ONLINE LIBRARY MANAGEMENT INFORMATION SYSTEM. A CASE STUDY OF TEBOTECH TRAINING INSTITUTE

SALMA GAIYE SHALLE

A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF MANAGEMENT AND LEADERSHIP IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF A DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY OF THE MANAGEMENT UNIVERSITY OF AFRICA

APRIL 2023

DECLARATION

Declaration by the Student.

This is my original work, which has not been submitted to any other university for review.

Signature……. Date…….

SALMA GAIYE SHALLE

DICT/11/00049/3/21

Declaration by the Supervisor

As the University Supervisor, I have approved the submission of this study project for review.

MR. BENARD RUTTO

Sign **Date**

……. ……

The Management University of Africa

DEDICATION

This work is dedicated to my family for the encouragement throughout my studies. Allah bless you all. The dedication of this work to the author's family shows a deep appreciation for the support and encouragement received from them throughout their academic pursuits. This gesture is an acknowledgment of the important role played by the family in the author's life, and a recognition of the sacrifices and contributions made by them towards the author's success. The mention of Allah's blessings is a testament to the author's faith and gratitude towards a higher power for the gift of family and their unwavering support. It is also a reminder of the values of humility and thankfulness, and the belief that the family's love and guidance will continue to inspire and shape the author's future endeavors. Overall, this dedication is a heartfelt expression of the author's love and appreciation for their family and a fitting tribute to the people who have been instrumental in their journey.

ACKNOWLEDGEMENT

I want to thank God for the gift of life. My gratitude to my supervisor Mr. Benard Ruto for her help and insightful advice during the course work and study. I will always be grateful.

ABSTRACT

The purpose of this project is to develop an Online Library Management Information System for the TeboTech Training Institute. The system aims to provide an efficient and user-friendly platform for managing the institute's library resources, including books, journals, and other materials. The system was a web-based application that can be accessed from any device with an internet connection. The system had different modules for managing various aspects of the library, such as book acquisition, cataloging, circulation, and user management. It also included features like online book reservation, book renewal, and overdue notifications to help users manage their borrowing activities effectively. The system was designed and developed using modern web technologies such as HTML, CSS, JavaScript, PHP, and MySQL database. The system was tested using a real-world scenario, where the TeboTech Training Institute library was used as a case study. The Online Library Management Information System will provide benefits to both the institute and its users. The system enabled the institute to automate its library management processes, reduce manual errors, and improve operational efficiency. It also provided users with easy access to the library resources, enable them to manage their borrowing activities online, and enhance their overall experience with the library. In conclusion, this project aims to develop an efficient and user-friendly Online Library Management Information System that benefited the TeboTech Training Institute and its users. The system provided a solid foundation for managing the institute's library.

TABLE OF CONTENT

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Today, libraries face the challenge of remaining relevant to the users. The concept of a library staying in one fixed space is slowly evolving. Because of technology, users can get information from alternative sources. As more information becomes available electronically and systems become ever more user-friendly with personalized functionality, driven by the sophisticated use of artificial intelligence and social media networks, many users will choose to by-pass libraries. Competition is clearly already apparent in many areas such as books, e-books, audio books, videos, and other forms of multimedia (Levien, 2011). Libraries need to be more competitive in terms of extending services. It also plays an important role in overcoming this challenge. Library may provide integrated information that can be a basis for evaluating what users want. It can also be a tool for implementing new ideas that will enhance the users' library experience.

Library management information system is basically used for storing, organizing, sharing and retrieving vital information needed to carry out daily operational functions of the library.

According to (fox & Urs, 2012) modern libraries are therefore being redefined as places to get wider access to information in many formats and from many sources. The technological development in libraries has affected both information space and information practice. An important development in the second half of the 20th century was the introduction of integrated library systems and online catalogues giving access to information on library collections from anywhere with an internet connection. The distance between author and reader has been shortened while it gives a more direct involvement in the dissemination of information. Libraries provide access to an endless variety of information resources and opportunities for interactive communication.

Idea Kenya is a leading supplier of fixed asset management and Warehouse and logistics software solutions and Business Solutions.it offers a library management software that has been designed to cut down the cost on library staff and time invested in library management. It also adds pace to library management and one can perform every activity on a virtual environment.

Tebotech training institute will integrate a library management system which will provide a simple Graphical User Interface (GUI) for the library staff to manage the functions of the library effectively. Usually when a book is returned or issued, it is noted down in a register after which data entry is done to update the status of the books in a moderate scale. This process takes some time and proper updating process cannot be guaranteed. Such anomalies in the updating process can cause loss of books. So, a more user-friendly interface which could update the database instantly has a great demand in libraries. Users can register or edit the member or book in the system. With this computerized maintenance, library will not lose the book record or member record which always happens when it is done manually

1.1.1 Online Library Management System

The field of library management is no exception. With the increasing popularity of online resources and digital materials, libraries have had to adapt and evolve to meet the changing needs of their users. One significant development in this regard has been the implementation of online library management systems. These systems offer a range of benefits, including improved efficiency, accessibility, and user experience. This essay will discuss the advantages of online library management systems and their impact on libraries and their patrons.

One of the primary advantages of online library management systems is their ability to streamline library operations and improve overall efficiency. These systems automate many of the tasks associated with traditional library management, such as cataloging, circulation, and resource management. As a result, librarians can focus their time and energy on more specialized tasks, such as research assistance and collection development. According to a study conducted by the University of Washington, implementing an online library management system can reduce staff workload by up to 50% (Borst, 2008). This allows librarians to provide better and more personalized service to library users.

In addition to improving efficiency, online library management systems also enhance accessibility and user experience. These systems allow users to search and access library resources from any location with an internet connection, eliminating the need to physically visit the library. Moreover, online library management systems provide users with a more personalized and interactive experience. Users can create personalized profiles, save searches, and receive alerts for new resources or updates to existing resources. These features enable

users to better organize their research and stay up-to-date on the latest developments in their fields.

Another significant advantage of online library management systems is their ability to facilitate collaborative research and learning. These systems allow users to create and share lists of resources, collaborate on research projects, and participate in virtual discussions and forums. This fosters a sense of community among library users and encourages knowledge sharing and collaboration. As noted by Strasser et al. (2012), online library management systems have the potential to transform libraries into "collaborative spaces for knowledge creation and dissemination" (p. 123). This, in turn, can lead to more innovative and impactful research outcomes.

Online library management systems also provide libraries with a range of benefits beyond their immediate impact on users. These systems can help libraries collect and analyze data on user behavior and resource usage, which can be used to inform collection development and resource allocation decisions. Moreover, online library management systems enable libraries to more effectively manage their budgets and resources by providing real-time data on resource usage and circulation patterns. According to a survey conducted by Library Journal, nearly 70% of libraries reported that online library management systems helped them make more informed decisions about resource allocation and collection development (Breeding, 2018).

However, despite the many benefits of online library management systems, there are also some challenges and concerns that need to be addressed. One of the primary concerns is the potential for increased reliance on digital resources to exacerbate existing digital divides and inequalities. While online library management systems can improve accessibility for many users, those without access to digital technologies or internet connectivity may be left behind. Additionally, there are concerns about the privacy and security of user data in online library management systems, particularly given the sensitive nature of library usage data.

In conclusion, online library management systems offer a range of benefits for libraries and their patrons. These systems improve efficiency, accessibility, user experience, and facilitate collaborative research and learning. Moreover, they provide libraries with a range of data and insights that can inform decision-making and resource allocation. However, as with any technological innovation, there are also challenges and concerns that need to be addressed.

By balancing the benefits of online library management systems with careful consideration of potential challenges and concerns, libraries can continue to evolve and adapt

1.1 Problem Statement

In the current age of technology, manual record keeping can be a daunting and time-consuming task. Tebotech training institute is currently managing their library records manually, which can lead to inconsistency in data entry and other issues. Manual record keeping makes it more difficult to retrieve information, and changes or corrections to data must often be completely redone, rather than just updated. According to Balakrishnan (2019), manual data entry is prone to errors and can be time-consuming, which can lead to mistakes and inconsistencies in data management.

Moreover, storing paper documents takes up a lot of physical space, which can be problematic for institutions with limited space for their library. At Tebotech training institute, filling cabinets are being used to store paper documents, which has accumulated more space in the library, making it difficult for the librarian to manage it. Inefficient use of space can have a negative impact on library services and can also make it difficult for librarians to manage and organize their collections. According to a study conducted by the International Journal of Humanities and Social Science Research, the effective use of space in libraries is critical for the delivery of quality library services (Nzotta, 2019).

Furthermore, the manual system of issuing books to library users requires them to be physically present, which can result in fewer students borrowing books and reading them. This can impact the quality of education provided by the institution, as students may not have access to the materials they need for their coursework. The use of online information systems can help to address this problem by improving access to library resources. According to a study conducted by Adedokun and Adewuyi (2019), the use of online library management systems can improve access to library resources, which can lead to improved student academic performance.

To address these challenges, Tebotech training institute has decided to embrace the use of a web-based management system for their library. This will help to create more space for other activities in the library, as well as improving data management, access to resources, and overall library services. The implementation of a web-based management system can help to address many of the challenges faced by Tebotech training institute, as well as improving the quality of education provided by the institution. According to Gao and Wu (2019), the

implementation of online library management systems can help to improve the quality of library services and make them more efficient and effective.

The manual system of record keeping in libraries can be time-consuming and prone to errors. In addition, storing paper documents can take up valuable physical space in the library, which can impact library services. The manual system of issuing books can also result in fewer students borrowing books and reading them. The implementation of a web-based management system can help to address many of these challenges by improving data management, access to resources, and overall library services. The use of technology in library management can help to improve the quality of education provided by institutions and make their library services more efficient and effective.

1.2 Project Objectives

1.2.1General Objectives

To develop an online library management information system

1.2.2 Specific objectives

i. To analyze functional requirements
ii. To design a user-friendly graphical interface that suits the users.
iii. To test and review system for usability.
iv. To code and develop online library management information system.

1.3 Significance/ justification of the Study

1. The system is capable of reducing time spent and errors associated with the identification and verification of library reading materials as well as charging-in and charging out through the use of computer technology whereby all information concerning library will be stored in the computer.
2. Since the system will hold an online public access catalog (OPAC), the library will be kept organized and library collection will be located immediately, if in case available on shelf. Nevertheless, whether the book or any other reading material has been checked-in or checked-out will appear in the book information.
3. Speed of data retrieval for library users will also be more appreciated. Users should be able to enter/exit the library with minimal sign in/out time. Also, because of the absence of human intervention, the report generated by the system is perfect and accurate.

1.4 Research questions

1. Will the user needs be analyzed effectively in order to come up with intended system?
2. Will the system be implemented easily?
3. Will I be able to test the system for functionality and efficiency?

1.5 project scope

1.5.1 Scope

This project is going to work towards developing an online library management information system for Tebotech training institute library staff to manage library functions effectively. Tebotech training institution is located Moi airport road opposite holy cross Catholic Church. In this institution for they don't have system for keeping library information about books online. One has to physically present him/her to collect book which results to students not often borrow books and read.

1.5.2 Target users

The users of this proposed system will be Administrator/Librarian whose main mandate is to manage the system, he/she will also be capable of handling internal and external administrative matters for the library, providing managerial leadership, strategic planning, resource management, and also add new users and will provide access to information, support students learning and their development into effective, independent learners and readers, select, develop, catalogue and classify library resources. Students will be able to access the library materials and information concerning the library.

1.5.3 Specific platform

The server to host the proposed system is expected to contain the following specs:

Hardware requirements

Hard disk 250 GB

4GB of RAM

At least 2.5GHz duol core processor

Software requirements

HTML, PHP and java script.

