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A LIBRARY STOCK MANAGEMENT SYSTEM FOR KANYANYA HILLVIEW SECONDARY SCHOOL

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JULY, 2026

DECLARATION

We hereby confirm that this project report is our own original work and has not been presented to any other institution for the purpose of obtaining any academic qualification. All information sources used have been properly acknowledged and referenced.

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LIST OF ABBREVIATIONS

ACM	Association for Computing Machinery
AI	Artificial Intelligence
APA	American Psychological Association
BMJ	British Medical Journal
CEUR	CEUR Workshop Proceedings
CSS	Cascading Style Sheets
COVID-19	Coronavirus Disease 2019
ERD	Entity Relationship Diagram
GUI	Graphical User Interface
HTML	HyperText Markup Language
ICT	Information and Communication Technology
ID	Identification
IEC	International Electro technical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFLA	International Federation of Library Associations and Institutions
IJSAT	International Journal of Scientific Advances and Technology
ISBN	International Standard Book Number
ISO	International Organization for Standardization
IT	Information Technology
LMS	Library Management System
LSMS	Library Stock Management System
PHP	PHP: Hypertext Preprocessor
RAD	Rapid Application Development
RFID	Radio Frequency Identification
RO1	Research Objective One
SDLC	System Development Life Cycle (include this only if it appears in your figures or text)
SDM	System Development Methodology
SQL	Structured Query Language

ABSTRACT

This study focused on the design and development of a Library Stock Management System for Kanyanya Hill View Secondary School to address the challenges associated with the existing manual library stock management practices. The study was motivated by persistent problems including poor record keeping, loss and mismanagement of library materials, delays in book borrowing and returning processes, difficulties in tracking library stock, and inefficient report generation, all of which reduced the effectiveness of library services. The study adopted a qualitative case study research design. Data were collected from library staff, teachers, students, and school administrators through semi-structured interviews, non-participant observation, and document analysis. Purposive sampling was used to select participants who possessed relevant knowledge and experience regarding library operations. The collected data were analyzed using thematic analysis to identify the challenges of the existing system and determine the functional and non-functional requirements of the proposed computerized system. The findings revealed that the manual library stock management system was time-consuming, prone to human errors, inefficient in tracking library materials, and ineffective in generating accurate reports. The study further established that stakeholders required a computerized system capable of managing library resources, recording borrowing and returning transactions, tracking stock, generating reports, and improving data accuracy and security. Based on these findings, a web-based Library Stock Management System was designed and developed using PHP, HTML, CSS, JavaScript, and MySQL following the Rapid Application Development (RAD) methodology. The system automated major library operations, improved record management, enhanced efficiency in service delivery, and supported effective decision-making through accurate reporting. The study concluded that implementing a computerized Library Stock Management System would significantly improve library stock management, reduce operational inefficiencies, enhance accountability for library resources, and improve access to information services at Kanyanya Hill View Secondary School. It recommended that the school adopt the developed system, provide user training, and allocate adequate resources for system maintenance and future enhancements

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter presents the background to the study, organizational background, statement of the problem, purpose of the study, research objectives, research questions, scope of the study, significance of the study, operational definitions, and chapter summary. The study focused on the design and development of a computerized Library Stock Management System for Kanyanya Hill View Secondary School. It was undertaken to address the challenges associated with the existing manual library stock management practices and to improve the efficiency of library operations through the use of information technology.

1.2 Background of the study

Libraries play a crucial role in supporting teaching and learning by providing access to information resources. School libraries are increasingly recognized as essential learning environments that support literacy development, information access and academic success. Research shows that schools with well-resourced libraries and qualified librarians tend to achieve better student learning outcomes and higher academic performance (Burress et al., 2023; Loh, 2023).

Traditionally, many school libraries have relied on manual systems such as; card catalogues, record books and registers to manage their stock. However, these systems are often inefficient, time consuming and prone to errors (Kumar, 2014). With the advancement of IT, computerized systems have been introduced to improve the management of library resources. Computerized library systems automate key operations such as cataloguing, circulation and inventory management. These systems enhance efficiency, accuracy and accessibility of information. As a result, many institutions are transitioning from manual to automated systems to improve service delivery (Blanco-Domingo & Tramullas, 2025).

1.3 Organizational background

Kanyanya Hillview SS is a private secondary school located in Kanyanya, a rapidly growing residential area in Kampala, Uganda. The school was established to meet the increasing demand for secondary education following the introduction of USE in Uganda. The school library supports teaching and learning by providing access to various information resources. However, like many

schools in similar settings, the library operations are still managed manually. This has led to challenges such as poor record keeping, loss of books and difficulty in tracking borrowed materials. The growing number of students and library sources has increased the need for a more efficient system. Therefore, introducing a computerized LSMS helped improve the management of library resources and enhance service delivery.

1.4 Problem statement

According to Raju and Patnala (2024), traditional library systems face significant challenges in managing the growing volume of information resources and meeting users' evolving information needs. Similarly, Kanyika et al. (2024) found that digitization improves access to information resources and enhances users' research capabilities. Reliance on manual library operations has been associated with increased workload, slower service delivery, inaccuracies in record management and reduced operational efficiency (Jaiswal and Pandey, 2024). For example, Ikwuanusi et al. (2024) emphasize that manual handling of cataloguing, circulation and inventory processes consumes considerable time and limits staff productivity, making it difficult for libraries to operate efficiently in modern academic environments. Similarly, Ahammad, Bahry and Husaini (2024) highlight that traditional and manual library operations are increasingly unsustainable, particularly in institutions striving to provide scalable and technology-driven services. Their work shows that modern libraries require automated systems to enhance efficiency, improve service quality, and support sustainable information management practices. In addition, Ivanova (2024) argues that automation represents a critical turning point in library development, as manual systems are no longer capable of supporting the complexity of contemporary library services or the need for rapid information access.

Beyond operational inefficiencies, manual systems also limit the ability of libraries to generate accurate and timely reports for decision-making. According to Shiv Kumar et al. (2025), traditional library environments are characterized by "time-heavy processes," which hinder effective data management and reduce the reliability of records needed for planning and resource allocation.
Furthermore, the rapid digital transformation of higher education has intensified the limitations of manual systems. Recent studies indicate that by 2025, the majority of academic libraries have shifted toward automated and digital platforms to support real-time access, data-driven services

and users expectations for efficiency (Olatokun & Afolabi, 2024; UNESCO, 2023). This shift underscores the inadequacy of manual systems in supporting modern library functions, particularly in areas such as reporting, analytics, and strategic decision-making. Our preliminary investigations found out that the library at Kanyanya Hillview SS currently relies on manual methods such as registers to manage its stock. This has resulted in several challenges, including poor record keeping, loss of books, slow issuing and returning processes and difficulty in tracking borrowed and overdue materials. As the number of students and library materials continued to grow, these challenges reduced the efficiency and effectiveness of library services. Therefore, this study developed a computerized Library Stock Management System to address the identified challenges

1.5 Purpose of the study

To design and develop a computerized Library Stock Management System (LSMS) for Kanyanya Hillview SS in order to improve the efficiency, accuracy and accessibility of library services.

1.5.1 Objectives of the study

The study was guided by the following objectives;

To examine the current manual system used in managing library stock at Kanyanya Hillview SS.

To identify the challenges associated with the existing manual system.

To determine the requirements for the computerized LSMS.

To design and develop a computerized LMS for the school.

1.5.2 Research questions

The study addressed the following research questions;

What methods are currently used in managing library stock at Kanyanya Hillview SS?

What challenges are associated with the existing manual system?

What are the requirements for developing a computerized LSMS?

How can a computerized system improve the management of library resources?

1.6 Scope of the study

The study was limited to Kanyanya Hillview SS located in Kanyanya, Kampala, Uganda. The research focused on the design of a LSMS aimed at improving the management, tracking and

control of library resources within the school library. The study specifically examined the current manual stock management practices used in the library, including paper-based cataloguing, physical stock registers, borrowing and returning records and manual tracking of library materials. It investigates how these existing systems are used by library staff, teachers and students, as well as the challenges associated with them such as data duplication, loss of records, difficulty in tracking book availability, delays in updating records and inefficiencies in inventory management. In addition, the study analyzed the flow of library stock processes, including book acquisition, cataloguing, classification, shelving, circulation and stock verification. This analysis was ntended to identify gaps and inefficiencies in the current system that hinder effective library service delivery and resource utilization.

The study also explored the system requirements for a computerized LSMS tailored to the operational needs of Kanyanya Hillview SS. The design will included system architecture, database structure, user interface design and workflow processes for managing library stock efficiently and accurately

The scope is also limited to the system analysis and design phase only. It does not include full system implementation, deployment or integration into the school's operational environment. The focus is strictly on understanding the current system, identifying requirements and developing a proposed design solution. The study will be conducted within Kanyanya Hillview SS for 3months, May to July and will involve key stakeholders such as library staff, teachers and students who will interact with the library system.

1.6.1 Delimitations of the Study

The study was delimited to Kanyanya Hill View Secondary School as the single case for investigation. This delimitation was intentional because the study aimed to conduct an in-depth and context-specific examination of library stock management practices within a clearly defined institutional setting. Focusing on one institution enabled the researcher to obtain detailed insights into existing stock management processes, challenges, and user requirements. However, this delimitation meant that the findings were context-specific and could not be statistically generalised to all secondary schools.

The study focused exclusively on library stock management practices, challenges, and user requirements related to the development of a computerized library stock management system. Other aspects of school library operations, including collection development, library budgeting, staffing issues, and broader library service management, were outside the scope of the study. This delimitation enabled the research to maintain a clear focus on the specific problem that the proposed system was designed to address.

The study was further delimited to participants who were directly involved in or affected by library stock management at Kanyanya Hill View Secondary School. The participants included library staff, teachers, students who regularly used library services, and school administrators responsible for overseeing library-related activities. Individuals who had no direct involvement in library management or utilisation, such as non-teaching staff without library responsibilities, members of the Board of Management, and parents, were excluded from the study. This delimitation ensured that data collected was relevant to understanding existing library stock management practices and developing an appropriate computerized solution.

The study adopted a qualitative research approach using a case study design and was delimited from the use of quantitative methods such as surveys and statistical analysis. This approach was selected because the study sought to obtain detailed explanations of participants' experiences, perceptions, and challenges associated with manual library stock management practices. Therefore, the findings were interpretive and context-dependent rather than based on numerical measurement.

The system development process was delimited to the Rapid Application Development (RAD) methodology. Other system development approaches, including Waterfall, Spiral, and other Agile frameworks, were not considered in the study. RAD was selected because it supported rapid prototyping, continuous user involvement, iterative improvement, and timely development of systems based on user requirements (Adriyanto et al., 2025). This delimitation allowed the development process to remain aligned with the objectives and practical requirements of the proposed computerized library stock management system.

1.7 Significance of the Study

This study is significant in several ways as it contributes both practical and academic value to the improvement of library stock management systems in secondary schools. The study will improve the management of library stock at Kanyanya Hill View Secondary School by introducing a computerized system that enhances the organization, tracking, and control of library materials. Automated library systems have been shown to improve efficiency in library operations by reducing reliance on manual processes and improving overall service delivery (Bansode & Shinde, 2023).

The study will reduce errors commonly associated with manual stock management systems, such as incorrect data entry, duplication of records, and missing information. Automation improves data accuracy, consistency, and reliability, thereby strengthening the integrity of library records and ensuring better inventory control (IFLA, 2022).

The study will also enhance access to library resources for both students and teachers by enabling faster search, real-time availability checking, and efficient retrieval of information materials. Digital library systems improve user satisfaction by making resources more accessible and reducing delays in information delivery (Okello-Obura & Magara, 2023).

The system will support school administrators and library staff in making informed decisions through accurate and timely reporting. Automated systems generate useful data such as circulation statistics, stock levels, and usage patterns which are essential for planning, budgeting, and effective resource allocation (Chisenga, 2023). This research also contributes to the growing body of knowledge in Library and Information Science by demonstrating the role of automation in improving library stock management within resource-constrained educational environments. It provides evidence that can guide future studies and system development in similar institutional contexts (Bansode & Shinde, 2023; Okello-Obura & Magara, 2023).

Finally, the study serves as a foundation for future research and development of digital library systems in secondary schools. It offers a reference point for designing scalable and efficient library

management solutions that can be adapted to other institutions facing similar challenges in manual stock control.

1.8 Definition of Operational Terms

Library Stock Management System: A computerized information system designed to automate the management of library resources, including book registration, cataloguing, circulation, inventory management, and report generation.

Library Stock: The collection of books and other information resources available in the school library for use by students and staff.

Computerized System: A software-based system that performs organizational activities electronically with minimal manual intervention.

Manual Library System: A paper-based method of recording, storing, and managing library transactions such as book borrowing, returns, and stock records.

Inventory Control: The process of monitoring, recording, and managing library resources to ensure accountability, availability, and efficient utilization.

1.9 Chapter Conclusion

This chapter presented the background of the study, organizational background, statement of the problem, purpose of the study, research objectives, research questions, scope of the study, significance of the study, and operational definitions. These sections established the basis for investigating the challenges associated with manual library stock management and justified the development of a computerized Library Stock Management System for Kanyanya Hill View Secondary School. The next chapter presents the review of related literature relevant to the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive review of existing literature related to library stock management systems. The review focused on both manual and computerized approaches. The purpose of the review was to establish a theoretical and empirical foundation for the study and to identify gaps that justify the development of a computerized Library Stock Management System for Kanyanya Hillview Secondary School.

Globally, libraries have evolved from traditional manual record-keeping systems to automated and digital platforms that enhance efficiency, accuracy, and accessibility of information resources. According to Bagewadi et al. (2025), modern library systems are increasingly adopting digital technologies to improve service delivery and reduce human effort in managing library collections. However, despite these advancements, many secondary schools in developing countries such as Uganda still rely on manual systems, which are often inefficient and error-prone.

This chapter is organized according to the study objectives, beginning with an examination of manual systems, followed by challenges, system requirements, and finally the design and development of computerized library systems.

2.2 Manual library stock management systems

Before the introduction of computerized library management systems, libraries depended entirely on manual methods to manage stock control and circulation activities. These manual systems were based on physical documentation tools such as accession registers, stock ledgers, card catalogues, and borrower cards, all of which required continuous human input and physical handling. While such systems were suitable for small libraries with limited collections, they gradually became inefficient as library sizes expanded and user demand increased. This inefficiency was mainly due to the increasing complexity of managing large volumes of records manually, which required more time, effort, and accuracy from library staff.

In many educational institutions, especially in developing countries, manual library systems are still widely used. This continued reliance is largely attributed to limited financial resources,

inadequate ICT infrastructure, and a shortage of trained personnel capable of managing computerized systems (Aina, 2023; Tevera & Ruhode, 2024). As a result, many school libraries continue to operate using traditional methods despite the availability of modern automated solutions. According to IFLA (2023), institutions that rely on manual systems often experience reduced efficiency in information retrieval, increased workload for librarians, and challenges in maintaining accurate and up-to-date records, particularly as collections grow. Furthermore, studies show that the persistence of manual systems in secondary schools is also influenced by institutional priorities, where limited budgets are often allocated to core academic needs rather than library automation (IFLA, 2023; UNESCO, 2023). This has contributed to slow adoption of computerized systems in many school environments, leaving libraries dependent on outdated methods that struggle to meet modern information demands (Watsemba, 2023; IJSAT, 2025). Consequently, manual systems, while still functional, are increasingly considered unsuitable for effective library stock management in contemporary educational settings.

2.3 Challenges associated with manual library systems

Although manual systems have been used for many years, they present several operational challenges that significantly affect the efficiency of library services. These challenges become more pronounced in school environments where resources are limited and the number of users is increasing.

2.3.1 Time Consumption in Library Operations

One of the major challenges associated with manual library systems is the significant amount of time required to perform basic library operations. In manual environments, librarians are required to physically search for books on shelves, manually record borrowing and return transactions, and continuously update stock registers whenever changes occur. These activities are repetitive, labor-intensive, and highly time-consuming, especially in schools where library users frequently request learning materials throughout the day. Saikia (2025) observes that manual cataloguing systems significantly slow down library operations, particularly as the size of the collection increases. As libraries expand, locating specific materials becomes more difficult because users depend entirely on physical catalogues or handwritten records. Similarly, Kumar and Singh (2021) argue that manual record systems create delays in information retrieval because every transaction must be

processed and verified manually, which reduces operational efficiency. Oyelude (2022) notes that librarians working with manual systems spend a considerable amount of time handling administrative tasks such as updating registers, searching for books, and correcting record errors, instead of focusing on user support and information services. In the same line, IJSAT (2025) reports that manual circulation and cataloguing processes significantly increase waiting time for users, especially during peak academic periods when demand for books is high. Additionally, Tevera and Ruhode (2024) emphasize that inefficient manual processes negatively affect the overall performance of academic libraries by limiting the speed at which information is accessed and processed. This delay becomes more critical in educational settings where timely access to learning resources is essential for academic success. Jeong (2024) highlights that inefficiencies in manual systems reduce user satisfaction and discourage frequent use of library services, particularly among students who expect fast and convenient access to information. As a result, the cumulative effect of time-consuming manual operations leads to reduced productivity, poor service delivery, and limited effectiveness of school library systems.

2.3.2 Errors and Inconsistencies in Data Recording

Manual library systems are highly prone to human errors such as incorrect book entries, duplication of records, and misfiling of information. These errors often accumulate over time, leading to unreliable and inconsistent library data. In school library environments, such inaccuracies are common because records are maintained manually without automated validation or centralized databases. According to Watsemba (2023), inconsistencies in manual library records make it difficult for librarians to maintain accurate inventory control, which negatively affects decision-making processes such as book procurement, stock verification, and resource allocation. Similarly, Rathod (2025) emphasizes that manual record-keeping systems lack error-checking mechanisms, making them vulnerable to data redundancy and loss of information integrity, especially as library collections expand.

2.3.3 Loss and Mismanagement of Library Resources

In manual library systems, the process of tracking borrowed and returned books is often inefficient and heavily dependent on human record-keeping. This increases the likelihood of books being lost, misplaced, or not returned on time, especially in busy school environments where library usage is

high. The absence of automated tracking mechanisms makes it difficult for librarians to maintain accurate oversight of library stock, leading to gaps in accountability and control of resources. In addition, monitoring overdue books becomes challenging because manual records are not always updated in real time. As a result, delays in updating borrowing registers reduce the effectiveness of follow-up procedures for unreturned materials. This weakens the overall management of library resources and contributes to continuous stock discrepancies over time. Rathod (2025) emphasizes that the lack of automated circulation and tracking systems in manual library environments significantly increases the risk of resource loss, particularly in educational institutions where large numbers of users access library materials daily. Similarly, Saikia (2025) notes that without digital monitoring tools, libraries struggle to enforce return policies and maintain accurate circulation records, which ultimately affects the availability of learning resources for other users.

2.3.4 Inefficient Reporting and Inventory Control

Manual library systems make it difficult to generate accurate and timely reports on key aspects such as library usage, stock levels, and borrowing trends. In such systems, librarians are required to manually count books, review registers, and compile data from different records before producing any meaningful report. This process is not only time-consuming but also increases the likelihood of errors, especially when dealing with large volumes of records. Because information is scattered across multiple physical registers, consolidating data for decision-making becomes a complex task. This limits the ability of library management to quickly assess the status of library resources or identify usage patterns that could guide procurement and policy decisions. According to Mamatlepa and Maluleka (2024), the absence of automated reporting tools in manual systems significantly restricts libraries from making informed, data-driven decisions, as the accuracy and reliability of manually compiled reports are often questionable.

2.3.5 Increased Workload for Library Staff

Another major challenge associated with manual library systems is the excessive workload placed on library staff. Librarians are required to perform all library operations manually, including recording book transactions, updating registers, shelving returned books, assisting users in locating materials, and maintaining inventory records. These repetitive and time-intensive tasks place significant pressure on staff, particularly in schools with large student populations. The continuous

reliance on manual procedures not only reduces operational efficiency but also increases the likelihood of mistakes due to fatigue and human limitations. Over time, this workload can negatively affect service delivery and reduce the overall effectiveness of library operations. Bagewadi et al. (2025) note that manual library management systems contribute to staff fatigue and inefficiency, as librarians are burdened with repetitive administrative duties that could otherwise be automated through computerized systems.

