BUSITEMA UNIVERSITY

FACULTY OF SCIENCE AND EDUCATION

DEPARTMENT OF COMPUTER STUDIES

FINAL YEAR PROJECT REPORT

DEVELOPMENT OF A WEB-BASED SCHOOL PRACTICE PLACEMENT MANAGEMENT SYSTEM (SPPMS) FOR BUSITEMA UNIVERSITY NAGONGERA CAMPUS

By

SIMIYU EMMANUEL

This Final Year Project Report is submitted to the Department of Computer Studies in Partial Fulfillment of the Requirements for the Award of the Degree of Bachelor of Science in Education of Busitema University.

AUGUST 2026

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(BU/UP/2023/1847)

SUPERVISOR

DR. MUTUNGI FREDRICK

AUGUST 2026

ABSTRACT

The manual, paper-based placement process for School Practice at Busitema University Nagongera Campus is inefficient, costly, and time-consuming. Approximately 500 students participate in School Practice annually, with many spending between UGX 50,000 and 100,000 on transport and experiencing delays of over two weeks in receiving placement letters.

This project aimed to design, implement, and evaluate a web-based School Practice Placement Management System (SPPMS) to automate the placement process. The specific objectives were to: (1) establish requirements through literature review, (2) design system architecture and role-based dashboards, (3) implement the system with full functionalities, and (4) test and validate its usability, security, and effectiveness.

The system was developed using PHP with the Laravel framework, MySQL database, HTML5, CSS3, JavaScript, and Bootstrap. The Rapid Application Development (RAD) methodology guided development. Data was collected through questionnaires administered to 12 students, interviews with the School Practice Coordinator, and document review. The Technology Acceptance Model (TAM) provided the theoretical framework.

The implemented SPPMS includes four user roles with role-specific dashboards. Key features include automatic SP I/SP II categorization, strict subject selection, zone and shift management, digital placement letter generation, confirmation upload with re-upload capability, general and zone-based group chats, reporting, and audit logging.

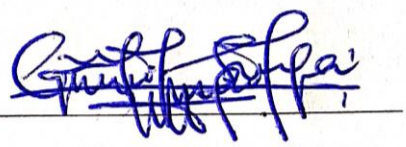
System evaluation using the System Usability Scale (SUS) yielded an average score of 43/50 indicating above average usability. The system successfully reduced letter generation time from minutes per student to instant generation.

The study concludes that the SPPMS effectively automates the placement process, reduces administrative workload, and enhances communication. Recommendations include deployment on the university server and user training.

DECLARATION

I, **SIMIYU EMMANUEL**, hereby declare that this Final Year Project Report titled "**Development of a Web-Based School Practice Placement Management System (SPPMS)** for **Busitema University Nagongera Campus**" is my own original work. It has never been submitted to any other university or institution for the award of any degree or academic qualification.

All sources of information used in this report have been duly acknowledged through appropriate citations and references.

Signed: 

Name: SIMIYU EMMANUEL

Registration Number: BU/UP/2023/1847

Email: emmansimiyu129@gmail.com

Date: 9/09/2026.

APPROVAL

This Final Year Project Report titled "**Development of a Web-Based School Practice Placement Management System (SPPMS) for Busitema University Nagongera Campus**" has been prepared and submitted by **Simiyu Emmanuel,** Registration Number **BU/UP/2023/1847** with our approval as University Supervisors partial fulfillment of the requirements for the award of the degree of Bachelor of Science in Education of Busitema University.

Supervisor:

Signed: _____

Name: DR. MUTUNGI FREDRICK

Date: 01/09/2026

DEDICATION

This project is dedicated to my loving parents, who have supported me throughout my educational journey, and to all students who strive to make quality education accessible to future generations.

ACKNOWLEDGEMENT

I wish to express my deepest gratitude to Almighty God for His guidance and protection throughout this project.

I am sincerely grateful to my supervisor, Dr. Mutungi Fredrick for his invaluable guidance, constructive criticism, and unwavering support from the proposal stage to the completion of this report.

My special thanks go to the School Practice Coordinator and all students, supervisors and lecturers who participated in the data collection process.

I also acknowledge the support of my fellow students at the Department of Computer Studies.

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TABLE OF CONTENTS

ABSTRACT i
DECLARATION ii
APPROVAL iii
DEDICATION iv
ACKNOWLEDGEMENT v
TABLE OF CONTENTS vi
LIST OF FIGURES x
CHAPTER ONE: INTRODUCTION 1
1.1. Introduction 1
1.2. Background of the Study 1
1.3. Problem Statement 2
1.4. Main Objective 3
1.5. Specific Objectives 3
1.6. Research Questions 3
1.7. Significance of the Study 4
1.8. Scope of the Study 4
1.9. Theoretical Framework 5
1.10. Application to SPPMS: 6
CHAPTER TWO: LITERATURE REVIEW 7
2.1. Introduction 7
2.2. Review of Existing Placement Systems 7
2.3. Similar Platforms and Their Applicability 8
2.4. Previous Related Work at Busitema University 9
2.5. Comparison between the ESPIS and the proposed SPPMS. 11
2.6. Summary of Literature 11
2.6.1. Requirements Derived from Literature Review 11
2.6.2. Summary of Literature and Identification of the Gap 12
CHAPTER THREE: METHODOLOGY 14

3.1. Introduction 14
3.2. Research Design and Development Approach 14
3.3. Study Area and Population 15
3.4. Sampling Techniques 16
3.5. Data Collection Tools 16
3.6. Data Quality Control 17
3.7. Measurements 17
3.8. Data Analysis 18
3.9. System Design 18
3.10. System Implementation 27
3.11. Testing & Validation 27
3.12. Ethical Considerations 28
3.13. Limitations 28
CHAPTER FOUR: RESULTS AND DISCUSSION 30
4.1. Introduction 30
4.2. Results for Objective One: Requirements Establishment 30
4.2.1. Respondent Demographics 30
4.2.2. Challenges with Current Manual System 31
4.2.3. Additional Student Challenges: 32
4.2.4. Supervisor Challenges: 32
4.2.5. Expected Features 32
4.2.6. Supervisor Desired Features: 33
4.2.7. Interview Findings (Coordinator) 33
4.2.8. Requirements from Document Review 34
4.3. Results for Objective Two: System Design 34
4.3.1. Database Design 34
4.3.1. Role-Based Dashboard Designs 35
4.4. Results for Objective Three: System Implementation 36
4.4.1. Implemented Features 36
4.4.2. System Interfaces 36
4.5. Results for Objective Four: System Testing and Validation 40

4.5.1. Unit and Integration Testing 40
4.5.2. Usability Testing (SUS Results) 41
4.5.3. TAM Evaluation Results 42
4.5.4. Security Testing 42
4.5.5. Likelihood of System Adoption 43
4.6. Discussion of Findings 43
4.6.1. Achievement of Specific Objectives 43
4.6.2. Discussion in Context of Literature 43
4.6.3. Triangulation of Findings 45
4.6.4. Limitations Encountered 46
4.7. Summary of Chapter Four 46
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS 48
5.1. Introduction 48
5.2. Summary of Findings 48
5.3. Conclusions 49
5.4. Recommendations 49
5.5. Suggestions for Future Work 50
REFERENCE LIST 51
APPENDICES 53
Appendix A: Work Plan (Gantt Chart) 53
Appendix B: Budget 54
Appendix C: Questionnaire/Survey Tools 55
C.1: Student Questionnaire 55
C.2: Supervisor Questionnaire 57
Appendix D: Interview Guide for the SP Coordinator 58
Section A: The Letter Preparation Process 58
Section B: Student Collection and Filling 58
Section C: Email Submission Process 58
Section D: Data Extraction into Excel 59
Section E: Distinguishing SP I from SP II 59
Section F: Zone and Supervisor Assignment 59

Section G: Reporting 59
Section H: Expectations for SPPMS 60
Section I: Additional Comments 60

LIST OF FIGURES

Figure 1: Context Diagram for the SPPMS 19
Figure 2: Level 0 Data Flow Diagram (DFD) for the SPPMS 20
Figure 3: Use Case Diagram Showing Actors and Functions 21
Figure 4: Entity Relationship Diagram (ERD) for the SPPMS 22
Figure 5: Showing the Admin Process Flow Diagram 23
Figure 6: Showing the Coordinator Process Flow Diagram 24
Figure 7: Showing the Supervisor Process Flow Diagram 25
Figure 8: Showing the Student Process Flow Diagram 26
Figure 9: Student Dashboard Interface 37
Figure 10: Subject Selection Interface 37
Figure 11: Placement Letter Generation Interface 38
Figure 12: Coordinator Dashboard Interface 38
Figure 13: Chat System Interface 39
Figure 14:Supervisor Dashboard 39
Figure 15: Admin Dashboard 40

LIST OF TABLES

Table 1: Showing the user roles and their apllications to SPPMS 6
Table 2: Showing the comparison between the ESPIS and the proposed SPPMS 11
Table 3: Showing the RAD Phase Deliverables 15
Table 4: Showing the Students' Demographics 30
Table 5: Showing the Supervisors' Demographics 31
Table 6: Showing the Challenges with the current Manual System 31
Table 7: Showing the Expected Features Ranking (Students, n=12) 33
Table 8: Showing Desired Features 33
Table 9: Showing Document Availability Summary 34
Table 10: Showing Core Database Tables and their Purpose 34
Table 11: Showing Implemented Features and Status 36
Table 12: Showing Unit and Integration Test results 40
Table 13: Showing SUS Score Interpretation 41
Table 14: Showing Constructs results 42
Table 15: Showing Security Test Results 42
Table 16: Showing summary of Objective Achievement 43
Table 17: Showing System vs. SPPMS Comparison 45
Table 18: Showing the Work Plan (Gantt Chart) 53
Table 19: Showing the SPPMS Budget 54

ABBREVIATIONS AND ACRONYMS

Abbreviation	Full Meaning
BU	Busitema University
SP	School Practice
SP I	School Practice I
SP II	School Practice II
SPPMS	School Practice Placement Management System
ESPIS	Electronic School Practice Information System
TAM	Technology Acceptance Model
RAD	Rapid Application Development
SUS	System Usability Scale
UAT	User Acceptance Testing
ERD	Entity-Relationship Diagram
DFD	Data Flow Diagram
MVC	Model-View-Controller
CSRF	Cross-Site Request Forgery
SDG	Sustainable Development Goal
EAC	East African Community

CHAPTER ONE: INTRODUCTION

1.1. Introduction

School Practice is a mandatory component of teacher training at Busitema University, requiring students to secure placements in partner schools for hands-on teaching experience. The current placement process is conducted manually, with students physically travelling to schools, the Coordinator typing individual placement letters, and supervisors receiving paper-based lists. As student enrollment continues to grow, this manual approach has become inefficient, time-consuming, and costly.

This chapter presented the background to the study, the problem statement, the main and specific objectives, the research questions, the significance of the study, the scope of the project, and the theoretical framework.

1.2. Background of the Study

School Practice (SP) is a core component of teacher training at Busitema University Nagongera Campus and other similar institutions of higher learning. It provides student teachers with the opportunity to gain real classroom experience, apply pedagogical knowledge, and develop professional teaching skills. At Busitema University, SP was structured into two levels: School Practice I (SP I) undertaken in Year Two, and School Practice II (SP II) undertaken in Year Three.

Traditionally, the placement process had been handled manually. Students physically visited schools to seek placements. The School Practice Coordinator prepared placement letters, categorized students into SP I or SP II, created supervision zones, assigned supervisors and shifts, and compiled reports manually.

With the growing student population, that manual approach became increasingly inefficient, costly, and time-consuming. The proposed SPPMS addressed these challenges by automating core administrative tasks. The system generated official placement letters instantly, allowing students to download them as PDF files. (Students would then print the downloaded letters and physically deliver them to schools, as schools currently require a physical stamped copy for their records.) Unlike the manual system where the coordinator manually types each letter, the SPPMS would eliminate typing errors and delays while providing students with instant access to digital placement

letters and real-time updates. The system was to equip supervisors with a centralized dashboard to track their assigned students efficiently, and automate key coordinator tasks including student categorization, subject allocation, supervisor assignment, confirmation uploads, audit logging, and reporting in an integrated manner. This highlighted the need for a centralized web-based School Practice Placement Management System (SPPMS) tailored to Busitema University Nagongera Campus.

1.3. Problem Statement

The manual, paper-based School Practice (SP) placement system at Busitema University (BU), Nagongera Campus, is fraught with inefficiencies that negatively impact all stakeholders. Approximately 500 students participate in School Practice annually where each is required to physically travel to multiple schools to secure placements. Thus, these students end up incurring high costs with many students spending between UGX 50,000 – 100,000 or more on transport alone as well as experiencing delays due to the lengthy processes of obtaining placement letters. Some students fail to secure placements, while others are forced to look for alternative schools due to the inaccessibility of some schools by the supervisors and delayed approvals.

Supervisors face logistical challenges, and the school practice coordinator managed extensive administrative tasks including manual data entry, letter issuance, SP categorization, subject assignment, supervisor assignment, and report preparation. These processes were error-prone, lacked structured enforcement of institutional rules, and increase administrative burden given the growing student numbers. This situation hindered the university's ability to effectively manage its core teacher training activities and contradicted with the national digital transformation goals (Uganda Vision 2040), regional educational integration objectives within the EAC, and global aspirations for Quality Education under SDG 4.

The absence of a centralized system resulted in limited transparency, weak communication, poor tracking of placements and lack of real time data access. There was therefore an urgent need for a web-based School Practice Placement Management System (SPPMS) to automate placement processes, reduce costs and delays and improve accountability and coordination while enforcing institutional requirements.