It also interacts with MYSQL as the database platform.

Internet browser e.g Mozilla Firefox

1.6 Constraints

New technology

Technology has become more dynamic and its changing every time. The developer has to learn and cope up with the frequent changes so as to develop an application that can reflects the current technological stage with the use of new methodology for developing applications.

Time

There is limited time to conduct the study and development of the system bearing in mind that developer is also undertaking class work at the same time. To manage the pressure involved, the researcher was forced to utilize the allocated time with working till midnight in order to complete the requirements.

Internet support

The use of internet facilities for research is another expense met as the developers has to spend a lot of money in cyber looking for material for the study.

Cost of hardware and software

During the study the developer had to consider the cost associated with installation of software and hardware to carry on research whereby some of the hardware's are so expensive so he/she was forced to go for the cheap one.

1.7 Summary

Library management information system in Tebotech Training Institution is done manually leading to data loss, inconsistency during data entry, where information is stored in files creating rooms for filling cabinets which has accumulate more space in the library, whereby this has been solved by use of web based application system. In cases like data retrieval by library users the system has improved the speed through the use of computer technology whereby all information will be stored in a computer compared to the manual one. Through users registration to the system will enhance system security.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

System review is a body of text that aims to review the critical points of current knowledge on a particular system. It compares existing systems in use with the proposed system being proposed. This chapter discusses the online library management information system for user time stock keeping. It will enable one to come up with a research gap.

2.2 Theoretical Framework

Library has moved from traditional era to digital in order to meet the current information needs of people. The purpose of library is to collect information materials, organize, store, preserve and disseminate information to users at the right time and in the right measure. The Library is an agent of development.

(Murugan, 2012) described library user education as instruction which equips library users with the skills to enable them to be independent and sophisticated users of libraries and their resources. He added that it included all the activities involved in teaching users how to make the best possible use of library resources, services and facilities, including formal and informal instruction delivered by a librarian or other staff member one-on-one or in a group. There are different kinds of catalogs, including book catalogs, card catalogs, microform catalogs, and computerized catalogs in either CD-ROM or online format. Catalog records typically contains the items author, its title, its subjects, the date it was published, the name of its publisher and other information which may be used as determinant for the users about whether the item listed suits his or her needs. In addition, the catalog record contains the items call number, a combination of letters and numbers used to classify the work. The call number also indicates the items location in the library. School library usually contains card catalogs, which are entries printed on cards and are arranged alphabetically in drawers. A card catalog usually contains three types of cards for each item in the library's collection, the author, title and subject card. In school library, users should have school id presented to borrow library materials. The identification card contains users name, section, year level, address, contact number and other basic information. Students, faculties and employees should sign the book card and log book before borrowing books from the library.

information systems to carry out and manage their operations, interact with their customers and suppliers, and compete in the marketplace.

(Odiase; , Unegbu; , Haliso;, 2010) book shelving is done in a classified way. The book must be shelved accurately and systematically so that these books could be easily located when users are in need of them. Shelving is a systematic arrangement of books on the shelf according to their call or book number. There are different types of shelves used in the library. These shelves are facilities for storing library resources. They help to preserve and conserve the life span of the resources. Using the shelves helps to create easy accessibility and retrieval of materials. Books are arranged according to their subjects with their class marks for easy identification. Proper shelf management helps conserve the users' time when searching for materials on the shelves. The shelf could be low or high, as the case may be. High shelves are used in the open stack and at the reference section, while the low shelves are used for storing journals publications and audio-visual resources such as Cassettes, Slides, Videotapes and others.

2.3 System review

This entails a review of the systems that are relevant to the proposed system, hence with the increase and advancement in technology similar ideas must have come from different individuals so they may be similar in functionality compared with one another. Therefore, the aspect of unique system is not true since there are existing systems relevant to the field of study

2.3.1 Eloquent library system

In the current age of technology, manual record keeping can be a daunting and time-consuming task. Tebotech training institute is currently managing their library records manually, which can lead to inconsistency in data entry and other issues. Manual record keeping makes it more difficult to retrieve information, and changes or corrections to data must often be completely redone, rather than just updated. According to Balakrishnan (2019), manual data entry is prone to errors and can be time-consuming, which can lead to mistakes and inconsistencies in data management.

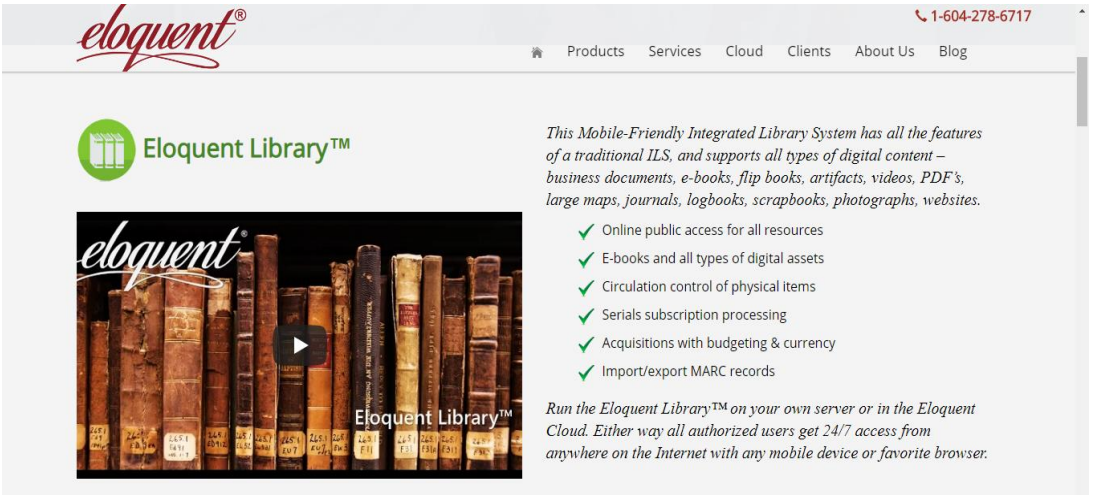
Moreover, storing paper documents takes up a lot of physical space, which can be problematic for institutions with limited space for their library. At Tebotech training institute, filling cabinets are being used to store paper documents, which has accumulated more space in the library, making it difficult for the librarian to manage it. Inefficient use of space can have a negative impact on library services and can also make it difficult for librarians to manage and organize their collections. According to a study conducted by the International

Journal of Humanities and Social Science Research, the effective use of space in libraries is critical for the delivery of quality library services (Nzotta, 2019).

Furthermore, the manual system of issuing books to library users requires them to be physically present, which can result in fewer students borrowing books and reading them. This can impact the quality of education provided by the institution, as students may not have access to the materials they need for their coursework. The use of online information systems can help to address this problem by improving access to library resources. According to a study conducted by Adedokun and Adewuyi (2019), the use of online library management systems can improve access to library resources, which can lead to improved student academic performance.

To address these challenges, Tebotech training institute has decided to embrace the use of a web-based management system for their library. This will help to create more space for other activities in the library, as well as improving data management, access to resources, and overall library services. The implementation of a web-based management system can help to address many of the challenges faced by Tebotech training institute, as well as improving the quality of education provided by the institution. According to Gao and Wu (2019), the implementation of online library management systems can help to improve the quality of library services and make them more efficient and effective.

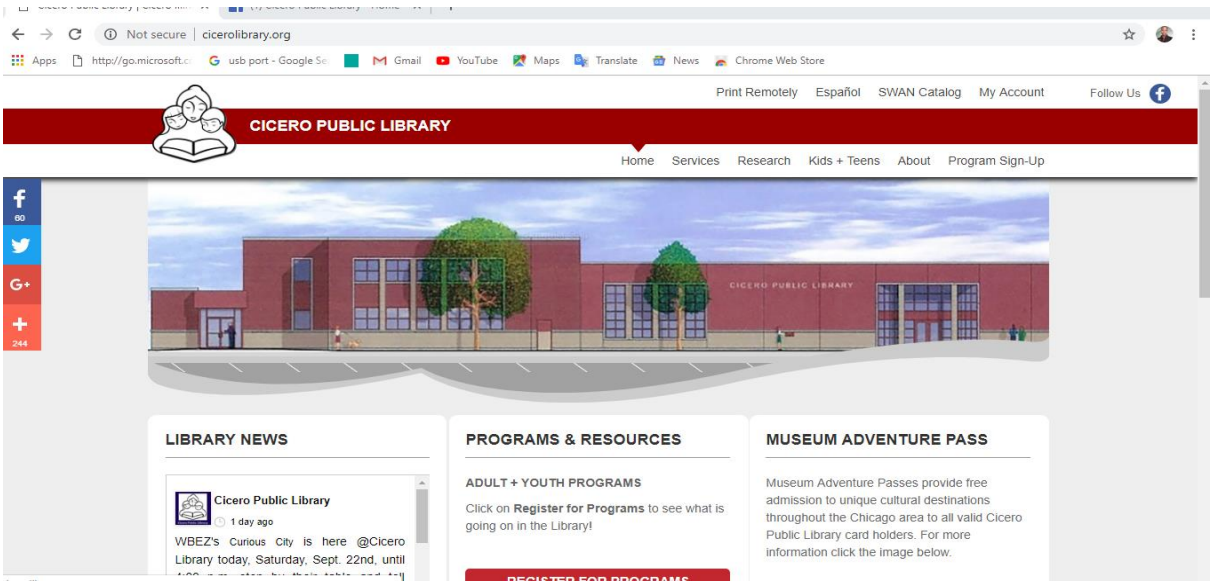
In conclusion, the manual system of record keeping in libraries can be time-consuming and prone to errors. In addition, storing paper documents can take up valuable physical space in the library, which can impact library services. The manual system of issuing books can also result in fewer students borrowing books and reading them. The implementation of a web-based management system can help to address many of these challenges by improving data management, access to resources, and overall library services. The use of technology in library management can help to improve the quality of education provided by institutions and make their library services more efficient and effective.



2.3.2 Cicero library management system

Is a modern modular system that supports the work flow of library staffs. The emphasis is on the majority of the functions involved in day-to-day work procedures being easy to find and easy to use, so that even occasional users are able to navigate the system with no effort.

The system provides the core of the Danish joint library system, which is based on a combination of existing national infrastructure and recognized library management standards. This makes it relatively easy to implement a joint system for library operation and management. At the same time, data can be pulled from other systems, so that data only needs to be updated in one place, providing library users with consistent services, while also releasing time and resources for other things.



2.3.3 Mandarin M5 library automation system

Mandarin M5 is a popular library automation system used by libraries worldwide. It is known for its user-friendly interface, comprehensive features, and excellent customer support. According to Cakmak and Serap (2019), Mandarin M5 is designed to streamline library operations, improve services to patrons, and save time and money for libraries.

One of the key features of Mandarin M5 is its ability to manage a variety of library resources, including books, journals, DVDs, and other library materials. The system provides a unified interface for managing these resources and allows librarians to easily search and retrieve information. According to the Mandarin Library Automation website, the system also provides efficient ways to manage circulation, cataloging, and acquisitions.

