

**DESIGN AND IMPLEMENTATION OF A WEB-BASED
E-LIBRARY SYSTEM**

BY

IYOHA CHRISTOPHER OSEGALE

(PSC1707510)

DEPARTMENT OF COMPUTER SCIENCE,

FACULTY OF PHYSICAL SCIENCE,

UNIVERSITY OF BENIN,

BENIN CITY.

DECEMBER, 2022.

**A PROJECT REPORT ON:
DESIGN AND IMPLEMENTATION OF A WEB-BASED
E-LIBRARY SYSTEM**

BY

IYOHACHRISTOPHEROSEGALE

(PSC1707510)

**A PROJECT REPORT SUBMITTED TO THE DEPARTMENT
OF COMPUTER SCIENCE, IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF
SCIENCE DEGREE (B. SC) IN COMPUTER SCIENCE,
FACULTY OF PHYSICAL SCIENCE, UNIVERSITY OF BENIN,
BENIN CITY.**

DECEMBER, 2022.

CERTIFICATION

This is to certify that this project work was carried out by IYOHA CHRISTOPHER OSEGALE under my supervision and it is adequate in scope and context for the award of Bachelor of Science degree in Computer Science of the University of Benin.

.....

PROF. SUSAN KONYEHA.
(PROJECT SUPERVISOR)

.....

DATE

APPROVAL

This project work is here by approved in partial fulfillment of the requirements for the award of the Bachelor of Science (B. Sc) degree in Computer Science of the University of Benin.

.....

PROF. Prof. Mrs A.O. Egwali

(HEAD OF DEPARTMENT)

.....

DATE

DEDICATION

This project work is dedicated to God Almighty, the giver of life who helped in carrying out this project work successfully.

I also want to dedicate this project work to my parents Mr. and Mrs. Iyoha for their support throughout my stay in the University.

ACKNOWLEDGEMENT

My sincere gratitude goes to Almighty God, for granting me the grace and mental prowess to complete this project. This project completes another milestone in my academic career. I sincerely appreciate the continuous support of my parent, Mr. and Mrs. Iyoha.

I also wish to appreciate the Head of Department, Computer Science, Prof. (Mrs.) A. O. Egwali. It is pertinent at this junction to appreciate the efforts of my project supervisor, Prof. (Mrs.) S. Konyha, for her support and guidance through the course of this project.

I also wish to appreciate the lecturers of the department of Computer Science , Prof. (Mrs.) V. A. Akukuma, Prof. G.O. Ekuobase, Prof. (Mrs.) F. A. Egbokhare, Prof A.A Imianvan, Prof. G. O. Ekuobase, Prof.(Mrs.) A. O. Egwali, Prof. F. I. Amadin, Prof. K. C. Ukaoha, Engr. Dr. F. A. U. Imouokhome, Dr. (Mrs.) V.I Osubor, Dr. F.O. Chete, Mr. P.E.B. Imiefoh, Mr. E. E Obasohan, Dr. (Mrs.) G. Aziken, Mr. E. Nwelih, Mr. S.O.P Oliomogbo, Mrs. A. R. Usiobaifo, Mr E. C. Igodan, Dr. F. O Oliha, Dr J. C. Obi, Dr. E. P. Ebietomere, Dr. (Mrs.) R. O. Osasri, Mr. K. O. Otokiti, Miss I. O. Usiosofe, Mrs. T. Agenmomen, Mr. F. Osagie, Mr. I. E Obayagbona. For their relentless service to the students of the Department.

TABLE OF CONTENT

CERTIFICATION	III
APPROVAL	IV
DEDICATION	V
ACKNOWLEDGEMENT	VI
CHAPTER 1	1
1.0 INTRODUCTION	1
1.1 Background of Study	1
1.2 Library System	3
1.3 Why Web-Based E-Library System	4
1.4 Statement of the Problem	5
1.6 Aim of the Study	6
1.7 Objectives of this Study	6
1.8 Scope of the Study	6
1.9 Significance of the Study	7
1.10 Limitation of the Study	7
1.11 Definition of Terms	7
CHAPTER 2	10
LITERATURE REVIEW	10
2.0 Introduction	10
2.1 E-Library	10
2.2 History	10
2.3 Types of Libraries	14
2.4 Types of Digital Libraries	16
2.5 Functional Components of Digital Library	18
2.6 Comparison of Online and Traditional Physical Libraries	19
2.7 Review of Related Work	20
CHAPTER 3	23
SYSTEM ANALYSIS, DESIGN AND METHODOLOGY	23
3.1 System Analysis	23