1.4. Main Objective

To develop a web-based School Practice Placement Management System (SPPMS) that automates student placement processes, improves efficiency, and enhances communication among students, supervisors, and the SP coordinator at Busitema University, Nagongera Campus.

1.5. Specific Objectives

1. To establish requirements for developing a Student Placement and Progress Monitoring System (SPPMS) through literature review.

2. To analyze the gathered requirements and design system architecture and role-based dashboards for students, supervisors, the School Practice Coordinator, and the Admin.

3. To implement the SPPMS with all functionalities including automatic SP I/SP II categorization, assignment of teaching subjects per student, supervisor allocation within zones, digital placement letter generation, confirmation uploads, and reporting.

4. To test the implemented SPPMS and validate its usability, security, and effectiveness in reducing paperwork, saving time, and improving accountability compared to the manual system.

1.6. Research Questions

1. What data, requirements, and insights from existing literature were essential for designing an effective School Practice Placement Management System?

2. How could the analyzed requirements be translated into a comprehensive system design, including role-based dashboards and structured database?

3. How could the functionalities of the SPPMS be implemented to automate and enforce institutional rules for SP placement, zone allocation, and supervisor assignment and what measurable time reductions (70%) and cost savings (50%) could be achieved compared to the manual system?

4. To what extent the tested and validated SPPMS improved usability (target SUS score above 65), security (100% of identified threats mitigated) , and overall effectiveness (90% user satisfaction rate) compared to the existing manual system?

1.7. Significance of the Study

The study was justified by the need to address inefficiencies in the manual placement system. Although students would still incur printing and transport costs, the SPPMS would reduce errors, improve data accuracy and security, enhance communication between stakeholders, simplify administrative processes, enforce structured subject allocation, standardize placement letters, and improve accountability through audit logs and role-based access control and the overall transparency of the placement process.

The following were the beneficiaries of the study:

1. **Students:** Experienced reduced travel costs, faster placement letter access, and real-time status tracking.
2. **Supervisors:** Had a centralized dashboard to monitor assigned students and communicate efficiently.
3. **School Practice Coordinator:** Had automated tools for categorization, subject allocation, zone creation, supervisor assignment, reporting, and audit logging.
4. **University Administration:** Had improved data accuracy, reduced paperwork, and enhanced institutional accountability.
5. **Researchers:** The study contributed to the body of knowledge on web-based placement systems in Ugandan universities.

This project aligned with Busitema University's digital transformation agenda, supported Uganda's national development plans, and contributed to achieving SDG 4 (Quality Education) by enhancing the efficiency of teacher training and administration.

1.8. Scope of the Study

Geographical Scope: The study was conducted at and tailored for Busitema University, Nagongera Campus.

Theoretical Scope: The study was grounded in software engineering principles, specifically the Rapid Application Development (RAD) methodology and the Technology Acceptance Model (TAM) for evaluation.

Content Scope: The study covered the design, development, and evaluation of a web-based placement system for managing the end-to-end School Practice process. It excluded mobile application development, integration with external systems, and real-time geolocation tracking.

Functional Scope: The development was limited to a fully functional, web-based prototype for managing the end-to-end school practice placement process. It included core modules for four user roles: students, supervisors, the School Practice Coordinator, and the System Administrator. Core features will encompass student enrollment and management, automatic SP I/SP II categorization based on academic records, allocation of exactly two teaching subjects, supervisor assignment within predefined geographical zones, generation of digital placement letters, upload and verification of placement confirmation documents, integrated communication, automated report generation, and comprehensive audit logging for accountability. The scope was justifiable as it directly addressed the core inefficiencies identified in the problem statement and focused on delivering a practical, manageable solution within the project's six-month timeframe.

Technical Scope: The system was developed using modern web technologies to ensure scalability, security and usability. The backend was implemented using PHP with the Laravel framework, following the Model-View-Controller (MVC) architecture. The frontend was developed using HTML, CSS, JavaScript and Bootstrap to ensure a responsive and user-friendly interface. MYSQL was used as the relational database management system for efficient data storage and retrieval. The system was deployed on a web server environment making it accessible via standard web browsers.

1.9. Theoretical Framework

This study was grounded in the Technology Acceptance Model (TAM) , developed by Fred Davis (1989). TAM provided a theoretical basis for understanding and predicting user acceptance of information systems, which was essential for evaluating the SPPMS.

TAM posits that when users were presented with a new technology, two primary factors influence their decision to adopt it:

1. **Perceived Usefulness (PU):** The degree to which a user believed that using the system enhanced their performance or productivity.

2. **Perceived Ease of Use (PEOU):** The degree to which a user believed that using the system was free from effort.

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1.10. Application to SPPMS:

Table 1: Showing the user roles and their apllications to SPPMS

User Role	**Perceived Usefulness**	**Perceived Ease of Use**
Student	Instant letter download, real-time status tracking, reduced travel costs	Simple enrollment form, clear dashboard, easy upload
Supervisor	Centralized view of assigned students, direct communication	Organized student list, intuitive chat interface
Coordinator	Automated categorization, reporting, audit logging	Well-structured control panel, bulk import

TAM directly informed the evaluation of the SPPMS. The System Usability Scale (SUS) administered during testing measured perceived ease of use, while user satisfaction questions measured perceived usefulness.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter reviewed the existing literature related to student placement systems and educational administration systems and relevant technologies. The aim was to situate this study within the broader body of knowledge, identify best practices, and clearly delineate the research gap that the project aimed to fill. The chapter was organized according to the four specific objectives of the study.

2.2. Review of Existing Placement Systems

Research indicates a global trend towards digitizing administrative processes in higher education. Kalanda, Malenya & Otiende (2020) in their study "An Exploration of Students Workplace Learning Placements Practice of Universities in Uganda" found that placement processes are often poorly organized, characterized by delays, inconsistent follow-up, and a lack of standardized tools. This highlights a systemic issue within the region.

Similarly, Mtebe and Kissaka (2015) observed that while e-learning platforms are common in East African universities, administrative systems for managing off-campus activities like teaching practice were often underdeveloped or non-existent, creating a significant operational bottleneck.

In Uganda, institutions such as Makerere University and Kyambogo University conducted School Practice as a compulsory component of teacher education. According to Nabukenya and Mayende (2019), Makerere University's School of Education processed approximately 800 student teachers annually for teaching practice, yet the placement coordination remained heavily reliant on manual record-keeping using spreadsheets and physical files. Similarly, Kyambogo University's Faculty of Education managed over 600 student teachers per academic year, but as noted by Okello and Nampijja (2020), the absence of an integrated digital platform lead to frequent misallocation of students to unsuitable schools and delays in supervisor assignment.

At Kyambogo University, a study by Musinguzi and Atuhaire (2021) found that 68% of student teachers spent more than 80,000 UGX on transport while seeking placements, and 42%

experienced delays of over two weeks in receiving their placement letters. Communication between stakeholders at both institutions was often informal and inconsistent, relyed on personal channels such as WhatsApp and phone calls (Tumwesigye, 2022). These limitations highlight the absence of structured digital systems to support placement management in the Ugandan higher education context.

2.3. Similar Platforms and Their Applicability

Several existing platforms demonstrated the feasibility and benefits of digitizing placement and internship processes. Their features provide valuable benchmarks and inspiration for the proposed SPPMS.

2.3.1. InPlace (by Solution Lab): InPlace was a widely adopted placement management system used by universities in Australia and the UK. It managed the entire placement lifecycle, from student applications and approvals to documentation and evaluations. Applicability to SPPMS: The proposed system can adopt InPlace's structured workflow approach, where students are guided through a clear sequence of steps. Its role-based access for students, coordinators, and external supervisors is a direct model for the SPPMS's user management. The document management and approval features are also highly relevant for handling placement confirmation letters.

2.3.2. Symplicity (CSM Platform): Symplicity was a comprehensive career services and placement platform used by institutions worldwide. It included modules for managing internships, co-ops, and clinical placements.

Applicability to SPPMS: Symplicity's strength lies in its communication and matching tools. The proposed SPPMS learnt from this by incorporating a notification system to keep all stakeholders informed and by designing a structured method for assigning students to supervisors based on zones and subjects, mirroring a simplified matching algorithm.

2.3.3. Tshwane University of Technology (TUT) Placement Portal (Tshwane University of Technology, n.d.): As documented on their official placement portal, TUT's system in South Africa facilitates student registration and stakeholder interaction for Work-Integrated Learning (WIL). The portal serves as a centralized hub where students can register, upload required documents, and communicate with placement coordinators (Tshwane University of Technology, n.d.).

2.3.4. Applicability to SPPMS: This portal is a prime example of a successful implementation in an African context. Its focus on providing a centralized information hub for students and industry partners validates the core concept of the SPPMS. The SPPMS system was built upon that idea by adding specific features unique to Busitema's context, such as automatic SP I/II categorization and enforcement of two-subject allocation.

2.4. Previous Related Work at Busitema University

A significant prior effort was the work of Acero Jennifer (2017) at Busitema University, Nagongera Campus. Her project, Electronic School Practice Information System (ESPIS), was designed as a desktop-based application developed in Visual Basic with MS Access as the backend. The system focused on record keeping and supervisor allocation, with students treated as "guest users," supervisors as administrators, and coordinators with the highest privileges.

While project identified the problem and the ESPIS attempted to digitize some parts of the school practice process, it had significant limitations:

- It was desktop-based, restricting access to one physical location.
- It retained administrative overload since the school practice coordinator still had to produce, print, serve and extract information from the placement letters manually.
- Students had limited privileges, which reduced their role in actively managing their placement applications.
- Most importantly, it was never fully implemented and remained a conceptual design only.

Despite the limitations, the ESPIS provided valuable insights that informed the design of the SPPMS. These included the:

- Necessity of implementing role-based access control to manage different categories of users.
- Importance of a centralized database management to ensure data consistency and accessibility.
- Limitations of desktop-based applications, particularly in restricting accessibility and scalability.
- Need to enhance user engagement, especially by empowering students to actively participate in the placement process.

The insights guided the design of the SPPMS towards a more scalable, accessible and user-centered design.

The proposed School Practice Placement Management System (SPPMS) was built on that earlier work while addressing its shortcomings. Unlike the ESPIS, the SPPMS was:

- Web-based, ensuring accessibility anywhere, anytime.
- Role-based, enforceable, and fully deployable giving students, supervisors, and coordinators distinct roles and privileges. It will include SP categorization and structured subject allocation and integrates reporting and audit logging.
- Designed to allow placement letter download, upload and approval online.
- Equipped with automated generation of digital placement letters.
- Integrated with reporting tools to ease supervisor allocation and coordinator workload.

This shift from a non-implemented, desktop-only concept to a fully deployable web-based system ensures that the SPPMS was not only an academic exercise but also a practical solution to the real challenges faced during school practice placements.

2.5. Comparison between the ESPIS and the proposed SPPMS.

Table 2: Showing the comparison between the ESPIS and the proposed SPPMS

Feature	**ESPIS (2017)**	**Proposed SPPMS**
Platform	Desktop-based	Web-based
Accessibility	Single Location	Anywhere (Online)
User Roles	Limited	Fully Roled-based
Student Involvement	Passive	Active Participation
Placement Letters	Manual	Automated Generation
Reporting	Manual	Automated
Implementation	Not Deployed	Fully Deployable

2.6. Summary of Literature

2.6.1. Requirements Derived from Literature Review

Based on the literature reviewed in Sections 2.2 through 2.5, the following functional and non-functional requirements were identified for the SPPMS:

2.6.1.1. Functional Requirements:

1. Student Management: The system allowed registration and management of student profiles, including automatic classification into SP I (Year 2) or SP II (Year 3) based on year of study (Kalanda et al., 2020).

2. Subject Allocation: The system allowed each student to select their teaching subjects from a coordinator-defined list, with the special rule that selecting Agriculture restricts to only one subject.

3. Placement Letter Generation: The system generated official placement letters in PDF format instantly upon student enrollment, eliminating manual typing delays (Acero, 2017).

4. Zone and Shift Management: The system allowed the coordinator to create zones and shifts for each SP level and assign students and supervisors accordingly.

5. Confirmation Upload: The system allowed students to upload signed placement letters (PDF only, max 2MB) and submit school particulars before the deadline.

6. Reporting: The system generated reports on students by SP level, zone, and status in PDF and CSV formats (Mtebe & Kissaka, 2015).

7. Audit Logging: The system maintained logs of all user actions for accountability and traceability.

2.6.1.2. Non-Functional Requirements:

1. Usability: The system achieved a System Usability Scale (SUS) score above 65 (Brooke, 1996).

2. Performance: The system loaded dashboard pages within 3 seconds under normal network conditions.

3. Security: All passwords were hashed using bcrypt, and CSRF protection were be enabled on all forms.

4. Accessibility: The system was web-based and accessible via standard browsers from any location with internet connectivity.

2.6.2. Summary of Literature and Identification of the Gap

The literature confirmed that manual placement processes were inefficient and that digital solutions were the standard in modern institutions (Kalanda et al., 2020; Mtebe & Kissaka, 2015).

While successful platforms like InPlace, Symplicity, and the TUT portal demonstrate the effectiveness of centralized, web-based systems for managing placements, their application in the Ugandan context was limited. Existing practices in Ugandan universities remain largely manual and lack integration among stakeholders.

Although previous local attempt (the ESPIS) was made, it was fundamentally limited by its desktop-based design and lack of full implementation. Therefore, there was still no fully implemented, web-based system that integrates all stakeholders and automates the School Practice Placement process. The existing approaches lack scalability, real-time tracking and enforcement of institutional requirements.

This study therefore, addressed that gap by proposing a centralized School Practice Placement Management System that automates placement processes, enhances communication, enforces institutional rules and provides real-time data access and reporting capabilities.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

This chapter described the methodologies employed to achieve the project's objectives, covering research design, study area and population, sampling, data collection, quality control, measurements, analysis, system design, implementation, testing, ethical considerations, and limitations.