2.4 Computerized Library Management Systems

The limitations of manual systems have led to the development of computerized library management systems that aim to automate library operations. These systems use digital technologies to store, process, and retrieve library information efficiently.

2.4.1 Concept of Computerized Systems

A computerized library management system is a software-based solution designed to automate library processes such as cataloguing, circulation, and inventory management. It uses a centralized database that allows real-time updates and easy retrieval of information. Bhati et al. (2024) describe computerized systems as integrated platforms that reduce manual intervention and improve the speed and accuracy of library operations. These systems allow users to search for books instantly, track borrowing history, and generate reports automatically.

2.4.2 Advantages of Computerized Library Systems

Computerized systems provide numerous advantages over manual systems. They significantly improve efficiency by enabling fast search and retrieval of books through digital databases. They also reduce human errors by automating data entry and updates. Furthermore, computerized systems provide real-time tracking of library stock, ensuring that librarians always have up-to-date information about available resources. Saikia (2025) emphasizes that automation improves user satisfaction by making library services more accessible and reliable. In addition, reporting and decision-making become easier because data can be generated automatically in various formats.

2.4.3 Technologies Used in Modern Library Systems

Modern library systems are developed using a combination of technologies including web development languages such as PHP, Python, and JavaScript, as well as database management systems like MySQL and PostgreSQL. Some advanced systems also integrate barcode scanning and RFID technology for tracking physical books. According to Bhati et al. (2024), cloud computing has also become an important component of modern LMS platforms, enabling remote access and data backup, which enhances system reliability.

2.5 Requirements for a Library Stock Management System

Before developing a computerized system, it is important to identify both functional and non-functional requirements. These requirements define what the system should do and how it should perform in real-world conditions.

2.5.1 Functional Requirements

Functional requirements define the essential operations that a system must perform to meet user needs and achieve its intended purpose. In a library management system, these requirements typically include user registration and authentication, book cataloguing, borrowing and returning of library materials, searching for resources, and generating operational reports. These functions are critical because they ensure that all core library processes are automated and managed within a single integrated system. According to Sommerville (2020), functional requirements specify the services a system should provide, how the system should behave in particular situations, and the actions it must support in response to user inputs. In the context of library systems, these requirements ensure that users can efficiently access and manage information resources while maintaining accurate records of library transactions. Similarly, Pressman and Maxim (2020) emphasize that well-defined functional requirements are fundamental in systems engineering because they provide a clear foundation for system design, implementation, and validation. Without properly defined requirements, software systems risk failing to meet user expectations or operational goals.

In library environments, functional requirements such as automated circulation, real-time search capabilities, and reporting functions improve service delivery and reduce the limitations associated

with manual systems. These features also enhance data accuracy, system reliability, and user satisfaction by ensuring that library operations are consistent and well-coordinated. Therefore, clearly defined functional requirements are essential in the development of a Library Stock Management System, as they ensure that the system effectively supports librarians, students, and administrators in managing library resources efficiently.

2.5.2 Non-Functional Requirements

Non-functional requirements define the quality attributes of the system such as usability, security, performance, and reliability. A library system must be easy to use so that both librarians and students can interact with it without difficulty. Rathod (2025) notes that system security is particularly important to ensure that only authorized users can access or modify library records. Additionally, the system should be fast in processing requests and reliable enough to operate consistently without failure.

2.5.3 User Requirements

User requirements are derived from stakeholders such as librarians, teachers, students, and administrators. These users typically require a system that allows quick book searches, efficient borrowing and returning processes, and accurate tracking of library stock. Ekuase-Anwansedo and Craig (2021) highlight that involving users in system design improves acceptance and ensures that the final system aligns with real operational needs.

2.6 Design and Development of Library Management Systems

The design and development phase focuses on how the system is structured and implemented. This stage is crucial because it determines how effectively the system will function in a real environment.

2.6.1 System Design Approaches

System design involves creating models that represent the structure and behaviour of the system. These include Entity Relationship Diagrams, which show how data is connected, Data Flow Diagrams, which illustrate how information moves through the system, and interface designs that

show how users interact with the system. These design tools help developers visualize the system before implementation, reducing errors and improving efficiency.

2.6.2 Development Methodologies

Different methodologies can be used in system development, including the Waterfall model, Agile approach, and Prototyping. The Waterfall model follows a step-by-step process, while Agile focuses on iterative development with continuous improvement. Bhati et al. (2024) recommend iterative approaches in library system development because they allow developers to incorporate feedback from users during the development process.

2.6.3 Implementation Technologies

The development of library systems typically involves programming languages such as PHP, Python, or Java, along with database systems like MySQL. Front-end technologies such as HTML, CSS, and JavaScript are used to create user interfaces. These tools are widely used because they are open-source, cost-effective and suitable for academic projects.

2.7 Research Gap

Although several studies have been conducted on library management systems, most of them focus on higher institutions such as universities and large public libraries. There is limited research focusing on secondary school libraries in Uganda, which still rely heavily on manual systems. Additionally, many existing systems are too complex or expensive for school-level implementation, making them unsuitable for institutions with limited resources. This creates a gap for a simple, affordable, and user-friendly computerized library stock management system tailored specifically for secondary schools such as Kanyanya Hillview Secondary School. Therefore, this study seeks to address this gap by designing and developing a system that improves efficiency, reduces errors, and enhances library service delivery in a school environment.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a detailed description of the methodology that was employed in the development of the Library Stock Management System for Kanyanya Hill View Secondary School. It explained the research design that was adopted, the study area, the target population, sampling approach, data collection procedures, instruments that were used, system development methodology, data analysis techniques, system testing procedures, and ethical considerations that guided the study. The purpose of this methodology was to ensure that the development of the system is grounded in real user needs and supported by systematic and reliable procedures for data collection, analysis, design, implementation, and evaluation.

3.2 Research Design

The study adopted a single-case study research design. The case study approach was selected as the primary strategy of inquiry because this investigation sought to examine a contemporary phenomenon library stock management within its real-life context, where the boundaries between the phenomenon and the context was not clearly evident (Yin, 2018). Unlike experimental designs that require variable manipulation, the case study approach was particularly suited to this research because the investigator exercised no control over behavioural events but instead aimed to capture the operational workflows that define the current manual library system (Yin, 2018; Käss et al., 2024).

The decision to employ a case study design was further justified by its epistemological alignment with the research objectives. According to Tołwińska (2024), the case study method has a strong position in the methodology of educational research and is commonly used to investigate institutional practices within school settings. This aligns precisely with the study's goal of conducting a granular needs analysis to inform a localized system development project. Recent scholarship emphasises the importance of improving credibility in case study research, particularly when findings are intended to inform practical system development (Buck & Boussebaa, 2024). Furthermore, Gerring (2017) posits that case study research is fundamentally suited to investigating the operational links and systemic workflows that define institutional processes, which directly corresponds to this study's focus on library management practices. Kanyanya Hill

View Secondary School was purposefully selected as the single case for this investigation. This selection was based on the school's representativeness as a typical secondary institution facing acute challenges associated with manual stock-keeping, including record redundancy, delayed retrieval of information, and susceptibility to human error. Recent case study research on school information systems in East African secondary schools demonstrates the value of this design for investigating institutional management practices and identifying system implementation challenges (Baharia, 2024). Following Yin's (2018) typology, this constituted a revelatory case, as the school's current transition phase from a manual to a proposed automated system offered critical insights into the infrastructural and human-capacity gaps that often derail digital transformation initiatives in Ugandan schools (Twinomugisha & Nsibirwa, 2019).

A case study design was deemed highly appropriate because it facilitated a multi-perspective analysis of the existing library stock management practices. Specifically, it allowed the us to systematically document workflows, cataloguing procedures, and borrowing and returning protocols as they naturally occur (Creswell & Poth, 2018). By situating the inquiry within the natural setting of the school library, the design enabled us to differentiate between formal prescribed library policies and the actual informal practices employed by staff to circumvent system deficiencies a distinction that survey-based or experimental designs would likely overlook (Flyvbjerg, 2016). Käss et al. (2024) emphasise that a key element of rigour in case study research is examining the unit of analysis from multiple perspectives in order to draw informed conclusions, which aligns with this study's multi-source data collection strategy. A case study approach was instrumental in identifying, categorizing, and prioritizing specific challenges inherent in the manual stock system. Drawing on the theoretical framework of system design lifecycle models (Sommerville, 2016), the in-depth investigation provided rich, context-specific user requirements necessary for the subsequent development of a computerized library stock management system. Yin (2018) emphasises that case studies are particularly advantageous when the research question asks "how" or "why" a system functions in a particular manner; this study explicitly asked how the current manual system operates and why it fails to meet user needs, thereby generating diagnostic data that directly informed the functional and non-functional specifications of the proposed digital solution.

To ensure methodological rigour, the case study design incorporated methodological triangulation through the integration of multiple, converging sources of evidence. Data were collected via semi-structured interviews with the librarian and selected staff members, direct non-participant observations of library usage patterns, and physical document analysis of existing stock registers, accession records, and borrowing logs. Conejero et al. (2024) provide guidelines for conducting case studies from design through research strategies to ensure validity and reliability, emphasising that triangulation serves to cross-validate findings by examining a single phenomenon from different vantage points. Käss et al. (2024) similarly affirm that the use of multiple sources of evidence per case supports findings through triangulation, thereby reducing the inherent bias associated with single-source data. Consequently, this multi-method strategy significantly enhanced the construct validity and reliability of the qualitative findings (Yin, 2018; Käss et al., 2024). A study acknowledged the inherent limitations of a single-case design. Critics such as Tsang (2014) argue that single-case findings lack external validity and are often incapable of producing generalizable theoretical propositions. However, this study did not aim for statistical generalization; instead, it adhered to the logic of analytical generalization, whereby the empirical findings were used to develop, test, and refine theoretical propositions regarding manual stock management challenges in secondary schools (Yin, 2018). To mitigate the risks of investigator bias and subjective interpretation, the researcher maintained a detailed case study database and a reflexive journal throughout the data collection and analysis phases. A case study database enhances the reliability and transparency of research by providing an organized record of evidence, while reflexive journaling enables the researcher to critically examine personal assumptions, decisions, and potential biases during the research process (Catherine Marshall & Gretchen B. Rossman, 2022). These procedural safeguards ensured that the final recommendations for the computerized system are firmly grounded in empirical evidence rather than researcher assumption.

3.3 Study area

The study took place at Kanyanya Hillview SS located in Kanyanya, Kampala, Uganda.

3.4 Target Population

The target population in research refers to the entire group of individuals, events, or objects about which the researcher seeks knowledge and to whom the study findings were generalised (Willie,

2023). As Karanja-Chege et al. (2025) emphasise, clearly defining the target population is essential for research validity and for ensuring that findings are applicable to the intended group. Similarly, Bulbulia (2024) argues that investigators must first state a clear research question and define the target population for which answers generalised before proceeding to sample planning and data collection. In this study, the target population comprised all individuals directly involved in or affected by the management and utilisation of the school library at Kanyanya Hill View Secondary School.

The target population for this study was defined along four interrelated categories, following established methodological guidelines (Willie, 2023; Robertson & Sibley, 2024). First, the target population included the individuals responsible for the day-to-day management of library stock. This consisted of the school librarian and any library assistants or support staff who are directly involved in cataloguing, accessioning, borrowing, and returning library materials. This group possessed direct operational knowledge of existing manual practices, challenges, and workflows. Second, the target population encompassed the users of the library services, specifically teachers who regularly utilise the library for teaching and research purposes. Teachers were included because they guide students in using library resources and depend on the library to support curriculum delivery. As recent research on high-risk populations demonstrates, identifying specific sub-groups with distinct characteristics and needs is critical to designing effective interventions (Aagaard-Hansen et al., 2023; Smith et al., 2025). Third, the target population included students as the primary beneficiaries of library services and the end-users of the proposed computerized stock management system. Students were included because they interact directly with the library's stock and systems and provided valuable insights into user experiences with the current manual system. Fourth, the target population included school administrators, such as the head teacher and the deputy head teacher in charge of academics, who oversee the allocation of resources to the library and make strategic decisions regarding its management and development. Lund and Matthews (2024) highlight the importance of identifying decision-makers for whom evidence is generated early in the research process, as each decision-maker has distinct target populations. School administrators represent the institutional oversight perspective and provided insights into policy decisions and resource allocation affecting library services. The inclusion of these four categories of participants is justified by their distinct but complementary perspectives on library

stock management. This multi-perspective approach enabled comprehensive data collection and enhanced the validity of the findings through triangulation. As Käss et al. (2024) affirm, a key element of rigour in case study research is examining the unit of analysis from multiple perspectives in order to draw informed conclusions.

3.4.1 Sample Size

The total sample size for this study was determined by the principle of thematic saturation, which refers to the point at which no new themes or insights emerge from the data (Hsu et al., 2025). Recent qualitative research suggests that thematic saturation is often achieved after 12 interviews with a relatively homogeneous population (Sage Research Methods, 2025). A study of recovered COVID-19 patients in Nairobi, Kenya, for instance, found that thematic saturation was achieved after 12 interviews (Sage Research Methods, 2025). Similarly, the sample size for case study research typically involves 4 to 5 cases or up to 10 individuals within a single case (University of KwaZulu-Natal, 2016; Tangaza University, 2024). Consistent with these guidelines, this study aimed for a sample of approximately14 to 19 participants, distributed across the four categories, with the flexibility to continue data collection until thematic saturation is reached (Hsu et al., 2025). The sample were drawn from the target population as follows:

Table 1; Sample of target population

Category	Target Population	Estimated Sample Size	Sampling Technique
Library Staff	All library staff (librarian and assistants)	2–3	Purposive
Teachers	Teachers who regularly use the library	4–6	Purposive
Students	Students who are frequent library users	6–8	Purposive
School Administrators	Head teacher and Deputy Head Teacher (Academics)	2	Purposive
Total		14–19	

The sample size was justified on several grounds. First, the study adopted a single-case design with a bounded institutional setting, which limited the potential participant pool (Yin, 2018). Second, purposive sampling ensured that selected participants possessed high information power, meaning that rich, detailed data could be obtained from a relatively small number of individuals. Third, thematic saturation, the point at which no new themes emerged, was used as a guide to determine when data collection was complete (Hsu et al., 2025). Recent methodological scholarship emphasises that data adequacy in qualitative research should be based on a constellation of factors, including data quality, research scope, and participant heterogeneity, rather than arbitrary numerical targets (Hsu et al., 2025; Alcott et al., 2025). Finally, the use of multiple data collection methods, including interviews, observations, and document analysis, further compensated for a smaller sample size by providing convergent evidence from different vantage points (Käss et al., 2024).

It was important to acknowledge that the target population in this study did not include all members of the school community. Individuals who were not directly involved in library management or utilisation, such as non-teaching staff without library duties, members of the Board of Management, and parents, were excluded from the target population, as they did not have the relevant knowledge or experience to contribute meaningfully to the study objectives. This demarcation ensured that the study remained focused on generating data that directly informed the development of the computerized library stock management system. As noted by researchers working in data-limited contexts, not knowing the population size is a common challenge (Field Methods, 2024). However, because this study adopted a single-case design with a defined institutional setting, the target population was bounded within the geographical and institutional boundaries of Kanyanya Hill View Secondary School. The time frame for this study was the academic period during which data collection occurred, as library stock management practices were contextually situated within the school's operational calendar.

3.4.2 Sampling technique

In qualitative research, sampling refers to the process of selecting a subset of individuals or cases from a larger population to participate in a study (Robertson & Sibley, 2024). Unlike quantitative research, which prioritizes statistical representativeness and generalizability, qualitative sampling

is guided by the principle of information power the idea that the quality and richness of data obtained from participants are more important than numerical quantity (Malterud, Siersma, & Guassora, 2016). Malterud et al. (2016) argue that a smaller sample with high information power can be sufficient when participants possess deep knowledge about the research topic. This study therefore employed purposive sampling techniques to select participants who can provide rich, context-specific insights into library stock management practices at Kanyanya Hill View Secondary School.

Purposive Sampling Strategy

Purposive sampling was the primary sampling technique employed in this study. Purposive sampling involves the deliberate selection of participants based on their ability to provide relevant and rich information about the phenomenon under investigation (Robertson & Sibley, 2024). This technique is particularly appropriate for case study research, where the goal is to gain an in-depth understanding of a bounded system rather than to generalize findings to a broader population (Yin, 2018). As Boddy (2016) notes, sample sizes as low as one can be highly informative and meaningful in qualitative research, particularly when the selected case or participants offer unique insights into new or under-researched areas.

The purposive selection of participants was guided by three criteria: relevance to the research objectives, direct involvement in library stock management or utilization and capacity to provide rich, detailed information on the existing manual system, its challenges, and user needs. This approach aligns with the principle that sample size in qualitative research should be determined by the research scope, the heterogeneity of the population, and the quality of data obtained (Hsu et al., 2025). As Hsu et al. (2025) emphasize in their Q-FORS framework, participant originality and capacity to generate new information are critical factors in determining sample adequacy and data quality.

3.5 Data Collection Methods

Data collection methods refer to the specific tools and procedures employed to gather empirical evidence that addressed the research questions and objectives of a study. In case study research, the use of multiple data collection methods is particularly important because a case as a bounded

system contains many characteristics, and it is not known ahead of time which characteristics are important; determining that is the work of the case study (Tracy, 2024). Consequently, a well-designed case study does not rely on a single method and source of data. This study adopted a multi-method data collection approach to capture the complexity of library stock management practices at Kanyanya Hill View Secondary School. Specifically, the study employed three primary data collection methods: semi-structured interviews, non-participant observations, and document analysis. These methods have been selected because they are among the most commonly used data collection techniques in qualitative case study research and are particularly suited to investigating institutional practices within educational settings (Chand, 2025).

3.5.1 Semi-Structured Interviews

Interviews are one of the most widely used research methods in social scientific disciplines due to the opportunity they provide to learn from participants about their perceptions and experiences of the phenomenon under consideration (Tracy, 2024). In this study, semi-structured interviews were employed as the primary data collection method. Semi-structured interviews are characterised by open-ended questions and the use of an interview guide in which the broad areas of interest, sometimes including sub-questions, are defined. Unlike structured interviews that follow a rigid questionnaire, semi-structured interviews allow the interviewer to ask probing questions to dig deeper into the responses given by participants, thereby eliciting richer and more detailed data (Hockey & Dawkins, 2025). This flexibility is particularly valuable for exploring the nuances of library stock management challenges and user needs.

The pre-defined topics in the interview guide were derived from the literature on library management, the research objectives, and preliminary insights from document analysis. Recent research demonstrates that semi-structured interviews can be successfully adapted to capture authentic perspectives from diverse participant groups, including those with varying communication needs, through the use of scaffolding, prompts, and visual supports (Hockey & Dawkins, 2025). Across interviews, the focus on different questions may differ and some questions may be skipped altogether if the interviewee is not able or willing to answer, ensuring that the conversation remains relevant and participant-centered.

Interviews were conducted face-to-face with participants at Kanyanya Hill View Secondary School. Face-to-face interviews offer the advantage of allowing the interviewer to observe important non-verbal cues, such as hand gestures and nodding, which can enhance understanding (Tracy, 2024). Furthermore, conducting interviews in person enables the development of rapport between the interviewer and participant, thus encouraging more detailed conversations and responses (Abedi, 2025). The interviews were guided by an interview schedule containing a set of pre-planned core questions to ensure that the same general areas are covered with each participant. However, the schedule served as a guide, allowing questions that are not included to be asked as the researcher probes and explores perceptions of the participants. This approach aligns with the characteristics of semi-structured interviews, which are used by most qualitative interviewers.