3.2 Research Methodology	23
3.3.0 Method of Data Collection:	24
3.3.1 Primary Source	24
3.4 Analysis of the Existing System	24
3.4.1 Problems of Existing Systems	25
3.5 Analysis of Proposed System	25
3.5.1 Objectives of Proposed Systems	26
3.5.2 Justification for New System	26
3.6 System Development Life-Cycle	27
3.6.1 Requirement Analysis	27
3.6.2 System Design	28
3.6.3 Implementation	28
3.6.4 Integration and Testing	28
3.6.5 Deployment	28
3.6.6 Maintenance	28
3.7 Software and Hardware Design Requirements	29
3.7.1 Software Requirements	29
3.7.2 Hardware Requirements	29
3.8 Functional Requirements	30
3.8.1 Non Functional Requirements	30
3.9 System Design	31
3.9.1 Frontend	31
3.9.2 HTML	31
3.9.3 Cascading Style Sheet	32
3.9.4 JAVASCRIPT	33
3.9.5 Advantages of JavaScript	33
3.9.6 Limitations of JavaScript	34
3.10 BACKEND	34
3.10.1 PHP	34
3.10.3 How PHP works	36
3.10.4 Features of PHP	37
3.11 Tools Used in Developing the System	38
3.11.1 MySQL	38

3.11.2 BOOTSTRAP	38
3.11.3 Why use Bootstrap	39
3.11.4 Visual Studio Code	39
3.11.5 XAMPP Server	39
3.12 System Architecture	41
CHAPTER 4	45
SYSTEM IMPLEMENTATION AND RESULT ANALYSIS	45
4.0 Introduction	45
4.1 System Testing	45
4.2 Output and Input designs of the System	45
4.2.1 Home Page	45
4.2.2 Admin Page	48
4.2.3 Dashboard	48
4.2.4 Request Page	51
4.2.5 Materials and past questions	52
4.2.6 php dashboard	53
CHAPTER 5	54
SUMMARY, CONCLUSION, AND RECOMMENDATIONS	54
5.0 Summary	54
5.1 Conclusion	54
5.2 Recommendation	54
Reference	56

ABSTRACT

Libraries are an essential part of academic and records region of any school. The fulfillment of any library in large part relies upon on right management.

This project work aims at the creation of web based library management system that will encourage e-learning by providing access to a wide variety of digitalized materials, articles, past questions and more to various researchers and students.

This was created to solve the ever increasing demand of information by students and researchers in the University of Benin. With the E-library system we now have the capacity to process, organize and provide information faster and more detailed to users. Thereby saving cost and increasing the accessibility level of information not just in the institution but on a global stage.

CHAPTER 1

1.0 INTRODUCTION

Information is defined by oxford as fact or detail about a particular subject. Despite it availability, access to the desired information in our institutions prove difficult if not impossible, therefore to curb this scourge the use of web technology to facilitate the creation of a e-library management system is employed.

1.1 Background of Study

The internet was created as a hub for information with the intention that it would facilitate interpersonal contact. Initially, a library was simply a repository for books and other documents that were typically off-limits to users. It took a while before libraries began offering document delivery services, and circulation entered the picture. There were significant changes to library services starting in the middle of the 19th century, and many new services entered the picture. The introduction of computers in the middle of the 20th century resulted in a significant shift in the way libraries provided their services. Information services predominated more and more. In the 20th century, a brand-new service model emerged that offered internet services.

Web-based library services are those that are offered through a specific website that is available online and that allows for seamless access to numerous databases. According to Madhusudhan, (2012) “Web based Library Services means library services provided using internet as medium and library website as a gateway with the help of integrate library management system.” White, (2001) has defined web based services as an information service in which users ask question via electronic means e.g email or web forms. Customer who use web based library services benefit from the convenience of information access on their own timetable, saving money and time on

travel while also having additional opportunities to find solutions to their problems. These services are not constrained by regular business hours and can be provided whenever it is needed.

According to Sangale, 2015 web based services are established due to following reasons:

- “Making sure that the information sources available and the demands of the users are always compatible;
- Supplying the users with those information sources in a timely and suitable manner;
- Ensuring the information provided is high quality, accurate and appropriate;
- Assisting the user in interpreting the materials, if necessary;
- Promoting user awareness of new services and information sources as they develop;
- Providing users with individualized guidance and support as they build their information research and application skills.”

