAD)** approach within the Structured System Analysis Design Method (SSADM) framework. RAD is an agile methodology that prioritizes iterative prototyping and user feedback over rigid planning, aimed at shortening the transition from planning to implementation.

The main aim of using RAD in this research is to shorten the time in a traditional system development life cycle between planning and implementing an online transaction processing system.

There are four stages under RAD;

1. **Requirement determination.** Analysts engage with students and department heads to identify pain points, such as physical document loss and lack of real-time tracking.
2. **Design.** At this stage this iterative phase involves creating system mockups. Users provide input on the interface for submitting clearance requests and viewing department-specific dashboards.
3. **Implementation.** This is where a discussion between the user and the system analyst and the design of the information system to be built.
4. **Testing.** The final stage where the system is checked for user satisfaction, ensuring it effectively generates automated clearance certificates.

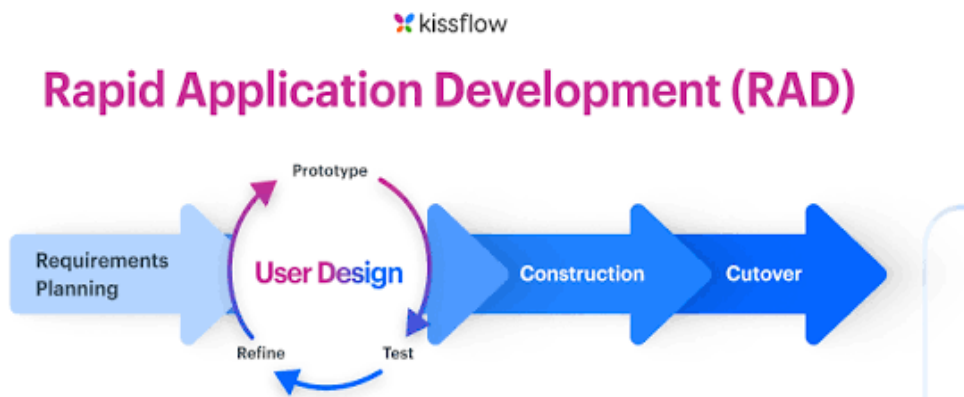


Figure 1: Rapid Application Development Process

System Architecture

This defined the overall structure of the system and outlined how components interact. The architecture adopted a client-server model, where the frontend provided user interfaces for patients and supervisors, and the backend handled data processing and storage, which ensured efficient data flow.

Context Diagram

The context diagram illustrated the system's interactions with external entities, such as students and staff (departments and administrators). These provided a high-level view of the system's scope and boundaries.

Dataflow Diagram (DFD)

The DFD illustrated how information moves through the system. It broke down the system's main functions into smaller processes, showing how data is transformed from input into useful output for both students and staff (departments and administrators).

UML Diagram (Use-Case Diagram)

A Use-Case Diagram visually summarized the interactions between the system's users (called "actors") and the key functions (called "use cases") the system provides. It helped ensure that the system is designed to meet the core needs of both students and staff (departments and administrators). The diagram featured three primary actors namely students who uses the system to submit clearance request, departments that approves or reject the student's clearance request and the administrators who manages and monitors students and departments clearance actions.

3.8 Implementation

The system was developed using modern web technologies to ensure reliability, security, and ease of use. Visual Studio Code was the primary code editor for writing and managing project files, while web browser (Microsoft Edge) developer tools were employed for real-time debugging and testing of the frontend interface during development. The implementation followed a structured approach with clear separation between the backend and frontend components. For the backend development; the server-side of the system was built using **PHP**: The server-side scripting language used to handle business logic, process clearance requests, and communicate with

the MySQL database. The frontend included **HTML & CSS**: For structuring the clearance forms and styling the user interface, **JavaScript**: To handle client-side validation and asynchronous updates (AJAX) for a smoother user experience.

3.9 Testing and validation

The system went through rigorous testing to ensure it is functional, user-friendly, and reliable. The testing process included the following stages:

1. Unit Testing: Individual components were tested in isolation to verify they worked correctly on their own.

2. Functional Testing: The system was evaluated against the initial requirements to ensure that all key features worked as intended. The tested functions included student registration and login, submission of clearance requests, uploading of supporting documents, departmental approval or rejection of clearance requests, clearance status tracking, feedback and notifications, and clearance certificate generation.

3. Integration Testing: All system components were tested together to ensure they interact seamlessly. For example, the user interface was tested on how it communicates with the server and database to confirm that data flows smoothly.

4. User Acceptance Testing (UAT): 20 students, 3 departments (members) and 1 administrator from the study sample used the system in a real-world setting at Nagongera Campus Busitema University. Their feedback on the system's ease of use, interface design, and the relevance of the advice was collected to identify any final improvements needed.

5. System Validation: The final system was evaluated to confirm it meets the objectives of the study. The system was validated to ensure that it successfully allows students to submit and track the clearance progress, and provides useful tools for staff (departments and administrators) monitoring. Success was measured through user satisfaction surveys and feedback from systems participants

3.10 Ethical consideration

The study adhered to the following ethical principles to ensure integrity and protect participants;

1. **Informed consent.** All participants were informed about the study's purpose, procedures, and written consent was obtained before interviews.
2. **Confidentiality.** Participant's data was stored securely in compliance with data protection regulations.
3. **Participation was voluntary.** Participants were free to withdraw at any time without consequences.
4. **Transparency.** Findings and system outcomes were shared with participants, promoting trust and accountability,
5. **Risk minimization.** The study prioritized doing no harm by ensuring the system was rigorously tested to prevent errors in clearance process,
6. **Respect for autonomy.** Participants' rights to make informed decisions about their participation in the study and their use of the clearance system were respected.

CHAPTER FOUR: FIELD STUDY AND SYSTEM DESIGN

4.1 Introduction

This chapter presents the results from the field study conducted at Busitema university, Nagongera Campus located in Nagongera Town Council. This chapter describes background information of the current system and new system requirements gathered during the study, including user requirements, functional requirements, and non-functional requirements. It also details the design of the proposed system, covering the system architecture, context diagram, data flow diagrams, entity relationship diagram, and use case diagram.

4.2 Background information of the current system

The current system at Nagongera Campus Busitema University for clearance is completely manual. Students are required to physically move across multiple departments to obtain signatures on clearance forms. The following problems were identified during the field study:

- 1. Time consuming and costly.** The clearance was found to be time consuming due to physical movement between departments, long queues, delays caused by unavailable staff. Students reported taking several days to complete clearance.
- 2. Poor Record Management.** Since the system relied on paper-based forms, clearance documents were highly vulnerable to loss, misplacement, physical damage. In cases where forms were lost, students were required to restart the process leading to increased stress on students, duplication of work
- 3. No real-time monitoring.** Administrators did not have a centralized system to monitor clearance activities across departments. This made it difficult to track student progress, identify delays, and monitor department performance.
- 4. Limited security and Data integrity.** The current manual system does not have security mechanism to protect student information. Unauthorized access to documents was possible since files were stored physically.

4.3 System Study and Analysis

The study was carried out at Nagongera Campus. The main purpose of the study was to find out the challenges faced by during clearance process by students, as well as the difficulties encountered by staff (departments and administrators) in monitoring student's clearance process and data storage for students. The study involved examining the existing manual system to identify its strengths and weaknesses. The information acquired from the study was gathered by employing a number of data collection methods, including semi-structured interviews and questionnaires administered to both students and staff (departments and administrators). The data collected were analyzed to provide the basis for designing a new, web-based clearance system.

4.3.1 Findings from interviews and questionnaires

Findings from the Student Questionnaire

A total of 20 students to undergo clearance process from Nagongera campus responded to the questionnaire. The survey aimed to understand current clearance management practices, challenges faced, technology readiness, and desired features for the system. The findings are presented below.

A. Nature of the Current Clearance Process

The findings showed that all students relied on a manual clearance process, which required them to physically visit multiple departments in order to obtain approval signatures.

Students indicated that the process was not clearly structured, as some relied on instructions from peers rather than official guidance. In some cases, students reported that they were uncertain about the correct sequence of departments to visit. This finding suggested that the current system lacked formal guidance mechanisms and standardized procedures. The dependence on informal communication indicated poor system design and inadequate user support leading to increased likelihood of errors, repeated visits, and delays, thereby reducing the overall efficiency of the clearance process

B. Delays and Time Consumption

A significant number of students reported that the clearance process was slow and time-consuming. The delays were mainly attributed to: Long queues at departmental offices, Limited

availability of staff, High number of students during peak periods, repeated visits due to incomplete clearance, and some students indicated that the process took several days or even weeks to complete. This finding demonstrated that the system operated sequentially and depended heavily on human availability, making it inefficient and unable to handle high demand. These negatively affected students' academic timelines.

C. Physical Movement and Inconvenience

Reported that they were required to move physically from one department to another, often across different locations within the campus. This movement resulted in increased transport costs, Physical fatigue, and Time wastage. This indicated that the system was not user-centered and did not consider convenience. The requirement for physical presence made the system rigid and inefficient. This discouraged timely clearance and created unnecessary burdens on students, especially those with limited financial resources.