A semi-structured interview guide was prepared prior to the interviews taking place. The interview guide summarized the content that we aim to cover during the interview and helped to focus and structure the research questions such that they can be asked as interview questions, allowing the participant the opportunity to respond to them. The interview guide was developed based on the research questions and the literature review.

Each interview began with the researcher setting the context and informing the participant about the purpose of the interview. The aim was to gain detailed descriptions from the participant about their experiences and views, as opposed to more abstract reflections. At the end of the interview, we debriefed and give the interviewee a chance to comment or ask questions about the interview and the research.

3.5.2 Non-Participant Observation

Observations are particularly useful to gain insights into a certain setting and actual behaviour—as opposed to reported behaviour or opinions (Tracy, 2024). While interviews captured what participants say about library practices, observations allowed us to see what actually happens in practice. This distinction is critical, as discrepancies between reported and actual behaviour often emerge in qualitative research. Observations also allowed for the potential discovery of topics that we did not realize were relevant and enabled gaining deeper insights into the real-world dimensions of the research problem (Cheek et al., 2024).

The study employed non-participant observations, where the observer was "on the outside looking in," present in the setting but not part of the situation, trying not to influence the setting by their presence (Cheek et al., 2024). Recent research demonstrates that non-participant observations are valuable for understanding complex institutional environments, workflows, and processes, and for providing rich understanding and description of context (Cheek et al., 2024; Boileau, 2024). This approach is appropriate because the researcher's presence as an observer did not disrupt the natural flow of library activities. Observations were conducted in the school library during regular operating hours to observe cataloguing, accessioning, borrowing, and returning procedures as they naturally occur. As Cheek et al. (2024) emphasize, non-participant observations allow researchers to observe "work-as-done" rather than "work-as-imagined," providing critical insights into actual institutional practices.

Written notes were taken during the observations using observation protocols developed prior to data collection. These protocols included pre-determined blocks for analysis, such as workflow processes, user-staff interactions, and documentation practices. After each observation, field notes were transcribed into observation protocols for analysis. The observation process were conducted in a structured manner with the help of observation protocols, ensuring consistency across observation sessions. Boileau (2024) highlights the importance of intentional design and well-reported research methods for exploring and understanding lived experience, which guided the observation approach in this study.

3.5.3 Document Analysis

Document analysis refers to the review by the researcher of written materials (Chand, 2025). Documents are a valuable source of information and, if they are available, they should be included in the research design. In this study, document analysis served as a starting point for getting an overview of the library's current operations and for triangulating data from interviews and observations. Chand (2025) identifies document analysis as one of the four central qualitative data collection methods, alongside interviews, focus groups, and observation, highlighting its importance in qualitative research.

Recent methodological scholarship provides guidance for conducting rigorous document analysis. Jung (2024) outlines key elements for ensuring transparency and reproducibility in document analysis studies, including selecting relevant documents, developing a review protocol, and coding and analyzing data. The focus is on ensuring that the methodology section is comprehensive and well-organized, covering the inclusion and exclusion criteria for document selection, the analysis framework, and techniques to ensure reliability and validity. Jalilvand, Raeisi, and Shaarbafchizadeh (2024) demonstrate the application of systematic document analysis frameworks in institutional research contexts, employing the READ framework (Ready materials, Extract data, analyze data, Distil) for document analysis.

The documents to be analyzed in this study included public and procedural documents such as: library accession registers, borrowing logs, cataloguing records, library policies and guidelines, stocktaking reports, and any other relevant administrative documents related to library stock management (Jalilvand et al., 2024). These documents provided valuable insights into the formal library procedures, record-keeping practices, and historical trends in library usage and stock management. Analyzing these documents also allowed the researcher to assess the accuracy and completeness of information provided during interviews and observations, thereby enhancing the validity of the findings. The document analysis followed a systematic approach, including document selection criteria, a review protocol, and thematic coding procedures (Jung, 2024).

3.6 Data Analysis

Data analysis in qualitative research involves the systematic process of organizing, reducing, and interpreting the collected data to identify patterns, themes, and meanings relevant to the research objectives. Unlike quantitative analysis, which relies on statistical procedures, qualitative analysis is an iterative and reflexive process that requires the researcher to engage deeply with the data (Tracy, 2024). In this study, data analysis were guided by an inductive thematic analysis approach, following the contemporary framework for reflexive thematic analysis developed by Braun and Clarke (2022). Thematic analysis is widely recognized as one of the most accessible and flexible methods for analyzing qualitative data, as it focuses on identifying patterned meaning within data and can be applied across diverse epistemological and theoretical positions (Chandrasekar et al., 2024; Naudé, 2024).

3.7 Ethical considerations

Ethical considerations are fundamental to the conduct of any research involving human participants. Ethical research practice requires that researchers anticipate and address potential ethical issues throughout the research process, from the initial design through to data collection, analysis, and dissemination of findings (Tracy, 2024). In qualitative research, ethical considerations are particularly important because of the close engagement between the researcher and participants, which raises concerns about consent, confidentiality, and the potential for harm (Braun & Clarke, 2022). This study adhered to established ethical principles and guidelines to ensure the protection, dignity, and well-being of all participants. The ethical framework for this study were guided by the principles of respect for persons, beneficence, and justice, as articulated in the Belmont Report (National Commission for the Protection of Human Subjects, 1979), as well as contemporary guidance on research ethics in educational and information systems contexts (Tracy, 2024; Roberts, 2024).

3.7.1 Informed Consent

Informed consent is a cornerstone of ethical research and requires that participants are provided with sufficient information about the study to make a voluntary and informed decision about their participation (Braun & Clarke, 2022). In this study, informed consent was obtained from all participants prior to data collection. Potential participants were provided with a participant information sheet that clearly explains the purpose of the study, the procedures involved, the voluntary nature of participation, the right to withdraw at any time without consequence, and how their data were used and protected. The information sheet were written in accessible language, avoiding technical jargon, to ensure that all participants can understand the information provided (Tracy, 2024).

For student participants under the age of 18, informed consent were obtained from both the parent or guardian and the student participant. Recent research on research ethics in school settings emphasizes the importance of obtaining dual consent for minors, ensuring that both parents and children understand the research and agree to participate (Langridge & Turner, 2025). Consent was documented through signed consent forms, which were stored securely and separately from the data to protect participant anonymity. Participants was also reminded of their right to withdraw at

any point during data collection, and their continued willingness to participate was checked at each stage (Braun & Clarke, 2022).

3.7.2 Confidentiality and Anonymity

Confidentiality and anonymity are essential for protecting participant privacy and ensuring that individuals cannot be identified from the research data or publications (Roberts, 2024). In this study, all participants were assigned pseudonyms, and any identifying information were removed from transcripts, field notes, and the final report. The school's name was also anonymized in the final report to protect the institution's identity. Specific measures included: removing all names, contact details, and other identifying information from interview transcripts; using codes rather than names in the data management system; and aggregating data where necessary to prevent identification of individuals (Tracy, 2024).

As Roberts (2024) emphasizes, the boundaries of anonymity should be discussed explicitly at the outset of a research project, particularly in small-scale qualitative studies where participants may be identifiable through context. In this study, participants were informed that while every effort was made to protect their anonymity, the small size of the case may mean that their identity is discernible to those familiar with the school. They were given the opportunity to consent on this basis and to request that particularly sensitive information be anonymized more carefully (Roberts, 2024). Data were stored on a password-protected computer and in locked filing cabinets, accessible only to the researcher. Audio recordings was destroyed following transcription and analysis, and all data were retained in accordance with the university's data management policy.

Voluntary Participation and Right to Withdraw. Participation in this study was entirely voluntary, and participants were free to withdraw at any time without giving a reason and without any negative consequences (Tracy, 2024). Recent ethical guidance emphasizes that the right to withdraw is not merely a procedural formality but an ongoing entitlement that participants should be reminded of throughout the research process (Langridge & Turner, 2025). Participants were informed of their right to withdraw at the time of consent, before interviews begin, and at the conclusion of data collection. In the event of withdrawal, any data already collected from that participant were excluded from the analysis and destroyed upon request.

3.7.3 Minimization of Harm and Protection from Risk

Researchers have a duty to anticipate and minimize any potential harm or discomfort that may arise from participation in research (Tracy, 2024). In this study, the potential risks to participants are considered minimal, as the research involves discussing library management practices rather than sensitive personal topics. However, the researcher remained vigilant to any signs of discomfort during interviews and offered participants the opportunity to pause or terminate the interview if they feel uncomfortable. Participants was also provided with the contact details of the researcher and the research supervisor should they have any concerns or questions (Braun & Clarke, 2022). Roberts (2024) emphasizes the importance of maintaining awareness of participants' needs and being flexible in research design and practice to maximize participation and minimize harm.

3.7.4 Researcher Reflexivity and Positionality

Reflexivity the process of critically reflecting on the researcher's own positionality, assumptions, and influence on the research process is an ethical imperative in qualitative research (Tracy, 2024; Braun & Clarke, 2022). The researcher maintained a reflexive journal throughout the study, documenting decisions, assumptions, emotional responses, and potential biases. This practice helped to surface and manage any preconceptions about library management practices and ensure that the findings are grounded in the data rather than the researcher's own perspectives (Braun & Clarke, 2022). The researcher also acknowledged their position as an outsider to the school context and engaged in ongoing critical reflection on how this may influence data collection and interpretation (Tracy, 2024).

3.7.5 Institutional Approval and Permissions

Prior to commencing data collection, the researcher obtained ethical approval from the university's research ethics committee. In addition, permission was sought from the head teacher and the school administration at Kanyanya Hill View Secondary School to conduct the research on the school premises. This involved providing the school with a detailed description of the study, its purpose, and the procedures involved, as well as assurances about the protection of participants and the institution. Written permission were obtained from the school administration before any data collection activities begin.

3.7.6 Data Storage and Security

Data security is a critical ethical consideration, particularly in an era of increasing concern about data breaches and the misuse of personal information (Roberts, 2024). In this study, all data were stored securely and in accordance with the university's data protection policies. Electronic data, including audio recordings and transcripts, were stored on a password-protected computer with encrypted files, accessible only to the researcher. Physical data, including consent forms and field notes, were stored in a locked filing cabinet. Data were retained for the duration of the research and for a period thereafter as required by the university, after which it was securely destroyed.

3.7.7 Avoiding Deception

We were transparent with participants about all aspects of the study, including its purpose, methods, and intended outcomes. Deception was not used at any point in the research process (Braun & Clarke, 2022). Participants were informed that the study aims to examine library stock management practices and to inform the development of a computerized system, and they were given honest answers to any questions they may have about the research.

3.7.8 Respect for Cultural and Institutional Contexts

The study was conducted with respect for the cultural and institutional contexts of Kanyanya Hill View Secondary School. This includes demonstrating respect for the school's routines, schedules, and hierarchies, and ensuring that data collection activities do not unduly disrupt school operations. We worked with the school administration to schedule interviews and observations at convenient times and were sensitive to cultural norms regarding communication and interaction (Tracy, 2024).

3.8 System Development Methodology

A system development methodology (SDM) is defined as a dynamic framework for developing systems, consisting of the systems development approach, the systems development method(s), the systems development process model(s), and the systems development technique(s), guided and uniquely shaped by a philosophy (Moyo, Huisman, & Drevin, 2022). Selecting an appropriate SDM for a systems development project is one of the most critical decisions in systems development practice, as an inappropriate SDM can lead to systems being delivered late, exceeding budget, or failing to meet user needs (Saeed et al., 2025). Recent research has identified key factors

influencing the selection of SDMs, including security, quality, communication and test cases, with security being the most frequently studied factor (Saeed et al., 2025). The challenge for systems development practitioners lies in selecting an SDM that aligns with the specific needs of the project context; a "one-size-fits-all" methodology has been categorically rejected as infeasible by research and practice evidence (Moyo et al., 2022).

For this study, the Rapid Application Development (RAD) methodology was adopted as the system development methodology for designing and developing the proposed computerized library stock management system. RAD is a software development methodology that emphasizes rapid prototyping, iterative development, and user involvement throughout the development process (Adriyanto et al., 2025). The selection of RAD is justified by its suitability for projects with well-defined user requirements, tight timelines, and the need for active user participation (Adriyanto et al., 2025). A recent study on library system development confirmed that RAD is appropriate for addressing problems such as inconsistent document formats, higher risk of recording errors, longer processing times, and excessive paper use (Adriyanto et al., 2025). Additionally, the use of prototyping a core component of RAD has been recommended for developing systems in contexts where poor computer literacy and lack of structure are challenges, as prototyping allows users to interact with a working model of the system and provide feedback early in the development process (Wayi, 2014).

The RAD methodology was implemented through four distinct phases: requirements planning, user design, rapid construction, and cutover. The phases of RAD align with the development of a web-based library management system, where iterative feedback and rapid delivery are essential to ensure the final product meets user needs (Adriyanto et al., 2025). The requirements planning phase involved identifying the system requirements through the data collection methods described in Section 3.5, including interviews with library staff, teachers, students, and administrators, as well as document analysis of existing library records. The findings from the case study informed the functional and non-functional requirements of the system. The user design phase involved iterative prototyping, where users reviewed and refine system prototypes through collaborative workshops and feedback sessions. The rapid construction phase involved the actual coding and development of the system, with frequent builds and demonstrations to stakeholders. The cutover

phase involved system testing, deployment, and user training, ensuring a smooth transition from the manual system to the computerized solution.

The Unified Modeling Language (UML) was employed as the system modelling tool during the design phase (Titan et al., 2014). UML was used to create use case diagrams, class diagrams, sequence diagrams, and other visual representations of the system architecture and functionality. The system was developed as a web-based application using PHP as the programming language and MySQL as the database management system, following approaches documented in recent library system development studies (Marsaq et al., 2025; Danjuma, 2025). The system underwent rigorous testing using Black Box Testing methods to ensure that all functionalities work as expected (Danjuma, 2025). User acceptance testing was also conducted with library staff to confirm that the system meets their needs and is intuitive to use.

Recent research on ethical values in system development emphasizes that ethical leadership, trust, and ethical team dynamics are vital components in determining the success of any information system development project (Zulkifli et al., 2026). The study adhered to ethical values throughout the development process, ensuring transparency with stakeholders, protecting user data, and maintaining professional standards of conduct. The development process also incorporated user feedback at each phase, ensuring that the final system is user-centred and addresses the challenges identified during the case study investigation. By adopting the RAD methodology, the study aims to deliver a functional, user-friendly, and sustainable computerized library stock management system that meets the needs of Kanyanya Hill View Secondary School.

3.9 System testing

System testing is a critical phase in the software development life cycle where the entire integrated software system is tested as a whole to ensure that it functions according to specified requirements (Kossiakoff et al., 2020). The primary goal of system testing is to validate that all individual components, modules, and their interactions within the system work seamlessly, and the system as a whole meets its functional and non-functional requirements (Kossiakoff et al., 2020). Proper system testing requires a multi-step process: components must be tested individually, interactions between integrated units must be verified, and the complete system should be subjected to testing

that simulates real usage with a representative workload and user distribution (Bertolino et al., 2023). The opinion that a system "works well enough" is not sufficient; systematic testing is essential to verify completeness and proper functioning before deployment (Radview, 2026). In this study, system testing was conducted to ensure the proposed computerized library stock management system operates reliably, securely, and in alignment with user requirements.

Testing Strategy. The study adopted a comprehensive testing strategy that combines multiple testing techniques to ensure thorough validation of the system. As recent research on library management systems demonstrates, the most effective approach to testing involves both functional and non-functional testing to verify system behaviour and performance (Garuda, 2025). The testing strategy was guided by the principle that test cases should be derived from requirements and specifications, with a focus on covering a wide range of scenarios, including positive and negative test cases (Yang et al., 2025). The testing process followed a structured approach, beginning with module-level testing and progressing to full system testing (Belli et al., 2018; Estevani et al., 2025).

Unit Testing. Unit testing, also known as module testing, was conducted to discover any errors that may exist in individual modules of the system (Oxford CS, 2025). Each module, such as the user registration module, book cataloguing module, and borrowing and returning module, was tested in isolation to ensure it functions correctly before integration with other modules. Test cases were developed for each system function by including inputs within valid ranges, inputs outside valid ranges, and inputs at the boundary values of valid ranges, with the expected outputs clearly specified. This approach helps verify that the system behaves correctly under both normal and exceptional conditions and is consistent with established software testing practices that emphasize boundary value analysis and equivalence partitioning (Ammann & Offutt, 2024; ISO/IEC/IEEE 29119-4:2021). Furthermore, the testing process was guided by clearly defined preconditions to determine the required inputs and postconditions to establish the expected results, ensuring that each test case can be evaluated objectively and consistently (Ammann & Offutt, 2024; Pressman & Maxim, 2023).

Integration Testing. This testing was conducted to ensure that the individual components and modules work together correctly as a whole system (Oxford CS, 2025). The functioning of the overall system requires that individual software components and modules interact correctly through well-defined interfaces to ensure that the integrated system performs as expected (Sommerville, 2021; Pressman & Maxim, 2023).In the context of a library stock management system, this involved verifying that data entered into one part of the system, such as book borrowing, is properly reflected in other parts, such as inventory availability and user borrowing history (Testsigma, 2024). Integration testing was conducted using a top-down approach, where modules are integrated gradually from the highest to the lowest levels of the application, and stub functions used in unit testing are replaced with actual functions (Hellhake et al., 2022; Tole et al., 2024). The integration continued in a systematic, planned manner until the entire system is fully integrated and all module interactions function correctly (Ahamed, 2010).

System testing was conducted on the fully integrated system to verify that it meets all specified functional and non-functional requirements (Hamilton, 2025). The objectives of system testing were to confirm that each component and module operates correctly within the integrated environment, to ensure the correct integration of different components and identify issues related to system interactions, and to assess the system's performance, scalability, and security features (Hamilton, 2025; Radu, 2026). System testing were conducted using Black Box Testing, a functional testing technique where the tester is not aware of the actual working of the software, and the test analysis is performed based on the outputs that the software generates for various inputs (Coursera, 2026; GeeksforGeeks, 2026). The bugs were detected by comparing the expected output with the obtained output (GeeksforGeeks, 2026). Recent library management system development studies confirm that Black Box Testing is effective for verifying system functionality and ensuring the system operates in accordance with specifications and user requirements (Garuda, 2025).

User Acceptance Testing (UAT) was the final phase of testing, where end users or stakeholders evaluate the software to ensure it satisfies technical specifications, real-world user requirements, procedures, and usability standards before production release (Hazdia et al., 2024, as cited in Universiti Poly-Tech Malaysia, 2026). The primary goal of UAT is to gain user approval and

confidence that the application aligns with their expectations and functions correctly in real-world scenarios. UAT was conducted by individuals who represent the actual users of the software, including library staff, teachers, and students who used the system in their daily activities (Testsigma, 2024). During UAT, stakeholders verified that the software meets the specified business requirements, confirm that the application aligns with end users' needs and expectations, and evaluate the application in a simulated production environment to identify any issues before actual deployment (Testsigma, 2024). The test cases developed for UAT covered a range of user scenarios, emphasizing critical business processes such as book borrowing, returning, cataloguing, and user management, and included both positive and negative test cases to thoroughly evaluate application behaviour (Testsigma, 2024). Upon successful completion of UAT, end users provided a formal sign-off indicating their acceptance of the software.