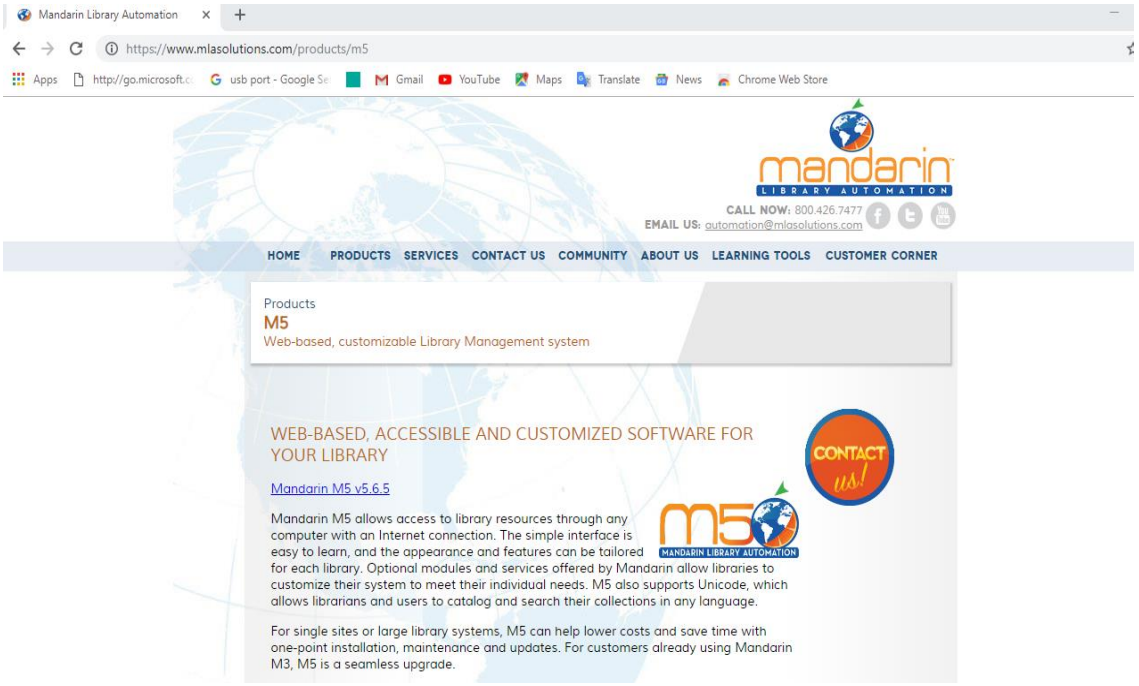
Mandarin M5 is also known for its customizable user interface, which can be tailored to meet the specific needs of individual libraries. According to Cakmak and Serap (2019), the system allows librarians to customize the interface, add or remove features, and integrate with other library systems. This customization allows libraries to create a unique user experience that is tailored to the needs of their patrons.

Furthermore, Mandarin M5 provides robust reporting and analytics capabilities, which can be used to analyze library usage, track trends, and identify areas for improvement. The system also provides tools for creating custom reports and exporting data, which can be useful for library administrators and staff. According to the Mandarin Library Automation website, the system provides a variety of reports and analytics, including circulation reports, inventory reports, and patron usage reports.

In addition, Mandarin M5 provides excellent customer support to libraries that use the system. According to Cakmak and Serap (2019), the company provides technical support, training, and consultation services to help libraries make the most of the system. This support ensures that libraries can use the system effectively and efficiently, and that they can troubleshoot any issues that may arise.

In conclusion, Mandarin M5 is a popular library automation system that is known for its user-friendly interface, comprehensive features, and excellent customer support. The system provides efficient ways to manage library resources, track circulation, and generate reports and analytics. Its customizable interface ensures that libraries can create a unique user experience that is tailored to the needs of their patrons. Overall, Mandarin M5 is a powerful

tool for modern libraries that are looking to streamline their operations and provide excellent services to their patrons.



2.4 System critique

Eloquent library system uses client sided database management system which is not secure and limits the functionality of the database in manipulation of record. The system is not suitable if the company has many branches. Although Mandarin M5 uses a Microsoft structured query language which is a server-side database that secure and has much functionality. The system does not have a log in or register page where the user can register to access the library

Online library management information system will be a web based application that will be specialized in management. The proposed system will have an interactive interface enabling users to comment and a newsletter for users to get feedback. It will also have a log in-log out registration process. Just like M5 is powered by new SQL server software which will make quicker and more frequent update.

2.5 system adaptations

1. The system will have a log in-log out registration process whereby users will be able to key in username and password.
2. It will also have an interactive interface enabling users to comment in case a user needs a soft copy.

3. It will have a newsletter for users to get feedback or alerts from the librarian.
4. The system will be responsive whereby it will fit on mobile device that is user can access through phones.

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.0 Introduction

This chapter presents the methods, techniques and tools used to collect and analyze data that aid in the design of the system. The system was developed using RAD (Rapid Application Development) model, this model is most preferred by the developer as it allows for extensive user interaction with the reviews and suggestions on timely basis during the iteration and the phases. This saves development time compared to Traditional Application Development model where user is involved at the beginning during the requirement stage and then in the delivery during user acceptance stage.

3.1 development approach

3.1.2 System analysis

System analysis is a method of studying a system by examining its component parts and their interaction for the purpose of developing a system solution.

According to (publisher, 2012) system analysis is the analysis of the requirements of a task and the expression of those requirements in a form that permits the assembly of computer hardware and software to perform the task.

3.1.3 System design

System design is the process of defining the elements of a system such as the architecture, modules ad component, the different interface of those component and the data that goes through the system.

According to (Jansen, 2014), systems design implies a systematic approach to the design of a system. It may take a bottom-up or the top-down approach, but either the way the process is systematic where it takes all the related variables of the system that needed to be created from the architecture, to the required hardware and software. The system designed is important as it shows the blueprint of how the proposed system is developed.

3.2 System development methodology

The type of methodology used in the development of online library management system is Rapid Application Development (RAD) methodology which is characterized by the quick turnaround time for requirement definition to completion of the system. According to

(Whitten, 2004) rapid application development is a merger of various structured techniques especially data-driven information engineering with prototyping techniques that accelerate system development. According to (sommerville, 2007) quality is defined as both the degree to which a delivery system has low maintenance cost. RAD attempts to deliver on quality through the involvement of users in the designing stage.

3.2.1 Rapid Application Development (RAD)

RAD aims to build applications faster using an iterative development process. RAD model is based on prototyping and iterative development with no specific planning involved. A prototype is a working model that is functionally equivalent to a component of the product.

According to (Martin, 2014), is a development life cycle designed to give faster development and higher quality results than those archived with the traditional life cycle. It is designed to take maximum advantage of powerful development software that has evolved recently.

The developer preferred to use RAD because it enables quick development of software products by use of computer aided software engineering (CASE) tools in combination with the methods of interactive development and rapid prototyping, it's aimed at reducing the time involved in the planning phase.

3.2.2 RAD Phases

Requirement planning phase

This stage defines the organizations function and data subject areas that the system will support and determines the system scope. Users, managers and IT staff agree upon the organization needs, project scope and system requirement and also obtain approval to continue.

User design phase

This stage interacts with users, build models and working prototypes of critical system component, conduct intensive JAD-types session. Its objectives is to analyze in detail business activities associated with the proposed system area to develop proposed screen layouts for the most important automated functions, also to prepare a work plan defining the steps necessary for transition of the system and a schedule by which these steps can be completed.

Testing phase

Its objective is to complete the detailed design of the proposed system, to create and test the software that implements the proposed system, to generate a system that operates the proposed application, to design, develop and test the required transition software and to perform the steps necessary to prepare for the conversion of the system to production status.

Deployment phase

The tasks involved are data conversion, full-scale testing, system changeover and user training and implementation of the application system. The software developed in construction stage becomes operational here, hence at this stage the researcher prepares existing data for the new system and train user to operate the new application and also provide support to resolve any problems that arise immediately after the application becomes operational.

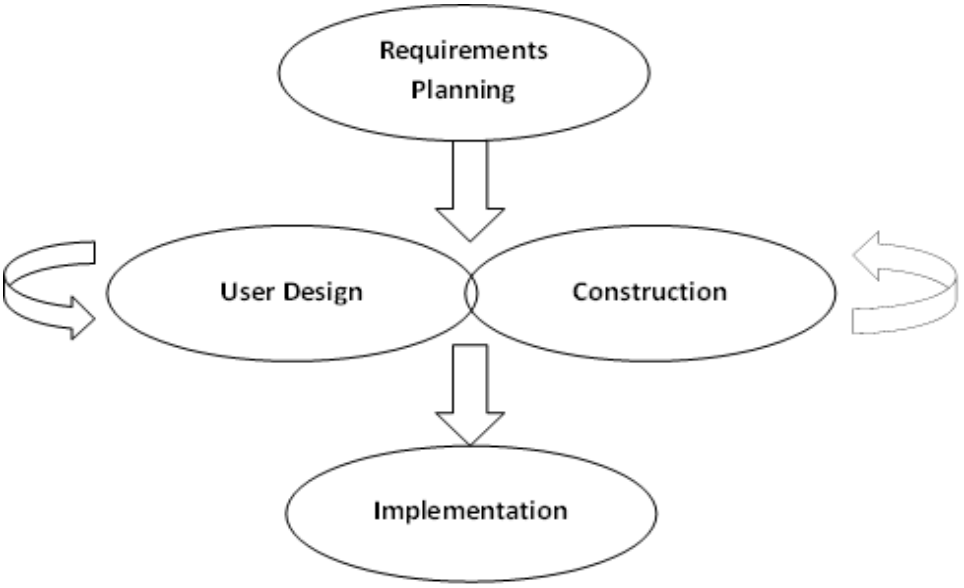


Figure 3.1 Rapid Application Development

Advantages of RAD

1. First of all RAD is designed to help deliver the systems faster with minimize cost, and insured quality.

2. Deliverables sometimes are easier to port because they make greater use of high-level abstraction, scripts and intermediate code.
3. Also, the development is conducted at a higher level of abstraction because RAD tools operate at that level.
4. RAD offers its users early visibility because of prototyping, greater flexibility because developers can redesign at will, and reduction of the manual coding because of wizards, code generators, code reuse.

Disadvantages of RAD

I. The cost of the integrated toolset and hardware covers a sufficient amount of money.
II. It might be harder to gauge progress because there are no classic milestones, or could less efficient because code isn't hand crafted.
III. In addition, there is the possibility of the loss of scientific precision because no formal methods are used, or may accidentally empower a return to the uncontrolled practices of the early days of software development.
IV. Also there is the danger the requirements may not converge because the interests of customers may diverge from one iteration to the next.