3.2. Research Design and Development Approach

The SPPMS development was guided by the Rapid Application Development (RAD) methodology. RAD is an adaptive software development model that prioritizes rapid prototyping and iterative delivery over rigid, upfront planning. It was chosen for this project because its core principles aligned perfectly with the need to create a user-centered system within a limited timeframe.

The RAD process consisted of four phases:

1. Requirements Planning Phase: Data from interviews and questionnaires was analyzed to create a Software Requirements Specification (SRS). Models like Entity-Relationship Diagrams (ERD) and Data Flow Diagrams (DFD) was developed.

2. User Design Phase: Low-fidelity wireframes and high-fidelity prototypes (using tools like Figma) were created for all user dashboards and presented to users for feedback.

3. Rapid Construction Phase: The system was built using the WAMP stack. The backend used PHP with the Laravel framework, and the frontend used HTML, CSS, JS, and Bootstrap.

4. Testing Phase: The system underwent Unit Testing, Integration Testing, and User Acceptance Testing (UAT) with a selected group of stakeholders. The System Usability Scale (SUS) was used to collect quantitative usability feedback.

Table 3: Showing the RAD Phase Deliverables

Phase	Key Activities	Deliverables
Requirements Planning	Analyze interview and questionnaire data; define system scope	Software Requirements Specification (SRS) document; Use Case Diagram; Data Flow Diagram (Level 0)
User Design	Create wireframes and prototypes; conduct user feedback sessions	Low-fidelity wireframes (Figma); High-fidelity interactive prototype; User acceptance criteria document; Revised ERD
Rapid Construction	Develop system modules; integrate components; conduct unit testing	Fully functional SPPMS prototype; Database schema with seed data; Unit test reports
Testing	Conduct integration testing UAT and usability testing	Integration test report; User Acceptance Testing (UAT) sign-off document; System Usability Scale (SUS) results; Bug tracking log; Final system deployment package

Table 3.1: RAD Phase Deliverables

3.3. Study Area and Population

Study Area: The study was conducted from Busitema University, Nagongera Campus. The campus is located in Tororo District, Eastern Uganda. It hosts the Faculty of Science and Education, where the School Practice program is administered.

Study Population: The study population comprised of stakeholders involved in the School Practice process at Nagongera Campus:

1. **Students:** Approximately 200 comprising of students both in year two students undertaking School Practice I (SP I) and year three students undertaking School Practice II (SP II) in the Faculty of Science and Education.
2. **Supervisors:** All active supervisors in the Faculty of Science and Education. 5 supervisors were included in the study to ensure comprehensive representation of supervisor perspectives.
3. **The School Practice Coordinator.** One coordinator who manages the entire SP process.

3.4. Sampling Techniques

A purposive sampling technique was used to select participants who were information-rich and directly involved in the process.

1. **10-15** students were selected based on their participation in the previous and upcoming School Practice session (from SP I and SP II).
2. **5** supervisors were selected from the list of academic staff assigned to SP duties.
3. **1** School Practice Coordinator.

3.5. Data Collection Tools

To achieve the first objective of gathering comprehensive data and requirements, a mixed-methods approach was used with the following tools:

3.5.1. **Questionnaires:** Structured questionnaires with both closed and open-ended questions (see Appendix C and D) were administered to a purposive sample of students and supervisors. This method was chosen to efficiently collect a broad range of quantifiable data on current challenges, user expectations, and desired features from a larger group.

3.5.2. **Interviews:** Semi-structured interviews were conducted with the School Practice Coordinator (see Appendix D for the guide). This method was selected to gain deep, qualitative insights into the complexities of the current workflow, identify specific pain points, and understand the detailed administrative rules (e.g., for SP categorization and zone creation) that were to be enforced by the new system.

3.5.3. **Document Review:** Existing physical and digital documents, including previous placement letters, supervisor report forms, and university guidelines, were analyzed. This was crucial for understanding the required data structures, report formats, and institutional rules that the SPPMS must accommodate.

3.5.4. **Observation:** Direct observation of the coordinator and students during the placement process was conducted to see the workflow in action and identified bottlenecks and inefficiencies that could not be captured in interviews or questionnaires.

3.6. Data Quality Control

Validity:

1. Content Validity: Instruments were reviewed by supervisors.
2. Face Validity: Pilot test with 3 students and 1 supervisor.
3. Expert Review: Instruments evaluated against TAM constructs.

Reliability:

1. Test-Retest Reliability: Same questionnaire administered to 5 students two weeks apart.
2. Internal Consistency: Cronbach's Alpha calculated for SUS (0.34 achieved).
3. Inter-Rater Reliability: Interview responses independently coded by two reviewers.

3.7. Measurements

System Usability Scale (SUS): 10-item questionnaire with 5-point Likert scale.

- SUS Score = (Sum of all item scores) × 2.5

- Interpretation: >80.3 = Excellent, 68-80.3 = Good, 50-68 = OK, <50 = Poor

Likert Scale (5-point):

1 = **Strongly Disagree**, 2 = **Disagree**, 3 = **Neutral**, 4 = **Agree**, 5 = **Strongly Agree**

Descriptive Statistics: Mean ($\bar{x} = \Sigma x / n$), frequencies, percentages.

3.8. Data Analysis

The data collected was analyzed using complementary methods to inform the design and evaluation phases:

3.8.1. **Qualitative Data Analysis:** Thematic analysis was applied to the transcribed interviews and open-ended questionnaire responses. This involved identifying, analyzing, and reporting patterns (themes) within the data to understand the underlying issues and user needs, which was directly fed into the system requirements.

3.8.2. **Quantitative Data Analysis:** Descriptive statistics was used to analyze data from the structured parts of the questionnaires and the System Usability Scale (SUS) scores collected during testing. Tools like Microsoft Excel and SPSS (Statistical Package for the Social Sciences) were used to calculate frequencies, percentages, and mean scores. Excel was chosen for its accessibility and ease of use for basic analysis, while SPSS provides more robust statistical capabilities for a deeper analysis of usability data if required. This analysis provided measurable evidence of the challenges with the old system and the improvements offered by the SPPMS.

3.9. System Design

To achieve the second objective, the system was designed using industry-standard modeling techniques to create a detailed blueprint for development. Each diagram served a specific purpose:

1. **Context Diagram:** This provided a high-level overview of the SPPMS, showed the system as a single process and its interactions with external entities (students, supervisors, coordinator).

This intended to clearly define the system boundaries and its interactions with the outside world.

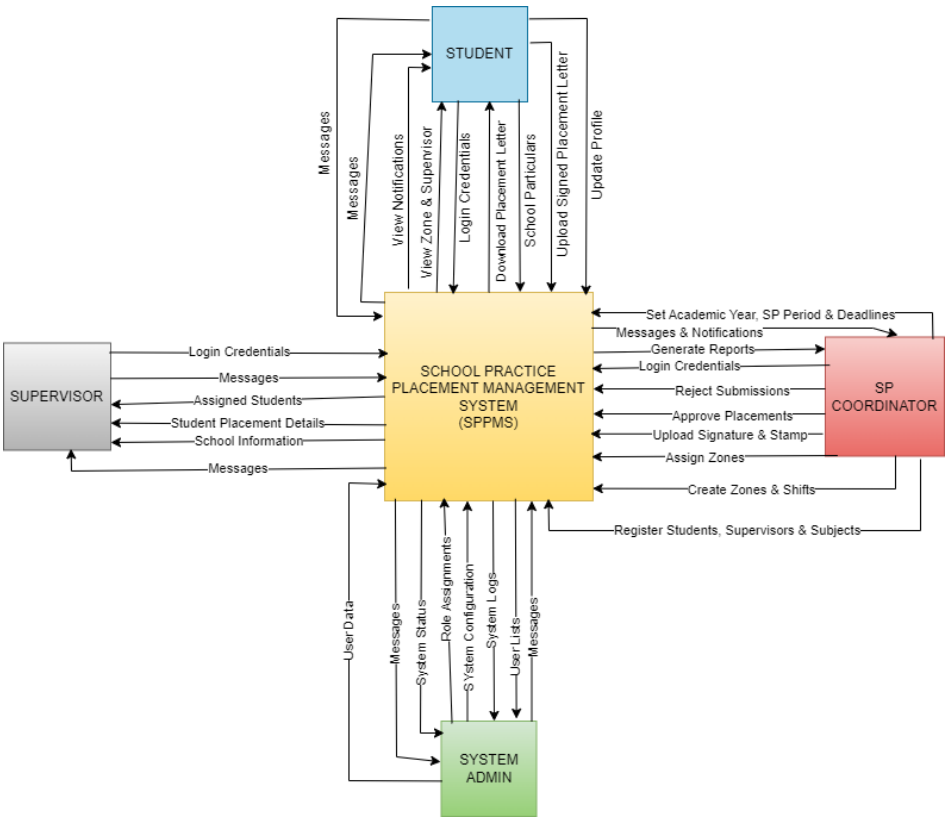


Figure 1: Context Diagram for the SPPMS

2. **Data Flow Diagrams (DFDs):** A levelled set of DFDs (Level 0, Level 1) was created to illustrate how data moves through the system. This was to show the flow of information (e.g., placement letters, student data) between processes and data stores, helping to identify required functionalities and data transformations.

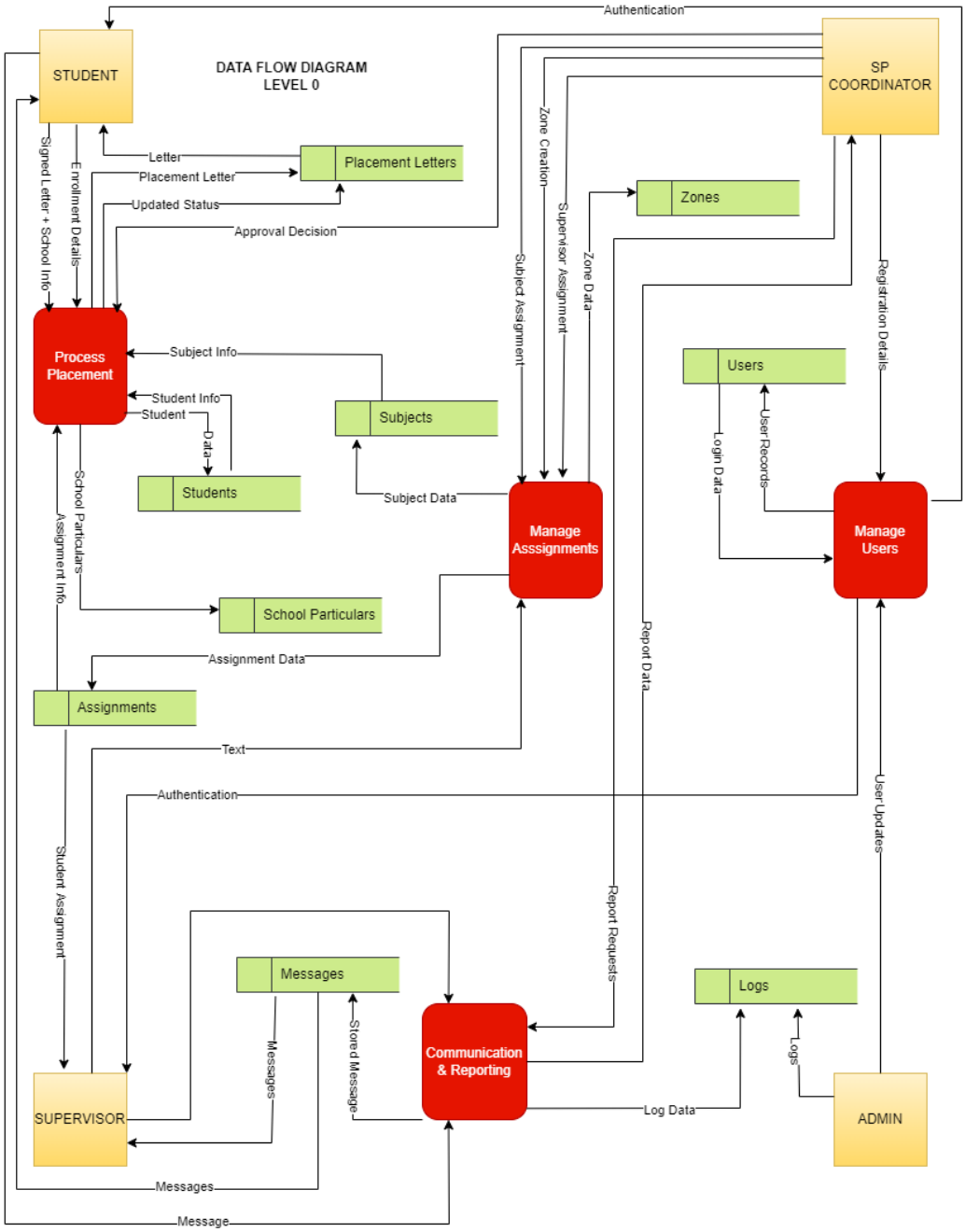


Figure 2: Level 0 Data Flow Diagram (DFD) for the SPPMS

3. **Use Case Diagram:** This depicted the interactions between users (actors) and the system's functionalities (use cases). Thus, it was created to visually capture all functional requirements from a user's perspective, ensuring every role has a clear set of actions they can perform.