Test Cases for Library Management System. The test cases for the library stock management system were designed to cover all core functionalities of the system (Testsigma, 2024). For the login interface, test cases verified that the login page is accessible, that users can successfully login with valid credentials, that appropriate error messages are displayed for invalid login attempts, and that the system redirects to the appropriate page after successful login (Testsigma, 2024). For the user account interface, test cases verified that users can update their profile information, change their password, view their borrowing history, view their fines and fees status, renew borrowed books, place holds or requests for books, pay fines and fees online, and logout from their account (Testsigma, 2024). For the book issue interface, test cases verified that librarians can search for books by title, author, or ISBN and get the right information displayed, view detailed book information, check the availability of books, issue books to users, set due dates for issued books, and handle holds or requests for books (Testsigma, 2024). For the book return interface, test cases verified that users can initiate the book return process, view return due dates for borrowed books, receive notifications for overdue book returns, return multiple books in a single transaction, pay fines or fees associated with late returns, and receive confirmation of successful book returns (Testsigma, 2024). For the search functionality, test cases verified that users can search for books by title, author, ISBN, category, or genre; that search results are displayed accurately and relevantly; that appropriate feedback is provided for no search results found; and that the search functionality supports partial or wildcard searches (Testsigma, 2024). For the resources inventory,

test cases verified that the inventory includes all available books in the library with accurate metadata, accurately reflects the availability status of each book, is updated in real-time when books are added or removed, and supports bulk updates or imports (Testsigma, 2024).

Non-Functional Testing. In addition to functional testing, non-functional testing was conducted to ensure the system meets quality standards and user expectations. Non-functional test cases verified that the system performance meets acceptable response times for search queries, that the system can handle concurrent user loads without degradation in performance, that the system is secure and protects sensitive user data from unauthorized access or breaches, that the system is reliable and minimises downtime or disruptions in service, that the system is compatible with different web browsers and devices, and that the system provides adequate error handling and graceful degradation under load (Testsigma, 2024).

Success Criteria. The system was considered ready for deployment when the following criteria are met: all specified functional and non-functional requirements are verified, the number and severity of defects identified and resolved during testing are within acceptable limits, performance metrics such as response times and resource utilisation meet acceptable benchmarks, approval and positive feedback are obtained from end users or stakeholders during the UAT phase, successful integration of all components and modules is confirmed without critical issues, and system stability is demonstrated by monitoring for crashes, errors, or unexpected behaviour (Agung Gunawan, 2026; Salem, 2026). System testing were considered successful when the software system demonstrates reliability, functionality, and performance in alignment with specified requirements, ultimately meeting user expectations and business objectives (Lorincz, 2026; Salem, 2026).

3.10 Limitations and Delimitations of the Study

In research methodology, it is essential to distinguish between limitations and delimitations. Limitations are defined as potential weaknesses or problems with the study that are often beyond the control of the researcher and may affect the interpretation of the findings (Tracy, 2024). Delimitations, by contrast, are choices made by the researcher to define the boundaries of the study, including the scope, focus, and parameters that are intentionally set to make the research manageable and achievable (Rossman & Rallis, 2017). Acknowledging both limitations and

delimitations transparently demonstrates methodological awareness and strengthens the credibility of the research (Tracy, 2024). In this study, several limitations and delimitations was acknowledged to ensure transparency and to guide the interpretation of the findings.

The most significant limitation of this study was its adoption of a single-case study design. Single-case studies are often criticized for their limited generalisability, as findings from a single institution cannot be statistically generalised to the broader population of secondary schools (Yin, 2018). Critics argue that single-case findings lack external validity and are often incapable of producing generalizable theoretical propositions (Tsang, 2014). This study did not aim for statistical generalisation but instead adhered to the logic of analytical generalisation, whereby the empirical findings were used to develop and refine theoretical propositions regarding manual stock management challenges in secondary schools (Yin, 2018). However, readers should exercise caution when applying the findings to other contexts without considering contextual differences.
The study employed a relatively small sample size of approximately fourteen to nineteen participants, drawn from a single institution. While this sample size is appropriate for qualitative case study research and is justified by the principle of information power and thematic saturation (Malterud et al., 2016), it does limit the breadth of perspectives captured. The findings reflected the experiences and perceptions of a specific group of participants at a single point in time, and may not capture the full range of experiences present in the wider school community. The researcher mitigated this limitation by ensuring that participants are selected purposively to represent diverse perspectives and by continuing data collection until thematic saturation is reached (Hsu et al., 2025).

In qualitative research, the researcher is the primary instrument of data collection and analysis, and subjectivity is an inherent aspect of the research process (Tracy, 2024). The researcher's own experiences, assumptions, and positionality may influence data collection, interpretation, and presentation. While this study did not aim to eliminate subjectivity, as it is recognised as a resource in qualitative research (Braun & Clarke, 2022), it may nevertheless introduce bias into the findings. We addressed this limitation by maintaining a reflexive journal throughout the research process, engaging in regular discussions with the research supervisor and using multiple sources of evidence to triangulate findings (Tracy, 2024).

The study was conducted within a single secondary school in a specific geographical and cultural context, which limits the applicability of the findings to other settings. Library stock management practices, challenges, and user needs are likely to vary across different types of schools, regions, and countries. The findings may reflect the unique characteristics, resources, and constraints of Kanyanya Hill View Secondary School, which may not be representative of other secondary schools. To enhance the usefulness of the findings, the researcher will provide a detailed description of the research context, participants, and procedures, allowing readers to determine the relevance of the findings to similar environments (Roberts, 2024).

The study was conducted within a limited time frame, which may constrain the depth of data collection and the comprehensiveness of the system development process. A longer period of engagement would allow for more extensive observations, repeated interviews, and more iterative prototyping during the system development phase (Tracy, 2024). The researcher mitigated this limitation by using multiple data collection methods to gather rich data within the available time and by adhering to the Rapid Application Development methodology, which is designed to deliver functional systems within tight timelines (Adriyanto et al., 2025).

The study relied partly on self-reported data from participants during interviews, which may be subject to social desirability bias, recall bias, and inaccuracies (Rossman & Rallis, 2017). Participants may present themselves or their practices in a more favourable light, or may not accurately recall past events or experiences. The researcher addressed this limitation by supplementing interview data with observations of actual library practices and document analysis of library records, which allowed for cross-verification of participant accounts (Tracy, 2024).
The development of the proposed computerized library stock management system may be affected by technological constraints, including limited internet connectivity, hardware availability, and technical expertise at the school. These constraints may affect the design, implementation, and adoption of the system.

The study may be limited by financial, material, and human resource constraints. Budgetary limitations may affect the quality or scope of system development, while limited access to software or hardware may constrain the development process. The researcher addressed this limitation by using open-source tools and platforms wherever possible.Language barriers may affect the clarity and accuracy of communication during data collection. While the researcher and participants share a common language, differences in technical vocabulary or understanding may affect the quality of interview data. The researcher used clear, accessible language during interviews and clarified any ambiguous responses by asking probing questions (Braun & Clarke, 2022).

The study is bound by ethical obligations to protect the anonymity and confidentiality of participants. While these obligations are essential and appropriate, they may limit the extent to which the findings can be presented in detail, potentially masking some contextual features that are critical to understanding the findings (Roberts, 2024). The researcher balanced the need for transparency with the duty to protect participants by carefully anonymizing data and presenting findings in a way that preserves meaningful insights without compromising confidentiality (Tracy, 2024).

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents, analyses, interprets, and discusses the findings from a study on a Library Stock Management System at Kanyanya Hill View Secondary School. The chapter presents findings obtained from library staff, teachers, students, and school administrators who participated in the study. The purpose of presenting these findings was to establish the existing library stock management practices, identify challenges associated with the current manual system, determine the requirements for a computerized Library Stock Management System, and assess the effectiveness of the developed system.

The findings are presented according to the objectives of the study. Quantitative data obtained from questionnaires are presented using frequencies and percentages, while qualitative information obtained from interactions with respondents is integrated into the interpretation of findings. Each finding is further discussed in relation to the reviewed literature in Chapter Two in order to establish similarities, differences, and implications for library management at Kanyanya Hill View Secondary School.

The chapter is organized into sections covering the response rate, demographic characteristics of respondents, findings according to research objectives, presentation of the developed system, system testing results, discussion of findings, and summary of the chapter.

4.2 Response Rate

The study targeted 19 respondents consisting of students, teachers, library staff, and school administrators at Kanyanya Hill View Secondary School. These categories of respondents were selected because they interact with library resources either as users, managers, or decision-makers. Students provided information regarding access and use of library materials, teachers provided views regarding academic information needs, library staff provided technical information regarding stock management activities, while administrators provided management perspectives concerning adoption of technological solutions. Out of the 19 questionnaires distributed, 18 questionnaires were successfully completed and returned, representing a response rate of 94.7 percent

Table 2; Response Rate of Respondents

Response category	Frequency	Percentage (%)
Questionnaires distributed	19	100
Questionnaires returned	18	94.7
Questionnaires not returned	1	5.3
Total	19	100

The findings presented in Table 2 indicate that the study achieved a response rate of 94.7 percent. This response rate was considered adequate because it represented participation from almost all targeted respondents. According to research methodology principles, a high response rate improves the reliability of findings because it reduces the possibility of missing important information from the target population. The high response rate could be attributed to the relevance of the study to the school community. Since the research focused on improving the management of library resources, respondents were willing to provide information regarding the challenges experienced and the possible solutions through the implementation of a computerized system.

4.3 Demographic Characteristics of Respondents

This section presents the demographic characteristics of respondents who participated in the study. The characteristics considered included respondents' category, gender, and experience with library services. Understanding these characteristics was important because respondents had different levels of interaction with library resources and therefore provided different perspectives concerning the need for a Library Stock Management System.

4.3.1 Distribution of Respondents According to Category

Respondents were categorized into students, teachers, library staff, and school administrators based on their level of interaction with library services and their involvement in library stock management activities

Table 3; Distribution of Respondents According to Category

Respondent category	Frequency	Percentage (%)
Students	10	55.6
Teachers	4	22.2

Library staff	2	11.1
School administrators	2	11.1
Total	18	100

The findings in Table 3 show that students constituted the largest proportion of respondents, accounting for 55.6% of the total participants. Teachers represented 22.2%, while library staff and school administrators each contributed 11.1% of the responses.

The higher representation of students was expected because students are the primary users of library resources and directly experience challenges related to accessing, borrowing, and locating library materials. Their participation provided important insights into user experiences with the existing library stock management procedures and the expected improvements from introducing a computerized system.

Teachers contributed information regarding the role of library resources in supporting teaching and learning activities. Their responses were important in understanding how availability, accessibility, and management of library materials affect academic activities. Similarly, school administrators provided managerial perspectives concerning decision-making, resource planning, and the adoption of technological solutions for improving library operations.

Although library staff constituted a smaller proportion of respondents, their views were essential because they are directly responsible for daily library activities such as acquisition, cataloguing, circulation, record keeping, and stock verification. Their responses therefore provided practical information regarding the operational challenges experienced under the existing manual system.

The inclusion of respondents from different categories enhanced the credibility of the findings because it captured multiple perspectives from users, managers, and decision-makers. This diversity of views provided a more comprehensive understanding of the existing library stock management practices and informed the requirements of the proposed computerized Library Stock Management System.

4.3.2 Distribution of Respondents According to Gender

The study considered the gender distribution of respondents to establish whether views regarding the existing library stock management practices and the proposed computerized Library Stock Management System were obtained from both male and female participants.

Table 4; Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	9	50
Female	9	50
Total	18	100

The findings presented in Table 4 indicate that male and female respondents were equally represented, with each category contributing 50% of the total responses. The balanced participation of both genders ensured that the study incorporated diverse perspectives regarding the accessibility of library resources, challenges associated with the existing manual stock management system, and expectations concerning the proposed computerized system.

The equal representation of male and female respondents was important because library services are utilized by students and staff regardless of gender. Therefore, the findings obtained were not dominated by the experiences or opinions of one gender group. The balanced participation improved the credibility of the findings by ensuring that perceptions regarding library operations, resource accessibility, and system requirements reflected views from both male and female users.

The findings further suggest that the proposed Library Stock Management System should be designed to provide equal access and usability for all categories of users. This supports the principle of user-centred system development, where information systems should consider the needs and experiences of diverse users to improve acceptance and effectiveness.

4.3.3 Respondents' Experience with Library Services

The study further examined respondents' experience with library services because the level of interaction with library resources influences participants' ability to identify challenges associated

with existing stock management practices and provide meaningful recommendations for system improvement.

Table 5; Respondents' Experience with Library Services

Period of experience	Frequency	Percentage (%)
Less than one year	3	16.7
One to three years	8	44.4
More than three years	7	38.9
Total	18	100

The findings shown in Table 5 represent that the majority of respondents had considerable experience with library services. Respondents with one to three years of experience constituted the largest proportion at 44.4%, followed by those with more than three years of experience at 38.9%. Only 16.7% of respondents had less than one year of experience with the school library.

The results indicate that 83.3% of respondents had used library services for at least one year, suggesting that most participants had adequate exposure to the existing library stock management procedures. This level of experience enabled respondents to provide informed views regarding challenges such as difficulties in locating books, delays in borrowing and returning materials, manual record keeping, and the need for improved management of library resources.

The inclusion of respondents with varying levels of experience was beneficial because newly exposed users provided perspectives regarding current accessibility challenges, while long-term users were able to provide deeper insights into recurring problems associated with the manual system. This combination of experiences contributed to a more comprehensive understanding of the existing library operations and informed the requirements for the proposed computerized Library Stock Management System.

4.4 RO1: Examination of current library stock management practices at Kanyanya Hill View Secondary School

The first objective of the study was to examine the existing library stock management practices at Kanyanya Hill View Secondary School. Data for this objective were collected through interviews

with library staff, teachers, students, and school administrators, supported by direct observation of library activities and analysis of existing library records. The findings revealed that library stock management activities, including acquisition, cataloguing, borrowing, returning, and stock verification, were predominantly performed using manual procedures. The findings are presented and discussed according to the major library stock management activities.

4.4.1 Acquisition of Library Materials

The findings revealed that library materials at Kanyanya Hill View Secondary School were mainly acquired through purchases made by the school administration, donations from well-wishers, and textbooks supplied by the Ministry of Education and Sports. After receiving new materials, library staff manually recorded details of the books in accession registers before arranging them on library shelves.

During the interview, a library staff respondent explained:

"Whenever new books arrive; we first enter them into the accession register before arranging them on the shelves." (LS01)

This finding indicates that the accession register was the primary tool used for maintaining records of newly acquired materials. Although the manual accession process provided a basic mechanism for documenting library resources, it depended heavily on handwritten entries, which may affect efficiency when handling large volumes of materials.

Document analysis of accession registers confirmed that newly acquired books were recorded manually using details such as accession number, title, author, publisher, and date of acquisition. However, observation revealed that updating these records required considerable time, particularly when several books were received at once. The manual nature of the process also increased the possibility of recording errors, duplication of entries, and difficulties in retrieving information about available resources.

The findings suggest that although the existing acquisition procedure enabled the library to maintain records of new materials, it lacked the efficiency and accuracy associated with computerized systems. An automated acquisition module would therefore improve the speed of

recording new resources, enhance accuracy, and provide easier access to updated stock information.

4.4.2 Cataloguing of Books

The study found that cataloguing of library materials was performed manually. Each book was assigned a call number and labelled before being arranged on shelves according to subject classification. The manual catalogue records were used to assist users and library staff in identifying the location and availability of materials.

However, respondents indicated that maintaining and updating catalogue records was challenging because any corrections or changes required rewriting information manually. A teacher respondent stated:

"Finding books becomes difficult whenever catalogue records are incomplete or outdated." (T02)

This finding demonstrates that although the manual cataloguing approach supported basic organization of library materials, outdated or incomplete records affected efficient retrieval of information. Observation further revealed that catalogue records were maintained using handwritten entries, making searching for specific materials slow and dependent on the librarian's familiarity with the collection.

The findings implied that the existing cataloguing practice limited accessibility to library resources because users couldn't quickly search for materials based on different criteria such as title, author, or subject. A computerized catalogue would address these challenges by enabling faster searching, easier updating of records, and improved accuracy in managing bibliographic information.

4.4.3 Borrowing Procedures

The study established that borrowing procedures at Kanyanya Hill View Secondary School were conducted manually. Students were required to identify the required book on the shelves before presenting it to the librarian, who recorded borrower details in a borrowing register. The recorded information included the student's name, admission number, class, title of the book, accession number, borrowing date, and expected return date.

Observation revealed that each borrowing transaction required several manual steps, resulting in delays, especially during busy periods such as break time. Students reported that long queues frequently developed because every transaction had to be recorded by the librarian before books could be issued.

One student respondent explained:

"Sometimes many students come to borrow books at the same time, but we have to wait because the librarian records every person's details manually." (S04)

The finding indicates that the manual borrowing process places a significant workload on library staff and affects the speed of service delivery. Since every transaction depends on physical recording, the system becomes slower as the number of users increases.

The findings suggest that introducing an electronic borrowing module would improve efficiency by automatically capturing borrower details, updating book availability, and reducing waiting time for users.

4.4.4 Returning Procedures

The study revealed that book return procedures were also managed manually. When books were returned, the librarian searched through borrowing records to identify the original transaction and then manually recorded the return date.

Respondents explained that identifying overdue books was difficult because library staff had to examine individual borrowing records. A library staff respondent stated:

"Sometimes we spend hours checking which students have not returned books." (LS02)

Observation confirmed that there was no automated mechanism for identifying overdue materials or generating reminders for users. As a result, monitoring returned and outstanding books depended entirely on manual checking of borrowing records.

This finding demonstrates that the existing return procedure reduces efficiency and makes it difficult for library staff to track the movement of resources effectively. A computerized system

with automated tracking and notification features would improve accountability by enabling timely identification of overdue materials and improving control over library stock.

4.4.5 Stock Verification

The study established that stock verification was conducted manually at the end of each school term. Library staff physically counted books available on shelves and compared them with information recorded in accession registers.

Respondents indicated that the exercise was time-consuming and required significant human effort. One library staff respondent explained:

"Stocktaking takes several days because we have to check every shelf and compare the books with the records." (LS01)

Document analysis of previous stocktaking reports revealed discrepancies between recorded and available books, indicating instances of missing resources and possible recording errors. Observation also showed that the verification process depended entirely on physical counting and manual comparison of records.

The findings demonstrate that manual stock verification is inefficient and may affect the accuracy of library inventory information. A computerized stock management system would simplify stocktaking by maintaining real-time inventory records and allowing library staff to quickly identify available, borrowed, or missing materials.

4.5 Challenges Associated with the Manual Library Stock Management System

The second objective of the study sought to identify the challenges associated with the manual library stock management system currently used at Kanyanya Hill View Secondary School. Data were collected through semi-structured interviews with library staff, teachers, students, and school administrators, supported by observations and document analysis. The findings revealed several operational and managerial challenges that affected the efficiency of library services. These findings are presented under thematic sub-headings.

4.5.1 Time-Consuming Library Operations

The study established that the manual library stock management system was highly time-consuming. Library staff indicated that every library transaction, including book acquisition, cataloguing, borrowing, returning, and stocktaking, required manual recording in registers. This significantly increased the time required to complete routine library activities.

One librarian stated: "*Every book that comes into the library has to be written in different registers. When students borrow books, we again write everything manually. During busy hours, this consumes a lot of time."* (LS02)

Teachers also noted that delays in borrowing books often affected classroom activities because students spent considerable time waiting for services.

Observation findings supported these responses. During break time, long queues of students were observed waiting for the librarian to record borrowing transactions manually. On average, each borrowing transaction took between three and five minutes depending on the number of books borrowed.

Document analysis of the borrowing registers further revealed that hundreds of transactions were recorded manually each term, demonstrating the large workload imposed on library staff. This finding is consistent with Kumar and Singh (2021) and Oyelude (2022), who observed that manual record systems create delays because every transaction must be processed and verified by hand, as well as with Tevera and Ruhode (2024) and Jeong (2024), who linked such inefficiencies to reduced user satisfaction.

The findings therefore indicate that the manual system reduced operational efficiency and delayed service delivery.

4.5.2 Difficulty in Retrieving Library Information

The study found that retrieving information from the manual records was difficult and inefficient. Respondents explained that searching for information about a particular book or borrower required physically examining several registers.

A teacher explained: "Sometimes you want to know whether a particular book is available, but the librarian has to search through many records before giving an answer."

Similarly, one student remarked: "Finding books is not easy because sometimes the catalogue is outdated or the book has already been borrowed without anyone knowing."