Digital technology have recently made it possible for us to digitalize and visualize content on the internet. With the use of the internet, computers can make a significant amount of information accessible to the World Wide Web community.

Businesses, institutions, the government, and individuals have all benefited immensely from the employment of computers as machines to carry out their tasks more easily. The internet will be used extensively in this study for both educational and research purposes. Digital libraries that are primarily web-based are already in use in significant educational institutions around the world.

A World Wide Web library is a typical example of a web application. Web applications have gradually started to replace standalone applications for the sake of the advantages they provide.

There have always been digital libraries long before the existence of the internet in the western world. Due to the numerous advantages measured up to web-based digital libraries they are commonly used technology among students today.

1.2 Library System

A space or structure where books are kept and used as references is referred to as a library. It is a hub of diverse activity related to book management. As a storehouse of knowledge, libraries contain collections of books both specialized and general, as well as technical reports, periodicals, journals, conference papers, and other materials. As a result, using the aforementioned resources, one can discover and obtain knowledge from the library. The informational content of any collection can be preserved on microfilms, audiotapes, microchips, and other materials that are typically kept in the library. The library is responsible for acquiring, organizing, maintaining, and judiciously distributing books and other library materials through the different sections of the library to ensure that users can use the library effectively.

The library's acquisition, cataloging, and circulation departments are responsible for, respectively, acquiring, categorizing, keeping, and circulating books and library items. When a book is purchased by the library through its acquisitions department, a record of the purchase is made, and the book is given an accession number. Next, the book is sent to the library's cataloging department for cataloging. Before the book is sent to the library's circulation section, depending on the situation, it will first be properly examined and given a catalog number under this section. The distribution or circulation of books is under the purview of the circulation department.

Other components include the reference section, which answers queries about references and offers a bibliographic service, and the serial section, which contains periodicals, journals, and

related items. The distribution or circulation of books is under the purview of the circulation department.

Other components include the reference section, which answers queries about references and offers a bibliographic service, and the serial section, which contains periodicals, journals, and related items. Additionally, the library maintains special collections and manages the circulation system through which books are borrowed by patrons. In reality, it is a hub for a variety of book management tasks.

1.3 Why Web-Based E-Library System

An e-library is a collection of documents made accessible electronically through the application of digital technologies that enable their retrieval, archiving, preservation, and distribution. This digital information requires little physical room to store it. It has the potential to hold considerably more information than traditional/manual libraries, which are constrained by storage capacity. As a result, the expense of keeping a digital library can be far lower than that of a traditional/manual library. Large sums of money must be spent on employees, book upkeep, and extra volumes in a physical library.

a. No physical boundary:

As long as there is an Internet connection, everybody in the globe can access the same knowledge through a digital library without physically visiting the physical location.

b. Round the clock availability:

The fact that users can access the content whenever they want is a significant benefit of web-based libraries.

c. Multiple access:

Multiple students and staff members can utilize the same materials (such books, journals, and articles) at once.

d. Easily accessible:

User can access the e-library from the comfort of their homes and with their desired devices such as PC, mobile, tablets and more,

e. Information retrieval:

The student or staff is able to use any search term (word, phrase, title, name, and subject) to search the entire collection. Digital libraries can provide very user-friendly interfaces, giving clickable access to its resources.

1.4 Statement of the Problem

Numerous advancements, investigations, and discoveries made by humans result in a wide variety of publications and library resources. The complexity of the library system and its operations has increased as a result of these said advancements.

Based on these, the library systems are experiencing a number of issues, such as:

- a. Needless delays in library operations.
- b. Exorbitant salaries for hiring and maintaining staff.
- c. Operation or process errors.
- d. Ineffective management of the library.
- e. There is an excessive amount of paper work and data duplication.

- f. A card catalog system that is unreliable.
- g. Book destruction by students, such as tearing or concealing books.

1.6 Aim of the Study

The goal of this study is to construct a web based e-library, which will enable students and institution employees to easily access books and study materials in softcopy format. In addition to university staff having access to the library from the convenience of their various offices, students can complete their coursework and research projects without physically being present in the library.

To create an archive in order to store and preserve materials from educational instructors (lecturers) notes, past questions, textbooks and more.