D. Loss and Mismanagement of Clearance Documents

Some students reported cases where clearance forms were lost or misplaced during the process. Since the system relied entirely on paper-based documentation, there was no backup or recovery mechanism. This finding indicated poor data management practices and lack of reliability in the system resulting in duplication of effort, delays, and increased stress for students, thereby reducing trust in the system.

E. Technology Readiness of Students

The findings showed that a large proportion of students Owned smartphones, had access to the internet and were familiar with web-based systems. This demonstrated that the users had the necessary technological capability to interact with a digital system. The high level of technology readiness supported the feasibility of implementing a web-based clearance system.

F. User Expectations and Desired Improvements

Students expressed a strong need for improvements in the clearance process. The most commonly suggested features included Online submission of clearance requests, Real-time tracking of progress, Notifications on approval or rejection, Reduction in physical movement. These expectations directly reflected the challenges experienced in the current system and the

suggested features provided a clear direction for system design and confirmed the demand for automation and digital transformation.

Findings from the interview with the Staff and Administrators.

A semi-structured interview was conducted with the Staff and Administrators at Nagongera campus to understand current practices and desired system features.

Challenges in Manual Record Management

Staff reported that clearance records were maintained manually using files and registers. This made it difficult to Store records efficiently, Retrieve past records and track student clearance status. This indicated that the system lacked an organized data management structure and relied on inefficient storage methods limiting the ability of the institution to maintain accurate records and support administrative functions.

Increased Workload during Clearance Periods

Staff indicated that the number of students seeking clearance increased significantly during certain periods, leading to Work overload, Delays in processing, reduced service quality. This showed that the system was not scalable and could not efficiently handle high demand hence reduced staff productivity and slowed down the entire clearance process.

Lack of Centralized Monitoring and Control

Administrators reported that there was no centralized system for monitoring clearance activities. They were unable to Track overall progress, identify delays in specific departments, Generate reports. This indicated weak administrative control and lack of visibility into system operations. The absence of monitoring tools hindered effective decision-making and reduced accountability.

Communication Gaps

Staff noted that students frequently returned to inquire about their clearance status due to lack of communication mechanisms. This demonstrated that the system lacked automated communication channels. This increased workload for staff and contributed to inefficiency.

Staff Recommendations

Staff and administrators recommended the introduction of a centralized digital clearance system, automated approval processes, Dashboards for monitoring, reporting tools. These recommendations aligned closely with the challenges identified and reflected a need for system modernization. The input from staff provided strong justification for the proposed web-based system.

Conclusion of Findings

The findings from both students and staff clearly indicated that the existing manual clearance system was inefficient, time-consuming, lacked transparency, and suffered from poor record management and limited administrative control.

Furthermore, the study established that users were technologically ready and strongly supported the introduction of a digital solution.

These findings provided a solid foundation for defining system requirements and designing a web-based clearance system that would improve efficiency, enhance transparency, and streamline clearance processes.

4.4 User Requirements

User requirements describe what the system must do from the perspective of the end-users. The user requirements were categorized into functional and non-functional requirements as described below;

4.4.1 Functional Requirements

1. Administrators monitoring dashboard. Administrators should see cleared and pending clearance of students through the administrator's dashboard.

2. Secure data storage and trend analysis. All Students clearance records must be saved safely in the system. Both students, departments and administrators can look back at past records to see progress over time.

3. User login and authentication. Students and staff (departments and administrators) must log in with their own username and password and choose the user role. This keeps each person's information private and secure.

4. Department Approval. Departments must review and approve or reject requests and be able to add comments.

5. Profile management and Account Management. Users must be able to update their personal details whenever needed. The administrators should manage all user accounts and role.

6. Report Generation. Administrators should be able to access the clearance reports generated through the system.

4.4.2 Non-Functional Requirements

1. **Usability.** The system must be designed to be simple and easy to use. Buttons and menus are clear so users do not get confused.

2. **Performance.** Pages and reports should open quickly within a few seconds. This keeps users from getting frustrated while waiting.

3. **Security.** User information must be protected with passwords and secure login methods. No one else can see a user data without permission.

4. **Reliability.** The system should work well without crashing during clearance system. It should also check that information entered is correct before saving it.

5. **Scalability.** The system must handle more students, departments and administrators being added later. It will not need to be rebuilt if the number of users grows.

4.5 Hardware/ software requirements

4.5.1 Hardware Requirements

1. A server or hosting machine with a minimum of 80GB hard disk space
2. A server or hosting machine with a minimum of 4GB RAM
3. End users only require a smartphone, tablet, or computer with internet access

4.5.2 Software Requirements

Server-Side Software:

1. Windows, Linux, or macOS operating system
2. PHP
3. HTML
4. MySQL database management system
5. CSS

End User Software:

6. A modern web browser such as Microsoft Edge or Google Chrome

4.6 System Design

Based on the gathered requirements, the system was designed following the development approach described earlier in chapter 3.

4.6.1 The system architecture

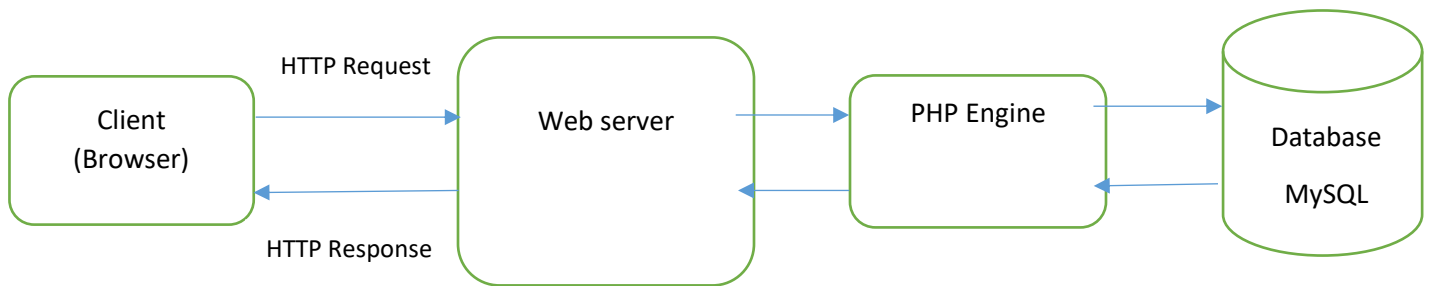


Figure 2: System architecture

Client Side (Frontend): The client side represents the presentation layer of the system, comprising the devices and web browsers through which end-users interact with the application.

1. Student Client: Accessed via smartphones or computers, this interface allows students to login, apply and submit clearance request, track progress, and read feedback from their departments and administrators.

2. **Department Client:** Accessed via smartphones or computers, this interface allows departments officers or lecturers to login, view lists of requests, approve, reject and add comments.

3. **Administrator Client:** Accessed via smartphones, computers or tablets, this dashboard enables administrators to manage registered users, monitor clearance activities, view student clearance progress, manage departments and roles, generate reports, and monitor overall system performance.

Server Side (Backend): The server side hosts the core application logic, data storage, and integrations with external services. It is responsible for processing client requests, enforcing business rules, securing data, and returning appropriate responses.

1. **Web Server:** This acts as the entry point for all client requests. It handles incoming HTTP/HTTPS traffic, serves static files, and routes API requests.

2. **Application Server:** This forms the core component of server-side architecture and is responsible for handling all the business logic. The application server is organized into modules that correspond to system functionalities which include student module, department module, administration module, and so on.

3. **Database Server:** The database server stores, manages, and retrieves all persistent data within the system. A Relational Database Management System (RDBMS) which is MySQL is used for development. The database contains the following key entities: User profiles, clearance request, departmental approval and rejection, and so on.