Observation confirmed that locating particular records required considerable time, especially where multiple borrowing registers had accumulated over several academic years.

The researcher observed that there was no centralized mechanism for searching books by title, author, subject, or accession number. Consequently, retrieval of information depended largely on the librarian's familiarity with the collection.

These findings demonstrate that the manual system significantly affected information retrieval and reduced user satisfaction

4.5.3 Inconsistencies in Record Keeping

The findings revealed that manual record keeping frequently resulted in inaccuracies and inconsistencies. Respondents indicated that errors occurred during data entry, particularly when recording accession numbers, student details, or return dates.

One library staff member stated that, mistakes were sometimes made while writing accession numbers or student names, and that correcting these errors was difficult because everything was handwritten (LIS03).

Document analysis further revealed instances where borrowing records contained incomplete information, missing return dates, and illegible handwriting.

Observation showed that corrections were often made by crossing out previous entries and writing new information, making some records difficult to interpret.

These findings suggest that the manual system compromised the accuracy and reliability of library records, a pattern also reported by Watsemba (2023) and Rathod (2025), who observed that manual record-keeping lacks error-checking mechanisms and is therefore prone to inconsistency and data redundancy.

4.5.4 Inadequate mechanisms for tracking Borrowed Books

The study established that monitoring borrowed books was one of the major challenges experienced under the manual system.

Respondents explained that identifying overdue books required checking each borrowing record individually, making the process slow and inefficient.

A librarian explained: "*There is no automatic reminder. We only discover overdue books after checking every borrowing record."* (LIS04)

School administrators indicated that delayed book returns negatively affected the availability of learning materials for other students.

Observation revealed that no mechanism existed for automatically identifying overdue books or calculating penalties.

Consequently, several borrowed books remained outstanding for extended periods before being detected, which mirrors Rathod's (2025) observation that the absence of automated circulation and tracking mechanisms increases the risk of resource loss in busy institutional settings.

4.5.5 Difficulty in Conducting Stocktaking

The study found that stocktaking was one of the most labour-intensive activities performed by library staff.

During interviews, respondents explained that all books had to be physically counted and compared with accession records.

One administrator stated: "Stocktaking usually takes several days because every shelf must be checked manually."

Observation confirmed that library staff physically removed books from shelves while comparing them with handwritten accession registers.

Document analysis of previous stocktaking reports revealed discrepancies between recorded and available books, indicating occasional losses and recording errors.

The findings therefore demonstrate that manual stock verification consumes significant time and human resources.

4.5.6 Limited Security of Library Records

The study established that manual records were vulnerable to physical damage, loss, and unauthorized alteration.

Respondents explained that borrowing registers, accession books, and catalogues could easily be misplaced or damaged by dust, water, insects, or continuous handling.

One respondent commented: "If one register gets lost, recovering that information becomes almost impossible."

4.5.7 Difficulty in Preparing Management Reports

The findings revealed that the manual library stock management system made the preparation of management reports both time-consuming and laborious. Information obtained from interviews with the librarian indicated that the preparation of reports required extensive manual calculations and verification of records kept in different registers. Reports concerning books borrowed, books returned, overdue books, missing books, newly acquired books, and the distribution of books according to subject categories had to be compiled manually by reviewing several record books. This process consumed considerable time and increased the possibility of computational errors and inconsistencies in the final reports.

One librarian explained, "Preparing the end-of-term report takes almost a full day because every figure has to be counted manually." (LIS05) This response illustrates the challenges associated with relying on manual record-keeping for management reporting. Observation findings further confirmed that report preparation involved checking multiple registers and manually tallying figures before producing summary reports. School administrators also expressed concern that delays in preparing management reports affected timely decision-making, budgeting, procurement of new library resources, and overall planning of library activities. The findings therefore suggest that the existing manual reporting system does not adequately support efficient management of library operations, consistent with Mamatlepa and Maluleka (2024), who found that the absence of automated reporting tools restricts libraries from making informed, data-driven decisions, and highlights the need for an automated reporting mechanism capable of generating accurate reports within a short period.

4.5.8 Increased Workload for Library Staff

The study established that the manual library stock management system substantially increased the workload of library personnel. Interview findings revealed that the librarian was responsible for performing numerous activities manually, including registering newly acquired books, cataloguing library materials, registering borrowers, recording book borrowing and returns, monitoring overdue books, preparing management reports, and conducting periodic stocktaking. Since all these activities were performed using manual registers, they required considerable time, effort, and concentration.

Observation findings further revealed that during busy periods, particularly during break time and after class hours, the librarian often attended to several students simultaneously while updating multiple registers. This situation resulted in delays in service delivery and increased the likelihood of recording errors due to work pressure. Respondents generally agreed that the repetitive nature of manual record-keeping contributed to staff fatigue and reduced overall operational efficiency. This is in line with Bagewadi et al. (2025), who noted that manual library systems contribute to staff fatigue and inefficiency because librarians are burdened with repetitive administrative duties that could otherwise be automated. The findings indicate that introducing a computerized Library Stock Management System would automate routine tasks, minimize repetitive manual work, improve staff productivity, and enable librarians to devote more time to other important library management activities.

4.6 Requirements for a Computerized Library Stock Management System

The third objective of the study sought to determine the functional and non-functional requirements for the proposed computerized Library Stock Management System. Data relating to this objective were obtained through interviews with the librarian and school administrators, direct observation of library operations, and analysis of existing library documents and records. The findings identified several functional requirements that define the services the system should provide, as well as non-functional requirements that specify the quality attributes necessary for effective system performance, consistent with Sommerville (2020) and Pressman and Maxim (2020), who emphasize that clearly defined functional and non-functional requirements form the foundation for effective system design, implementation, and validation.

4.6.1 Functional Requirements

User Authentication

The findings revealed that respondents considered secure access control to be an essential requirement of the proposed Library Stock Management System. Both the librarian and school administrators emphasized that the system should permit access only to authorized users in order to protect library records from unauthorized modification. During the interviews, respondents indicated that the system should provide secure login facilities for administrators and librarians using usernames and passwords. In addition, users should be able to change their passwords

whenever necessary to improve account security. These authentication mechanisms would ensure that only authorized personnel are able to access the system and perform activities according to their assigned responsibilities.

Book Registration

Respondents indicated that the proposed system should provide comprehensive book registration functionality to facilitate efficient management of library resources. The system should enable librarians to register newly acquired books, edit existing book information whenever corrections are required, remove obsolete records from the database, categorize books according to subject areas, and automatically generate accession numbers for newly registered books. Respondents believed that automating book registration would improve the accuracy, consistency, and completeness of library records while significantly reducing the time required to register new library materials.

Book Search

The study established that respondents regarded a fast and efficient book search facility as one of the most important features of the proposed system. Interview findings showed that librarians frequently spend considerable time searching through manual registers whenever users request particular books. Respondents therefore recommended that the computerized system should allow users to search for books using multiple search criteria, including the book title, author, International Standard Book Number (ISBN), accession number, publisher, and subject category. Such functionality would enable librarians to locate books quickly and improve the efficiency of library services.

Book Borrowing

The findings revealed that respondents expected the computerized system to automate the book borrowing process. The system should record borrower information electronically, capture the borrowing date, automatically generate the expected return date, and update the availability status of each borrowed book. Automating these activities would eliminate repetitive manual recording, reduce human errors, and improve the efficiency of borrowing transactions.

Book Returning

The study further established that respondents required the proposed system to automate book return transactions. The system should automatically update the inventory whenever a borrowed book is returned, record the return transaction, calculate overdue periods where applicable, and

notify the librarian whenever books exceed the specified borrowing period. Respondents believed that these automated processes would improve accountability, facilitate effective monitoring of borrowed materials, and reduce the incidence of lost or overdue books.

Report Generation

Respondents identified automated report generation as one of the most critical functional requirements of the proposed Library Stock Management System. School administrators indicated that the system should automatically generate various management reports, including reports on available books, borrowed books, returned books, overdue books, lost books, the most frequently borrowed books, and overall library inventory. They explained that automated report generation would significantly reduce the time required to prepare management reports while improving the accuracy and reliability of information used for planning, budgeting, and decision-making.

4.6.2 Non-Functional Requirements

In addition to the functional requirements, respondents identified several non-functional requirements that the proposed Library Stock Management System should satisfy to ensure its effectiveness, reliability, and sustainability. These requirements relate to the quality attributes of the system rather than the specific functions it performs.

System Security

The findings revealed that respondents considered security to be one of the most important characteristics of the proposed system. The librarian and school administrators emphasized that only authorized users should be allowed to access the system. One administrator stated: "The system should not allow everyone to edit library records. Different users should have different levels of access." (Administrator 1)

Based on these findings, the proposed system was designed with user authentication features requiring every authorized user to log into the system using a valid username and password before accessing any information. Different user privileges were assigned according to responsibilities, whereby the administrator was given full access to all system functions while the librarian was granted access to routine library operations. This arrangement was intended to enhance data security, prevent unauthorized access, and protect sensitive library information, in line with Rathod (2025), who notes that system security is essential to ensure that only authorized users can access or modify library records.

Reliability

Respondents expressed the need for a system that could operate consistently without frequent failures. They explained that interruptions during borrowing or returning transactions would inconvenience users and negatively affect library service delivery. One librarian explained that once the computerized system was in use, it should always be available whenever the library was open (Library Staff 2).

To satisfy this requirement, the system was developed using a stable database structure capable of storing, retrieving, and updating information accurately. Error-handling mechanisms were incorporated into the system to minimize operational failures and improve reliability during daily library activities.

Usability

The study established that many prospective users possessed only basic computer skills. Consequently, respondents recommended that the system should be simple, user-friendly, and easy to learn. One teacher commented that the interface should be simple because not everyone was highly skilled in using computers (Teacher 3).

This requirement influenced the design of the graphical user interface. The system was therefore developed with clearly labelled menus, straightforward navigation buttons, readable fonts, and organized forms to enable users to perform tasks with minimal training. The interface was intentionally designed to reduce confusion and improve user satisfaction.

Performance

Respondents expected the computerized system to process library transactions much faster than the existing manual system. Students particularly emphasized the need for quick searching and borrowing services because they often experienced long queues under the manual system. One student stated: "Searching for a book should only take a few seconds." (Student 2)

To meet this requirement, the database was optimized to support rapid searching, sorting, filtering, and retrieval of records. Consequently, the system significantly reduced the time required to perform routine library operations.

Maintainability

The study further established that respondents expected the system to accommodate future improvements as library requirements evolved. Consequently, the system was developed using modular programming techniques that simplify maintenance, troubleshooting, and future

expansion. This design approach enables developers to modify individual modules without affecting the functionality of the entire system.

Data Backup and Recovery

The findings revealed concerns regarding possible loss of computerized records due to hardware failure, accidental deletion, or system malfunction.

One respondent observed that if the computer crashed, they should still be able to recover their records (Respondent 2).

To address this concern, the proposed system incorporates database backup and recovery mechanisms that allow administrators to restore lost information whenever necessary. This feature improves data integrity and ensures continuity of library operations.

4.7 Discussion of Findings

This section discusses the findings of the study in relation to the research objectives and compares them with existing literature reviewed in Chapter Two. The discussion demonstrates how the findings contribute to the understanding of library stock management systems and the extent to which the developed computerized system addressed the identified challenges.

4.7.1 Discussion of Findings on the Current Library Stock Management Practices

The first objective of the study sought to examine the current library stock management practices at Kanyanya Hill View Secondary School. The findings established that the school relied entirely on a manual library stock management system in which accession registers, borrowing registers, catalogue cards, and stock registers were used to record and manage library resources. The study further revealed that all library activities, including acquisition, cataloguing, circulation, stock verification, and report preparation, were performed manually.

Although the manual system enabled the library to maintain records of its resources, respondents reported that it was slow, labour-intensive, and increasingly difficult to manage as the library collection continued to grow. The researcher observed that manual recording required considerable time and effort, particularly during periods of high library usage. Information retrieval depended on searching through several registers, making routine library operations inefficient.

These findings are consistent with Saikia (2025) and Kumar and Singh (2021), who reported that manual library management systems reduce operational efficiency because they rely heavily on handwritten records and manual searching procedures. Oyelude (2022) and Bagewadi et al. (2025) similarly observed that manual systems often lead to delays in service delivery, increased workloads for library staff, and difficulties in maintaining accurate inventory records. The findings of this study therefore reinforce existing evidence that manual library stock management systems are no longer adequate for modern educational institutions with growing collections and increasing information demands. Furthermore, the findings demonstrate that the manual system limited timely access to library information and hindered effective decision-making because administrators could not easily obtain accurate reports concerning book circulation, inventory status, or overdue materials.

4.7.2 Discussion of Findings on the Challenges Associated with the Manual Library Stock Management System

The second objective sought to identify the challenges associated with the existing manual library stock management system. The findings revealed several operational challenges that affected the effectiveness of library service delivery. Respondents consistently identified time-consuming procedures, difficulty retrieving library records, inaccurate record keeping, poor monitoring of borrowed books, inefficient stock verification, weak security of library records, delays in report generation, and increased workload for library staff as the major limitations of the manual system. The researcher observed that every library transaction required manual recording, increasing the possibility of transcription errors and inconsistencies. Stocktaking involved physically counting books and comparing them with accession registers, a process that consumed significant time and human resources. Similarly, identifying overdue books required manual examination of borrowing registers, making timely follow-up difficult.

These findings correspond with Watsemba (2023) and Rathod (2025), who indicated that manual record management systems frequently suffer from inefficiencies arising from human error, duplicate records, missing information, and delayed retrieval of data. Mamatlepa and Maluleka (2024) further emphasized that manual systems expose library records to physical damage, loss, and unauthorized alterations, thereby compromising information security and data integrity.

The findings therefore confirm that the challenges experienced at Kanyanya Hill View Secondary School are similar to those experienced by many institutions that continue to rely on manual library management practices. Consequently, there is a clear need for a computerized system capable of automating routine library operations and improving service delivery.

4.7.3 Discussion of Findings on the Requirements for a Computerized Library Stock Management System

The third objective sought to determine the functional and non-functional requirements of the proposed computerized Library Stock Management System. The findings revealed that users required a system capable of automating major library operations including book registration, catalogue management, book searching, borrowing, returning, inventory management, user management, and report generation. Respondents also emphasized the importance of non-functional requirements such as system security, reliability, usability, maintainability, performance, and data backup. These requirements reflected users' expectations that the proposed system should not only automate library processes but should also be easy to use, secure against unauthorized access, and capable of protecting valuable library information. The identified requirements guided the design and development of the computerized Library Stock Management System. The resulting system incorporated password-based authentication, automated inventory updates, centralized database management, efficient searching facilities, and automated report generation. These features directly addressed the limitations identified in the manual system and provided users with a more efficient means of managing library resources. The findings support Ekuase-Anwansedo and Craig (2021), who emphasize that successful information systems should be designed around user requirements to ensure user satisfaction and system acceptance. By involving prospective users throughout the requirements analysis and prototype evaluation stages, the researcher ensured that the final system adequately reflected the operational needs of Kanyanya Hill View Secondary School.

4.7.4 Discussion of Findings on the Design and Development of the Proposed Library Stock Management System

The fourth objective sought to design and develop a computerized Library Stock Management System capable of addressing the identified weaknesses of the manual system. The findings

demonstrate that the Rapid Application Development (RAD) methodology was appropriate for this project because it enabled continuous interaction between the researcher and prospective users throughout the development process. The developed system successfully automated major library operations including user authentication, book registration, inventory management, book circulation, report generation, and database management. The integration of these modules significantly reduced the manual workload previously experienced by library staff while improving the speed and accuracy of library operations. System testing further demonstrated that all major modules performed according to their intended functions. Unit testing confirmed that individual modules operated correctly, integration testing established that information flowed effectively between system components, and user acceptance testing indicated that users were satisfied with the functionality, usability, and performance of the system.

The findings therefore demonstrate that the computerized Library Stock Management System effectively addressed the research problem by improving the efficiency, accuracy, reliability, and security of library stock management at Kanyanya Hill View Secondary School. The developed system also provides management with timely reports that support planning, budgeting, and decision-making.

CHAPTER FIVE: SYSTEM DESIGN AND DEVELOPMENT

5.1 Introduction

This chapter presents the design and development of the proposed computerized library stock management system for Kanyanya Hill View Secondary School. The chapter describes how the findings obtained from the requirements analysis phase were translated into system specifications, design models, and implementation components. The purpose of the system design and development phase was to create a user-centred solution that addresses the challenges associated with the existing manual library stock management practices identified during the study.

5.2 Design and Development of the Library Stock Management System

The fourth objective of the study was to design and develop a computerized Library Stock Management System capable of addressing the shortcomings identified in the existing manual system. The development process followed the Rapid Application Development (RAD) methodology because it promotes rapid prototyping, continuous user participation, and iterative improvement throughout system development. The proposed system was developed as a web-based application using PHP as the server-side programming language, HTML and CSS for interface design, JavaScript for implementing interactive functionalities, Bootstrap for responsive page layouts, MySQL as the database management system, and Apache through the XAMPP development environment. The implementation of the system followed the four phases of the Rapid Application Development methodology.

5.2.1 Requirements Planning Phase

The requirements planning phase involved identifying the weaknesses of the existing manual library stock management system and determining the functional and non-functional requirements of the proposed computerized solution. Information was obtained through interviews with library staff, teachers, students, and school administrators, together with observations and document analysis.

The analysis revealed that library activities were characterized by slow manual record keeping, difficulty in retrieving books and library information, inaccurate inventory records, poor monitoring of overdue books, delays in report generation, increased workload for library staff, and

inadequate security of library records. These findings provided the basis upon which the computerized system was designed.

5.2.2 User Design Phase

During the user design phase, several system prototypes were developed and continuously refined based on feedback obtained from prospective users. The researcher worked closely with library staff and administrators to ensure that the interfaces reflected the actual workflows followed within the school library. The prototypes included interfaces for user authentication, book registration, book searching, borrowing and returning books, user management, and report generation. Users evaluated each prototype and suggested improvements regarding screen layout, navigation, and ease of use. These recommendations were incorporated before the system was implemented.

5.2.3 Rapid Construction Phase

Following approval of the prototypes, we proceeded with system implementation. The system was developed incrementally to facilitate continuous testing and improvement throughout the development process. The completed system consists of several integrated modules. The user management module enables administrators to register users, manage user accounts, assign user roles, authenticate users, and manage passwords. The book management module enables librarians to register new books, edit book information, delete obsolete records, search for books, and categorize library materials. The borrowing module records borrower details, captures borrowing dates, generates return dates automatically, and updates the inventory immediately after books are issued. The return module records returned books, updates stock availability, captures return dates, and assists librarians in identifying overdue materials. The reporting module automatically generates reports relating to available books, borrowed books, returned books, overdue books, lost books, inventory status, and user activities. These modules operate together to improve efficiency and accuracy in library management.

5.2.4 Cutover Phase

The final phase of system development involved preparing the computerized Library Stock Management System for operational use. During this phase, the system was installed on the designated computer, the database was configured, users were trained, and comprehensive testing

was conducted before deployment. Training sessions were organized for library staff to familiarize them with the operation of the system. The training focused on user authentication, book registration, book borrowing, book returning, report generation, and database backup procedures. At the conclusion of the training, users demonstrated the ability to operate the system independently with minimal assistance.

5.3 System Analysis and Design

System analysis and design constituted an important phase in the development of the proposed Library Stock Management System. The purpose of this phase was to translate the user requirements identified during data collection into a logical and physical system design capable of addressing the challenges associated with the existing manual library stock management system. The analysis focused on understanding the current workflow, identifying system users, defining system processes, modelling data relationships, and specifying how different components of the proposed system would interact. The design process ensured that the developed system met the functional and non-functional requirements established during the requirements analysis phase.