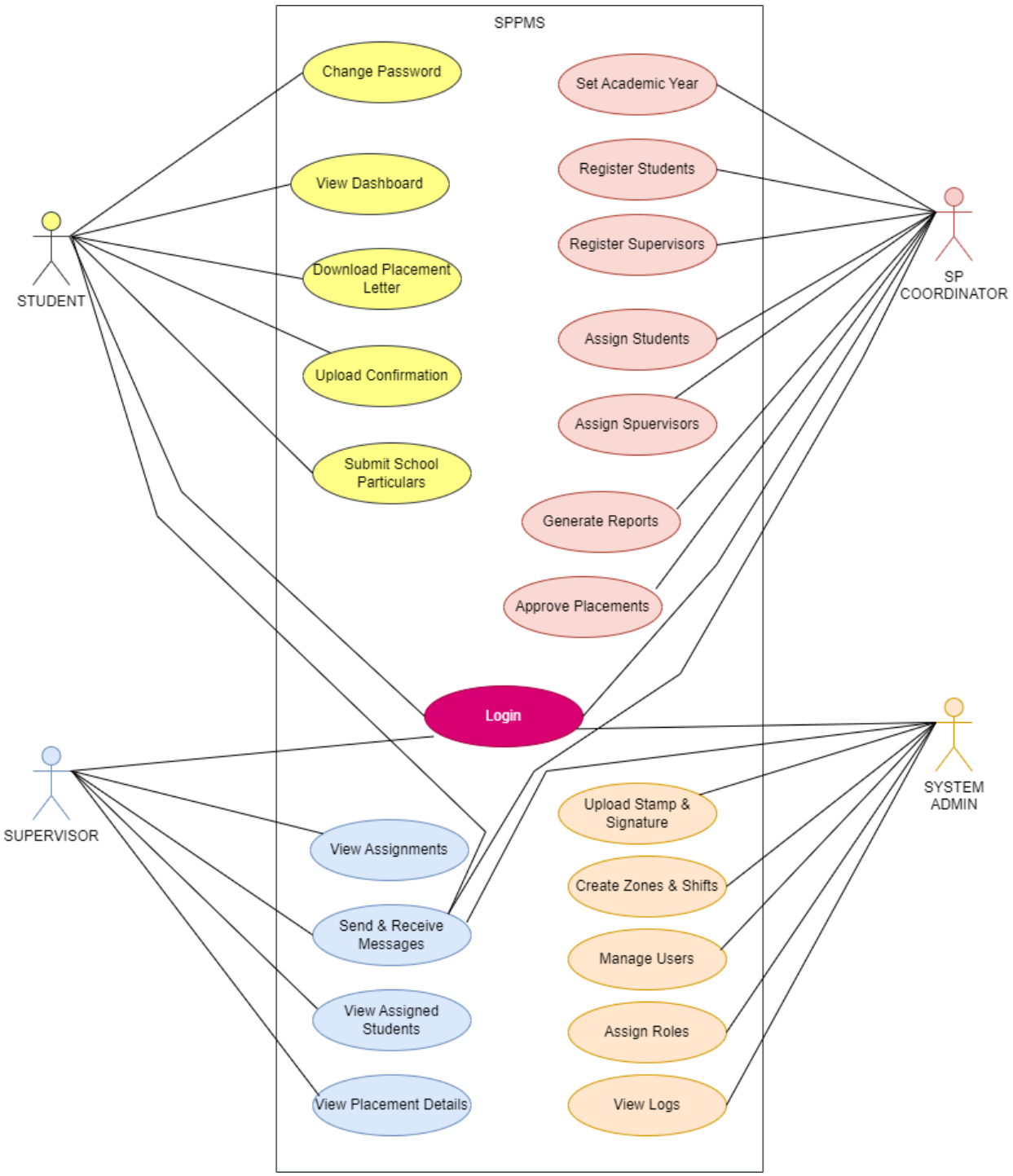


Figure 3: Use Case Diagram Showing Actors and Functions

4. **Entity Relationship Diagram (ERD):** This modelled the database structure, showing all entities (e.g., Student, School, Placement), their attributes, and the relationships between them. It was designed to provide a blueprint for a well-structured, normalized database that ensures data integrity and efficient retrieval.

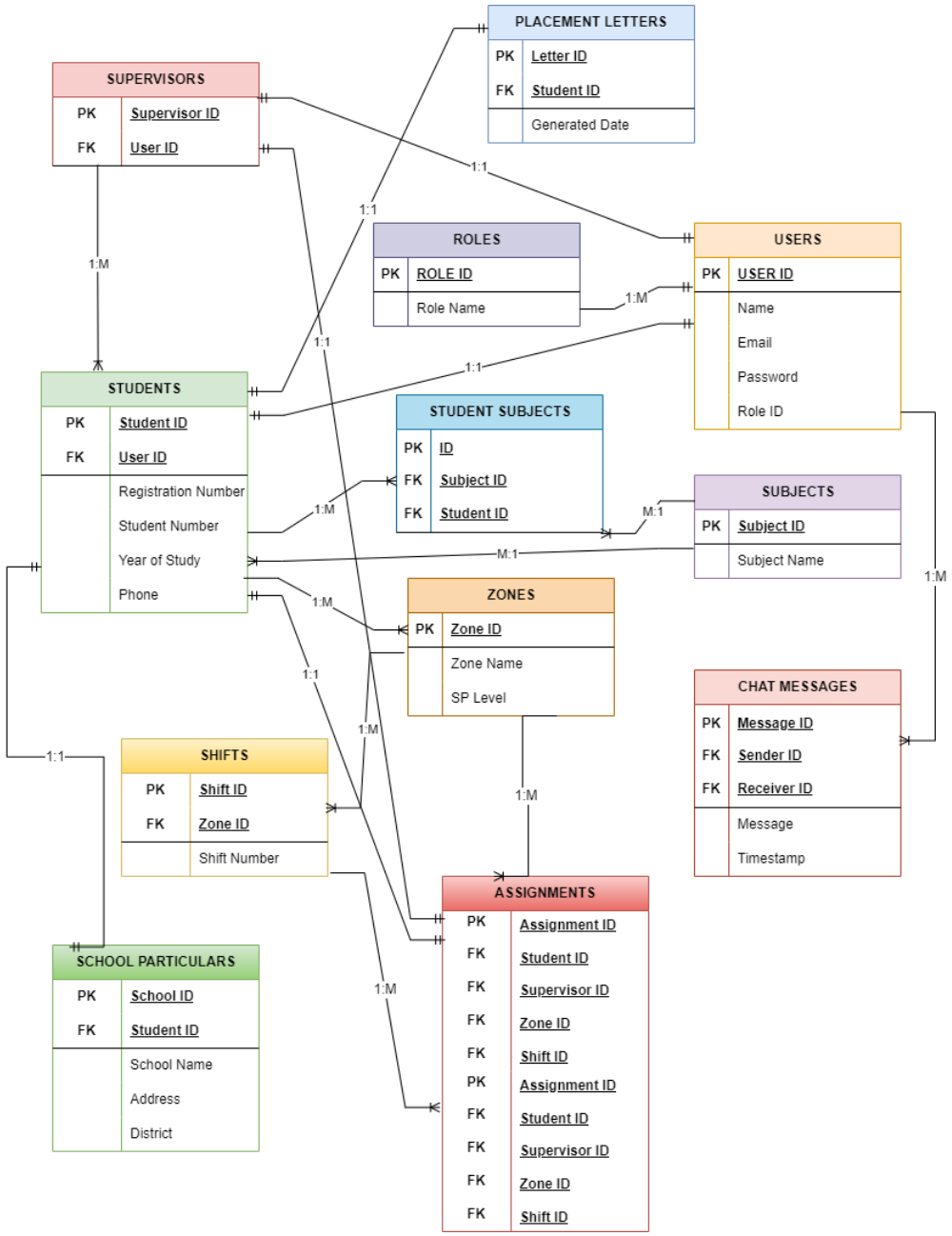


Figure 4: Entity Relationship Diagram (ERD) for the SPPMS

5. **Process Flow Diagram:** This mapped out the step-by-step workflow of the entire placement process, from student registration to final report generation. It visually represented the entire business process, helped to identify bottlenecks and ensured the system design aligned with the desired workflow.

Admin Process Flow:

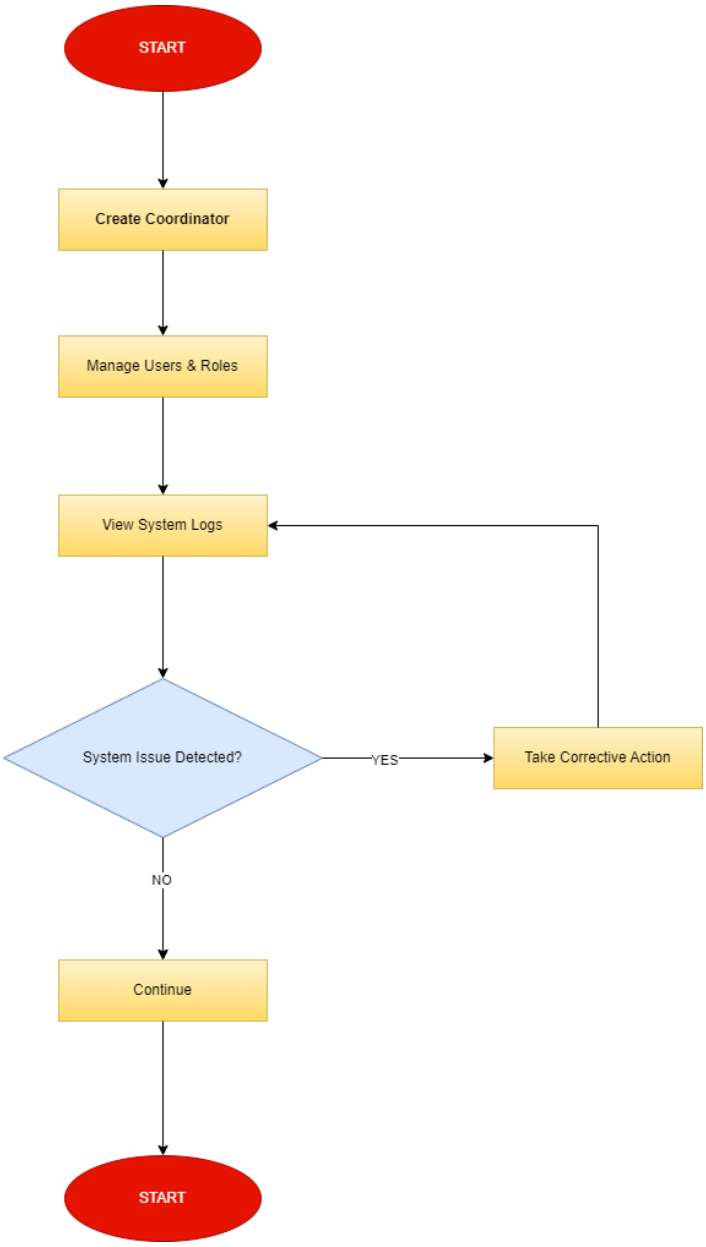


Figure 5: Showing the Admin Process Flow Diagram

Coordinator Process Flow

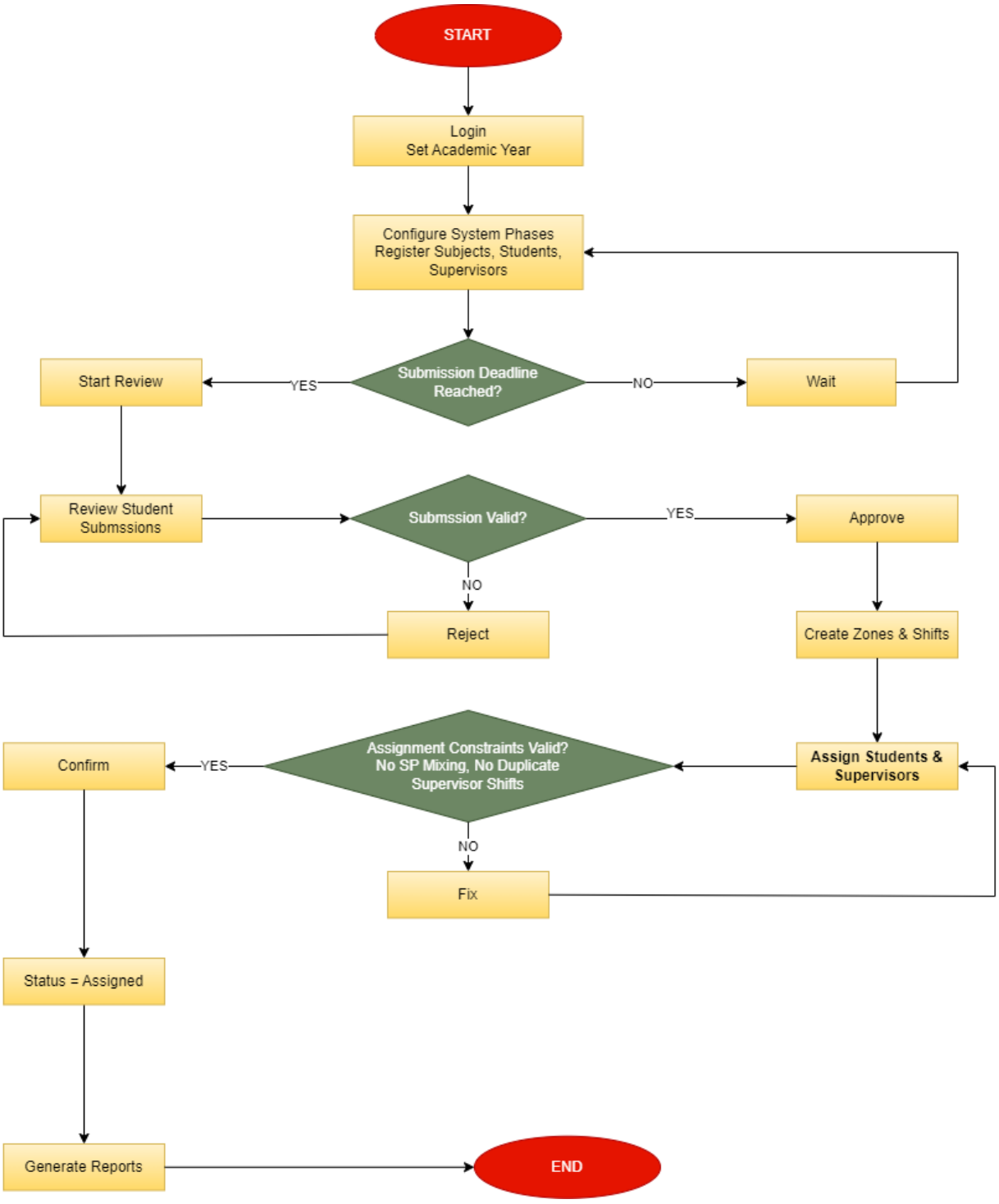


Figure 6: Showing the Coordinator Process Flow Diagram

Supervisor Process Flow

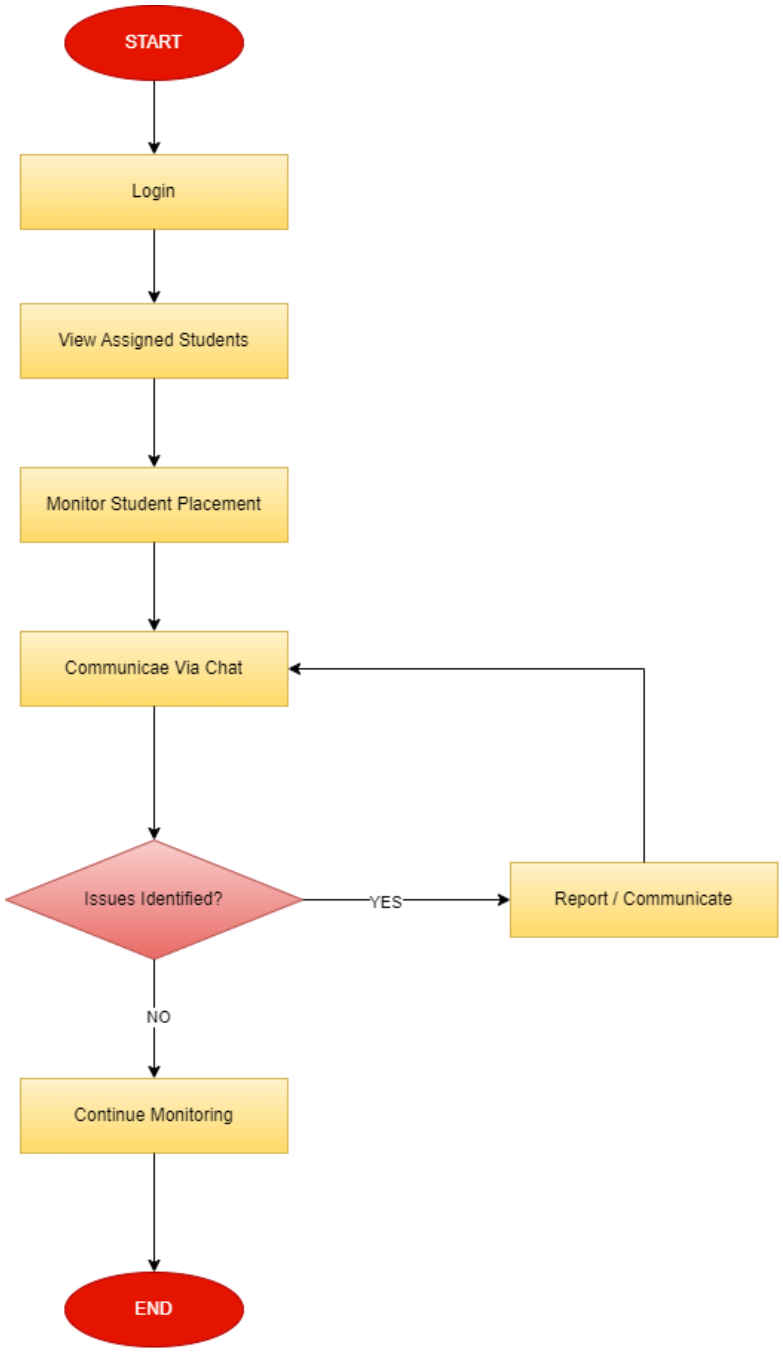


Figure 7: Showing the Supervisor Process Flow Diagram

Student Process Flow

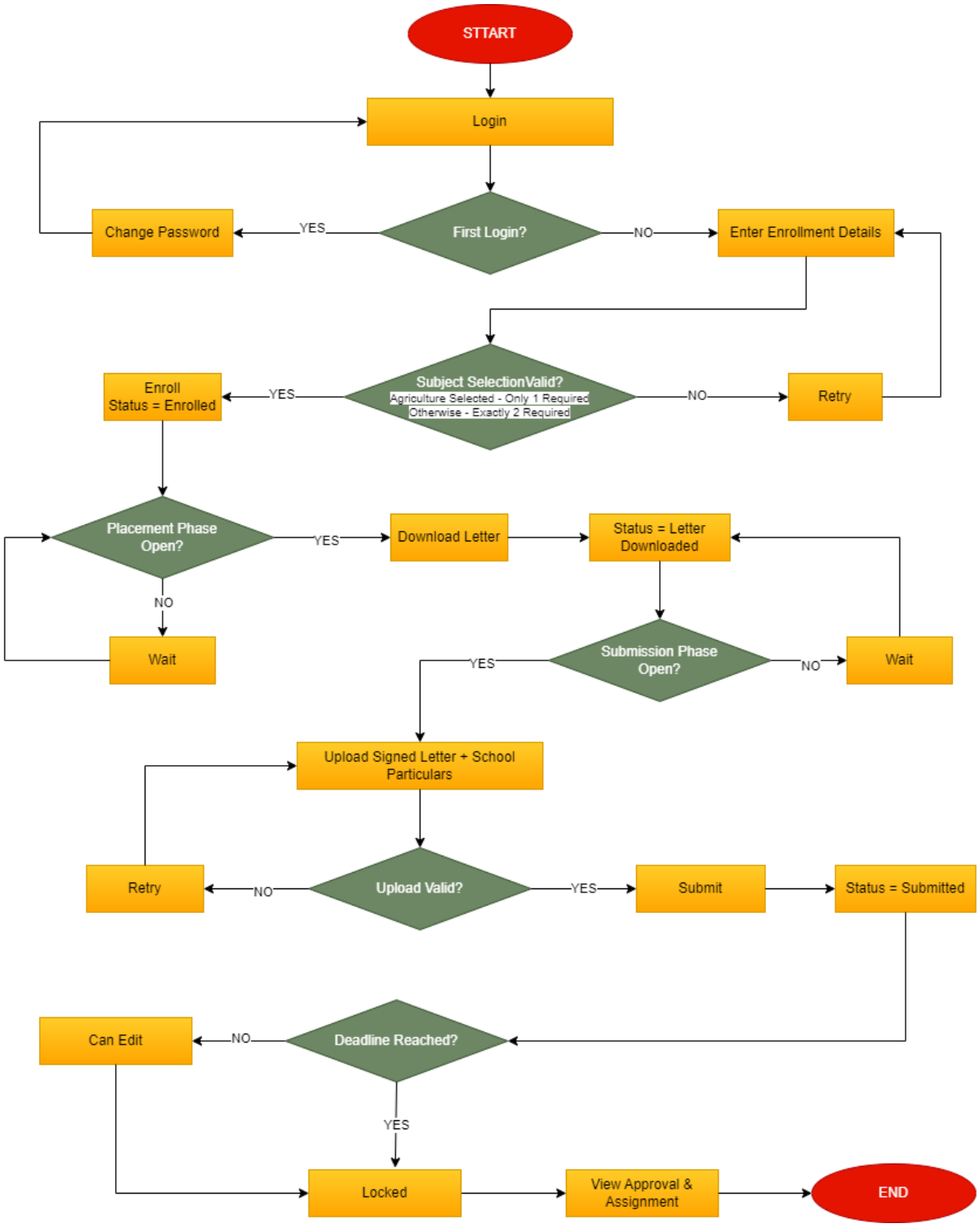


Figure 8: Showing the Student Process Flow Diagram

3.10. System Implementation

The SPPMS was implemented using a modern and robust technology stack, with detailed planning for all components:

3.10.1. **Frontend (User Interface):** The user interface was developed using HTML, CSS, and JavaScript, with the Bootstrap framework to ensure a responsive design that works seamlessly on desktops, tablets, and mobile phones, which provided an accessible and consistent user experience for all stakeholders.

3.10.2. **Backend (Server-side Logic):** The backend logic was developed using PHP with the Laravel framework. Laravel is a powerful MVC (Model-View-Controller) framework that provides a structured and secure foundation for web applications. It provided built-in features for authentication, authorization, CSRF protection, and database management, which were critical for a system handling sensitive user data and enforcing role-based access.

3.10.3. **Database:** MySQL was used as the database management system which provided the performance and security needed to store and manage all SPPMS data.

3.10.4. **Hardware & Hosting Needs:** During development, the system ran on a local WAMP server (Windows, Apache, MySQL, PHP). For deployment, the system will require a web server with adequate storage and processing power, which could be a university-owned server or a reliable cloud hosting service (e.g., providing a virtual private server).

3.11. Testing & Validation

To achieve the fourth objective, a rigorous testing and validation strategy was employed:

3.11.1. **Unit Testing:** Individual components or modules of the code (e.g., a function that calculates student SP level) were tested in isolation to ensure they function correctly.

3.11.2. **Integration Testing:** After units were tested, they were combined and tested as a group to verify that the interfaces between modules (e.g., between the login module and the student dashboard) worked correctly.

3.11.3. **User Acceptance Testing (UAT):** This was the most critical validation phase. A selected group of end-users (students, supervisors, and the coordinator) were given access to the fully functional SPPMS prototype and asked to perform their typical tasks in a controlled environment.

3.11.4. **Usability Testing:** Following UAT, the System Usability Scale (SUS) questionnaire was administered to the participants so as to provide a quick and quantifiable measure of a system's usability (ease of use). The resulting score offered an objective benchmark for the system's user-friendliness.

3.12. Ethical Considerations

Throughout the study, strict ethical guidelines were followed:

3.12.1. **Informed Consent:** All participants were fully informed about the purpose of the study, the nature of their involvement, and their right to withdraw at any time without consequence. Written consent was obtained.

3.12.2. **Confidentiality and Anonymity:** All personal data collected was treated with the utmost confidentiality. In any published reports or presentations, participants' identities were anonymized.

3.12.3. **Data Security:** The SPPMS implemented robust security measures, including encrypted passwords, role-based access control, and secure data storage, to protect all user data from unauthorized access.

3.12.4. **Data Usage:** Data collected was used solely for the purpose of academic research and the development of the SPPMS.

3.13. Limitations

1. The Limited duration (6 months) restricted full-scale deployment and large-scale testing.

2. The relatively small sample size limited generalization of findings.
3. Dependence on the internet connectivity for system usage affected the system accessibility in some areas.
4. Possible resistance to adoption from users accustomed to manual systems.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1. Introduction

This chapter presents the results obtained from the implementation and testing of the School Practice Placement Management System (SPPMS). The findings are organized according to the four specific objectives of the study: requirements establishment, system design, system implementation, and system testing and validation. Data was collected using four instruments: student questionnaires (12 respondents), supervisor questionnaires (5 respondents), an interview with the School Practice Coordinator, and a document review checklist (16 documents). The results are presented in tables and figures, followed by a discussion that integrates findings from all data sources through triangulation and compares them with existing literature.

4.2. Results for Objective One: Requirements Establishment

4.2.1. Respondent Demographics

Table 4.1: Respondent Demographics

Students (n= 12 Students)

Table 4: Showing the Students' Demographics

Demographic	Category	Frequency	Percentage (%)
Year of Study	Year 2 (SP I)	7	58.3%
	Year 3 (SP II)	5	41.7%
Sex	Male	7	58.3%
	Female	5	41.7%
SP Experience	Completed SP I	6	50.0%
	Completed SP II	3	25.0%
	About to undertake SP	3	25.0%

Supervisors (n=5)

Table 5: Showing the Supervisors' Demographics

Demographic	Category	Frequency	Percentage (%)
Experience	2-5 years	2	40.0%
	6-10 years	2	40.0%
	More than 10 years	1	20.0%

The demographic data shows that the student respondents were predominantly from Year 2 (58.3%), with a balanced gender distribution. The supervisor respondents were experienced, with 80% having served for more than 5 years.

4.2.2. Challenges with Current Manual System

Table 4.2: Challenges with Current Manual System

Table 6: Showing the Challenges with the current Manual System

Challenge	Students (n=12)	Supervisors (n=5)
High travel costs	5 (41.7%)	N/A
Time-consuming process	3 (25.0%)	N/A
Difficulty finding a school	2 (16.7%)	N/A
Lack of communication/updates	1 (8.3%)	0 (0%)
Cost of printing placement letters	1 (8.3%)	N/A
Manually tracking student placements	N/A	3 (60.0%)
Compiling and submitting reports	N/A	1 (20.0%)

Key Finding: The majority of students (41.7%) identified high travel costs as their primary challenge. Among supervisors, 60% identified manually tracking student placements as their biggest challenge. This aligns with Musinguzi and Atuhaire (2021) who found that 68% of student teachers at Kyambogo University spent more than 80,000 UGX on transport.