4.6.2 Context Diagram (Level 0 DFD)

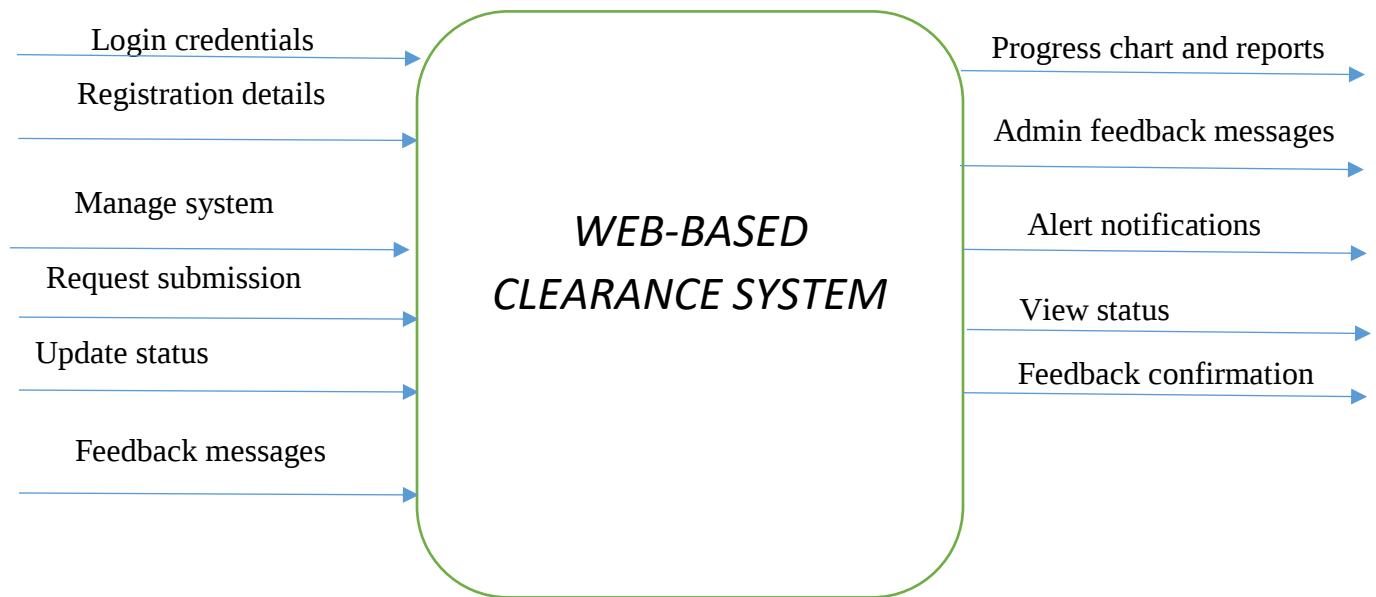


Figure 3: Context diagram

Inputs and Outputs for Context Diagram

From students to System (Inputs):

1. Students provides registration details during account creation username and password to access the system.
2. Students enter login credentials to access the system
3. Students submits clearance request and upload required supporting documents

From System to Students (Outputs):

1. The system provides real-time clearance status updates.
2. Students receive feedback or comments from departments.

3. Notifications are sent regarding approval or rejection of clearance requests.
4. Upon successful completion of all required clearance processes, the system generates a clearance certificate.

From Administrator to System (Inputs):

1. Administrators log in using secure credentials.
2. They perform user management (register, update, delete users).
3. They configure system settings such as departments and roles.

From System to Administrator (Outputs):

1. The system generates clearance reports and statistics.
2. Administrators access a dashboard for monitoring system activities.
3. They can view user activity logs and overall system performance.

From Department to System (Inputs):

1. Department officers enter login credentials.
2. They approve or reject clearance requests.
3. They provide comments or feedback on submitted requests.

From System to Department (Outputs):

1. The system displays pending clearance requests.
2. Officers can view student details and uploaded documents.

3. Notifications are received when new clearance requests are submitted.

4.6.3 Data flow diagram (DFD)

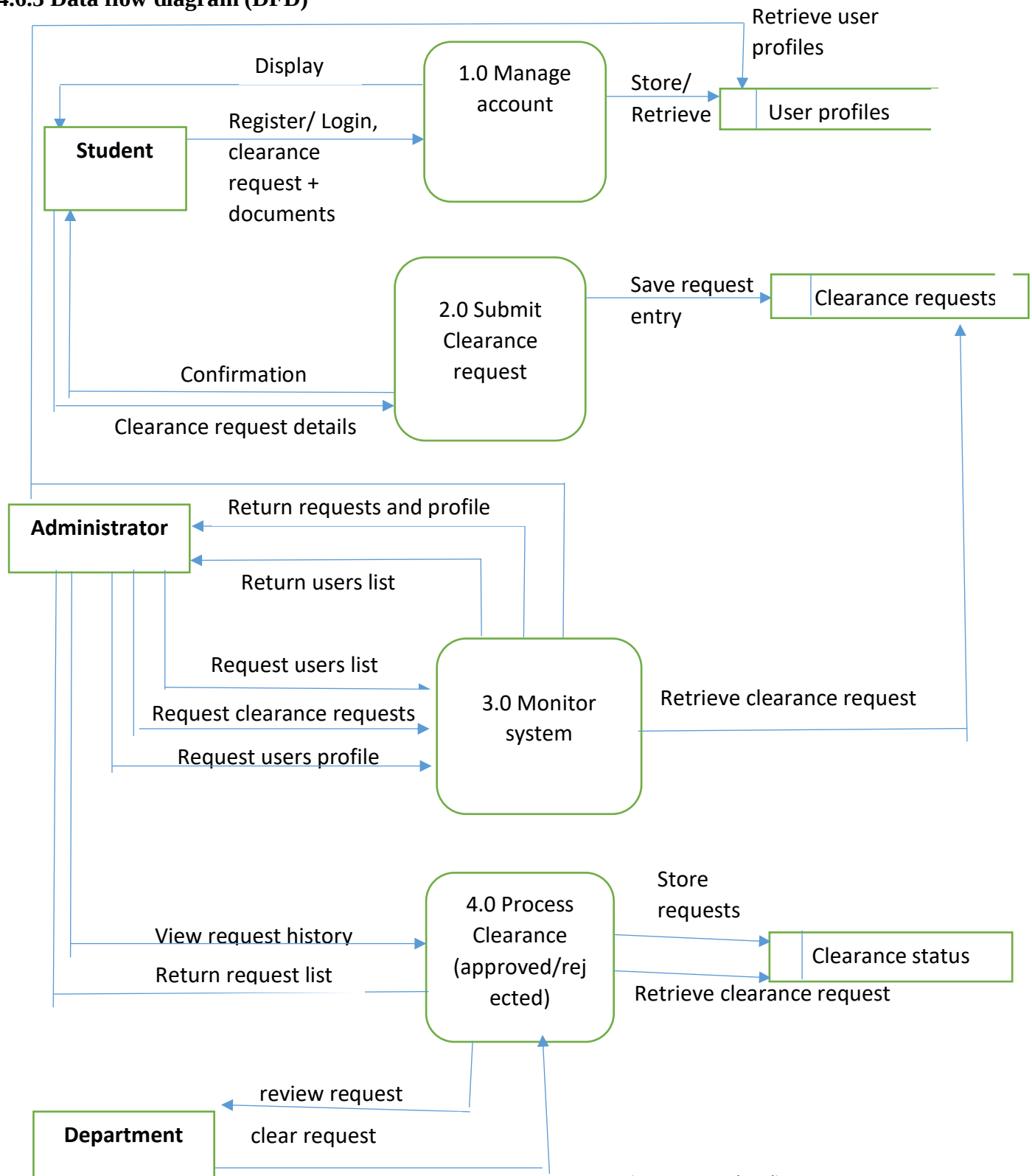


Figure 4: Data Flow diagram

The components of the DFD Level 1

1. Processes

These are the main functions of the system. They include;

1.0 Manage Account. This process handles everything related to user accounts including registration, login, and profile updates for students, departments officers and administrators. It ensures secure authentication and stores user details in the system.

2.0 Submit Clearance Request. This process is performed to apply for clearance by filling forms and uploading required documents. The request is stored in the clearance database for further processing.

3.0 Monitor System. This process allows administrators to view users' information. When a supervisor requests to see a user list, or user's profiles, this process retrieves that data from the database and displays it on the admin's dashboard.

4.0 Process Clearance. This process allows department officers to review submitted clearance requests, verifying documents, and either approve or reject requests with comments. The requests are updated in the system.

2. Data Stores

These are where all the information in kept. The data stores include;

User Profiles. This is where all account information is stored. It contains student, department staff and administrator details like names, contacts, passwords. Process 1.0 saves new profiles here and reads from it during login.

Clearance Request. This is where every request submitted is saved. It contains details like type name, the student who sent it, and the date it was sent. Process 2.0 writes new entries here and Process 3.0 reads from it when administrator check student clearance progress.

Clearance Status. This is where all approved and rejected clearance requests are kept. It stores the clearance feedback, who sent it, which department, and when it was cleared or rejected.

3. External Entities

These are people who Use the System. They include;

Student. The person who submits request to the system, view status or request, and read clearance feedback from their department officers. They interact with Process 1.0 (account) and Process 2.0 (submit clearance) and receive outputs from Process 4.0

Students. The person who views the student clearance request requests and process them, add comments. They interact with Process 1.0 (account) and Process 4.

Administrator. The person who monitors and manages the system, students and department officers. They interact with Process 1.0 (account), Process 3.0 (monitoring), and Process 4.0, and receive users' data and logs from the system.

4. Data Flows

This shows how information moves in the system.