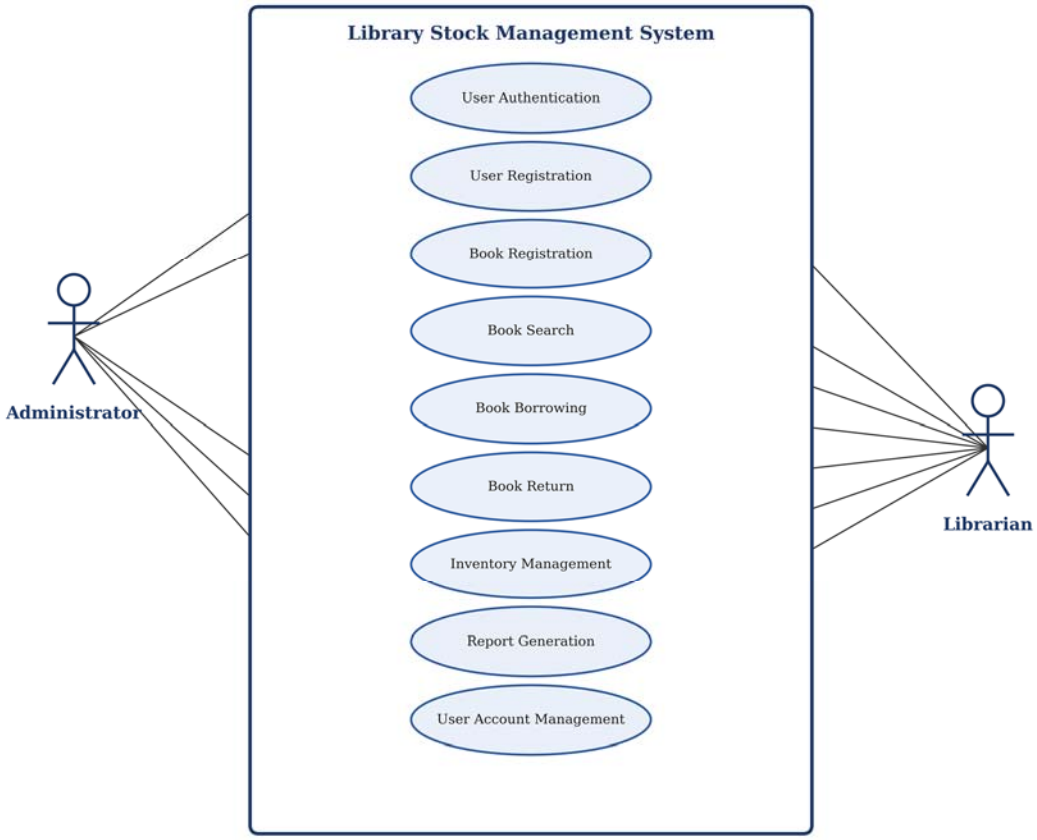
The proposed system was modelled using the Unified Modeling Language (UML), which provides standardized techniques for representing system functionality, user interactions, data flow, and database relationships. The modelling process resulted in the development of several diagrams, including the use case diagram, context diagram, data flow diagrams, entity relationship diagram, sequence diagram, activity diagram, and class diagram. These models served as blueprints for the implementation of the computerized Library Stock Management System.

5.3.1 Use Case Analysis

Use case analysis was carried out to identify the interactions between the users and the proposed Library Stock Management System. The analysis revealed that the system would primarily be used by the administrator and the librarian. The administrator would be responsible for managing user accounts, maintaining system security, generating reports, and monitoring the overall operation of the library. The librarian would be responsible for registering books, managing book circulation, updating library records, searching books, and generating operational reports.

The major use cases identified during system analysis included user authentication, user registration, book registration, book search, book borrowing, book return, inventory management, report generation, and user account management. These use cases formed the basis upon which the various system modules were developed.

Figure 1; Use Case Diagram of the Proposed Library Stock Management System

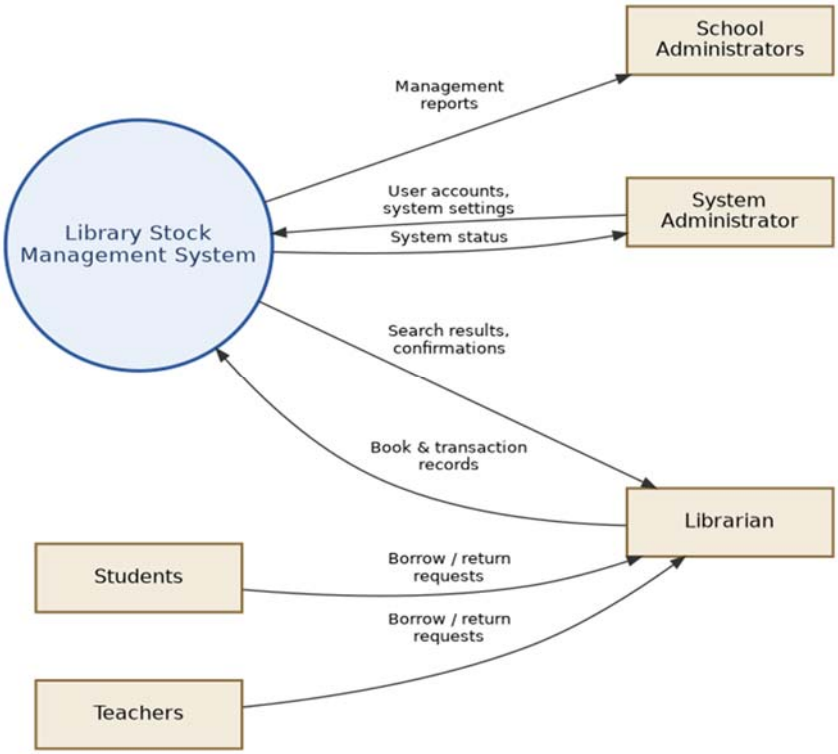


The use case diagram illustrates the interactions between the system users and the major functions performed by the computerized library management system. It demonstrates that both the administrator and librarian interact with the system through secure authentication before accessing their respective functionalities.

5.3.2 Context Diagram

The context diagram provides a high-level representation of the proposed Library Stock Management System by illustrating how the system interacts with external entities. The main external entities identified during system analysis included the librarian, students, teachers, school administrators, and the system administrator. Students and teachers interact with the system indirectly through the librarian during borrowing and returning transactions. The librarian records these transactions into the system, while the administrator accesses management reports generated by the system to facilitate decision-making regarding library operations.

Figure 2: Context Diagram of the Proposed System



The context diagram demonstrates that the proposed computerized system serves as the central repository for all library transactions. It receives information from users, processes the information, stores it in the database, and generates reports for library management.

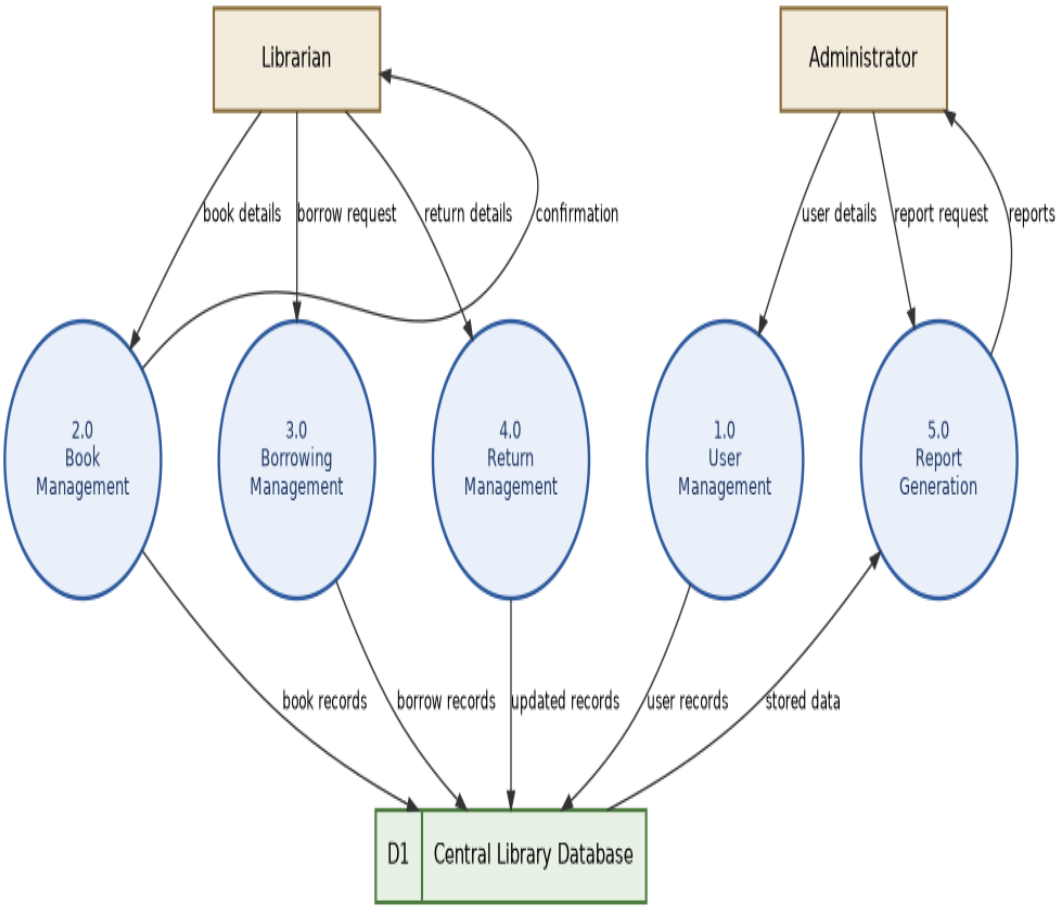
5.3.3 Data Flow Diagram (Level 0)

The Level 0 Data Flow Diagram illustrates the major processes performed by the proposed Library Stock Management System. The analysis identified five principal processes including user

management, book management, borrowing management, return management, and report generation.

Data enters the system through user interactions and is processed before being stored in the central database. The stored information is then retrieved whenever users perform searches or request reports

Figure 3: Level 0 Data Flow Diagram



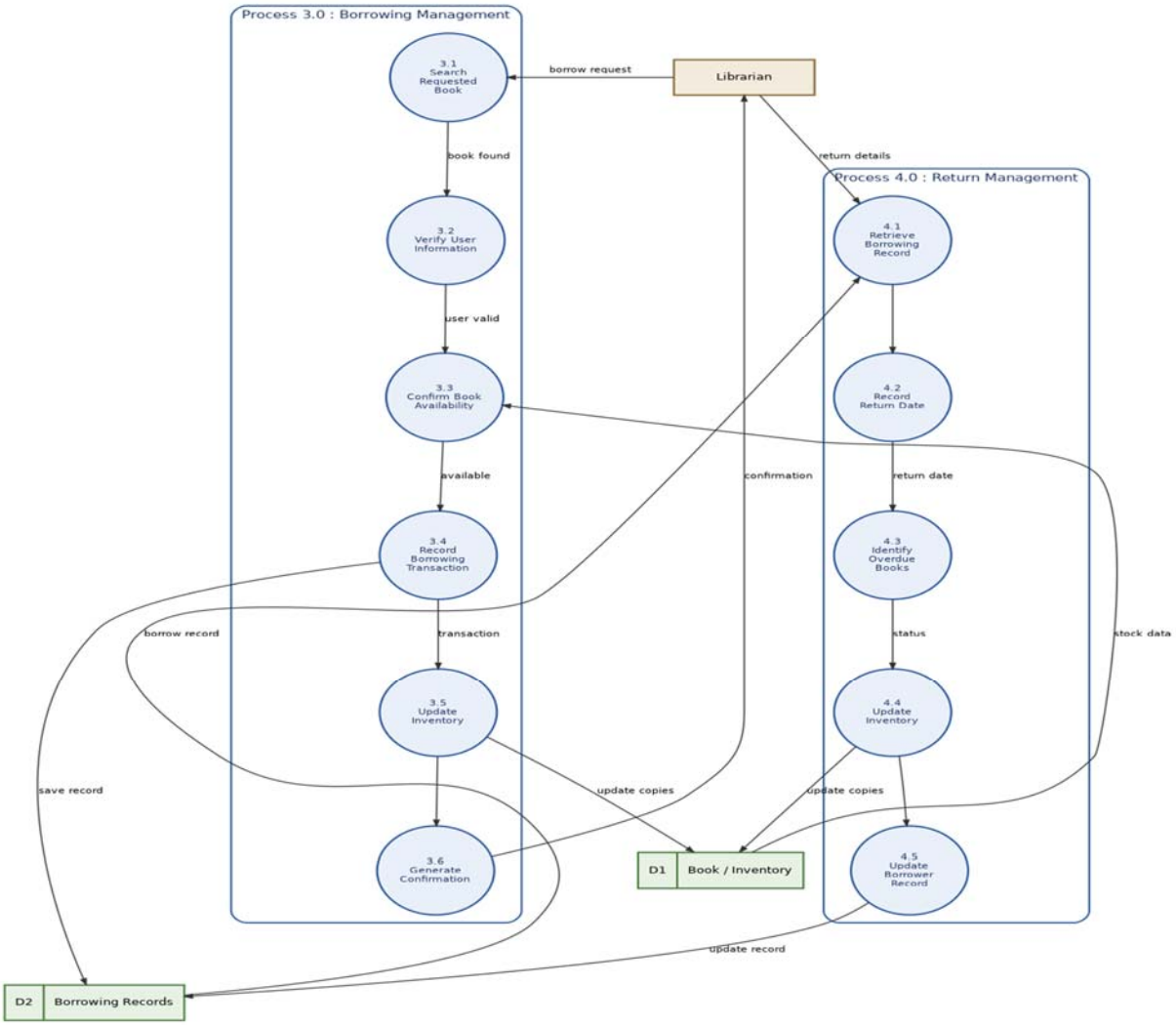
The Level 0 Data Flow Diagram illustrates the movement of information between users, processing units, and the central database. It provides an overview of how information flows through the computerized system.

5.3.4 Data Flow Diagram (Level 1)

The Level 1 Data Flow Diagram provides a more detailed representation of the processes illustrated in the Level 0 diagram. Each major process is decomposed into smaller subprocesses to

illustrate the logical flow of information within the system. For example, the borrowing process consists of searching for the requested book, verifying user information, confirming book availability, recording the borrowing transaction, updating the inventory database, and generating a borrowing confirmation. Similarly, the return process consists of retrieving borrowing records, updating inventory information, recording the return date, identifying overdue books where applicable, and updating borrower records.

Figure 4: Level 1 Data Flow Diagram



The Level 1 Data Flow Diagram provides greater detail regarding the internal processing activities performed by the proposed system and demonstrates how individual processes contribute to overall library management.

5.4 Database Design

The database was designed to provide secure, accurate, and efficient storage of library information. A relational database model was adopted because it minimizes redundancy, improves data consistency, and facilitates efficient retrieval of information. The database consists of several related tables that collectively support all library operations. Each table stores specific information while maintaining relationships with other tables through primary and foreign keys.

Books Table

The Books table stores detailed information regarding all library materials. The attributes contained in this table include the Book ID, Accession Number, ISBN, Title, Author, Publisher, Publication Year, Category, Quantity Available, Shelf Location, and Book Status. The Book ID serves as the primary key for uniquely identifying each book within the database.

Users Table

The Users table stores information about authorized system users. The attributes include User ID, Full Name, Username, Password, User Role, Telephone Number, Email Address, **and Account** Status. The User ID serves as the primary key, while usernames are maintained as unique values to prevent duplication.

Students Table

The students table stores information relating to student borrowers. The table contains attributes including Student ID, Admission Number, Full Name, Class, Gender, Telephone Contact, and Status. This information facilitates accurate identification of borrowers during library transactions.

Borrowing Table

The Borrowing table records all borrowing transactions conducted within the library. The attributes include Borrow ID, Student ID, Book ID, Borrow Date, Expected Return Date, Actual Return Date, Borrow Status, and Librarian ID. This table establishes relationships between students, books, and library staff.

Categories Table

The Categories table stores information regarding different categories of library materials. The attributes include Category ID and Category Name. This table simplifies book classification and supports efficient searching of library materials**.**

Reports Table

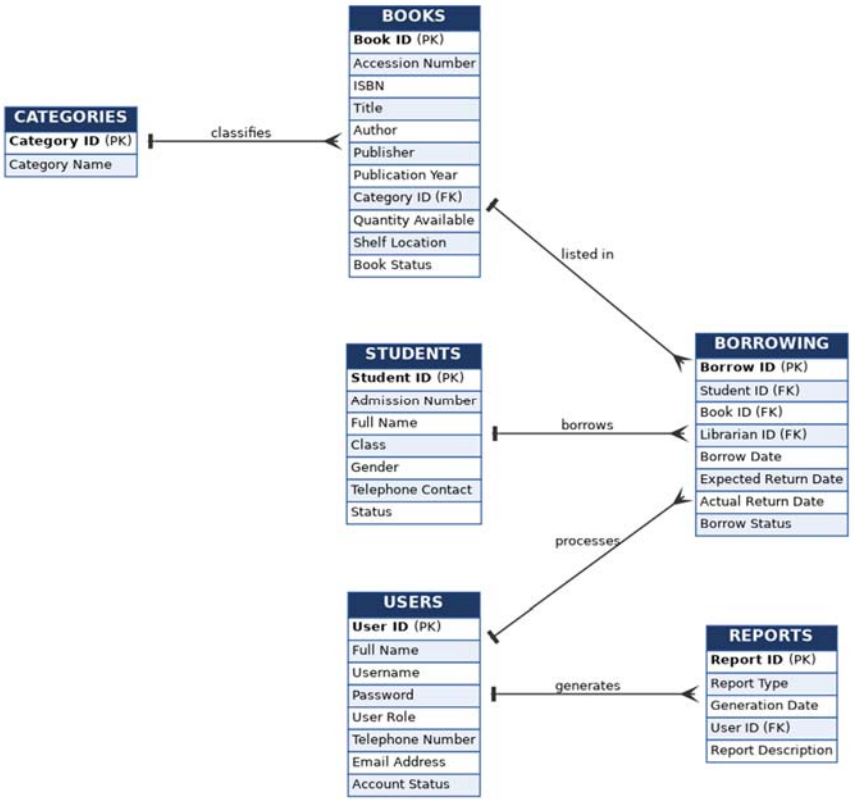
The Reports table stores generated reports together with the report type, generation date, user responsible, and report description. This enables administrators to retrieve previous reports whenever necessary.

5.4.1 Entity Relationship Diagram (ERD)

An Entity Relationship Diagram was developed to illustrate the relationships between the various entities within the database.

The major entities identified include Books, Students, Users, Borrowing Records, Categories, and Reports. The relationships indicate that one student may borrow many books over time, while one book may be borrowed by different students at different times. Similarly, one librarian may process numerous borrowing transactions during daily library operations**.**

Figure 5: Entity Relationship Diagram



The Entity Relationship Diagram provides a graphical representation of the database structure and demonstrates how different entities interact within the proposed Library Stock Management System.