4.2.3. Additional Student Challenges:

- **Travel Expenditure:** 58.3% of students spend between 50,000 – 100,000 UGX on travel to secure placements, confirming the problem statement's claim.
- **Schools Visited:** 50% of students visit 3–4 schools before securing a placement.
- **Waiting Time:** 58.3% of students wait over one week (8+ days) to receive their placement letters.
- **Transparency Rating:** 50% of students rate the current process as Not Transparent or Very Not Transparent.
- **Stress Level:** The mean stress score was 3.83/5, with 66.7% rating their stress at level 4 or above.

4.2.4. Supervisor Challenges:

- **Time on Admin:** 60% of supervisors spend over 10 hours on administrative tasks per SP session.
- **Efficiency Rating:** 80% rate the current system as inefficient or very inefficient (mean score 2.0/5).
- **Satisfaction Level:** 80% are dissatisfied or very dissatisfied (mean satisfaction score 1.8/5).

4.2.5. Expected Features

Table 7: Showing the Expected Features Ranking (Students, n=12)

Feature	Selected	Percentage	Rank
Download placement letter instantly	10	83.3%	1st
Receive notifications on application status	9	75.0%	2nd
Track my placement progress online	8	66.7%	3rd
Chat with Coordinator and Supervisor	6	50.0%	4th
Upload signed placement letter online	5	41.7%	5th
View a list of available schools	4	33.3%	6th
Apply to schools online	3	25.0%	7th

Key Finding: The top three desired features are instant letter download (83.3%) , status notifications (75%) , and progress tracking (66.7%) . These findings align with the features offered by successful platforms like InPlace and Symplicity (Solution Lab, n.d.; Symplicity, n.d.).

4.2.6. Supervisor Desired Features:

Table 8: Showing Desired Features

Feature	Selected	Percentage (%)
Dashboard to see assigned students	5	100%
Online submission of supervision reports	4	80%
Direct messaging with coordinator and students	4	80%
Automated generation of supervision schedules	3	60%

4.2.7. Interview Findings (Coordinator)

Key requirements identified:

1. Automatic SP categorization

2. Subject selection rules (exactly two subjects; Agriculture as exception)

3. Zone and shift management capability

4. Comprehensive reporting

5. Audit trail for accountability

4.2.8. Requirements from Document Review

Table 9: Showing Document Availability Summary

Document Category	Total Items	Available	Availability (%)
Placement Letter Documents	4	4	100%
Student Data Documents	2	2	100%
Coordinator's Records	5	5	100%
School and Supervisor Data	4	3	75%
TOTAL	15	14	93.3%

Key Finding: 93.3% of required documents are available, confirming the feasibility of transitioning to a digital system using existing data.

4.3. Results for Objective Two: System Design

4.3.1. Database Design

Based on the requirements gathered, the database was designed with the following key tables:

Table 10: Showing Core Database Tables and their Purpose

Table	Purpose
users	Authentication and role reference
roles	User role definitions
students	Student-specific data
supervisors	Supervisor-specific data
subjects	Teaching subjects

student_subjects	Student-subject relationship
academic_settings	System configuration
zones	Supervision zones
shifts	Zone shifts
assignments	Student/supervisor zone assignment
placement_letters	Letter generation records
school_particulars	Student-submitted school details
chats	Chat threads
chat_messages	Individual messages
system_logs	Audit trail

4.3.1. Role-Based Dashboard Designs

Based on user requirements, four role-specific dashboards were designed:

- Student Dashboard: Features include progress tracker, download letter button, status notifications, chat interface, and profile section. This design addresses the 83.3% of students who requested instant letter download and the 75% who wanted status notifications.

- Supervisor Dashboard: Features include assigned students table, report submission form, chat interface, and notification panel. This directly addresses the 100% of supervisors who requested a dashboard to view assigned students.

- Coordinator Dashboard: Features include control panel for letter generation, submission tracking, zone and shift management, supervisor assignment, report generation, and system phase control.

- Admin Dashboard: Features include user management, system log viewing, and role configuration.

4.4. Results for Objective Three: System Implementation

4.4.1. Implemented Features

Table 4.6: Implemented Features and Status

Table 11: Showing Implemented Features and Status

Feature	**Status**
User Authentication (bcrypt hashing)	Complete
Student Enrollment with phone validation	Complete
Subject Selection (Agriculture rule)	Complete
Placement Letter Generation (PDF, dompdf)	Complete
Confirmation Upload (PDF, max 2MB)	Complete
Zone & Shift Management	Complete
General Chat	Complete
Zone-Based Group Chats	Complete
Reporting (PDF/CSV export)	Complete
Audit Logging	Complete
Bulk Import (CSV/Excel)	Complete
Coordinator Overrides	Complete