1.7 Objectives of this Study

Nowadays, almost every facet of human activity benefits from computerization. Therefore, the following are the study's goals:

- i. To design a system that will assist the librarian in managing the vast library resources
- ii. To develop a catalogue system that will aid the user to search for resources easily
- iii. To provide a vast resource pool of academic resources for users
- iv. To provide library services with high levels of efficiency.
- v. To allow users (students and staff) access to library information at any time of the day that is convenient for them.

1.8 Scope of the Study

In order to make books, references, and study materials easily accessible to students and employees at the institution, this project examines the procedures involved in making them

available in portable document format (PDF). The study is primarily concerned with the activities taking place in the library's acquisition, cataloging, and circulation departments. Specific details like ISBN will only be included if necessary as this project aims to target note of Lectures and past questions or the University of Benin.

1.9 Significance of the Study

In order to improve the efficiency of the library system's operations, the study aims to create a new online library services system. Some of the issues with the outdated (manual) method of running and maintaining libraries will be resolved, including the expense of staffing and equipment upkeep, and it will also make it simpler for the institution to manage the library's business.

1.10 Limitation of the Study

This study will not look in detail into other sections of the library except the only three sections aforementioned. The intuitive works like reading of a book before classification and technical work like ownership stamping conveyance of books etc, will not be part of this study.

Time and Cost

1.11 Definition of Terms

The User: The user here refers to the library staff or the students who make use of the library. It also refers to the person who uses the program (e.g. library staff).

Administrator: The individual that manages the system

ISBN: International Standard Book Number. The ISBN is a unique machine-readable identification number, which marks any book unmistakably. First implemented in the U.K. in 1967, the ISBN is now used in 159 countries and territories.

Automation: It is a process of making a system to carry out its processes on its own without much help from man.

Web Application: Due to the development of recent technologies used on the internet, web applications have emerged for traditional application development. Web applications help in building dynamic and more compelling information on the web. They also promote the web browser as a single client application to perform various functions.

Internet: A network formed by the co-operative interconnection of a large number of computer networks. It is a network of networks and is own by no one or everyone that makes a connection to it vast network. It also has no central administration.

The internet comprises of people: who use and develop the network.

A collection of resources: that can be reached from those networks.

A setup to facilitate collaboration: among the members of the research and educational communities worldwide.

Module: An independent unit that is part of a larger development. It is the same thing as sub-tasks.

World Wide Web: It is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the internet.

PDF: A PDF (Portable Document Format) refers to a type of document. It is a universal file format developed by Adobe that preserves all the fonts, formatting, graphics, and color of any source document, regardless of the application and platform used to create it.

E-Books: An eBook is a non-editable, reflowable book that is converted to a digital format to be read on any digital device such as computer screens or mobile devices.

Bibliography: A list of resources used in writing a research paper or other document that appears at the end of the document. See also: Citation, Reference.

Journals or Journal Articles: A journal is a collection of articles (like magazine) that is published regularly throughout the year. Journals represent the most recent research, and journal articles are written by experts, for experts. Journals may be published in print or online formats or both.

Library Catalogue: A library catalogue or library catalogue is a register of all bibliographic items found in a library or group of libraries, such as a network of libraries at several locations.

Database: Database is a collection of interrelated data that helps in efficient retrieval of information, insertion and deletion of data from a database which organizes the data in the form of views, tables, schemas etc. A database is any organized collection of data.

Visual Library System: It is the interface of the web-application designed by researchers to manage library operations. It is a program designed with a visual programming language in which the user will make use of a mouse in operating.

Data flow diagram: This is a way of representing a flow of data through a process or a system. It also provides information about the outputs and inputs of each entity and the process itself.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter aims to give readers a solid understanding on the history of libraries, its evolution and current knowledge on web-based e-Library systems. The comparative analysis of the adoption of E-library systems will aid in the development of a user-friendly and secure system.

Many libraries have chosen the web-based library system because it makes it easier for them to manage both manual and physical library operations.

2.1 E-Library

As opposed to print, microform, or other media, an e-library or digital library can be thought of as a collection of digital objects like text, images, videos, audio, etc. that are stored in standardized and customized electronic media formats, along with tools for organizing, storing, and retrieving the contents at existing access points or on personal devices.