5.5 User Interface Design

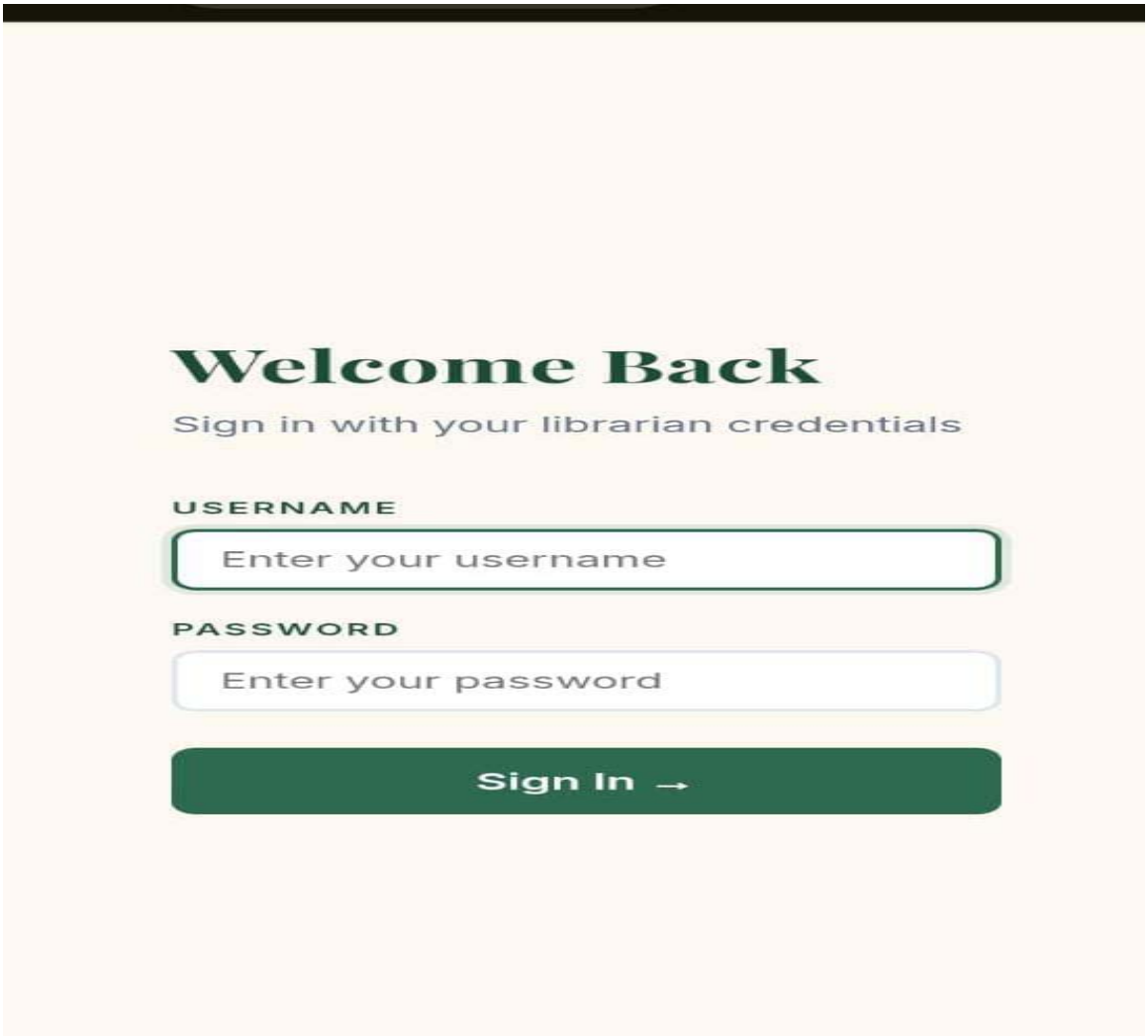
The graphical user interface (GUI) of the proposed Library Stock Management System was designed to provide users with a simple, attractive, and user-friendly environment for performing library operations. During system development, considerable emphasis was placed on usability to ensure that users with basic computer knowledge could easily navigate the system and complete tasks efficiently. The interface was designed using HTML, CSS, Bootstrap, and JavaScript, while PHP and MySQL were used for processing and storing data. The system consists of several interfaces that support different library operations. These interfaces include the login page, dashboard, book management page, borrowing page, return page, user management page, and report generation page.

5.5.1 Login Interface

The login interface serves as the entry point to the Library Stock Management System. Every authorized user is required to authenticate using a valid username and password before accessing the system. The authentication process enhances system security by preventing unauthorized access to sensitive library information.

The login page contains fields for entering the username and password together with a login button. When valid credentials are entered, the system grants access to the dashboard according to the user's assigned role. Invalid credentials result in an error message requesting the user to enter the correct login details.

Figure 6: Login Interface



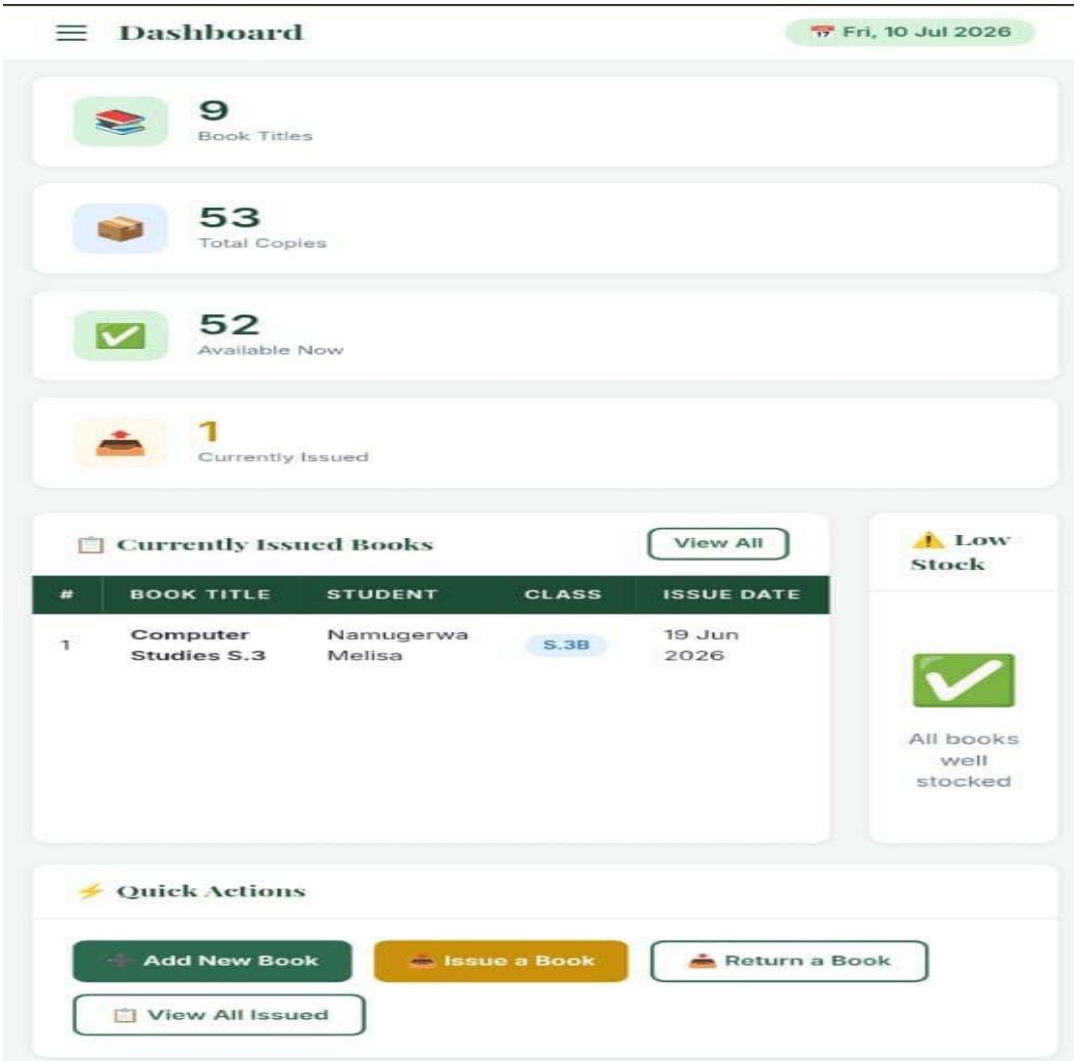
The login interface was designed to be simple and intuitive, enabling users to access the system with minimal effort while ensuring that library records remain protected.

5.5.2 Administrator Dashboard

The administrator dashboard provides an overview of all library activities. It displays summary information regarding the total number of books, borrowed books, returned books, overdue books, and system users. From this dashboard, the administrator can access all major system functions, including user management, book management, report generation, and database backup.

The dashboard was designed to improve decision-making by providing administrators with quick access to important library statistics.

Figure 7: Administrator Dashboard



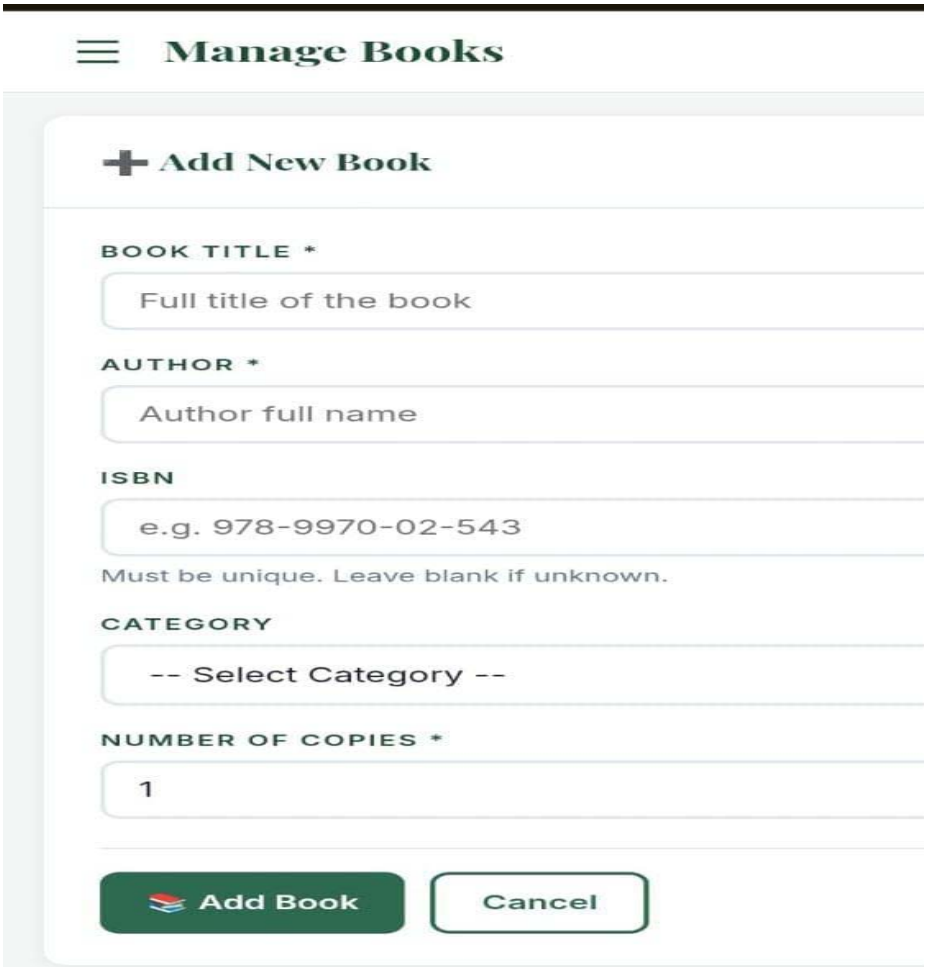
The dashboard enables administrators to monitor library performance and make informed decisions concerning library resource management.

5.5.3 Book Registration Interface

The book registration interface enables librarians to add new books into the system database. The interface captures important bibliographic information including title, author, ISBN, category and number of copies.

The system validates the entered information before saving it into the database. Once successfully saved, the newly registered book becomes immediately available for searching and borrowing.

Figure 8: Book Registration Interface

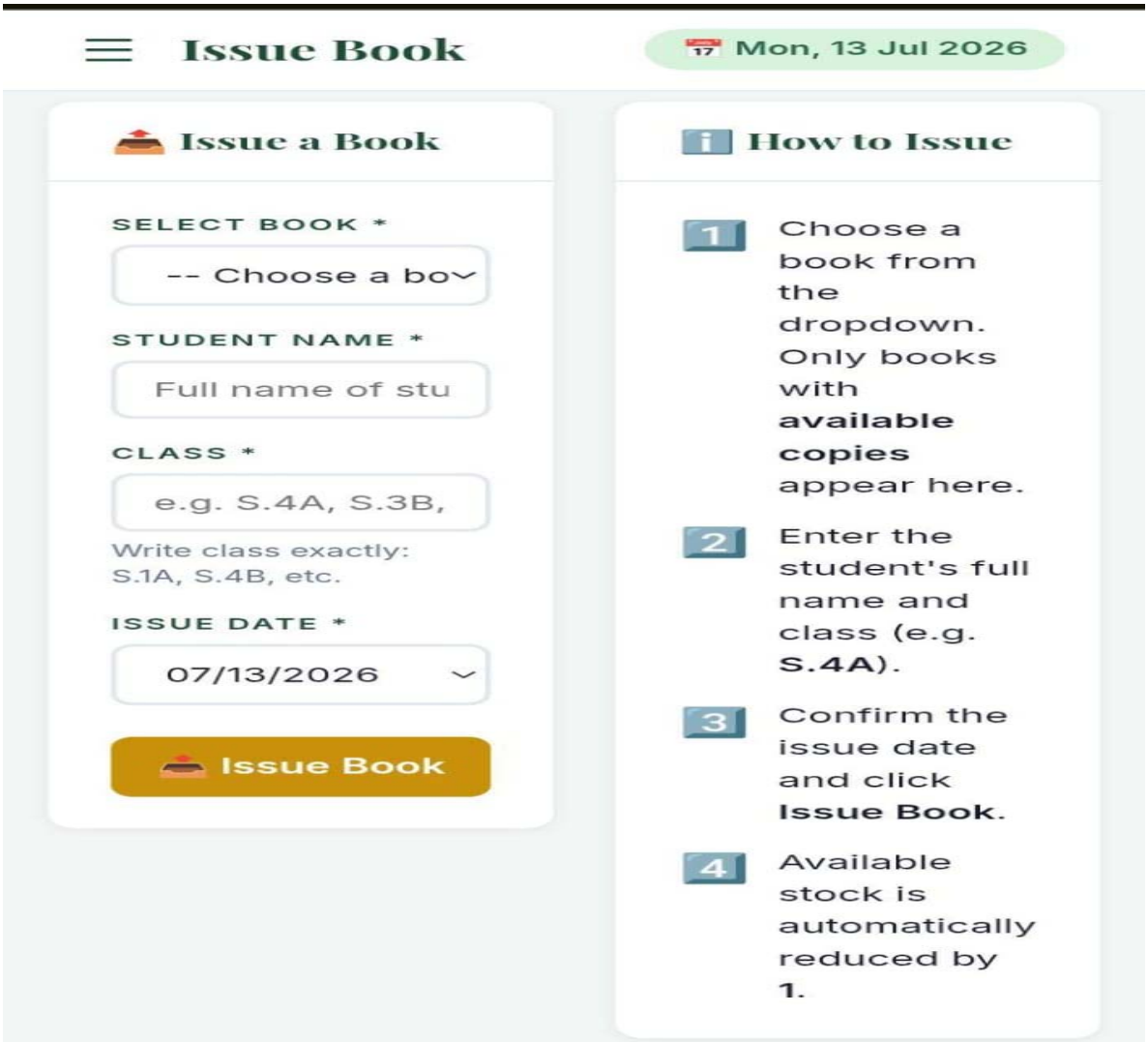


This interface simplifies the registration process and eliminates the repetitive manual recording previously carried out using accession registers.

5.5.4 Book Borrowing Interface

The borrowing interface facilitates the lending of books to students. The librarian selects the borrower, searches for the required book, confirms its availability, and records the borrowing transaction. The system automatically generates the borrowing date and expected return date while simultaneously updating the inventory database. This automated process minimizes human error and significantly reduces transaction time.

Figure 9: Book Borrowing Interface

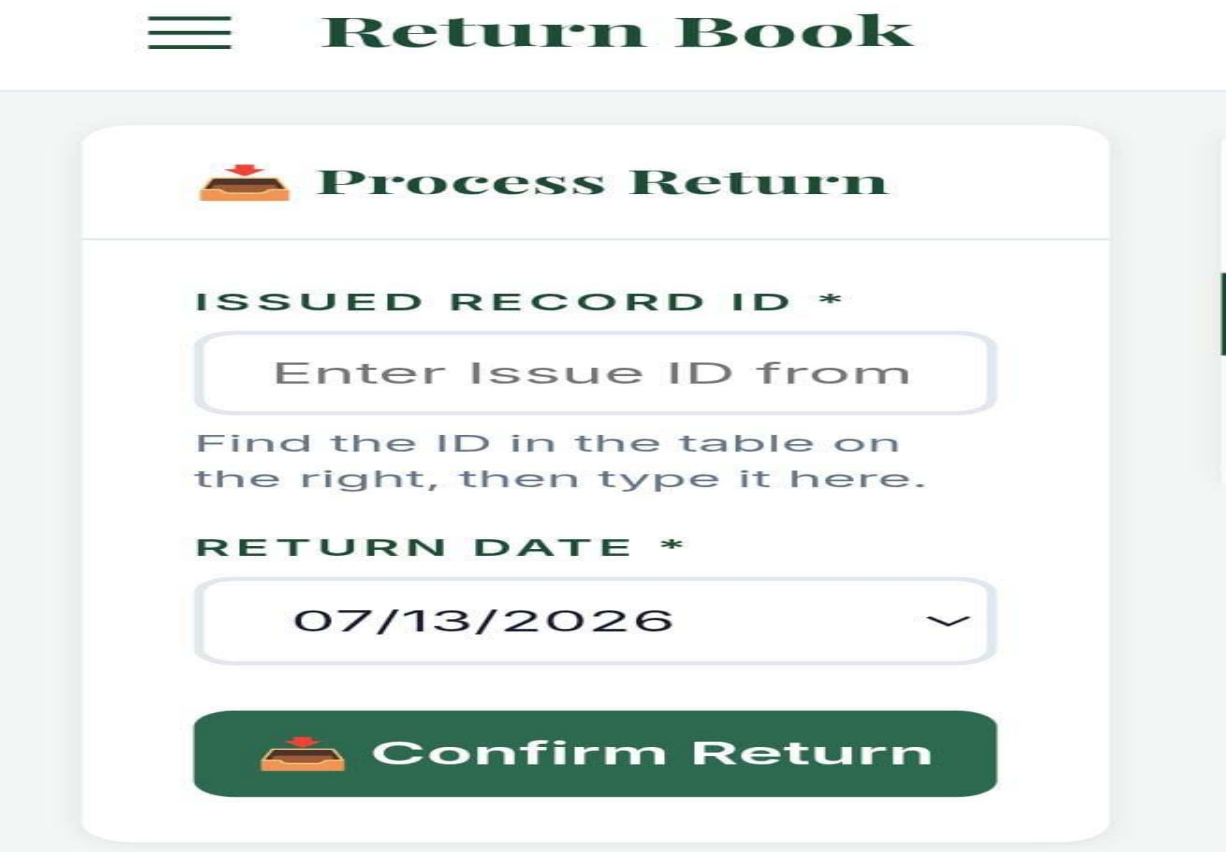


The borrowing interface contributes to efficient circulation management by maintaining accurate borrowing records.

5.5.5 Book Return Interface

The return interface enables librarians to record returned books efficiently. Upon selecting the borrowing record, the system automatically updates the inventory and records the actual return date. If the book is returned after the expected return date, the system identifies the item as overdue. The automation of the return process reduces errors associated with manual record keeping.

Figure 10: Book Return Interface



This interface improves inventory accuracy by ensuring that returned books are immediately reflected in the database.

5.6 System Testing

System testing was conducted to verify that the developed Library Stock Management System satisfied the specified functional and non-functional requirements. Testing involved evaluating

individual modules as well as the integrated system to ensure that all components functioned correctly. The researcher employed unit testing, integration testing, system testing, and user acceptance testing to identify and correct any errors before deployment.

5.6.1 Unit Testing

Unit testing was conducted on individual system modules to verify that each module functioned independently according to its intended purpose. The modules tested included the login module, book registration module, issue module, return module,

Table 6; Unit Testing Results

Module	Expected result	Actual result	Status
Login module	User logs in successfully	Successful login	Pass
Book registration	Book saved successfully	Book saved	Pass
Issue module	Issue transaction recorded	Transaction completed	Pass
Return module	Inventory updated	Inventory updated	Pass

The results indicate that all individual modules performed as expected without functional errors.

5.6.2 Integration Testing

Integration testing was performed after combining all system modules. The purpose of this test was to verify that information flowed correctly between the modules. The researcher confirmed that user authentication, inventory updates, borrowing records, return transactions, and report generation interacted seamlessly throughout the system. No integration errors were observed during testing, indicating that the developed modules functioned effectively as a unified system.