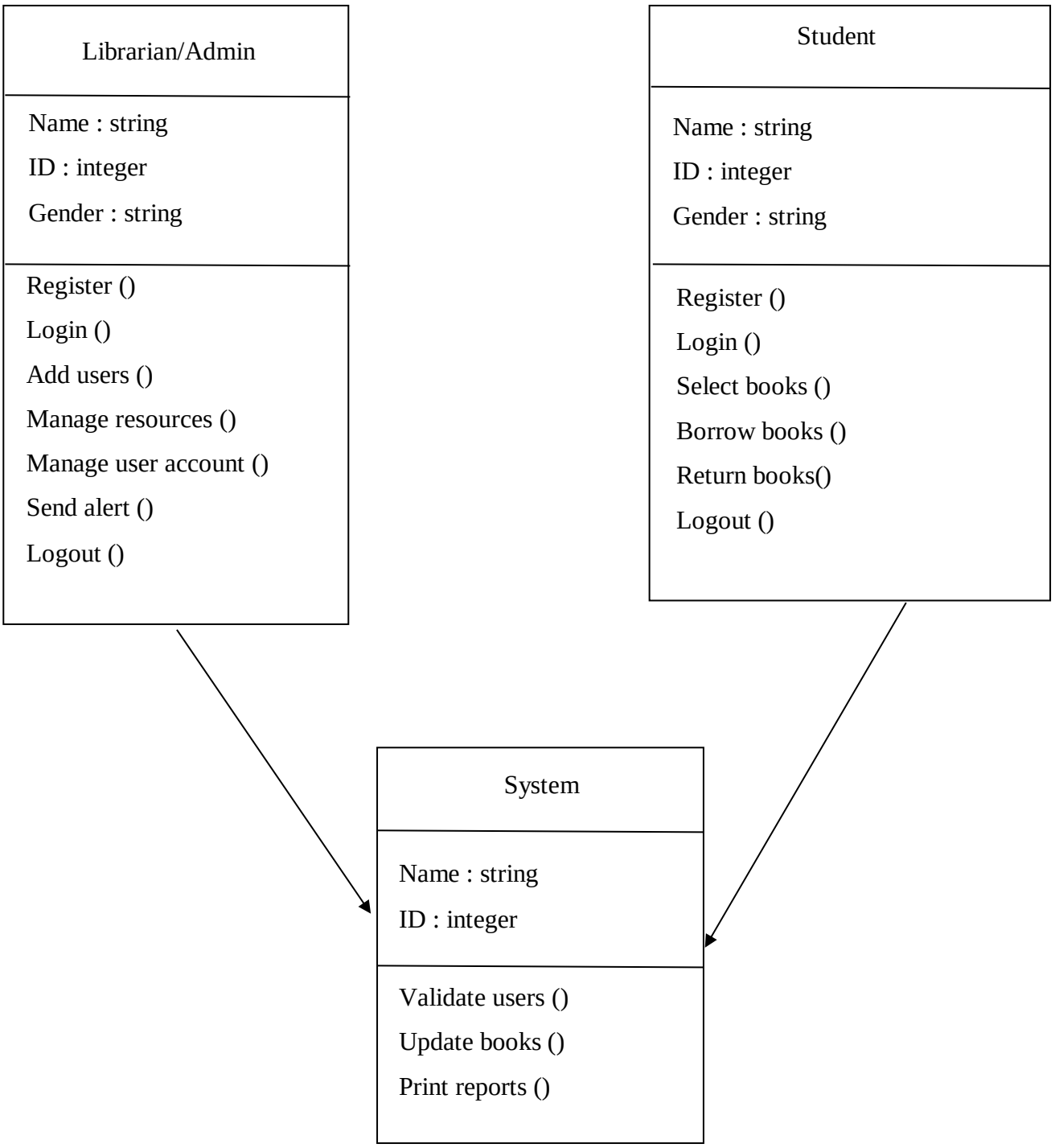


Figure 3.2 use case diagram

Justification of the system design approach

The developer preferred rapid application methodology because it was developed to respond to the need to deliver system very fast with minimum cost. In addition, RAD tends to shorten the development cycles and minimize defects because case tools may generate much of the code or other pre-designed application

The following are the reason as to why RAD has been chosen as the system development methodology for this project.

i. Capacity will be utilized to meet a specific and urgent business need
ii. High quality system will be delivered because of the methodology, tools and user involvement.
iii. Standards and consistency can be enforced through the use of case tools.

3.3 Logical design

This pertains to an abstraction representation of data flows input and input of the system. It is a graphical representation of the system showing the system's processes and the data flow in and out of the process.

The proposed information system will be modeled with:

1. Use case diagram
2. Class diagram
3. Activity diagram
4. Sequence diagram
5. Data flow diagram

Use case diagram

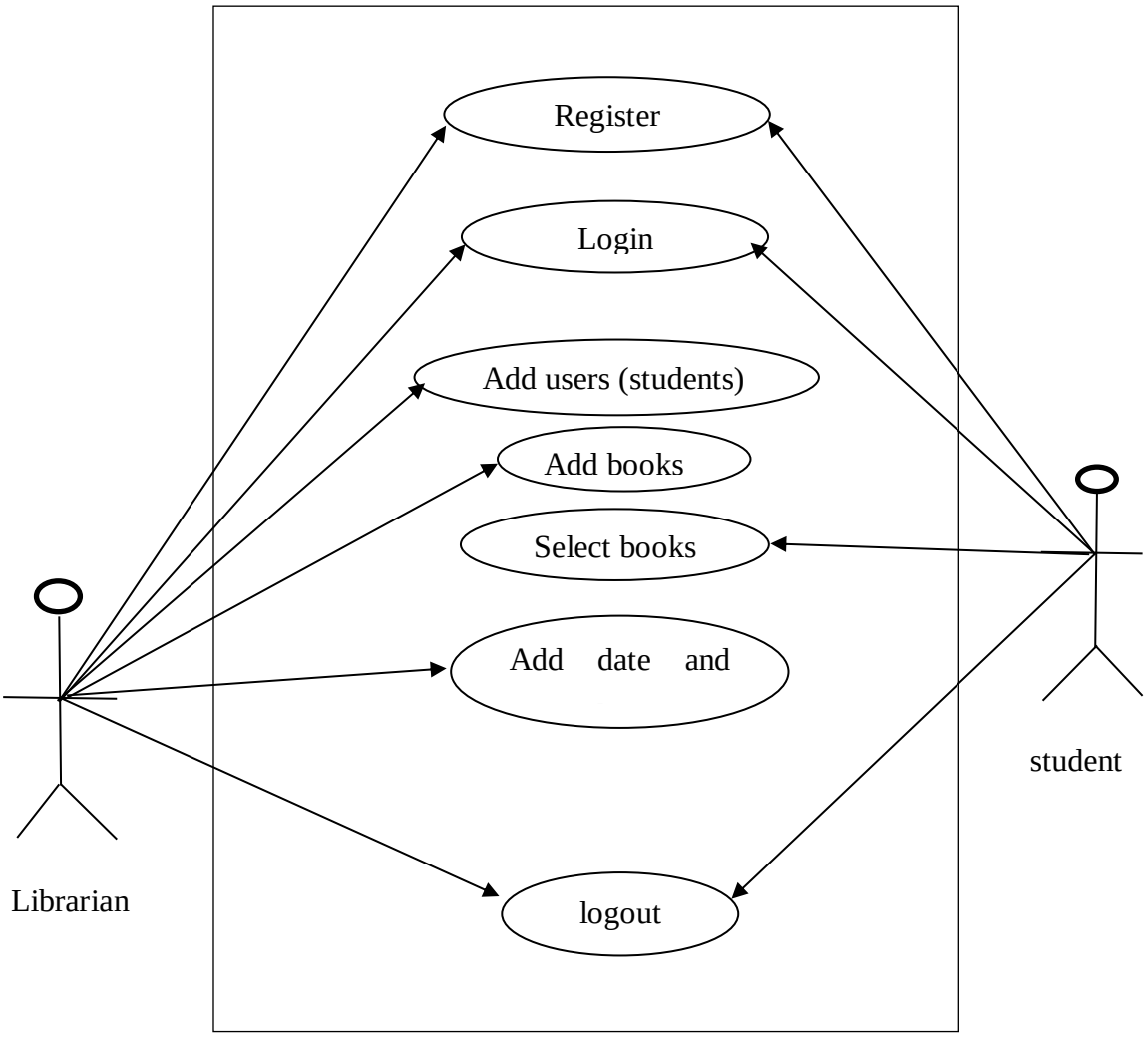


Figure 3.3 use case diagram

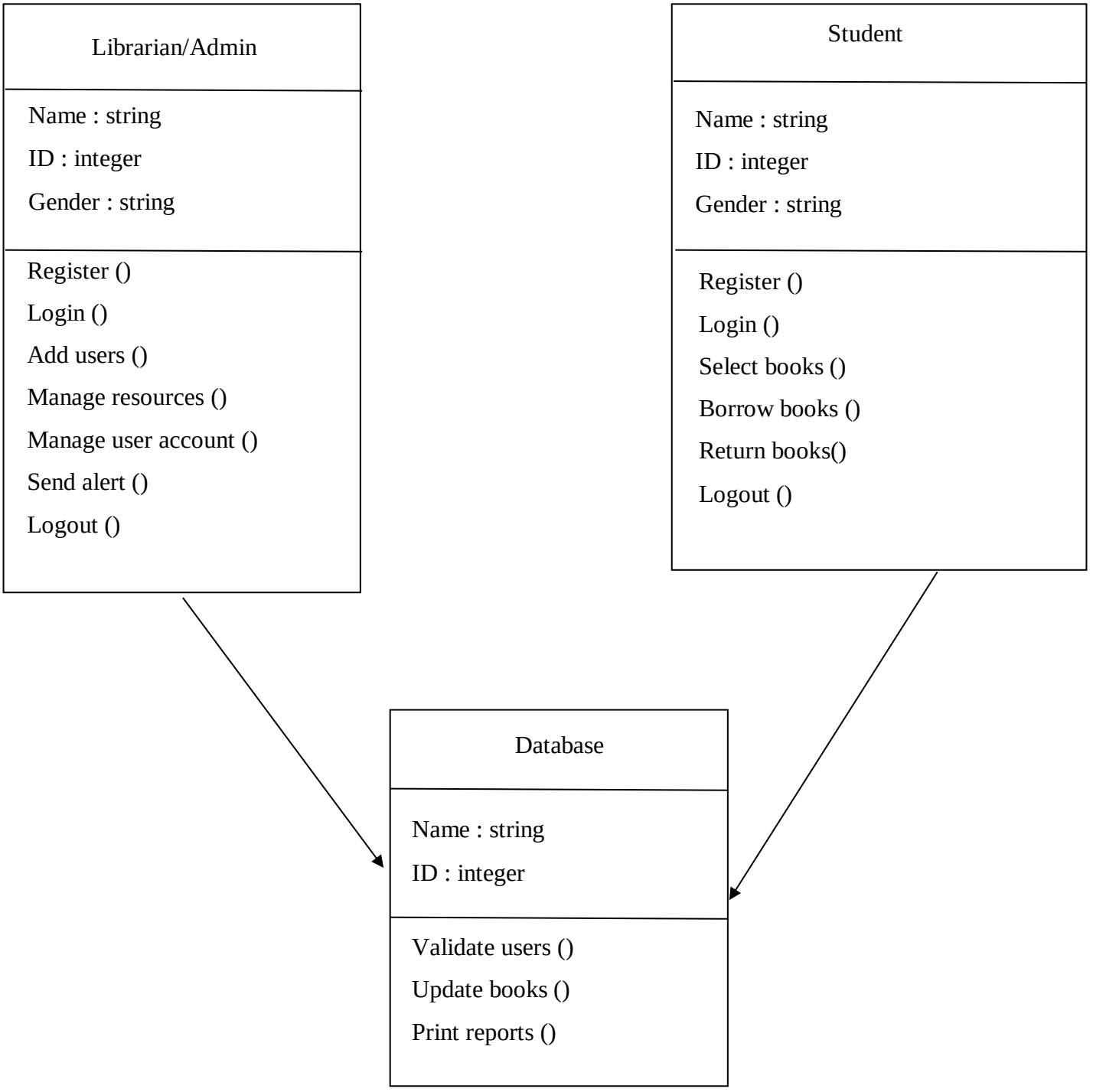


Figure 3.4 class diagram

Activity diagram

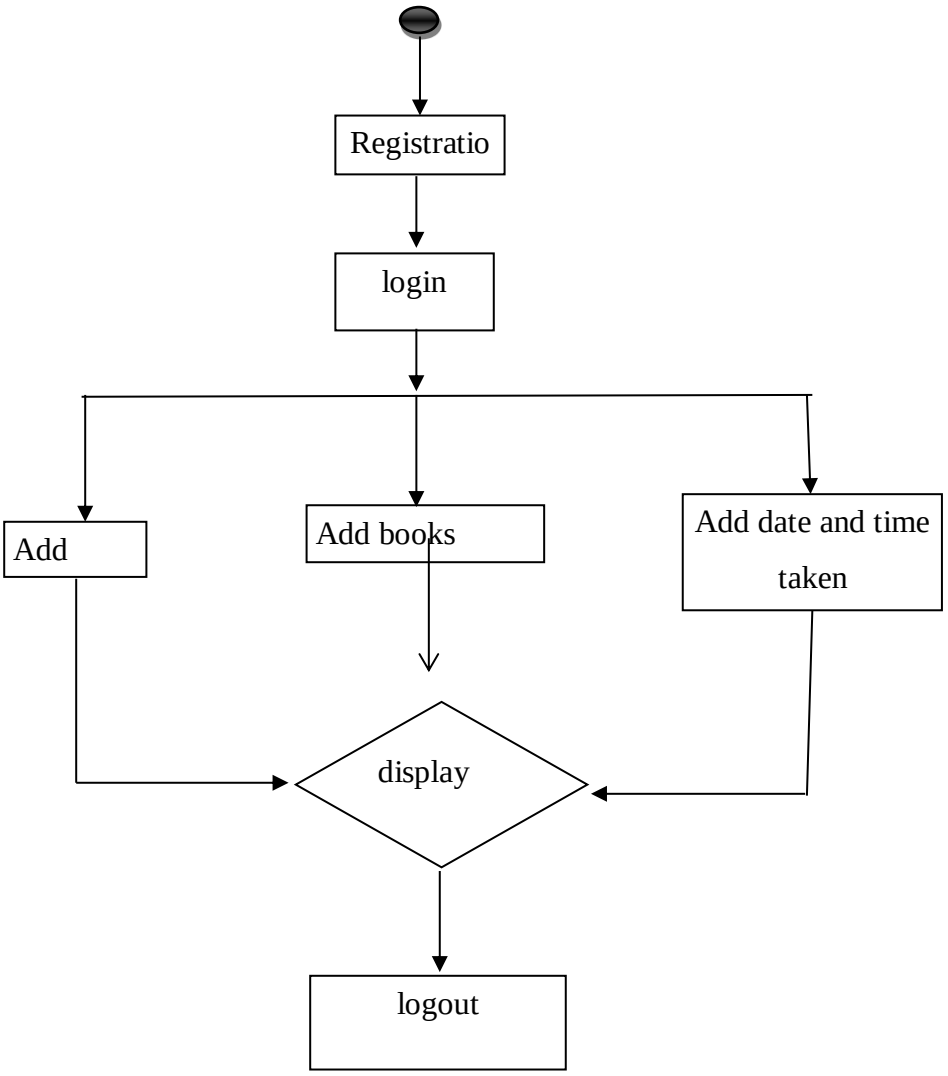


Figure 3.5 activity diagram

Sequence diagram (for librarian)

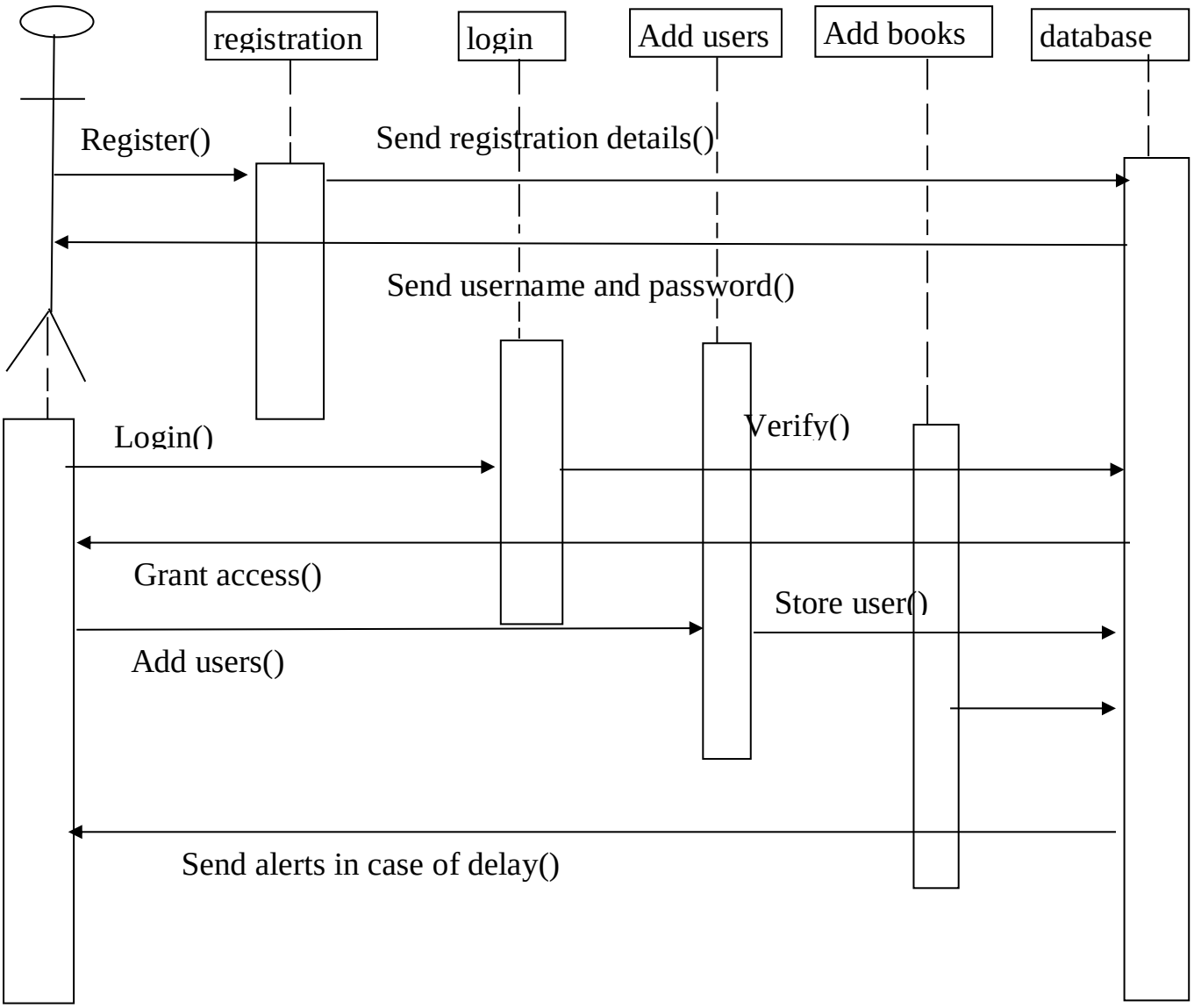


Figure 3.6 sequence diagram for librarian

Sequence diagram (for student)