2.2 History

According to some historians, the advent of the first libraries signals the end of prehistory and the beginning of human history as it is known today. As early writing systems, such as Mesopotamian Cuneiform and later Egyptian hieroglyphs, were being developed by ancient civilizations like those of Mesopotamia and Egypt, scribes started to compile records of economic transactions and inventory on clay tablets.

These ancient writings may not sound inspiring or intellectual, yet they played a crucial role in expanding knowledge and the development of early human society. They frequently exchanged crucial knowledge needed to create society. These ancient scribes' amassed records so they could

refer to information as needed, including early medical diagnoses, inventory of annual harvest surpluses, and the rules that ruled city-states, such as the Code of Hammurabi.

As ancient civilizations developed techniques for producing paper, grand libraries were built to house the great collections of scrolls that governments and individuals began to develop. These great ancient libraries included the Library of Alexandria and the Chinese Imperial Libraries created during the Han Dynasty. While these libraries were open to the public, they were not easy to browse. Scholars who intended to read specific texts or authors had to ask librarians to fetch specific scrolls for them Krasner K., (2001). Thus, librarians continued to be the players who connected scholars with critical recorded information.

The libraries established by the Han Dynasty were particularly exciting in the history of libraries, as Chinese librarian Liu Xin created the first library classification/formal catalog system Frank, (1966). Moreover, ancient Chinese scribes invented important book printing technologies such as wood-block printing that enabled the first large-scale printing and mass dispersing of texts.

Later on, as antiquity ended with the fall of the Roman Empire, religious institutions began to take over the functions of ancient government and private libraries. In Western Europe, Catholic monks took an active role in collecting and creating written texts, and monasteries made up the main libraries. In Muslim countries, Imams and other scholars used printing techniques developed by Chinese scholars to create collections of written texts. Early libraries were created to house Qur'anic texts, but also included important early developments in astronomy and mathematics by Arabic scholars.

As the Renaissance and later the Enlightenment movements spread throughout Europe, non-religious libraries began to pop-up. These libraries, such as the humanist, Bartolomeo Platina's library and the Austrian National Library, served as institutional meeting places of scholars who collected and produced written texts on philosophy, mathematics, religion, and science. After the creation of the Gutenberg Printing Press, the libraries began to store not just valuable ancient texts, but modern books as well, Krasner K., (2001).

Although these libraries were independent, they were open only to card-holders usually from grand academic institutions or the aristocracy.

The evolution to digital libraries is not well documented, but several key thinkers are connected to the emergence of the concept. According to Stocker and Gerfried, (2014) predecessors include Paul Otlet and Henri La Fontaine's Mundaneum, whose attempt begun in 1895 to gather and systematically catalogue the world's knowledge, with the hope of bringing about world peace. The visions of the digital library were largely realized a century later during the great expansion of the Internet, with access to the books and searching of the documents by millions of individuals on the World Wide Web.

Vannevar B. and Licklider J.C.R. (1945) are two contributors that advanced this idea into then current technology. Bush had supported research that led to the bomb that was dropped on Hiroshima. After seeing the disaster, he wanted to create a machine that would show how technology can lead to understanding instead of destruction. This machine would include a desk with two screens, switches and buttons, and a keyboard. He named this the "Memex". This way individuals would be able to access stored books and files at a rapid speed. In 1956, Ford Foundation funded Licklider to analyze how libraries could be improved with technology.

Almost a decade later, his book entitled "Libraries of the Future" included his vision. He wanted to create a system that would use computers and networks so human knowledge would be accessible for human needs and feedback would be automatic for machine purposes. This system contained three components, the corpus of knowledge, the question, and the answer. Licklider called it a procognitive system.

Early projects centered on the creation of an electronic card catalogue known as Online Public Access Catalog (OPAC). By the 1980s, the success of these endeavors resulted in OPAC replacing the traditional card catalog in many academic, public and special libraries. This permitted libraries to undertake additional rewarding co-operative efforts to support resource sharing and expand access to library materials beyond an individual library.

An early example of a digital library is the Education Resources Information Center (ERIC), a database of education citations, abstracts and texts that was created in 1964 and made available online through DIALOG in 1969, Bourne, Charles and Bellardo T., (2003).