5.6.3 User Acceptance Testing

User acceptance testing involved allowing prospective users, including librarians and school administrators, to operate the system under normal working conditions. Participants evaluated the

usability, responsiveness, reliability, and functionality of the system. Users reported that the system was easy to learn and considerably faster than the existing manual system. Respondents particularly appreciated the automated searching functionality, report generation capabilities, and inventory management features. Minor suggestions relating to interface appearance and additional reporting options were incorporated before the final deployment of the system. The successful completion of user acceptance testing confirmed that the developed system satisfied user expectations and was suitable for implementation at Kanyanya Hill View Secondary School.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary of the study, conclusions drawn from the findings presented in Chapter Four, recommendations for improving library stock management at Kanyanya Hill View Secondary School, the limitations encountered during the study, suggestions for future research, and the overall conclusion. The chapter is organized according to the research objectives and demonstrates how the study contributed to improving library management through the development of a computerized Library Stock Management System.

6.2 Summary of the Study

The purpose of this study was to develop a Library Stock Management System for Kanyanya Hill View Secondary School with the aim of improving the management of library resources and addressing the challenges associated with the existing manual library stock management system. The study was guided by four objectives, namely: to examine the current library stock management practices, identify the challenges associated with the manual library stock management system, determine the requirements for a computerized library stock management system, and design and develop a computerized Library Stock Management System.

The study adopted a qualitative case study research design because it enabled the researcher to obtain detailed information regarding the existing library management practices and the expectations of prospective system users. Data were collected through interviews, observation, and document analysis involving library staff, teachers, students, and school administrators. The collected data were analysed thematically to identify recurring patterns and issues relevant to the study objectives. The findings established that the school relied entirely on a manual system for managing library stock. Library operations including book acquisition, cataloguing, circulation, stock verification, and report preparation were performed manually using accession registers, borrowing registers, catalogue records, and stock registers. Although the manual system enabled the library to maintain records of available books, it was characterized by slow processing of transactions, inaccurate record keeping, difficulty retrieving information, inefficient monitoring of overdue books, delays in report preparation, increased workload for library staff, and vulnerability of records to loss or damage.

The study further established that users required a computerized system capable of automating major library operations including book registration, inventory management, searching books, borrowing books, returning books, user management, and report generation. Respondents also emphasized the importance of system security, reliability, usability, maintainability, and data backup to ensure efficient management of library information.

Based on these findings, we designed and developed a web-based Library Stock Management System using PHP, MySQL, HTML, CSS, JavaScript, Bootstrap, and Apache through the XAMPP development environment. The system incorporated user authentication, book management, circulation management, inventory management and user management functionalities. System testing confirmed that the developed system functioned correctly and effectively addressed the shortcomings identified in the existing manual system.

6.3 Conclusions

The conclusions of the study are presented according to the research objectives**.**

6.3.1 Current Library Stock Management Practices

The study concludes that Kanyanya Hill View Secondary School depended entirely on a manual library stock management system. Although the manual system enabled the library to maintain records of books and borrowing activities, it was inefficient in supporting modern library operations. The dependence on handwritten records increased the workload of library staff, slowed service delivery, and limited the accuracy and accessibility of library information.

6.3.2 Challenges Associated with the Manual Library Stock Management System

The study concludes that the manual system presented numerous operational challenges that negatively affected library performance. These challenges included slow processing of library transactions, difficulty retrieving information, inaccurate record keeping, inefficient monitoring of overdue books, delays in stock verification, poor report generation, and inadequate security of library records. These limitations reduced the effectiveness of library services and justified the need for automation.

6.3.3 Requirements for a Computerized Library Stock Management System

The study concludes that the successful implementation of a computerized Library Stock Management System depends on addressing both functional and non-functional user requirements. Functional requirements such as book registration, searching, borrowing**, returning, inventory** management, and report generation are essential for improving operational efficiency. Similarly, non-functional requirements including security, usability, reliability, maintainability, and data backup are critical for ensuring long-term sustainability and user acceptance.

6.3.4 Development of the Library Stock Management System

The study concludes that the developed Library Stock Management System successfully addressed the major weaknesses identified in the manual system. The computerized system improved the speed, accuracy, efficiency, security, and reliability of library operations. Automated inventory management, user authentication, report generation, and circulation management significantly reduced manual workload while improving the quality of library services. The successful testing of the system demonstrated that it is suitable for implementation at Kanyanya Hill View Secondary School.

6.4 Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed. Kanyanya Hill View Secondary School should replace the existing manual library stock management system with the developed computerized Library Stock Management System to improve the efficiency and effectiveness of library operations. The implementation of the computerized system will reduce manual errors, improve record accuracy, and facilitate timely access to library information. The school administration should provide adequate computer equipment and reliable network infrastructure to support the operation of the computerized system. This includes providing computers, uninterrupted power supply, secure servers, and reliable internet connectivity where necessary. The school should organize regular training programmes for librarians and other authorized users to enhance their computer skills and ensure effective utilization of the computerized Library Stock Management System. Continuous training will improve user confidence and maximize the benefits of the system.

The school administration should establish regular database backup procedures to protect library information against accidental loss, hardware failure, or cyber threats. Periodic backups will enhance data security and ensure business continuity.

The school should allocate sufficient financial resources for system maintenance, software updates, hardware replacement, and technical support. Continuous maintenance will ensure that the system remains functional and responsive to changing user requirements.

Library policies should be reviewed to align with computerized library operations. Procedures relating to book registration, circulation, inventory management, user authentication, and report generation should be updated to reflect the new digital environment.

The school should periodically evaluate the performance of the computerized Library Stock Management System to identify emerging challenges and implement continuous improvements based on user feedback.

6.5 Limitations of the Study

We encountered several limitations during the study. The study was limited to Kanyanya Hill View Secondary School; therefore, the findings may not necessarily represent library stock management practices in all secondary schools in Uganda. We also experienced time constraints due to the academic calendar and limited duration allocated for conducting the study and developing the computerized system.

Financial constraints limited the acquisition of additional hardware and software resources that could have enhanced system development and testing. In addition, some respondents had limited time to participate in interviews because of their teaching and administrative responsibilities. Despite these challenges, appropriate planning and cooperation from the school administration enabled us to successfully complete the study.

6.6 Areas for Further Research

Future researchers should investigate the integration of Library Stock Management Systems with barcode or Radio Frequency Identification (RFID) technologies to improve inventory control and circulation management.

Further studies should examine the effectiveness of cloud-based Library Management Systems in secondary schools in Uganda and compare their performance with locally hosted systems.
Researchers may also investigate the integration of Library Stock Management Systems with student information systems to facilitate seamless management of student records and library services.

Additional studies should assess user satisfaction and the long-term impact of computerized library systems on library service delivery in secondary schools after implementation.

Future research could explore the application of artificial intelligence in library stock management, including automated recommendations, predictive inventory management, and intelligent overdue notification systems.

6.7 Contribution of the Study

This study contributes to the improvement of library management practices by providing a practical computerized Library Stock Management System specifically designed for Kanyanya Hill View Secondary School. The system addresses the limitations associated with manual library stock management and provides an efficient solution for managing library resources.

The study also contributes to the body of knowledge in Library and Information Science by demonstrating the application of information systems development methodologies in solving real-world library management challenges. Furthermore, the findings provide useful information for researchers, librarians, school administrators, and software developers interested in automating library operations within educational institutions.

6.8 Final Remarks

The study successfully achieved all the research objectives by examining the existing library stock management practices at Kanyanya Hill View Secondary School, identifying the challenges associated with the manual system, determining the requirements for a computerized Library Stock Management System, and designing and developing a functional computerized solution. The findings demonstrated that manual library stock management is inefficient, time-consuming, and prone to errors, thereby limiting effective service delivery.

The developed Library Stock Management System provides an efficient, reliable, secure, and user-friendly solution for managing library resources. Through automation of book registration, circulation management, inventory control, user management, and report generation, the system significantly improves the efficiency and effectiveness of library operations. It is therefore concluded that the implementation of the developed system will enhance library service delivery, improve resource management, support informed decision-making, and contribute to the overall improvement of academic services at Kanyanya Hill View Secondary School.

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APPENDICES

APPENDIX I : INTERVIEW GUIDE FOR LIBRARY STAFF

Title: Interview Guide for Library Staff

Introduction

Dear Respondent,

This interview is intended to collect information regarding the current library stock management practices at Kanyanya Hillview Secondary School. The information provided will be used solely for academic purposes and will be treated with strict confidentiality.

Section A: Background Information

1. Position/Designation: …….
2. Gender:
    - Male [ ]
    - Female [ ]
3. Number of years working in the library: …….
4. Highest level of education: ……..

Section B: Current Manual Library Stock Management System

5. Please describe the process the library currently uses to manage its stock
6. How are new books acquired, registered, and made available to users?
7. What steps are taken to catalogue and classify new library materials?
8. How are borrowing and returning transactions recorded?
9. How do you keep track of borrowed items?
10. How is the availability of books checked when users make a request?
11. What is the procedure for conducting stocktaking or inventory checks?

Section C: Challenges of the existing system

12. What are the main difficulties you experience in managing library stock manually?
13. How does the manual system affect the speed and accuracy of library services?
14. What problems arise when updating, retrieving, or maintaining library records?
15. Have you encountered cases of missing, lost, or inaccurate records? Please elaborate.
16. How do manual processes impact users' (students and teachers) ability to access library materials?

17. In your view, what are the root causes of these challenges?

Section D: Requirements for a Computerized LSMS

18. What features or capabilities would you consider essential in a computerized library management system?
19. What information should the system capture for each book and user?
20. What types of reports would be valuable for your work and for management?
21. How should the system handle borrowing, returning, and overdue books?
22. What security or privacy measures should be in place?
23. What improvements in library operations do you expect from automation?

Section E: Additional Comments

25. What do you see as the future of library management here?
26. Do you have any further suggestions or concerns regarding improving library services?

APPENDIX II: INTERVIEW GUIDE FOR TEACHERS

Section A: Background Information

1. Which department do you belong to?
2. How many years have you been teaching?

Section B: Library Usage

3. How often do you use the library in your teaching?
4. What types of materials do you usually access?
5. How do you locate required materials for your teaching or research?

Section C: Challenges

6. Do you encounter delays or difficulties in finding books or resources?
7. Have you ever been unable to obtain materials due to poor records or unavailability?
8. How would you rate the current borrowing and returning processes?
9. What other challenges do you face as a library user?

Section D: System Requirements

10. What features would help you access library resources more efficiently?
11. Would electronic search or reservation functionalities be useful for teachers?
12. What reports or data from the library would assist your teaching or departmental planning?
13. What recommendations do you have for the new library management system?

APPENDIX III: INTERVIEW GUIDE FOR STUDENTS

Section A: Background Information

1. Class:
    - S1 [ ]
    - S2 [ ]
    - S3 [ ]
    - S4 [ ]
    - S5 [ ]
    - S6 [ ]
2. Gender:
    - Male [ ]
    - Female [ ]

Section B: Library Usage

3. How often do you visit the library?
4. What types of books do you usually use?
5. How do you usually find the books you need?

Section C: Challenges

6. Have you experienced any difficulties in locating or borrowing books?
7. Have there been times when you could not get a book you needed?
8. On average, how long does it take to get a book you want to borrow?
9. Are there any frustrations or barriers you face when using the library?

Section D: Proposed System

10. Would you prefer to have an electronic system to search for or reserve books? Why or why not?

11. What changes or improvements would make the library easier and more enjoyable to use?
12. What features or services would you like to see in a new library management system?

APPENDIX IV: INTERVIEW GUIDE FOR SCHOOL ADMINISTRATORS

Section A: Background Information

1. What is your current position at the school?
2. How many years have you served in school administration?

Section B: Management Perspective

3. How does the library contribute to academic performance and the school's mission?
4. What methods are currently used to monitor and manage library stock?
5. How are library reports and data used in your decision-making processes?
6. What are the main challenges the school faces regarding library resource management?

Section C: Proposed LSMS

7. What information and reports should be readily available to management through the system?
8. What benefits do you anticipate from the introduction of a computerized system?
9. What support (technical, financial, or policy) can the school provide for successful system implementation?
10. Are there any concerns or risks you foresee with automating the library management system?

APPENDIX V: NON-PARTICIPANT OBSERVATION CHECKLIST

Observation Area: School Library

Table 7; NON-PARTICIPANT OBSERVATION CHECKLIST

Item Observed	Yes	No	Comments
Are books shelved and labelled systematically?			
Are cataloguing and classification procedures visibly followed?			
Are borrowing and return records updated consistently and accurately?			
Can overdue or missing books be easily tracked from available records?			
Is the stock register current and organized?			
Do staff provide timely assistance to library users?			
Are inventory checks or stocktaking activities observable?			
Are delays or bottlenecks apparent in library workflows?			
Is reporting or record generation possible on demand?			
Are lost or damaged books documented appropriately?			
Is the physical environment conducive to efficient service delivery?			

Observation Notes

Date: ……..

Time: ……..

Observer: ……

Detailed observations:

……

……

……

APPENDIX VI: DOCUMENT ANALYSIS GUIDE

The researcher will review existing library records and documents.

Table 8; DOCUMENT ANALYSIS GUIDE

Document Reviewed	Available	Not Available	Information Obtained
Accession Register			
Borrowing Register			
Return Register			
Stocktaking Reports			
Library Policy Manual			
Book Catalogues			
Membership Records			
Inventory Records			
Overdue Book Records			
Lost Book Records			
Damaged Book Records			
Previous Library Reports			

Key Areas for Analysis

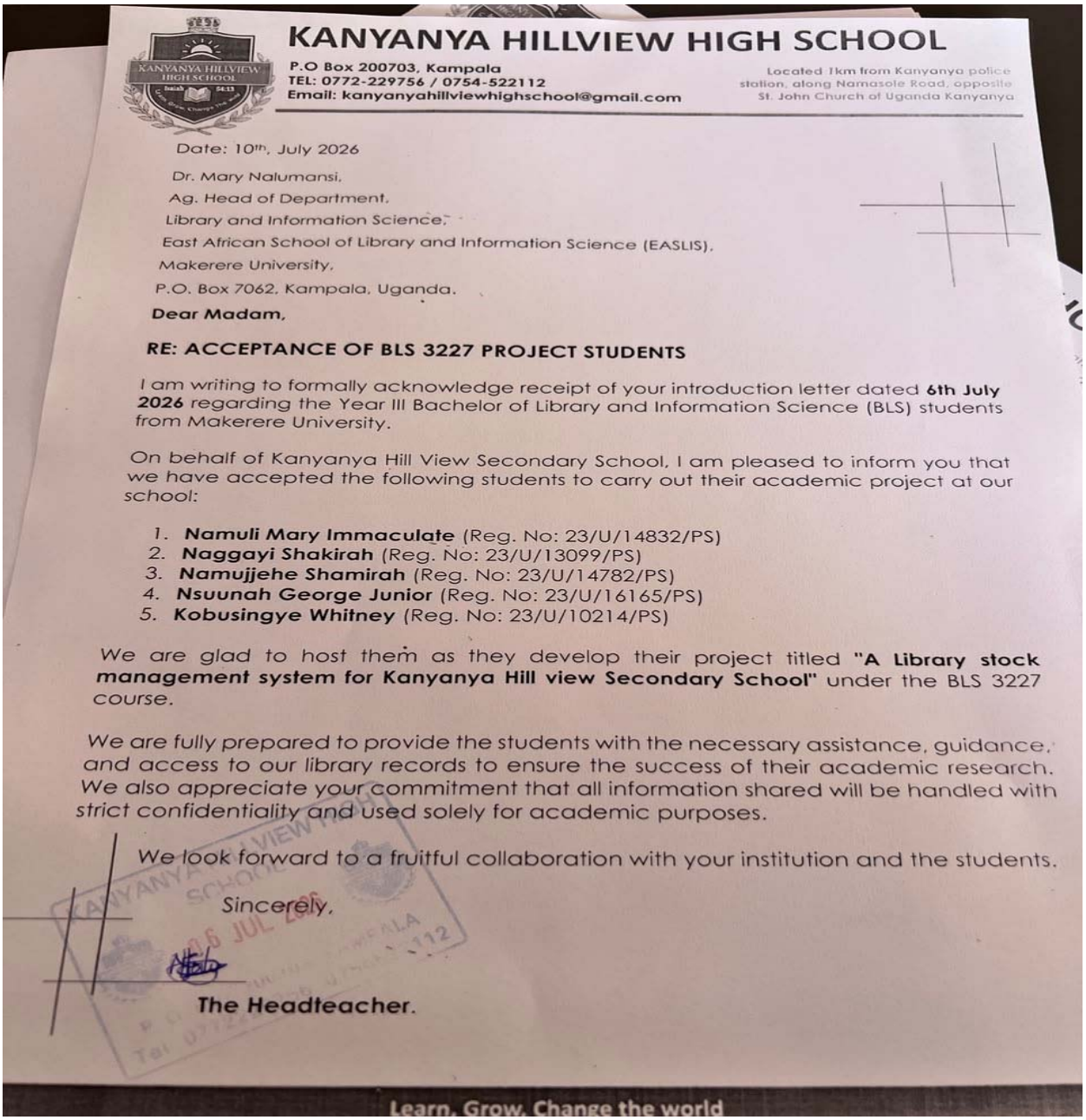
1. Accuracy of records.
2. Completeness of information.
3. Frequency of record updates.
4. Evidence of duplicate entries.
5. Missing records.
6. Tracking of borrowed books.
7. Tracking of overdue books.
8. Inventory control procedures.
9. Reporting procedures.
10. Information required for the proposed computerized LSMS.

APPENDIX VII: REQUIREMENTS CAPTURE FORM

Table 9; REQUIREMENTS CAPTURE FORM

Requirement Category	User Requirement	Priority (High/Medium/Low)
User Management		
Book Registration		
Book Search		
Borrowing Module		
Return Module		
Overdue Tracking		
Inventory Management		
Report Generation		
Security Controls		
Backup and Recovery		
Notifications		

APPENDIX VIII: PROJECT ACCEPTANCE LETTER



KANYANYA HILLVIEW HIGH SCHOOL

P.O Box 200703, Kampala
TEL: 0772-229756 / 0754-522112
Email: kanyanyahillviewhighschool@gmail.com

Located 1km from Kanyanya police station, along Namasole Road, opposite St. John Church of Uganda Kanyanya

Date: 10th, July 2026

Dr. Mary Nalumansi,
Ag. Head of Department,
Library and Information Science,
East African School of Library and Information Science (EASLIS),
Makerere University,
P.O. Box 7062, Kampala, Uganda.

Dear Madam,

RE: ACCEPTANCE OF BLS 3227 PROJECT STUDENTS

I am writing to formally acknowledge receipt of your introduction letter dated **6th July 2026** regarding the Year III Bachelor of Library and Information Science (BLS) students from Makerere University.

On behalf of Kanyanya Hill View Secondary School, I am pleased to inform you that we have accepted the following students to carry out their academic project at our school:

1. **Namuli Mary Immaculate** (Reg. No: 23/U/14832/PS)
2. **Naggayi Shakirah** (Reg. No: 23/U/13099/PS)
3. **Namujjehe Shamirah** (Reg. No: 23/U/14782/PS)
4. **Nsuunah George Junior** (Reg. No: 23/U/16165/PS)
5. **Kobusingye Whitney** (Reg. No: 23/U/10214/PS)

We are glad to host them as they develop their project titled **"A Library stock management system for Kanyanya Hill view Secondary School"** under the BLS 3227 course.

We are fully prepared to provide the students with the necessary assistance, guidance, and access to our library records to ensure the success of their academic research. We also appreciate your commitment that all information shared will be handled with strict confidentiality and used solely for academic purposes.

We look forward to a fruitful collaboration with your institution and the students.

Sincerely,

The Headteacher.

Learn, Grow, Change the world