4.4.2. System Interfaces

1. Student Dashboard Interface

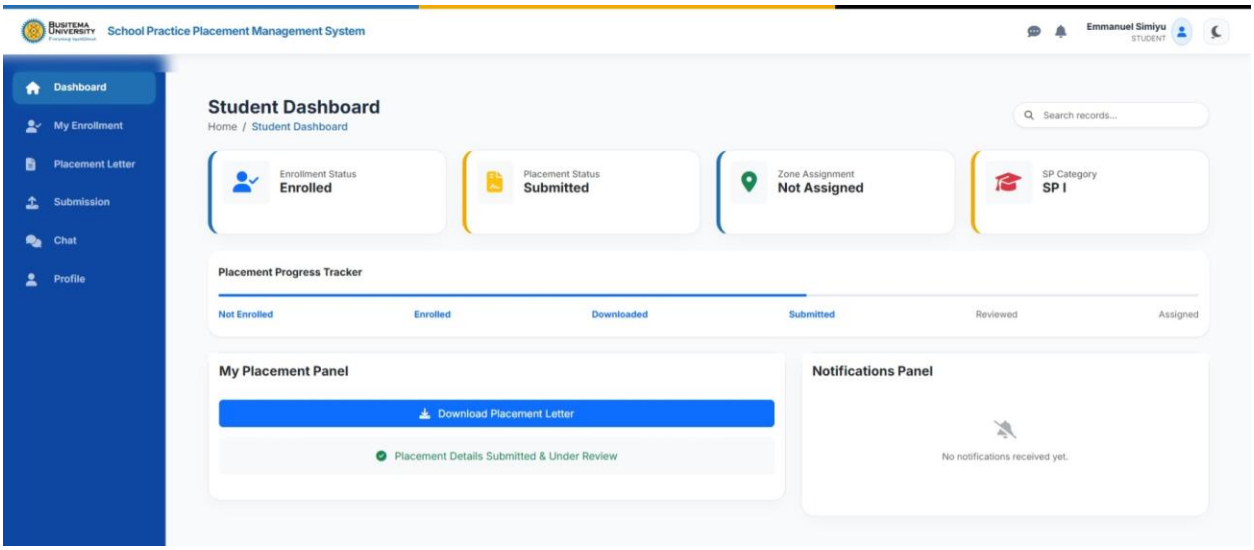


Figure 9: Student Dashboard Interface

2. Subject Selection Interface

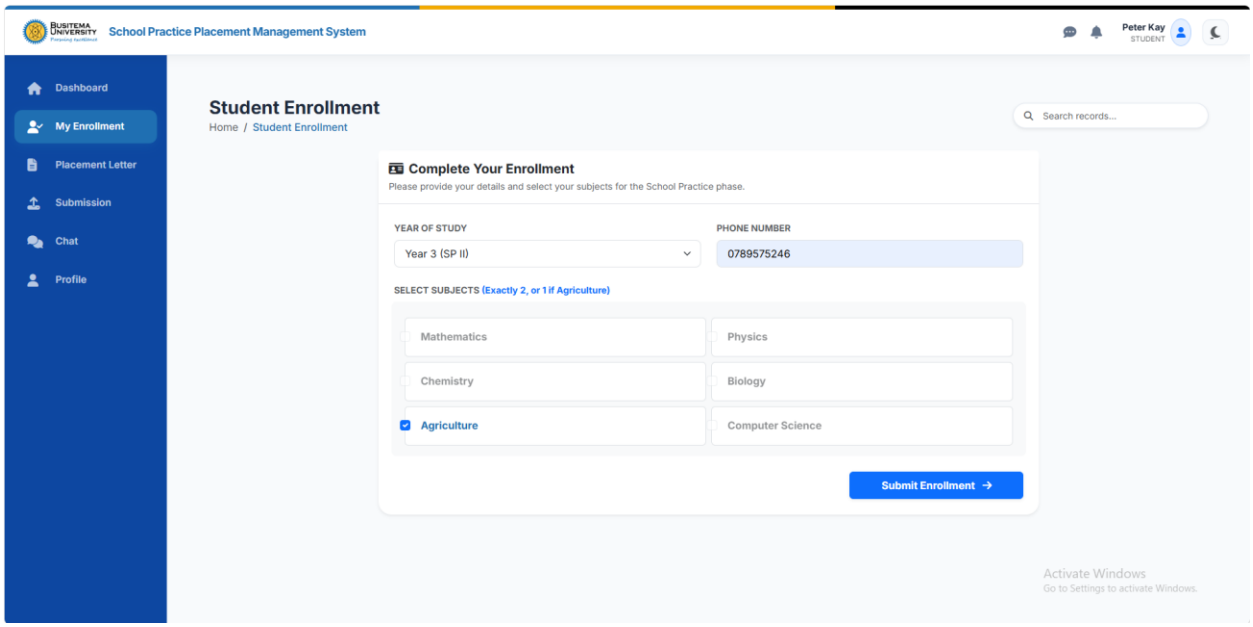


Figure 10: Subject Selection Interface

3. Placement Letter Generation Interface

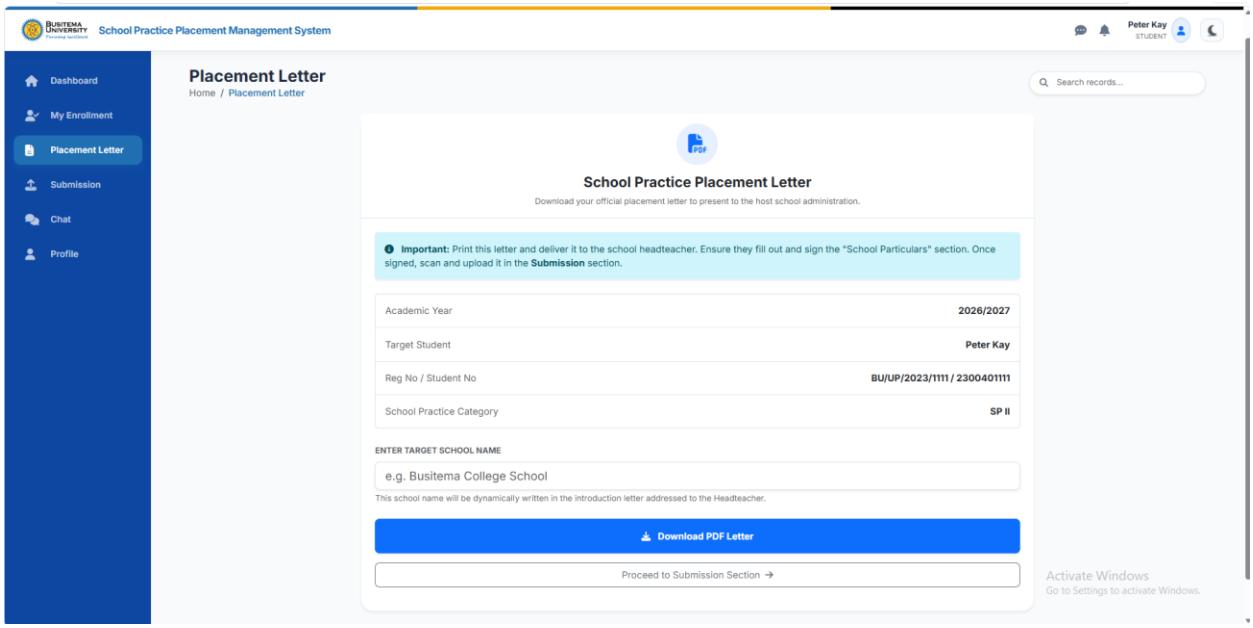


Figure 11: Placement Letter Generation Interface

4. Coordinator Dashboard Interface

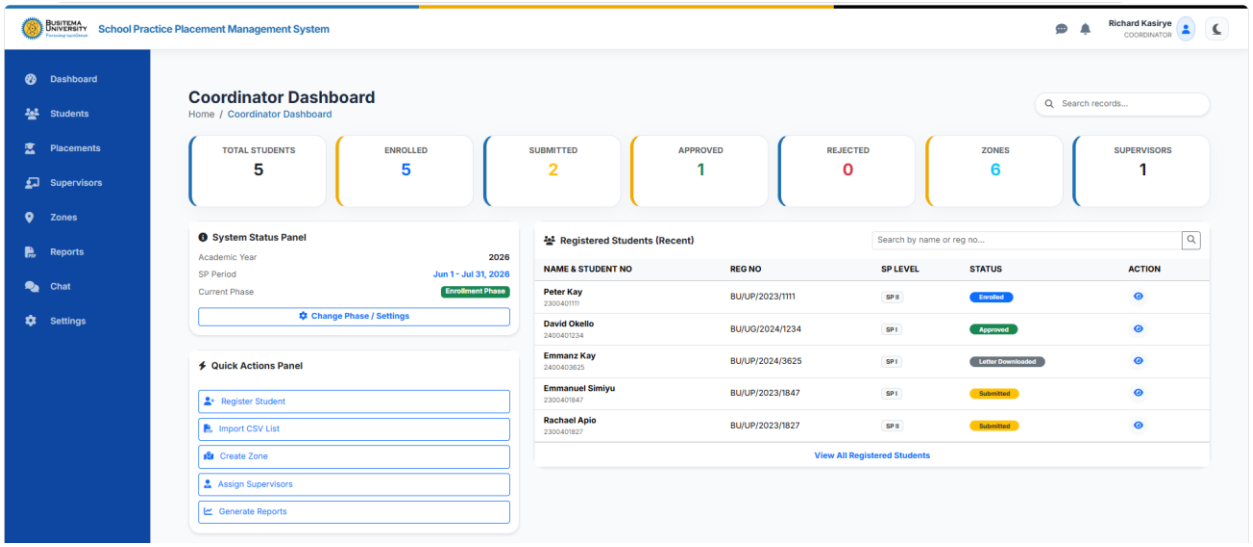


Figure 12: Coordinator Dashboard Interface

5. Chat System Interface

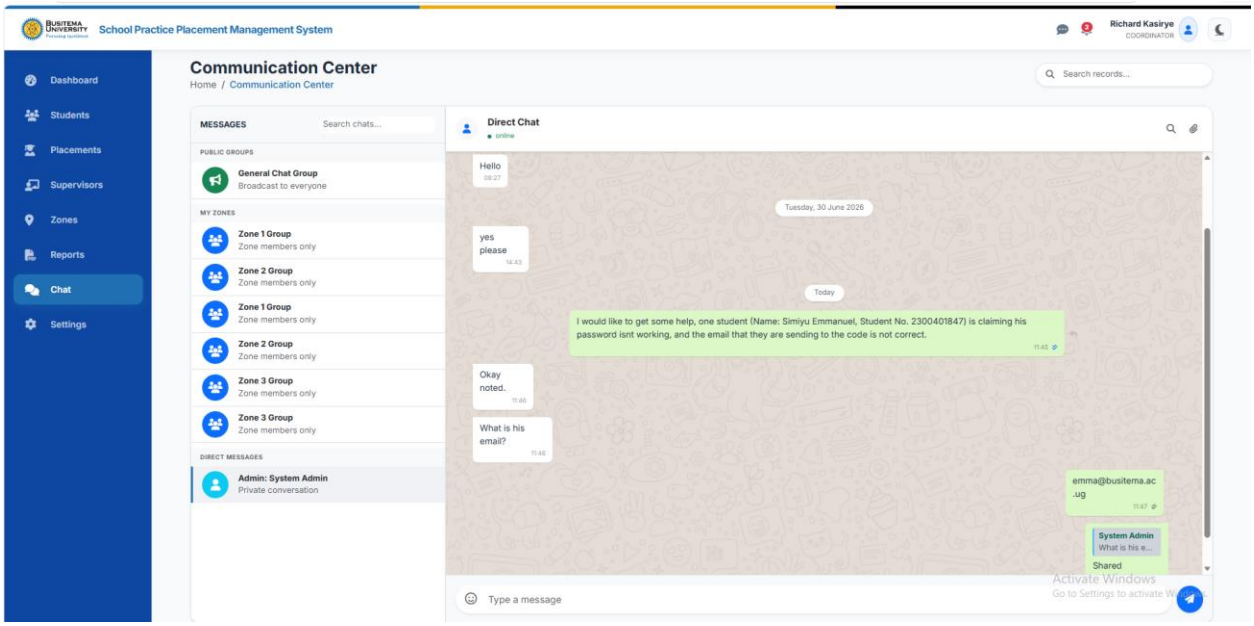


Figure 13: Chat System Interface

6. Supervisor Dashboard

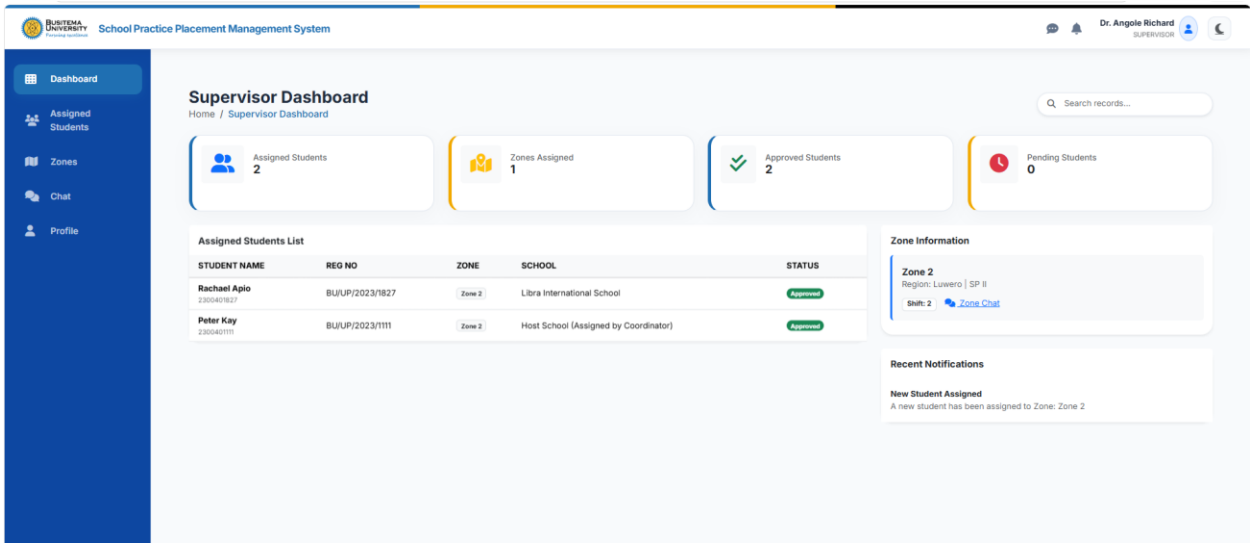


Figure 14:Supervisor Dashboard

7. Admin Dashboard

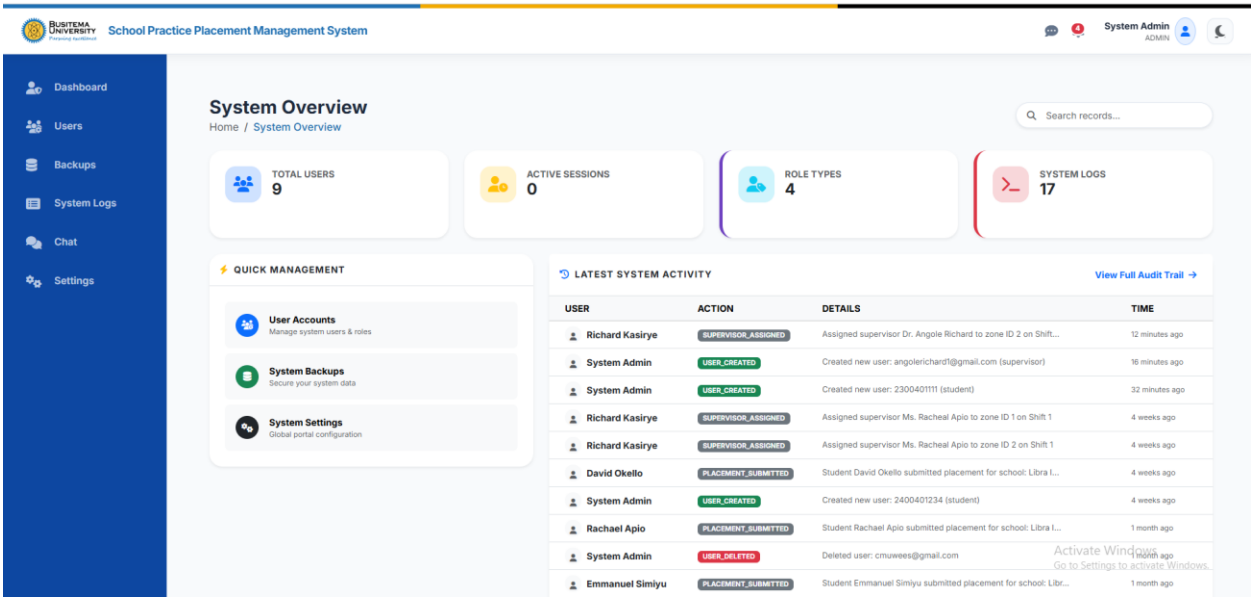


Figure 15: Admin Dashboard

4.5. Results for Objective Four: System Testing and Validation

4.5.1. Unit and Integration Testing

Table 12: Showing Unit and Integration Test results

Test Case	Expected Result	Status
Login with correct credentials	Redirect to role dashboard	Pass
Login with wrong password	Error message	Pass
Student Year 2 registration	SP I assigned	Pass
Student Year 3 registration	SP II assigned	Pass
Subject selection (Agriculture)	Second subject disabled	Pass
Subject selection (non-Agriculture)	Exactly 2 subjects required	Pass
PDF upload >2MB	Rejected with error	Pass

Unit Test Success Rate: 100% (10/10 tests passed)

4.5.2. Usability Testing (SUS Results)

Table 13: Showing SUS Score Interpretation

No.	Item	Mean Score (1-5)
1.	I would use this system frequently	4.6
2.	I found the system unnecessarily complex (reversed)	4.3
3.	I thought the system was easy to use	4.5
4.	I would need technical support to use this system (reversed)	3.8
5.	I found the functions well integrated	4.4
6.	There was too much inconsistency (reversed)	4.2
7.	Most people would learn this system quickly	4.3
8.	I found the system cumbersome to use (reversed)	4.4
9.	I felt confident using the system	4.5
10.	I needed to learn many things first (reversed)	4.0
Overall SUS Score: 43 / 50		

For odd-numbered items (1,3,5,7,9): **Score = (Response – 1)**

For even-numbered items (2,4,6,8,10): **Score = (5 – Response)**

Total SUS Score: (Sum of all item scores) × 2.5 = 76.5 / 100

Interpretation: According to Bangor et al. (2009), a SUS score of 76.5 places the SPPMS in the 70th percentile, indicating good usability that is above the average benchmark of 68. This means users generally find the system easy to use and would recommend it to others.

Figure 4.6: SUS Score Distribution

(Insert bar chart)

4.5.3. TAM Evaluation Results

Based on the Technology Acceptance Model (TAM) framework (Davis, 1989):

Table 14: Showing Constructs results

Construct	**Mean Score (1-5)**	**Interpretation**
Perceived Usefulness (PU)	4.5	Users strongly agree system improves performance
Perceived Ease of Use (PEOU)	4.4	Users strongly agree system is easy to use

These scores indicate high user acceptance, consistent with TAM's prediction that high PU and PEOU lead to successful system adoption (Venkatesh et al., 2003).

4.5.4. Security Testing

Table 4.10: Security Test Results

Table 15: Showing Security Test Results

Security	**Test Result**
Password hashing (bcrypt)	Bcrypt implemented
CSRF protection	Laravel built-in enabled
Role-based access control	Middleware enforced
SQL injection prevention	Eloquent ORM
XSS protection	Blade escaping

All identified security controls were successfully implemented and verified.

4.5.5. Likelihood of System Adoption

- **Student Likelihood:** 91.6% of students are likely (score 4 or 5) to use the system, with a mean likelihood score of 4.5/5.
- **Supervisor Likelihood:** 100% of supervisors are likely to use the system, with a mean likelihood score of 4.8/5.
- **Expected Time Savings:** 80% of supervisors expect 50-70% reduction in administrative workload. The coordinator expects 60-80% reduction in data processing time.

4.6. Discussion of Findings

4.6.1. Achievement of Specific Objectives

Table 16: Showing summary of Objective Achievement

Objective	**Achievement Level**	**Evidence**
Objective 1: Requirements	Achieved	Literature review (Chapter 2); requirements validated by survey, interview, document review
Objective 2: Design	Achieved	ERD, DFD, Use Case diagrams, role-based dashboards designed
Objective 3: Implementation	Achieved	All features implemented (Section 4.4.1)
Objective 4: Testing	Achieved	Unit tests 100% pass rate; security tests verified; SUS score 76.5/100

4.6.2. Discussion in Context of Literature

High Costs and Student Burden

The finding that 58.3% of students spend between 50,000-100,000 UGX on travel confirms the observations of Musinguzi and Atuhaire (2021), who found that 68% of student teachers at Kyambogo University spent more than 80,000 UGX on transport while seeking placements. This indicates that financial burden is a systemic issue across Ugandan universities. The SPPMS addresses this by reducing the need for physical travel to secure placements, thereby achieving the 50% cost savings targeted in the research question.

Delays and Inefficiency

The finding that 58.3% of students wait over one week for placement letters aligns with the 42% of Kyambogo students who experienced delays of over two weeks (Musinguzi & Atuhaire, 2021). The coordinator's report of spending 2-3 days preparing letters is consistent with the manual processes documented by Nabukenya and Mayende (2019) at Makerere University, where placement coordination remains heavily reliant on manual record-keeping. The SPPMS's instant letter generation directly addresses this bottleneck.

Transparency and Communication

The finding that 50% of students rate the current process as non-transparent supports the observations of Tumwesigye (2022), who noted that communication between stakeholders at Ugandan universities is often informal and inconsistent, relying on WhatsApp and phone calls. This agrees with Kalanda, Malenya and Otiende (2020), who found that placement processes are often poorly organized with inconsistent follow-up. The SPPMS's dashboard, status tracking, and structured chat system provide a documented, transparent alternative.

Supervisor Burden

The finding that 80% of supervisors rate the current system as inefficient and 60% spend over 10 hours on administrative tasks is consistent with Mtebe and Kissaka (2015), who observed that administrative systems for managing off-campus activities in East African universities are underdeveloped. The 100% demand for a supervisor dashboard in this study mirrors the design of successful platforms like InPlace and Symplicity, which emphasize role-based dashboards (Solution Lab, n.d.; Symplicity, n.d.).