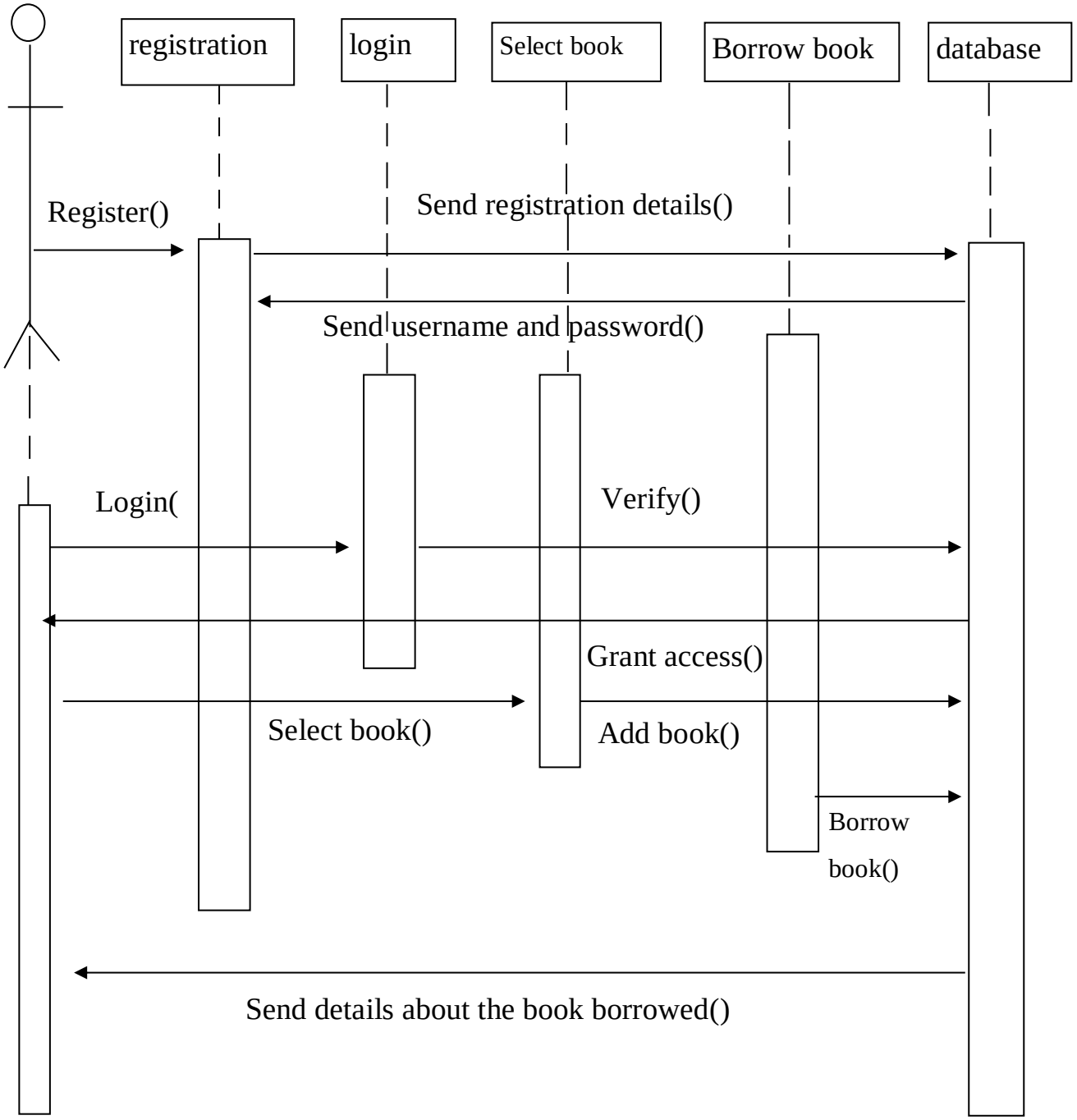


Figure 3.7 sequence diagram for student

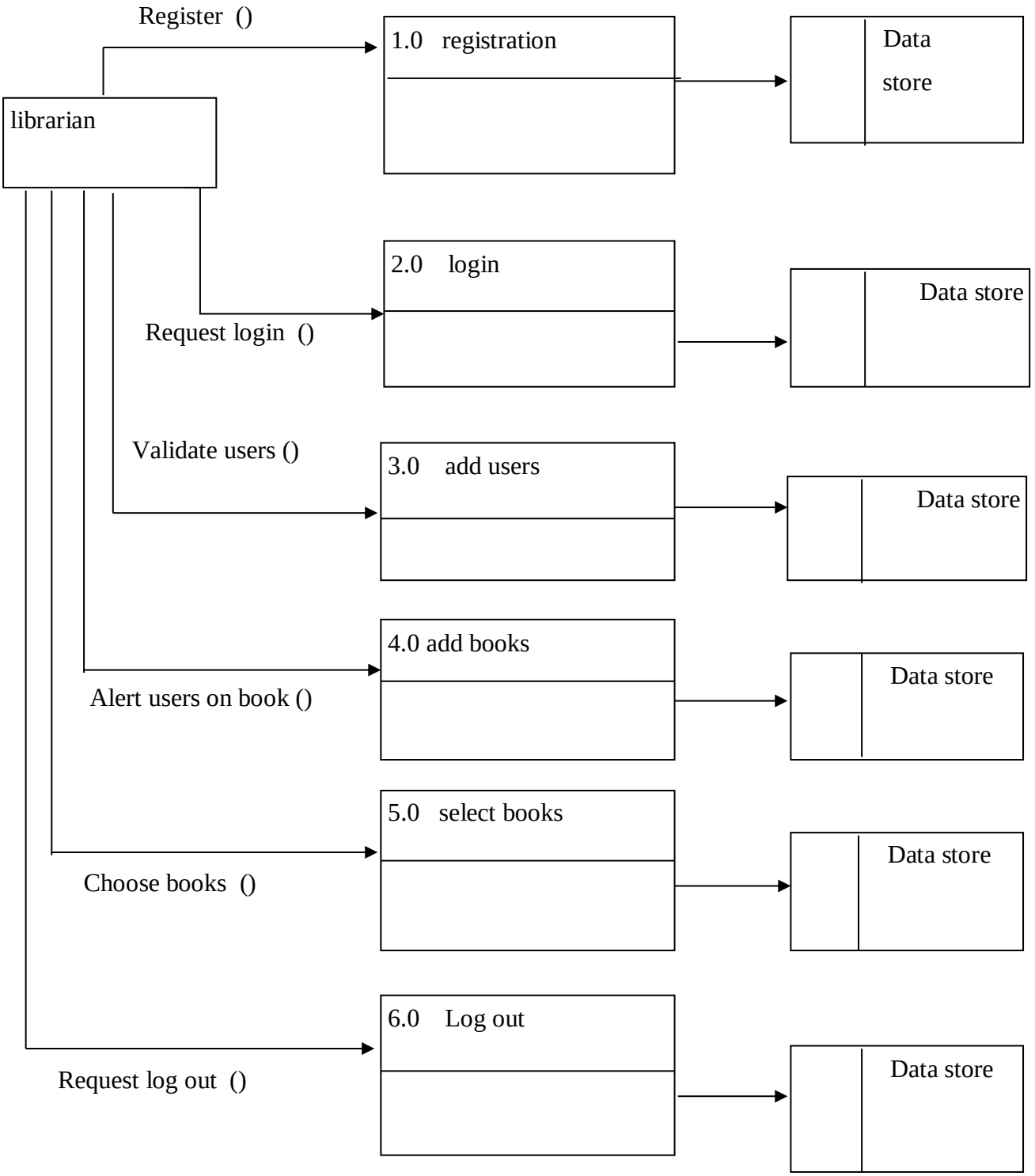


Figure 3.8 data flow diagram level 1(for librarian)

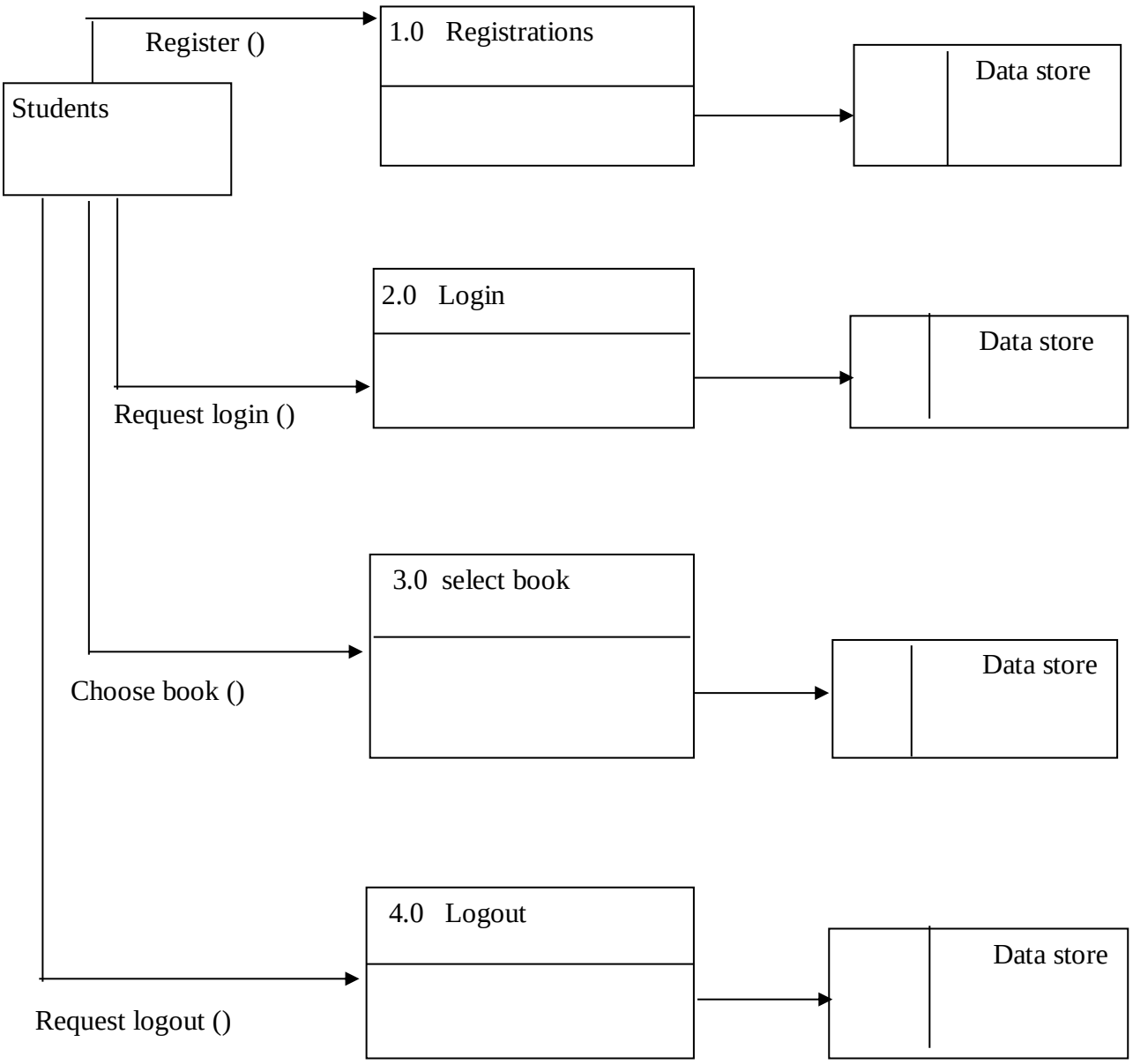


Figure 3.9 data flow diagram level 1(for students)

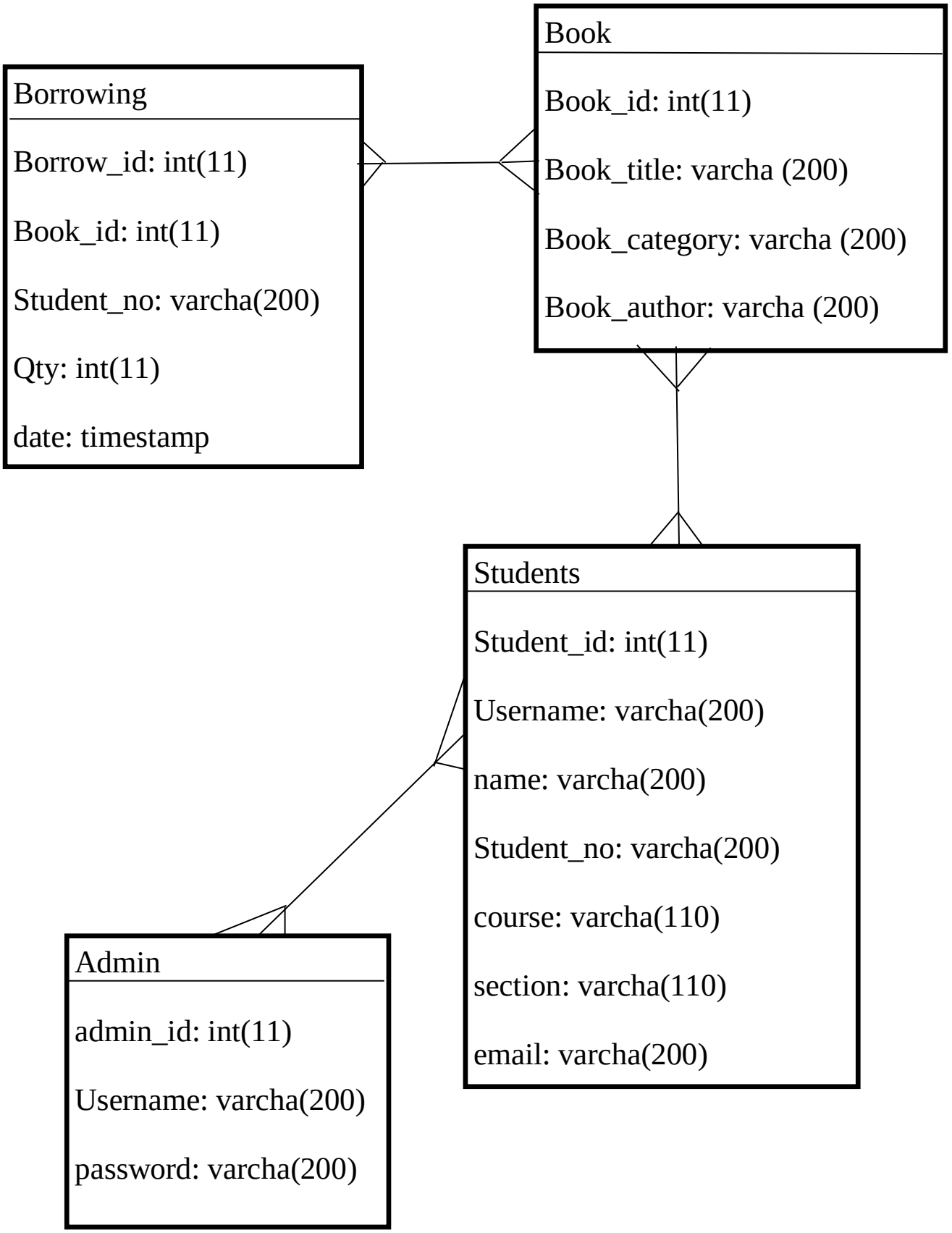


Figure 4.0 Entity Relationship Diagram

3.3.4 Data base design

3.1 Table name: users

Table 1: USERS

Fields	Data type	Description
User_id	Int(10)	unique identifier of the user table
Username	Varcha(20)	username of the user
Password	Varcha(20)	password of the user
First_name	Varcha(20)	first name of the user
Middle_initial	Varcha(20)	middle initial of the user
Last_name	Varcha(20)	last name of the user
Sex	Enum('male','female')	sex of the user

3.2 Table name: registration

Table 2: REGISTRATION

Fields	Data type	Description
User name	Varcha (20)	Username of the user
Phone No.	Int(10)	Phone number of the user
Email	Varcha (30)	Email of the user
Sex	Enum ('male','female')	Sex of the user

3.3 Table name: books

Fields	Data type	Description
Name	Varcha (20)	name of the book
Title	Varcha (20)	Title of the book
Authors name	Varcha (20)	Name of the author
Year	Int (5)	Year of publisher

3.4 Table name: Alerts

Fields	Data type	Description
Email	Varcha (20)	Email of the user
Phone No.	Int(10)	Phone number of the user

CHAPTER FOUR

SYSTEM IMPLEMENTATION AND TESTING

4.1 Introduction

This is a particular stage whereby the development of the system takes place. The objective of the chapter identifies suitable code and the best programming language. It entails the coding environment and debugging techniques to deliver a system that is intended by the user when the system runs.