In 1994, digital libraries became widely visible in the research community due to a \$24.4 million NSF managed program supported jointly by DARPA's Intelligent Integration of Information (I3) program, NASA, and NSF itself, Wiederhold 1993. Successful research proposals came from six U.S. universities, Besser and Howard (2004). The universities included Carnegie Mellon University, University of California-Berkeley, University of Michigan, University of Illinois, University of California-Santa Barbara, and Stanford University. Articles from the projects summarized their progress at their halfway point in May 1996. Stanford research, by Sergey Brin and Larry Page, led to the founding of Google, Schatz and Bruce (1996).

Early attempts at creating a model for digital libraries included the DELOS Digital Library Reference Model Candella 2018 and the 5S Framework, Watson, Layne T, Kipp and Neill A. (2004).

2.3 Types of Libraries

Libraries can be roughly categorized into four groups based on the services they provide to readers:

1. Academic Library,
2. Special Library,
3. Public Library, and
4. National Library.

1. **Academic library:** An academic library is one that is a part of an academic organization, such as a school, college, or university. A university's faculty, staff, researchers, and students are the primary beneficiaries of an academic library. The primary goal of an academic library is to provide as many learning resources as possible to its patrons so that they may be thoroughly educated at the level appropriate. School libraries, college libraries, and university libraries are the three types of academic library.

a) **School Library:** A school library serves as a learning laboratory by offering a variety of instructional resources that are crucial for the best possible support of the curriculum. The goals of the educational program are achieved by using the school library. It focuses on encouraging children's growth and development as well as the development of efficient ways of thinking, socialization, important knowledge acquisition, and social attitudes. The goal of the school

library is to support students as they discover who they are, adopt high moral standards, increase academic productivity through independent study, and cultivate the capacity for critical thought.

b) **College library:** The College plays a significant role in the educational process. A college without a library is similar to a tree without roots. Every college's standing can be determined by how well-regarded its library is. Therefore every college library ought to be functioning as a teaching tool. A college library should complement the institution's goals. Therefore, the primary purpose of a college library is to aid in the administration of programs by its parent organization.

c) **University Library:** A library is more important in a University, because a library can do without a University where as a university cannot function without a library. A university library is an integral part of the institution. It is primarily maintained for the benefit of students, officers, faculty members and for those who are engaged in research work. It plays a very important role in the national life of the community by acquiring material for educational use for the benefit of students and teaching departments.

2. Special Library: Special library became popular since the beginning of 20th century. A special library is one which serves a particular group of people, such as the employees of a firm of government department, or the staff and members of a professional or research organization. Such a library deals essentially in information, Krishan K., (1987).

3. Public Library: A public library (also called circulating library) is a library which is accessible by the public and is generally funded from public sources (such as tax money) and may be operated by the civil servants. Taxing bodies for public libraries may be at any level from local to national central government level. The public library is an excellent model of

government at its best. A locally controlled public good, it serves every individual freely, in as much or as little depth as he or she wants.

4. National Library: A national library is a library specifically established by the government of a country to serve as the preeminent repository of information for that country. Unlike public libraries, these rarely allow citizens to borrow books. Often, they include numerous rare, valuable, or significant works. A National Library is that library which has the duty of collecting and preserving the literature of the nation within and outside the country, Thus, National Library are those libraries whose community is the nation at large.

2.4 Types of Digital Libraries

Like the Physical Library, we have 3 major types of digital libraries, namely;

- i. **Institutional repositories:** Many academic libraries are actively involved in building repositories of their institution's books, papers, theses, and other works that can be digitized or were 'born digital'. Many of these repositories are made available to the general public with few restrictions, in accordance with the goals of open access, in contrast to the publication of research in commercial journals, where the publishers usually limit access rights. Irrespective of access rights, institutional, truly free, and corporate repositories can be referred to as digital libraries. Institutional repository software is designed for archiving, organizing, and searching a library's content. Popular open-source solutions include DSpace, Greenstone Digital Library (GSDL), E-Prints, Digital Commons, and the Fedora Commons-based systems Islandora and Samvera Castagné, Michel, 2013.

ii. **National library collections:** [Legal deposit](#) is often covered by [copyright](#) legislation and sometimes by laws specific to legal deposit, and requires that one or more copies of all material published in a country should be submitted for preservation in an institution, typically the [national library](#), National Library of Australia, 2016. Since the advent of [electronic documents](#), legislation has had to be amended to cover the new formats, such as the 2016 amendment to the [Copyright Act 1968](#) in Australia, Lemon and Barbara April 2020.

iii. **Digital Archives:** Physical archives differ from physical libraries in several ways. Traditionally, archives are defined as:

- Containing primary sources of information (typically letters and papers directly produced by an individual or organization) rather than the secondary sources found in a library (books, periodicals, etc.).
- Having their contents organized in groups rather than individual items. Archives differ from libraries in the nature of the materials held. Libraries collect individual published books and serials, or bounded sets of individual items. The books and journals held by libraries are not unique, since multiple copies exist and any given copy will generally prove as satisfactory as any other copy
- Having unique contents.