- Register/Login, update profile. Account information sent from user to Process 1.0
- Store/Retrieve. Data being saved to or read from the User Profiles store
- Display. User information shown back to the user after login or update
- Clearance Request and documents. Requests sent to the Clearance store
- Approval/ rejection and certificate. Confirmation message sent back to student after the request being processed

4.6.4 The Use Case Diagram

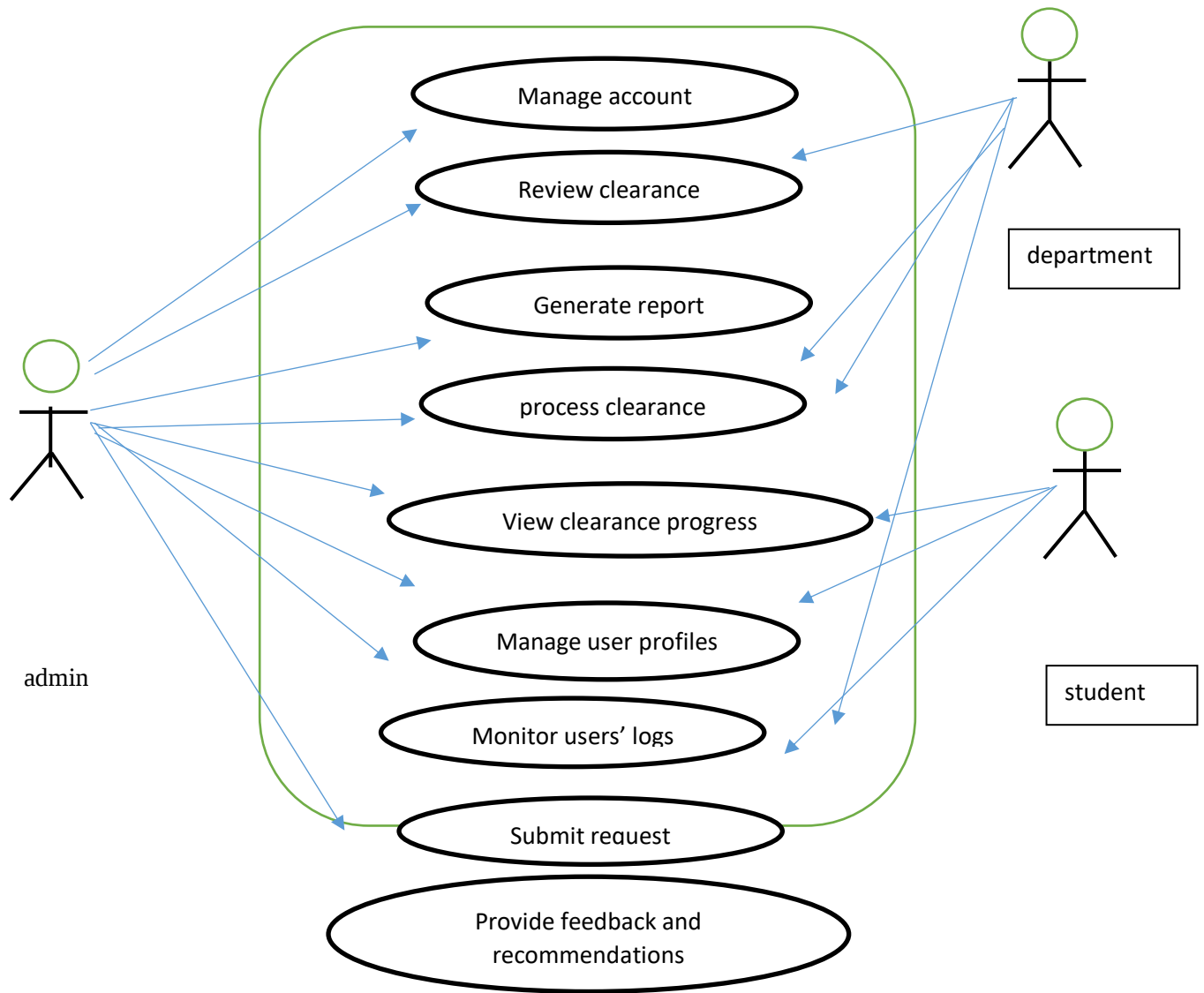


Figure 5: Use case diagram

Actors

- 1. Student:** This is the person who send the clearance request. They use the system to apply and submit clearance request, check clearance status, and see how well their request are being worked upon.
- 2. Department:** This is the department staff responsible for clearing of students in the department at Nagongera campus. They use the system to watch over student's clearance progress and give helpful feedback to them through approval or rejection.
- 2. Administrator:** This is the person responsible for overall system managing of all users' activities in the system. They use the system to watch over user interaction with the system.

Use Cases

For the Admin:

- 1. Manage account.** The admin can create an account for a user, and update users' details like their name, contact and so on. This keeps their information current and accurate.
- 2. Assign department.** The admin can assign the department the officer selecting from a list of officers and departments.
- 3. Monitor clearance progress.** The admin can check what requests has been approved or rejected for each student across departments. They can see who is progressing well with his/her clearance.
- 4. Generate Reports.** The admin can user's activities in the system and generate reports for decision-making.

For the Department:

- 5. Review clearance.** The officer can view the submitted requests to their department and update clearance status through approval, rejection and adding of comments.
- 6. Monitor user's log.** The admin can check what requests has been approved or rejected for each student. They can see who is progressing well with his/her clearance.
- 7. Provide feedback and recommendations.** The supervisor can send personalized messages and suggestions to patients. This helps patients stay on track and feel supported.

For the student:

8. Submit Clearance Request. The student can fill and send s submission clearance form to their department.

9. Upload Documents. The student can upload the required documents such as receipts and academic records.

10. Track clearance status. The student can monitor the progress of the requested clearance.

4.6.5 The Entity Relationship Diagram (ERD)

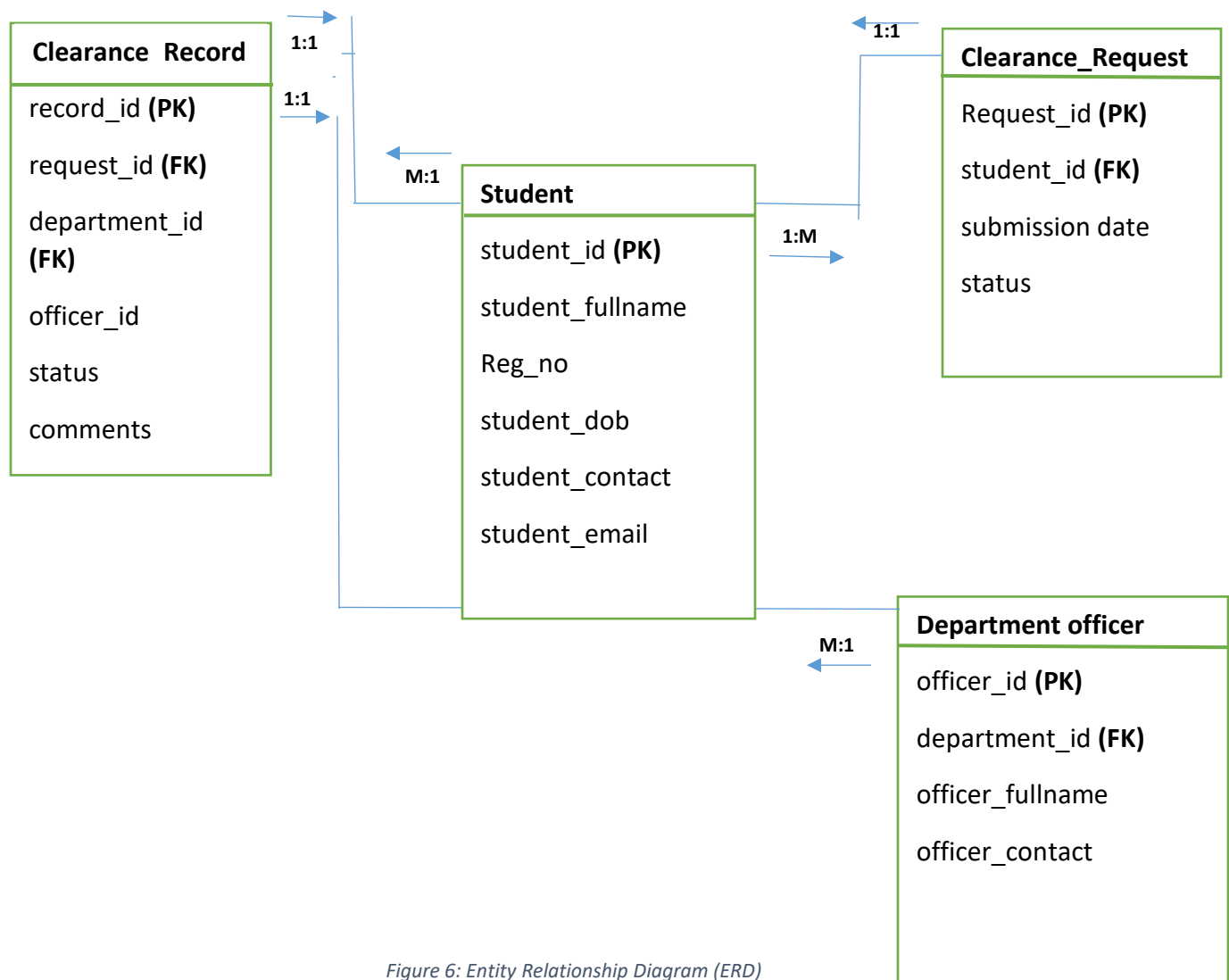


Figure 6: Entity Relationship Diagram (ERD)

Explanation of each table and its relationships in the ERD:

Tables in the ERD

1. Student Table: This table holds all the important information about each patient. It includes details like the student's ID number, full name, and so on.