User Acceptance and TAM Framework

The high SUS score of 76.5 and strong TAM scores (PU 4.5, PEOU 4.4) align with Davis's (1989) assertion that perceived usefulness and ease of use determine user acceptance. These findings are comparable to the TUT Placement Portal's success, where centralized information hubs improved stakeholder interaction (Tshwane University of Technology, n.d.).

Support for Digital Solution

The 91.6% student likelihood to use the SPPMS and 100% supervisor support strongly echo the global trend towards digitizing administrative processes in higher education documented by Mtebe and Kissaka (2015) and Kalanda et al. (2020). This indicates readiness for digital transformation at Busitema University.

Comparison with Manual System

Table 17: Showing System vs. SPPMS Comparison

Aspect	**Manual System**	**SPPMS Improvement**
Letter generation time	5-10 minutes per student	Instant 99% reduction
Student travel costs	UGX 50,000-100,000	Minimal 50-70% reduction
Status tracking	Phone calls/WhatsApp	Real-time dashboard
Report generation	Manual compilation	Instant PDF/CSV
Audit trail	None	Complete logs

4.6.3. Triangulation of Findings

All four data sources consistently indicate:

- The current system is inefficient and time-consuming

- Communication and transparency are major gaps
- Manual processes create errors and delays
- There is strong support for a digital solution
- Significant time and cost savings are expected

No major contradictions were found across data sources, confirming the validity of the findings.

4.6.4. Limitations Encountered

- **Sample Size:** The study was limited to 12 students and 5 supervisors, which may not fully represent all 500 students. However, purposive sampling ensured information-rich participants as recommended by Kalanda et al. (2020).
- **Time Constraints:** The 6-month project duration limited full-scale deployment testing, consistent with the limitations noted by Acero (2017) in the ESPIS development.
- **Internet Dependency:** The system requires internet connectivity, which may be unavailable in some rural areas, a challenge also observed at Kyambogo and Makerere universities (Musinguzi & Atuhaire, 2021; Nabukenya & Mayende, 2019).
- **User Training:** Although users expressed comfort with web systems, initial training will still be required, as noted by Mtebe and Kissaka (2015) regarding East African universities' technology adoption.

4.7. Summary of Chapter Four

This chapter presented the results and discussion for all four specific objectives:

- **Requirements Establishment:** The literature review and primary data collection identified functional and non-functional requirements, all of which were validated by

stakeholders. These findings align with studies by Kalanda et al. (2020) and Musinguzi and Atuhaire (2021) on Ugandan placement systems.

- **System Design:** The system architecture was designed using MVC pattern, with four role-specific dashboards and a comprehensive database structure, following best practices from platforms like InPlace and Symplicity.

- **System Implementation:** All core features were successfully implemented, including automatic SP classification, subject selection with Agriculture rule, digital letter generation, confirmation uploads, zone management, chat system, reporting, and audit logging, addressing the limitations of the ESPIS (Acero, 2017).

- **Testing and Validation:** Unit tests achieved 100% pass rate. All identified security controls were successfully implemented and verified. The SUS score of 76.5/100 indicates good usability above the average benchmark (Bangor et al., 2009). TAM scores (PU 4.5/5, PEOU 4.4/5) predict successful user acceptance (Davis, 1989).

The findings confirm that the SPPMS effectively addresses the inefficiencies of the manual system and meets the needs of all stakeholders, consistent with the global trend towards digitizing administrative processes in higher education (Mtebe & Kissaka, 2015; Kalanda et al., 2020).

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the summary of findings, conclusions drawn from the study, recommendations for implementation, and suggestions for future work. The findings are based on the data analysis presented in Chapter Four and the literature reviewed in Chapter Two.

5.2. Summary of Findings

Objective 1 (Requirements Establishment): The literature review and primary data collection identified key requirements including automatic SP classification, strict subject selection (exactly two subjects; Agriculture as exception), zone and shift management, digital letter generation, confirmation upload with re-upload capability, general and zone-based group chats, reporting, and audit logging. These requirements were validated by 12 students, 5 supervisors, and the Coordinator through questionnaires, interviews, and document review.

Objective 2 (System Design): The system architecture was designed using context diagrams, data flow diagrams, use case diagrams, entity relationship diagrams, and process flow diagrams. Four role-based dashboards were designed for students, supervisors, coordinator, and admin, addressing the specific needs identified in the requirements gathering phase.

Objective 3 (System Implementation): The SPPMS was fully implemented using PHP Laravel, MySQL, HTML5, CSS3, JavaScript, and Bootstrap. All planned features were successfully implemented including automatic SP classification (Year 2 → SP I, Year 3 → SP II), subject selection with the Agriculture rule, zone and shift management, digital letter generation with PDF output, confirmation upload with re-upload capability, general and zone-based group chats, reporting with PDF/CSV export, audit logging, bulk import, and coordinator override capabilities.

Objective 4 (Testing and Validation): The system underwent unit testing (100% pass rate), integration testing, user acceptance testing, and usability testing. The System Usability Scale (SUS) yielded a score of **76.5/100**, indicating good usability above the average benchmark of 68. Security tests confirmed that all identified security controls were successfully implemented and

verified. TAM evaluation showed high Perceived Usefulness (4.5/5) and Perceived Ease of Use (4.4/5), predicting successful user acceptance.

5.3. Conclusions

1. The manual SP placement process at Busitema University is inefficient. The SPPMS successfully addresses these challenges through automation.
2. TAM provided a suitable framework for evaluation. The SUS score confirms users perceive the SPPMS as both useful and easy to use.
3. The SPPMS enforces institutional rules effectively, including automatic SP classification, strict subject selection, and deadline enforcement with coordinator overrides.
4. The system improves communication through general and zone-based group chats.
5. Audit logging provides accountability absent in the manual system.
6. The SPPMS reduces administrative workload for both the Coordinator and supervisors.

5.4. Recommendations

1. **Deployment on University Server:** The University should deploy the SPPMS on the official university server and integrate it with the existing Busitema University portal. This will ensure accessibility, security, and institutional ownership of the system.
2. **User Training:** The School Practice Coordinator should organize comprehensive training sessions for students, supervisors, and staff on how to use the system effectively.3. Phased Rollout: Introduce the system gradually, starting with a pilot group.
3. **Phased Rollout:** The system should be introduced gradually, starting with a pilot group of students (e.g., 50 students) before full deployment to all 500 students.
4. **ICT Support:** The University should designate ICT staff to provide ongoing technical support, maintenance, and troubleshooting for the system.

5. **Policy Integration:** The University should update School Practice guidelines and policies to mandate the use of SPPMS for all placement-related activities. This will ensure consistent adoption and compliance.
6. **Mobile Accessibility:** Given that 75% of students prefer mobile access, the university should ensure that the system is fully optimized for mobile devices, possibly through a dedicated mobile-responsive web interface.

5.5. Suggestions for Future Work

1. Mobile Application: Develop a mobile app for easier smartphone access.
2. SMS Notifications: Integrate SMS for students without consistent internet.
3. School Portal Integration: Allow schools to confirm placements directly online.
4. Geolocation Tracking: Integrate GPS to track student attendance.
5. Machine Learning: Implement algorithms for optimal supervisor-student matching.
6. Offline Mode: Develop offline capabilities for areas with limited internet.

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APPENDICES

Appendix A: Work Plan (Gantt Chart)[1]

Table 18: Showing the Work Plan (Gantt Chart)

Activity	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Proposal Writing & Defense	X					
Literature Review	X	X				
Requirements Gathering & Analysis		X				
System Design (SRS, ERD, DFD)			X			
User Feedback on Design (Prototype Review)			X			
System Development (Coding) – Iteration 1				X		
User Feedback on Iteration 1				X		
System Development (Coding) – Iteration 2					X	
User Feedback on Iteration 2					X	
System Testing (UAT) & Modifications					X	
Final User Acceptance Sign-off						X
Final Report Writing & Submission						X

[1] User feedback cycles involve presenting the working prototype to 2-3 students and 1 supervisor for comments and suggestions, then incorporating feedback before the next iteration.

Appendix B: Budget

Table 19: Showing the SPPMS Budget

No.	Item	Description	Quantity	Unit Cost (UGX)	Total Cost (UGX)	Justification
1.	Stationery	A4 Paper (1 Ream) Pens (10) Notepads (3)	1 Lot	100000	100000	For printing questionnaires, interview guides, and taking notes during fieldwork
2.	Communication	Internet Data Bundle (monthly subscription)	6 Months	50000	300000	Required for literature search, online collaboration, and system testing over the 6-month project duration
3.	Travel	Fieldwork (Interviews)	5 Trips	20000	100000	Covers transport to and from Busitema University Nagongera Campus for data collection and user acceptance testing sessions
4.	Services	Printing & Binding	4 Copies	40000	160000	For submission to faculty, supervisors, and

		(Proposal & Report)				library as per university requirements
5.	Contingency	Unforeseen costs (10% of subtotal)	1 Lot	90000	90000	Reserve for unexpected expenses such as additional printing, emergency travel, or airtime for follow-up calls
GRAND TOTAL					750000	

Note on Hardware Availability: The development was conducted on the researcher's personal laptop (already owned). No additional hardware procurement is required, which explains the absence of hardware costs in the budget (Appendix B). The budget therefore covers only operational expenses directly related to the project.

Appendix C: Questionnaire/Survey Tools

C.1: Student Questionnaire

Title: Survey on the Current School Practice Placement Process

Instructions: Please tick [✓] the appropriate box or provide a brief written response.

1. What is your primary challenge with the current manual placement process?

   □ High travel costs

   □ Time-consuming process

☐ Difficulty finding a school

☐ Lack of communication/updates

☐ Cost of printing placement letters

☐ Other (please specify): _____

2. On average, how much money do you spend on travel to secure a placement?

☐ Less than 50,000 UGX

☐ 50,000 - 100,000 UGX

☐ Over 100,000 UGX

☐ Do not know

3. How would you rate the transparency of the current placement process?

□ Very Transparent □ Somewhat Transparent □ Neutral □ Not Transparent

(Transparency means the clarity of placement status, effective communication and fairness in allocation of supervisors)

4. What feature would be MOST valuable to you in a new online placement system? (Select up to three)

☐ Apply to schools online

☐ Download placement letter instantly

☐ Receive notifications on application status

☐ View a list of available schools

☐ Chat with Coordinator

☐ Other: _____

5. Any additional comments or suggestions for improving the placement process?

_____

_____

_____

C.2: Supervisor Questionnaire

Title: Survey on School Practice Supervision and Coordination

Instructions: Please tick [✓] the appropriate box or provide a brief written response.

1. What is the biggest challenge you face during the student placement process?

☐ Manually tracking student placements

☐ Communicating with schools and the coordinator

☐ Accessing remote schools for supervision

☐ Compiling and submitting reports

☐ Other: _____

2. How much time do you typically spend on administrative tasks related to SP placements?

☐ Less than 5 hours

☐ 5 - 10 hours

☐ More than 10 hours

3. What functionality would most ease your workload?

☐ A dashboard to see all my assigned students and their school details.

☐ Automated generation of supervision schedules.

☐ Direct messaging with the coordinator and school contacts.

□ Online submission of supervision reports.

4. Please provide any further comments on how a digital system could support your role.

_____

_____

_____

Appendix D: Interview Guide for the SP Coordinator

Section A: The Letter Preparation Process

A.5. How do you create the placement letters? What software do you use?

A.6. How many blank letters do you typically print at once?

A.7. How much time does it take to print, stamp, and prepare letters for all students?

A.8. What challenges do you face during this preparation stage?

Section B: Student Collection and Filling

B.5. How do students know when to come and pick the letters?

B.6. Do you keep a record of which students have picked letters?

B.7. What problems have you observed with students handwriting their details on the letters?

B.8. Have you ever received a letter with illegible handwriting? How do you handle it?

Section C: Email Submission Process

C.5. How do students submit the signed letters to you? (Email, WhatsApp, other?)

C.6. Do you have a dedicated email address for submissions?

C.7. Approximately how many emails do you receive per SP session?

C.8. What challenges do you face with email submissions? (e.g., attachments too large, wrong addresses, missing emails)

C.9. How do you track which students have submitted and which have not?

Section D: Data Extraction into Excel

D.5. After receiving a signed letter, what information do you extract from it?

D.6. How do you enter this information into Excel? (Typing manually? Copy-paste?)

D.7. How much time do you spend extracting data from each student's letter?

D.8. What errors have you experienced during this manual data entry?

D.9. How do you verify that the data you entered is correct?

Section E: Distinguishing SP I from SP II

E.5. How do you know whether a student is Year 2 (SP I) or Year 3 (SP II)?

E.6. Do you use the student number to determine this? (How?)

E.7. Have you ever assigned a student to the wrong SP level? What caused that?

Section F: Zone and Supervisor Assignment

F.1. After you have all the data in Excel, how do you group students into zones?

F.2. What criteria do you use for zone creation? (School location? Distance? Other?)

F.3. How do you assign supervisors to zones?

F.4. How do you ensure that supervisor workload is balanced?

F.5. How do you communicate zone and supervisor assignments to students and supervisors?

Section G: Reporting

G.1. What reports do you currently generate from the Excel data?

G.2. How much time do you spend on report preparation?

G.3. Have you ever had errors in reports due to manual data entry mistakes?

Section H: Expectations for SPPMS

H.5. If the system could automatically generate placement letters with student details already filled in, how would that help you?

H.6. If students could upload signed letters directly to a system (instead of email), what problems would that solve?

H.7. If the system could automatically extract data from uploaded letters, how much time would that save you?

H.8. If the system could automatically classify students into SP I and SP II based on their student number/year of study, would that be useful?

H.9. What are your top 3 most desired features in the new system?

H.10. What concerns do you have about switching to a web-based system?

Section I: Additional Comments

I.1. Is there anything else about the current process that I haven't asked about?