The environment should be conducive in building the system that will satisfy user requirement and describe implementation task

4.2 System Development

The system development includes analysis in which it defines project goals into defined function and operations of the intended system. System design which describes features and operations in detail. Development where the real code is written, testing and deployment where the system is checked for errors and put into production and maintenance where the system is assessed to ensure it doesn't become obsolete.

4.2.1 Home page

This is the home page of the developed system. In this page, a user or a potential member gets to view Tebotech Training Institution library

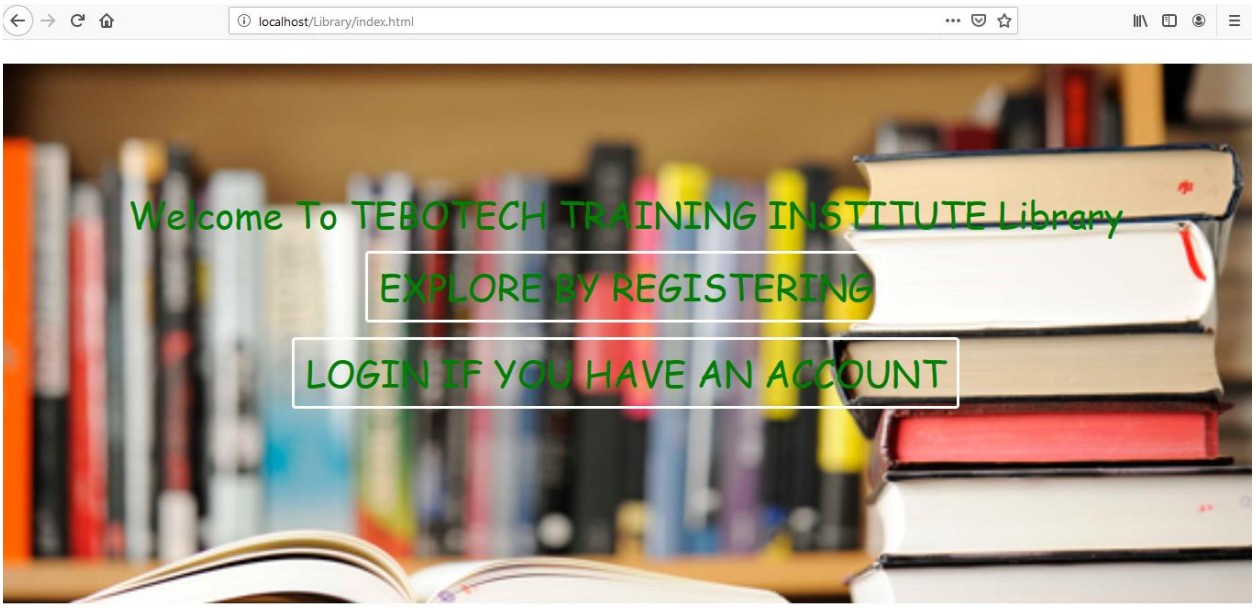


Figure 4.1 home page

4.2.2 Admin login page

The administrator is required to fill his/her username and password in the placeholders space to be logged in.

Figure 4.2 Admin login page

4.2.3 Students Registration Page

This is the registration page of the developed system. In this page, a new user needs to sign up by providing all their personal information accordingly. Existing user can login with their proper username and password.

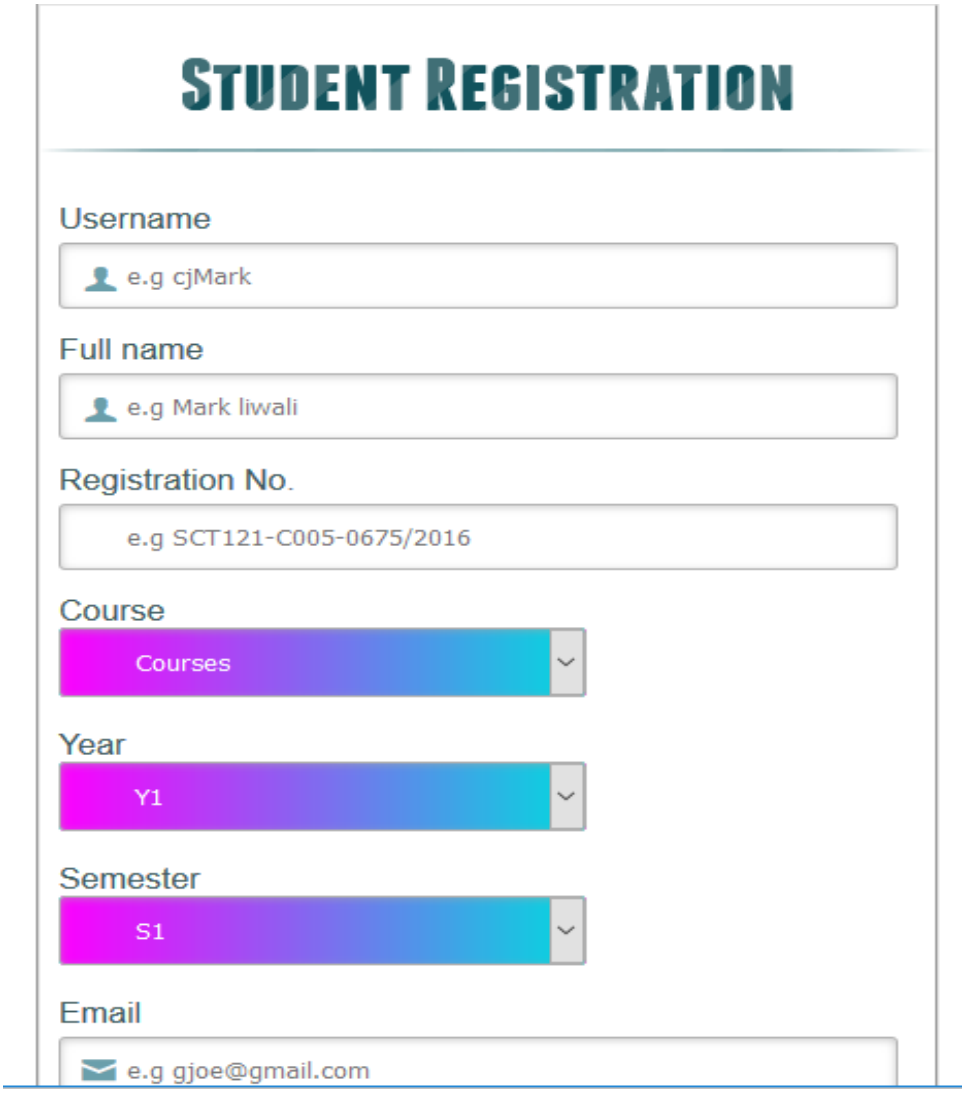


Figure 4.3 students registration page

4.2.4 Students Login page

This is the login page of the system. In this page, a member needs to sign up by using their proper login credentials.

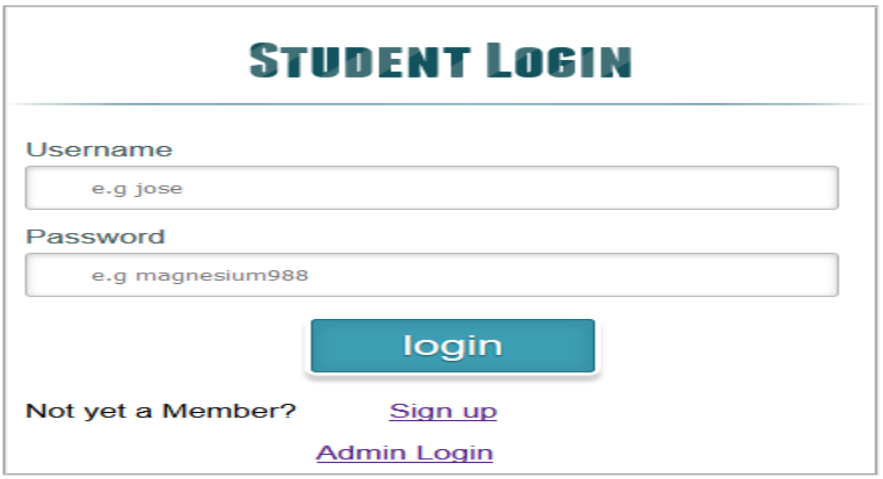


Figure 4.4 students login page

4.3 System Implementation

This is the construction of the new system and delivery of that system into operation. For an implementation process to be successful certain tasks are needed to be accomplished in a sequence that makes them run successfully.

4.4 System test

This is where the behavior of the whole system is tested by the scope of the development of project. It may include test based on the risks or requirement specifications or other high level description of the system behavior, interaction with the operating system and system resources.

4.4.1 Testing strategies

The system is tested according to the following levels in order to check if it meets the user requirement and function as required.

4.4.2 Unit testing

The different modules of the system shall be tested independently during development. Each module shall be tested on completion to establish if each module meets its specifications, any error shall be corrected at modular level and also check the database to ensure it has its details.

4.4.3 User Interface design

The results of figure 4.5 below indicates that 87.5 % of the respondents were satisfied with the overall user interface design while 12.5 % of the respondents were somehow satisfied but

suggested some improvement. This shows that the users approved on the user interface design in terms of the readability and clarity.

Table 1 user interface design rate

User interface efficiency	Respondent	percentage (%)
1 Satisfying	23	87.5
2 Needs improvement	7	12.5
3 Total	30	100

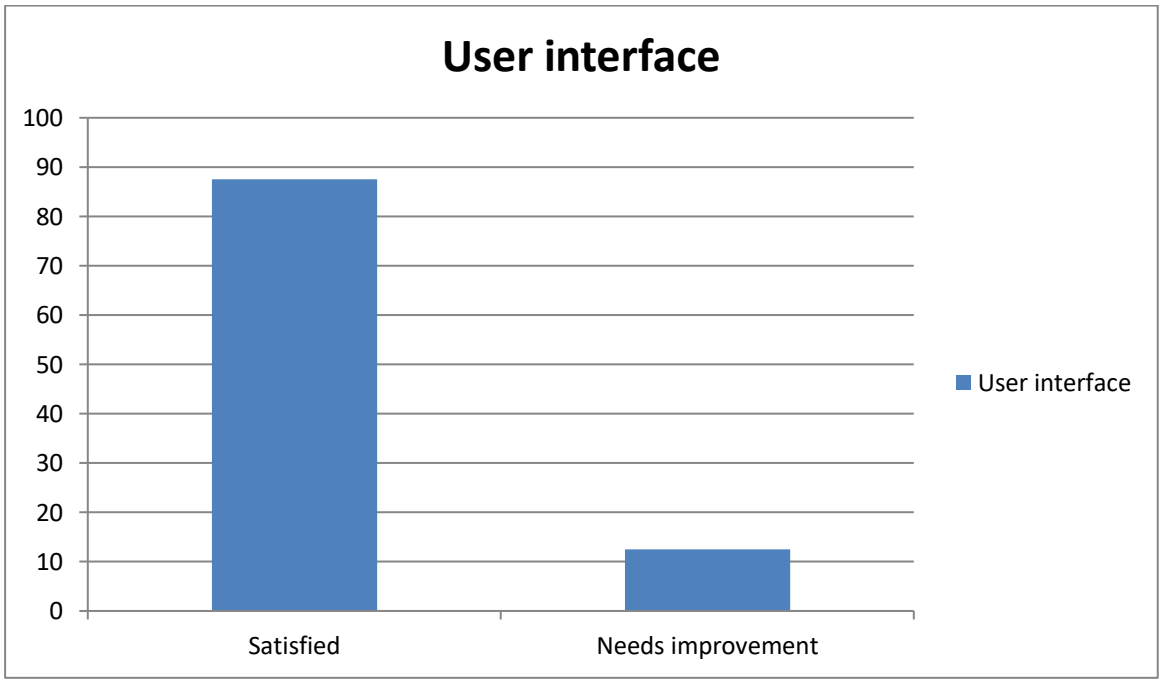


Figure 4.5 User Interface Design

4.4.4 System functionality

This was investigated asking respondents whereby 30 of the respondents of the population sampled accepted the user interface. 5 % of the 30 respondents found the system acceptable while 95% of the respondents found the system user interface very acceptable.