Field	Data type	Description
student's ID number	INT (pk)	Unique student_ID
student's name	Varchar (100)	Full name of student
Reg_no	Varchar (50)	Registration number
student_dob	date	Date of birth
student_contact	Varchar (100)	Phone contact
student_email	Varchar (100)	Student email

Table 2: student table

2. Department officer Table: This table stores information about the department officers review and process student clearance request. It includes details like the officer's ID number, full name, and so on.

Field	Data type	Description
officer_id (PK)	INT (pk)	Unique officer_ID
department_id (FK)	INT (fk)	Department identifier
officer_fullname	Varchar (100)	Officer full name
officer_contact	Varchar (50)	Officer contact

Table 3: department officer table

3. Clearance request Table: This table keeps a record of clearance request submitted by students containing relevant document. Each entry is linked to one student.

Field	Data type	Description
Request_id (PK)	INT (pk)	Unique request_ID
student_id (FK)	INT (fk)	Student submitting request
submission date	Date	Date request was submitted
Status	Varchar (50)	Pending/Approval/Rejected

Table 4: clearance request table

4. Clearance record Table: This table stores the decisions made by each department. it includes records like approval status, comments, date of processing and so.

Field	Data type	Description
record_id (PK)	INT (pk)	Unique clearance record_ID
request_id (FK)	INT (fk)	Linked clearance request
department_id (FK)	INT (fk)	Department reviewing request
officer_id	INT (fk)	Reviewing officer
Status	Varchar (100)	Approval/rejected
Comments	Text	Department comments

Table 5: clearance record table

5. Department Table: This table stores the information concerning departments it includes department name, department ID, and so.

Field	Data type	Description
department_id (PK)	INT (pk)	Unique department_ID
department_name	INT	Name of department
department_description	INT	Department details

Table 6: department table

Relationships in the ERD

1. Student to Clearance request (1:M). One student can submit multiple requests over time. For example, a student named Emma submit a clearance request to library department and later submits to security department.

2. Clearance request to Clearance record (1:M): One clearance request can have many clearance records and each clearance record belongs to one clearance request.

3. Student to clearance record (1:M): One student can receive many clearance feedback from multiple departments messages over time.

CHAPTER FIVE: IMPLEMENTATION AND TESTING

5.0 Introduction

This chapter focuses on transforming the functional and non-functional requirements established in previous chapters into a working system. It presents the implementation of the design outlined in Chapter Four, including interface designs, database structures, and system testing procedures for the Web-Based Clearance system at Nagongera Campus.

5.1 Interface Design

The goal of user interface design is to make the user's interaction with the system as simple and efficient as possible in terms of accomplishing user goals. It focuses on the appearance and style of how the system appears to the end users. Below are the key interfaces for the system:

5.1.1 Landing Page

This page serves as an entry point of the system. It provides general information about the system and allows users choose whether to log in as a student or department officer, or administrator. The page provides a brief overview of the system's purpose.

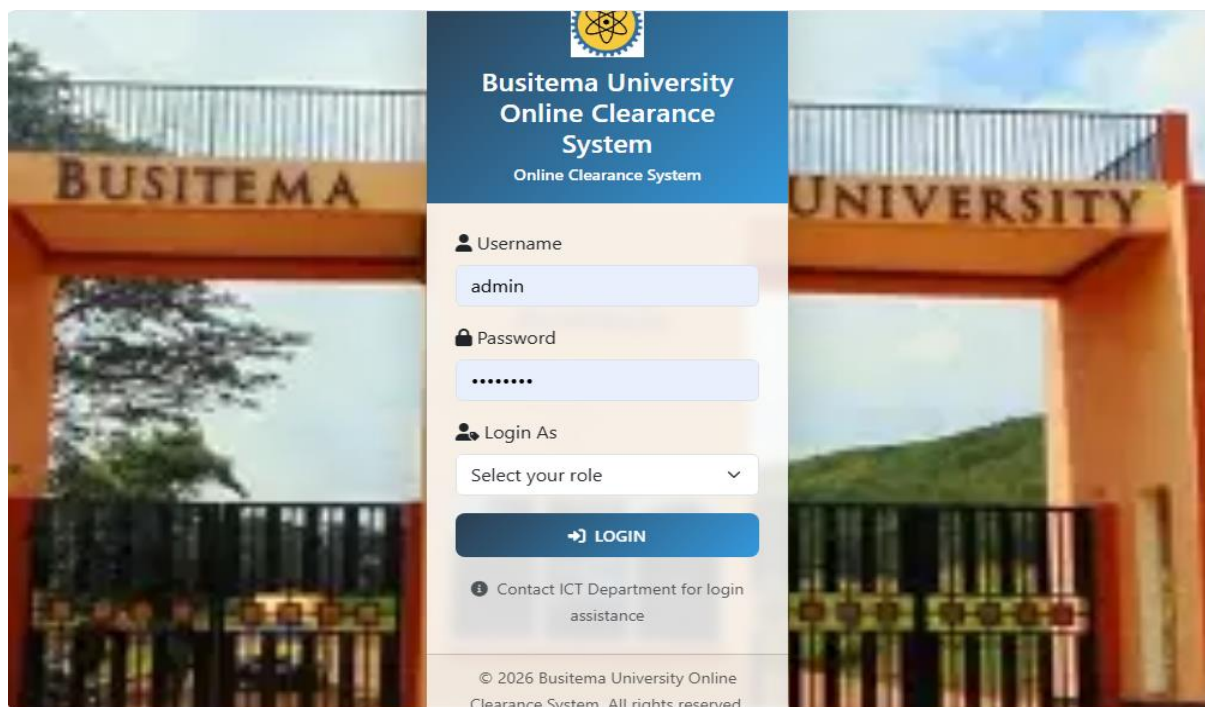


Figure 7: Landing page

5.1.2 Login Pages

The Login interface allows pre-registered users (students, department officials, administrator) to access the system using the secure login credentials which directs to the user dashboard using their username and password.

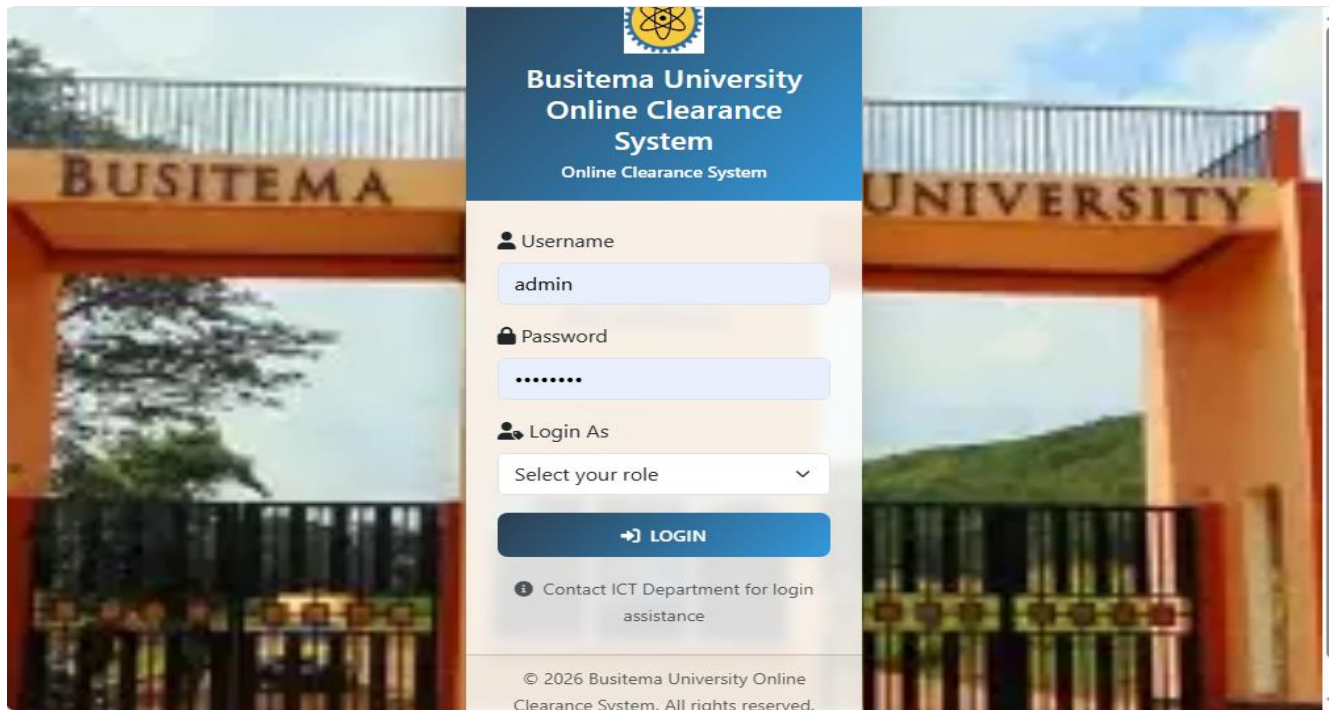


Figure 8: Login Page

5.1.3 Dashboards

The Administrator Dashboard provides full system control and displays key metrics including total users, cleared and pending request, report generation, Recent Activities, User Statistics.

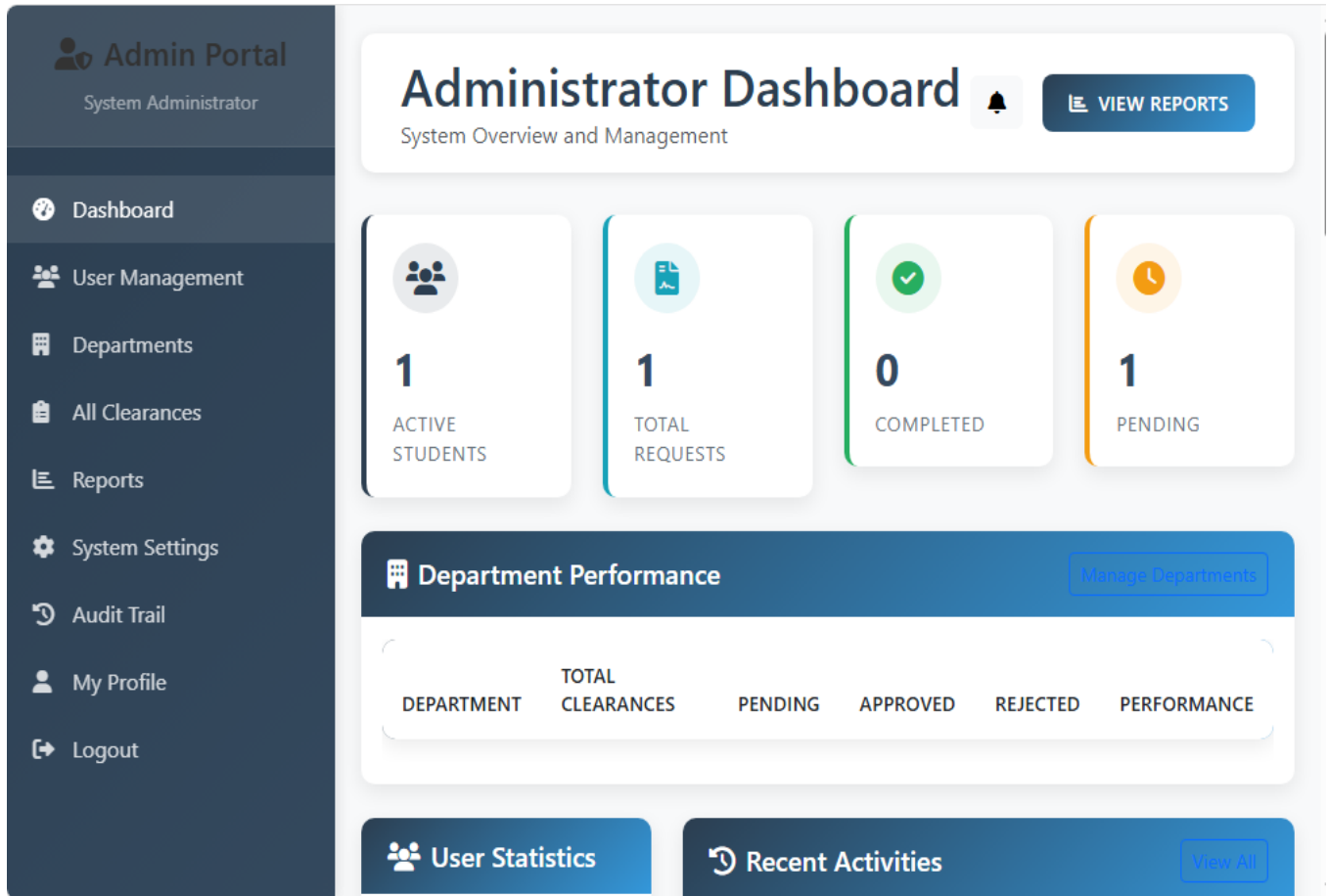


Figure 9: Administrator Dashboard

The Department Dashboard page shows the student's total clearance request, pending, approved, rejected, and recent clearance request.

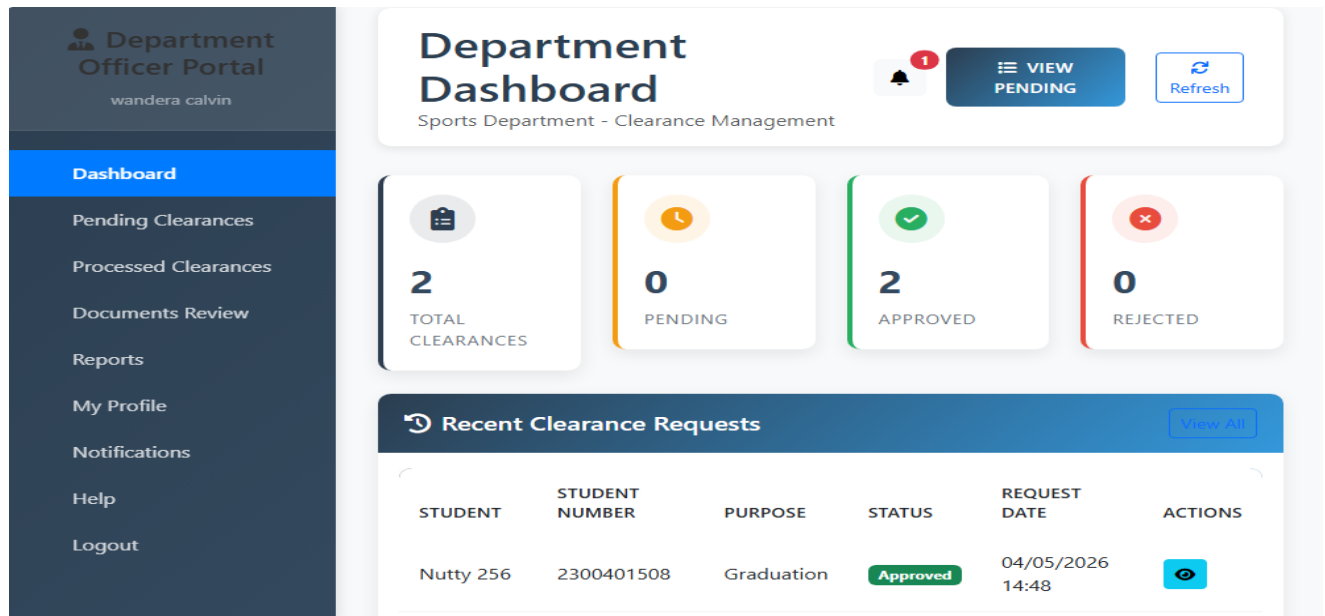


Figure 10: Department Dashboard

The Student Dashboard page shows the total request, completed, in progress and pending requests.

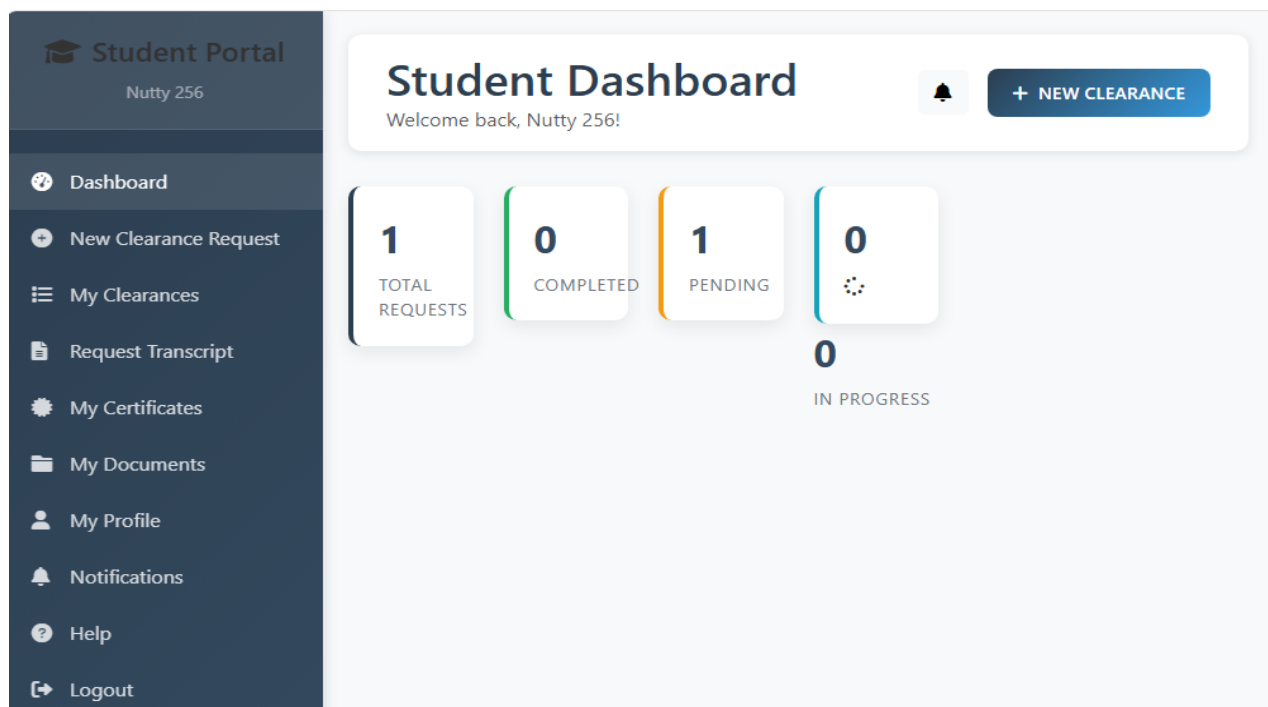


Figure 11: Student Dashboard

5.1.4 User Management

The All-users List Page displays all students, department officers and administrators. This module is primarily handled by administrator who ensures that only authorized individuals can access the system.