Table 2 system functionality

System functionality	Respondent	percentage (%)
1 Acceptable	5	5
2 Very acceptable	25	95
3 Total	30	100

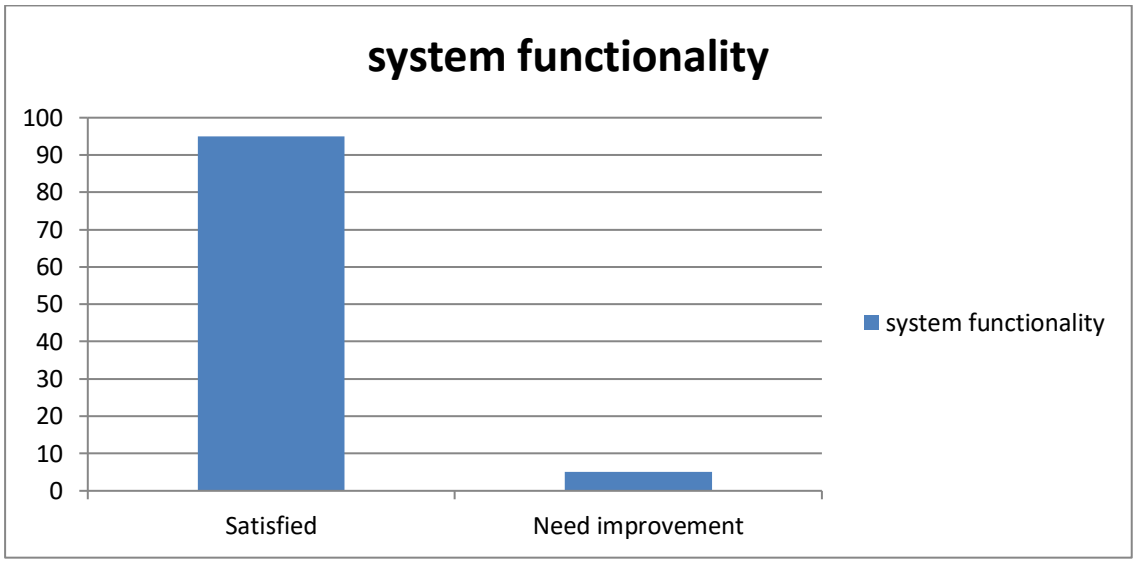


Figure 4.6 User Interface Design

4.4.5 User response on platform features

This was investigated by asking the 40 of the respondents to comment on the overall platform features of the system that was broadly categorized into the system functionality. After testing the system on different platforms 8 of the respondents said the system is good while 32 of the respondents said its excellent.

The responses were tabulated in the system by the respondents and presented by frequency table.

Table 3 User response on platform feature

Platform	Respondent	percentage (%)
1 Good	8	15.7
2 Excellent	32	87.3
3 Total	40	100

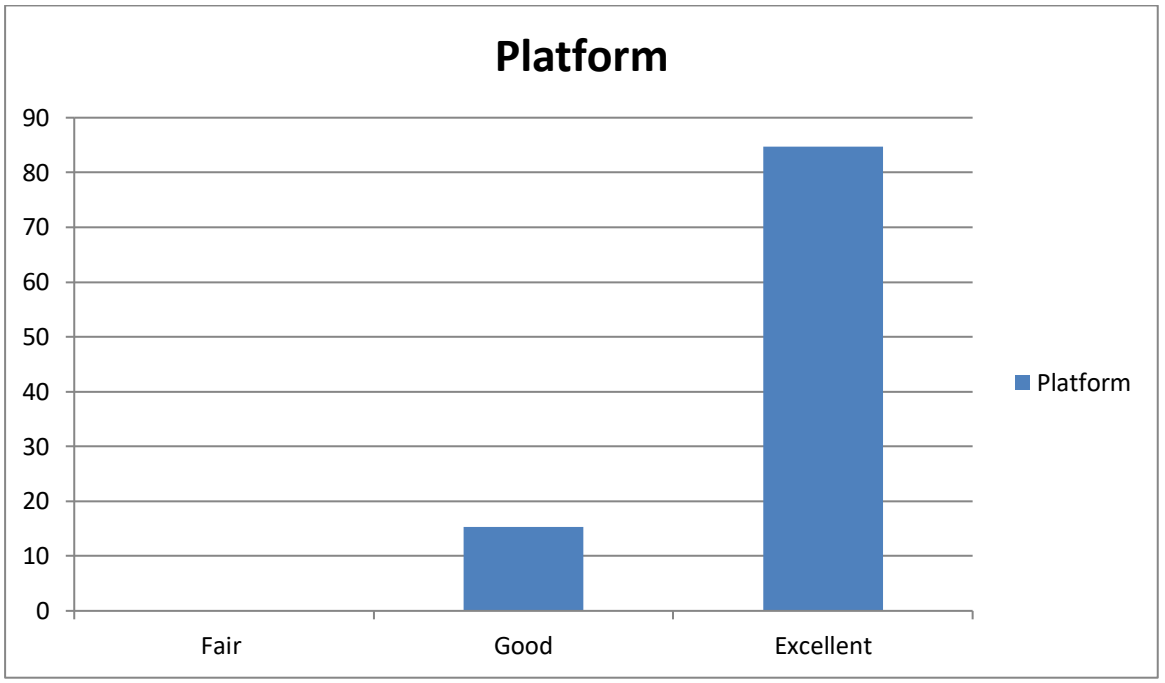


Figure 4.7 User Interface Design

4.4.6 System Testing

After each module is tested and integrated, various tests will be done on the system to ensure its continuity to the specifications. The system will be tested as a whole to ensure that it gives the expected output.

NO	Tested data	Expected results	Actual results
1.	Functionality	• Testing on registration users were expected to sign up and login the system • Users tested the functionality of the system to check whether they met their expectations or any improvement is required	• 10 out of 10 were able to sign up and login the system. • 9 out of 10 were satisfied with the functionality of the system
2	Interface design	• Testing on buttons, links and colors of the interface users were expected to give feedback from the interface • Users were expected to comment on how comfortable they were with the system	• 9 out of 10 users were pleased with the interface • 8 out of 10 users were comfortable with the system.
3	Platform	• Testing on different platform, users were expected to be able to access the system • Overall satisfaction with the system	• 9 out of 10 were able to access the system on different platform. • 8 out of 10 preferred the automated system to the manual system

4.5 System Coding

Coding translates the design into source code for functional units in design. The system is developed using PHP(Hypertext Preprocessor), HTML, Java script and MSQL for database.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is about the constraints, conclusion, future enhancement and recommendations of the online library management system.

5.2 System Constraints

Throughout the development of the online library management system, a few areas were overlooked by the researcher. Some of the limitation can be presented as follows;

Accessing research materials

Accessing associated research materials was a challenge. This was particularly case because of the limited variety of books in relation to the research topic in local library and online journal.

Understanding Key Concept

Limitation as far as understanding the key concept also posed a major challenge. Considering the fact that most of the concept were new, the researcher had to spend a considerable amount of time learning the concept. This took away a lot of valuable time that would otherwise be fully dedicated to the design of the system.

Programming Languages

Learning PHP and MYSQL requires considerable practice for one to gain the programming skills. With limited knowledge and ability, the programming progress was rather slow and this limited the number of functionalities that the researcher could implement into the system.

5.3 Summary

The project named Library management information system is developed on the basis of the manual system currently being used at Tebotech Training Institution. All information about the institutions library are recorded manually in books and sheets of paper leading to data loss, inconsistency during data entry, where information is stored in files creating rooms for filling cabinets which has accumulate more space in the library, whereby this has been solved by use of web based application system.

In cases like data retrieval by library users the system has improved the speed through the use of computer technology whereby all information will be stored in a computer compared to the manual one. Through users registration to the system will enhance system security.

5.4 Recommendation

A few additional components and functionalities can be included in the system in future. They may include;

i. Ability to send alerts in case of the delay of the book i.e how will the system reflect?
ii. Produce a report showing the amount paid for the penalties and available books and registered students.
iii. During data collection some of students requested to have a mobile in order to borrow books.

5.5 Conclusion

In conclusion, from a proper analysis and assessment of the developed system, it can be safely concluded that the system is usable and reliable for library management information system for the Tebotech Training Institute. It is working properly and adequately meets the minimum expectation that were set for it initially. The new system is expected to give benefits to the institution in terms of performance and record management.

REFERENCES

Maness, J. M. (2006). Library 2.0 theory: Web 2.0 and its implications for libraries. Webology, 3(2).

Rafique, H., Almagrabi, A. O., Shamim, A., Anwar, F., & Bashir, A. K. (2020). Investigating the acceptance of mobile library applications with an extended technology acceptance model (TAM). Computers & Education, 145, 103732.

Abdul Rahman, A. R., & Mohezar, S. (2020). Ensuring continued use of a digital library: a qualitative approach. The Electronic Library, 38(3), 513-530.

Cowell, J. (2021). Managing a library service through a crisis. Library Management, 42(4/5), 250-255.

Ensslin, L., Dutra, A., Ensslin, S. R., Moreno, E. A., Chaves, L. C., & Longaray, A. A. (2022). Sustainability in library management in higher education institutions: a bibliometric analysis. International Journal of Sustainability in Higher Education, (ahead-of-print).

Ensslin, L., Dutra, A., Ensslin, S. R., Moreno, E. A., Chaves, L. C., & Longaray, A. A. (2022). Sustainability in library management in higher education institutions: a bibliometric analysis. International Journal of Sustainability in Higher Education, (ahead-of-print).

Okeji, C. C., & Mayowa-Adebara, O. (2021). An evaluation of digital library education in library and information science curriculum in Nigerian universities. Digital Library Perspectives, 37(2), 102-118.

Leung, T. N., Chiu, D. K., Ho, K. K., & Luk, C. K. (2022). User perceptions, academic library usage and social capital: a correlation analysis under COVID-19 after library renovation. Library Hi Tech, 40(2), 304-322.

Mehta, D., & Wang, X. (2020). COVID-19 and digital library services–a case study of a university library. Digital library perspectives, 36(4), 351-363.

Leung, T. N., Chiu, D. K., Ho, K. K., & Luk, C. K. (2022). User perceptions, academic library usage and social capital: a correlation analysis under COVID-19 after library renovation. Library Hi Tech, 40(2), 304-322.

Kamble, V. T., & Raj, H. (2012). Open Source Library Management and Digital library software.

Longwell, B. (2010). Coming soon to a library near you: An open source ILS.

Tilley, S. (2019). Systems analysis and design. Cengage Learning.

Diniz, P. S., Da Silva, E. A., & Netto, S. L. (2010). Digital signal processing: system analysis and design. Cambridge University Press.

Kendall, K. E., Kendall, J. E., Kendall, K. E., & Kendall, J. A. (2002). Systems analysis and design (Vol. 4). Upper Saddle River, NJ: Prentice Hall.