The screenshot shows the 'Admin Portal' for a 'System Administrator'. The left sidebar contains navigation links: Dashboard, User Management (selected), Departments, All Clearances, Reports, System Settings, Audit Trail, My Profile, and Logout. The main content area is titled 'User Management' with the subtitle 'Manage system users and accounts' and an 'ADD NEW USER' button. Below this is a section for 'System Users (5 total)' containing a table with the following data:

USER ID	USERNAME	FULL NAME	EMAIL	USER TYPE	PHONE
5	nuttygriz	Nutty 256	nutty@gmail.com	Student	0781
4	calvin	wandera calvin	calvin@gmail.com	Department officer	0781
3	student	wankya brington	wankya@gmail.com	Student	0781
2	officer	Nasser Twaiфу	twaiфу8@gmail.com	Department officer	0761

Figure 12: Administrator All users list Page

5.1.5 Student's pending clearance

The Department's student clearance tracking Page shows all pending clearance across the department.

The screenshot shows the 'Department Officer Portal' for 'wandera calvin'. The left sidebar contains navigation links: Dashboard, Pending Clearances (selected), Processed Clearances, Documents Review, Reports, My Profile, Notifications, Help, and Logout. The main content area is titled 'Pending Clearances' with the subtitle 'Sports Department Department' and a '0 Pending' indicator. Below this is a section for 'Pending Clearance Requests (0)' displaying a green checkmark icon and the text 'No Pending Clearances' with the note 'All clearance requests have been processed.'

Figure 13: Department Clearance tracking

5.1.6 Student Features

The student clearance application Page is the main interface where students submit their request by selecting from a list of departments to submit to and purpose.

Student Portal
Nutty 256

New Clearance Request
Create a new clearance request

← Back to Dashboard

Clearance Request Details

Academic Year *
2026/2027

Semester *
Select Semester

Purpose of Clearance *
Select Purpose

Select Departments *

☐ Academic Affairs AA	☐ Finance Department FIN	☐ Health Services HEALTH
☐ Hostel Management HOSTEL	☐ ICT Department ICT	☐ Library LIB
☐ Sports Department SPORTS	☐ Student Affairs SAA	

✕ Cancel

➤ SUBMIT REQUEST

Figure 14: Student clearance submission Page

The Student Profile Page allows students to view and update their personal information.

Student Portal
Nutty 256

Manage your personal information and account settings

Profile Information

NUTTY 256
nutty@gmail.com
Student

Student Number:
2300401508

Phone: 0786860099

Member Since:
04/05/2026 14:47

Last Login: First login

Edit Profile

Full Name
NUTTY 256

Email Address
nutty@gmail.com

Phone Number
0786860099

Username
nuttygriz
Username cannot be changed

Change Password
Leave blank if you don't want to change your password

Current Password
.....

New Password
Minimum 6 characters

Confirm Password

SAVE CHANGES

Figure 15: Student clearance submission Page

5.2 Data storage

The system's database stores all persistent data required for system operation, including user profiles, logs, feedback messages, and health conditions. The following tables were implemented using MySQL for development

5.2.1 User Table

The User table stores personal information for each user, including user ID as the primary key, full name, contact details, email address, user type, and so on. This table is used to uniquely identify each user.

5.2.2 Department Table

This table stores information for department officers who monitor and clear students, including officer ID as the primary key, user id, department id, and so on. This table is used to identify each department officer and track their student clearance.

5.2.3 Clearance request Table

This table stores clearance information for each student, including request ID as the primary key, student ID as a foreign key, academic year, purpose, semester, and so on.

5.2.4 Uploaded document table

This table stores all documents that students send while seeking for clearance, including upload ID as the primary key, request ID as a foreign key, document ID as a foreign key, file name, the file size and the date the file was uploaded and so on.

5.2.5 Department clearance Table

This table stores the clearance status for each student per department, including clearance ID as the primary key, request ID as a foreign key, department ID as a foreign key, officer ID, status, comments and so on.

5.3 System Testing

The entire system was tested using various methods to ensure accuracy and efficient operation before delivery to the final users.

5.3.1 Unit Testing

Unit testing verified individual components including the login functionality, clearance request submission, department dashboard module.

5.3.2 Integration Testing

Integration testing ensured all modules worked together as a complete system, validating data flow between the frontend, backend, and database.

5.3.3 Functional Testing

Functional testing evaluated core features against the specified functional requirements including user registration, administrator dashboard displays, user monitoring, and data storage.

5.3.4 User Acceptance Testing

User acceptance testing was carried out at Nagongera Campus using the system in a real-world setting.

5.3.5 System validation

After completion of system testing, the system was validated to confirm the developed system the intended objectives and user requirements. Validation focused on assessing system functionality, ease of use, performance, reliability, and security.

The validation results showed that the system accurately processes the clearance requests, unauthorized access is prevented through authentication and role-based access, Data is securely stored and retrieved from the database, etc.

CHAPTER SIX: DISCUSSION, CONCLUSION, RECOMMENDATION AND FUTURE WORK

6.0 Introduction

This chapter discusses the findings from developing a Web-Based Clearance system for Nagongera Campus Busitema University in relation to the set objectives and methodology outlined in Chapter One. The study found that clearance process fully relied on manual methods, where students move between different departments and administrations during clearance period. This system focuses on replacing this manual method or process with a digital platform that enables continuous students' clearance monitoring and tracking of the clearance progress.

The implementation of this system involved the administrators, departments and students at Nagongera Campus Busitema University, with validation results discussed as shown in Chapter Five.

6.1 Discussion

The discussion of this chapter is based on the theme of objectives stated in the first chapter.

Objective (1): To review the literature and determine requirements for developing a Web-Based Clearance system

The requirements of the study were obtained from two main sources: library research and field research. Under library research, the study examined previous projects on similar topics, including management information systems.

The field research, conducted through interviews and questionnaires with the students, departments and administrators, helped establish how the manual system operates and gathered respondents' views toward the proposed digital system. The field research generated key requirements, including the need for a culturally relevant local food database, simplified logging interfaces and a supervisor dashboard for patient monitoring. Key functional requirements identified included online clearance application, Real-time status tracking, Centralized database, Role-based access control, Feedback mechanisms, and Administrative reporting tools. Non-functional requirements included usability for users with varying digital literacy, performance within 3 seconds under normal network conditions, security through password hashing, and scalability to accommodate more users over time.

Objective (2): To design a web-based clearance system based on the determined requirements

The system was designed depending on the requirements gathered, followed by the Rapid Application Development (RAD) approach from the Structured Systems Analysis and Design Methodology (SSADM). The design stage included the System Architecture (client-server model), Context Diagram, Data Flow Diagrams, Use Case Diagram, Entity Relationship Diagram (ERD), and Database Schema, which enabled the smooth flow of data throughout the system.

The System Architecture adopted a three-tier client-server model. The client side (frontend) was built using HTML, JavaScript and CSS, providing separate interfaces for students, departments and administrators. The server side (backend) was built using PHP, handling business logic, process clearance requests, and communicate with the MySQL database. The database server used MYSQL for development, storing student records, clearance statuses, and departmental data. **PhpMyAdmin** used for database administration

Objective (3): To implement a Web-Based clearance system

The implementation of the system design was carried out using the identified implementation tools which included: Visual Studio Code editor as the primary code editor, Microsoft Edge browsers for testing, MySQL for database management, PHP for handling business logic, process clearance requests, and communicate with the MySQL database, JavaScript and HTML for frontend development, CSS for styling, and Windows operating system. The implementation produced the interfaces shown in Chapter Five, which include: landing page and login pages, user's dashboards. The system was also optimized for mobile devices to ensure accessibility for students using smartphones.

Objective (4): To test and validate the Web-Based clearance system to ensure functionality and usability

The system was tested during and after implementation using multiple testing strategies. Unit testing was used to test individual parts and modules of the code, whereby every part of each interface was tested to check whether it worked properly. This was essential during the identification of errors in specific units of the code, thereby making debugging quite an easy task. Integration testing was done after all the different modules had been put together to make a complete

system. Integration aimed at ensuring that all modules of the system worked hand in hand and that they could be integrated to form a complete working system. Functional testing evaluated the system against the initial requirements to ensure all key features worked as intended, including food logging, and supervisor dashboard functionality.

Validation Results

After development and testing, the system was taken back to Nagongera Campus and given out for testing to the departments and administrators and a sample of students in order to evaluate its performance, appearance, security, integrity, efficiency, effectiveness, and usability. The validation results showed positive feedback from both students, departments and the administration. Both students, Departments staff and administrators found the logging interface easy to use. The administration confirmed that the admin dashboard provided useful visibility into students and departments adherence patterns.

6.2 Conclusion

User feedback from Students indicates strong agreement that the Web-Based clearance system effectively meets their needs. The system directly tackles the key shortcomings of the previous manual clearance approach, which were outlined in the problem statement found in Chapter One. Departments can now clear students without physically being in the office while and administration are equipped to track students and department engagement and offer meaningful feedback. Given these capabilities, the system is well-suited for adoption at in Nagongera campus Busitema University.

6.3 Recommendations

I recommend that my Web-Based clearance system should be adopted by campuses, especially those under Busitema University that are still using manual clearance methods.

I recommend that my system to be adopted by different academic institutions as a point of reference for the development of similar related systems, and for study purposes in courses related to system administration and web development.

I also recommend that the government of Uganda, through the Ministry of Education and sports, to adopt my system so that it can be deployed in various institutions across the country to support clearance process and facilitate remote monitoring.

6.4 Limitations and Future Work

1. The clearance database does not include all departments in the campus; therefore, the researcher should expand the database to cover a wider range of departments in the campus.
2. The system has been optimized for basic mobile devices, but more work should be done to enhance responsiveness across a wider range of screen sizes; therefore, Progressive Web Application (PWA) capabilities should be implemented to enable offline functionality and home screen installation.
3. System maintenance is necessary for continued optimal performance; therefore, regular maintenance should be performed to improve system performance and update the AI recommendation prompts based on user feedback.
4. The system is not currently hosted, which limits its security, uptime, and accessibility; therefore, the system should be hosted on a commercial web-hosting platform such as AWS or Google Cloud, to enhance its security and ensure optimal uptime.

REFERENCES

- Adamu, A. (2022). ONLINE CLEARANCE SYSTEM. *FUDMA JOURNAL OF SCIENCES*, 6(2), 283–291. <https://doi.org/10.33003/fjs-2022-0602-1756>
- Crockett, J. L., Fu, A. S., Greenwood, J. L., & John, M. A. (2018). Integrated Sociology Program Assessment: Inclusion of a Senior Portfolio Graduation Requirement. *Teaching Sociology*, 46(1), 34–43. <https://doi.org/10.1177/0092055X17726833>
- Jonathan, O., Misra, S., Makinde, F., Damasevicius, R., Maskeliunas, R., & Leon, M. (2019). Development of online clearance system for an educational institution. *Communications in Computer and Information Science*, 1051 CCIS, 327–339. https://doi.org/10.1007/978-3-030-32475-9_24
- Prabhash, N., & Raju, G. (2019). An Exemplary Online Single Window Clearance System – Paramount to Ease of Starting Business. *International Journal of Management Studies*, VI(2), 27. <https://doi.org/10.18843/ijms/v6si2/04>
- Agbo-Ajala, O., & Makinde, O. E. (2015). A Web-Based Database- Driven Students ' Clearance System. *International Journal of Advanced Research in Computer Science and Software Engineering Research*, 5(7), 65–69.
- Eweoya, I. O., Agbeyangi, A. O., & Lukose, J. M. (2025). Streamlining Student Clearance in Higher Education : A Web-based Solution. *JOURNAL OF INFORMATION AND KNOWLEDGE MANAGEMENT*, 16(1), 47–62. <https://doi.org/https://dx.doi.org/10.4314/ijikm.v16i1.5>
- Ifeanyi, O. E. (2013). *Design and implementation of online clearance system* (Issue July).
- Mangubat, J. M. L., Reubal, K. V. P., Caluya, J. F. M., Pepito, J. K. B., Catungal, M. L. P., & Encarnacion, D. P. C. (2023). Online Student Clearance Management System. *International Journal of Science and Applied Information Technology*, 12(5), 38–43.

APPENDIX

Appendix I: Requirements Collection Interview Guide

During this interview process, I first politely asked for permission before I started to ask questions to the interviewee.

Topic: WEB-BASED CLEARANCE SYSTEM

Dear Respondent;

My name is Nasser Twaifu, a student of Busitema University pursuing a Bachelor's Degree in Information Technology. I am carrying out a research study on a Web-based Clearance system at Nagongera Campus Busitema University.

This survey is to guide me into understanding the current clearance methods and challenges faced. I kindly request for your cooperation in answering the following questions. Any information provided will be for academic purposes only and will be treated with absolute confidentiality.

I hope that my humble request may meet your kind consideration.

Thank you.

Questions

1. How is Clearance system currently at Busitema University Nagongera campus?
2. What challenges do you face while clearing with departments?
3. How do you track clearance progress and milestones?
4. What delays are commonly experienced during clearance process?
5. What features would you expect in online clearance system?
6. How do you currently store and retrieve clearance documents?
7. If you had a digital dashboard showing your clearance status, what specific information would be most useful to help you provide better feedback?
8. What notifications are required? For each event (submission, approval, rejection, and request for more info) indicate preferred channels.
9. On a scale of 1 to 10, how helpful would you find a system? (1 to 2 = Not Helpful at All, 2 to 4 = Slightly Helpful, 5 to 6 = Moderately Helpful, 7 to 8 = Very Helpful, 9 to 10 = Extremely Helpful)
10. Any additional comments or sample forms you can share to help design the system?

Appendix II: Questionnaire form for students (clearance applicants)

TOPIC: USER REQUIREMENTS SURVEY FOR WEB-BASED CLEARANCE SYSTEM

Dear respondent;

This survey is conducted as part of a research project to develop a web-based clearance system for students at Nagongera campus Busitema University. Your responses will help us understand the challenges you face in during clearance process, and what features would be most helpful in a digital system.

This questionnaire is voluntary and anonymous. No personal identifying information will be collected. Your responses will be used only for research purposes to improve on clearance process at Nagongera Campus Busitema University. Please tick or fill the appropriate response Participation is voluntary. If you are unsure about the question, leave it blank.

For any questions about this survey, please contact: Nasser Twaifu, Busitema University |
Phone: +256 703093401 | Email: twaifun8@gmail.com

Use the spaces provided to answer the questions given.

Demographic information

1. Registration number: -----

2. Faculty / Department: -----

3. Year of study: -----

Clearance experience and preferences

4. How do you currently obtain departmental clearance?

1. Paper logbook

2.Email

3. In_ person

4. Other (specify)

5. How long does the clearance process usually take for you?

1. <1 week

2. 1–2 weeks

3. 2–4 weeks

4. >1 month

6. Which problems have you experienced with clearance? (tick all that apply)

a). Lost or misplaced forms

b). Long queues

c). Conflicting instructions

d). No feedback

e). Difficulty in obtaining of required signatures

f). other (specify) -----

7. Do you have regular access to a smartphone or computer?

a). Smartphone

c). Computer

d). Both

c). Neither

8. Would you prefer to submit clearance requests online? (tick one) a).

Yes

b). No

c). Maybe

9. Would you be willing to upload scanned documents or photos for

clearance? a). Yes

b). No

c). Depends (specify) -----

10. Which notification method would you prefer for status updates? a).

Email

b). SMS

c). In_app notification

d). Phone call

11. Have you used any online student portal before? (tick one)

a). Yes (If yes, name it): -----

b). No

Feature priorities

12. Rate the importance of the following features (1 = low, 5 = high):

a). Real-time status tracking: -----

b). Uploading documents online: -----

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c). Automated email confirmations: -----

d). Downloadable clearance certificate: -----

Open feedback

13. What would make an online clearance system easy for you to use? (tick all that apply) a).

Simple interface

b). Mobile access

c). Clear instructions

d). Offline support

e). Helpdesk support

f). Training session

14. Do you have any concerns about using an online clearance system? (Privacy, cost of data, device access, etc.) Please explain them

15. Any additional suggestions or concerns about an online clearance system?

THANK YOU FOR PARTICIPATING

ESTIMATED BUDGET

ITEM	COST
Software	80000
Hardware	500000
Transport	50000
Stationary	80000
Flash disk	40000
Miscellaneous	50000

TIME SCHEDULE

ACTIVITY	DURATION
Feasibility study	1 week
Proposal	1 week
Data collection	2 week
Analysis	1 week
Design	2 week
Implementation	3 week
System testing	1 week
Report writing	1 week