The technology used to create digital libraries is even more revolutionary for archives since it breaks down the second and third of these general rules. In other words, "digital archives" or "online archives" will still generally contain primary sources, but they are likely to be described individually rather than (or in addition to) in groups or collections.

Further, because they are digital, their contents are easily reproducible and may indeed have been reproduced from elsewhere, Pitti and Duff (2001).

2.5 Functional Components of Digital Library

Although there are many different types of digital libraries being created today, they all share a few basic functional elements. The development of a digital library will be aided by having a fundamental understanding of the essential functional elements. Following is a brief discussion of the essential elements:

- i. **Selection and acquisition** - this component typically covers the selection of the documents to be added as well as their digitization and/or conversion to the proper digital format.
- ii. **Organization** — a crucial step in this component is assigning metadata (such as bibliographic data) to each document that is added to the collection.
- iii. **Indexing and storage** - This part indexes and stores documents and metadata to facilitate effective search and retrieval.
- iv. **Repository** — is the digital library's front end, and users utilize it to browse, search, retrieve, and see its contents. The repository is normally seen as an HTML page by end users.
- v. **Digital library website** – The front-end that performs search and retrieval functions for the digital library collection is provided by this computer. The website's home page displays the digital library content. Users select an appropriate link on this page to access the front-end. Based on user search and retrieval activities, the digital library provides the content. The digital library's website may be accessed via a suitable hypertext link on its home page.

- vi. **Network connectivity** — for online access, the digital library website computer should have dedicated connection to the intranet and/or internet, depending on the target user community, access may be restricted to the intranet (organizational LAN) or extended to the external users through the internet.

2.6 Comparison of Online and Traditional Physical Libraries

- i. Books, periodicals, newspapers, monographs, and other printed materials make up a physical library whereas an e-library comprises of digital content like these: e-books, e-magazines, e-newspapers, e-reports, video, audio, rich media, animations, etc.
- ii. In contrast to an electronic library, that has limited space (restricted till the scalability of the underlying IT infrastructure) but a big collection room and makes it simpler to grow.
- iii. A physical library's issue and borrow mechanism would provide limited access to an item due to quantity available, whereas an e-library item might be accessed any number of users, any quantity of times.
- iv. A physical library can be built on a physical space, but an electronic library is built on virtual spaces include servers, data centers, and clouds.
- v. Unlike an electronic library that uses Web-based search and indexing, physical library uses rack-based search and indexing.
- vi. Material degradation, mutilation, and loss over time are the main drawbacks of a physical library, whereas an electronic library offers digital preservation and long-term archiving of the contents.

2.7 Review of Related Work

Schoolap: Kanik 2018, developed the educational site Schoolap. The web based E-Library is a platform offering a variety of materials to schools, students, educators, and parents of students. The platform offers several services, such as online tuition payment, a teacher search engine, and online school administration management services. During this COVID-19 pandemic, the website www.schoolap.com offers educational content adapted to the Congolese school curriculum that is accessible free of charge.

9ija kids: Adewusi et al. 2018, co-founded the educational website 9ijakids. This E-learning website caters for children within the age of 3-11 years, arming them with critical skills and knowledge to prepare them to be problem solvers in their generation. Their learning structure is fun-filled with learning tools and E-library filled with different colorful e-books, this is the best way you can get children to learn.

Afrilearn: Oladipupo 2019, developed the educational website Afrilearn. This website partner with key institutions across Africa to render specialized content to their learners through practice exercises, instructional videos, and personalized learning dashboard, this encourages learners to learn at their own pace anytime and anywhere. They render these services using WAEC, JAMB, NECO, Professional Exams, and African University Curriculums, etc.

ULesson: Shagaya 2019, developed an educational app called uLesson. It is an e-learning platform that caters to Senior Secondary School students in selected subjects like Mathematics, Physics, Chemistry, and Biology preparing them for Senior Secondary School Exams such as WAEC, GCSE, IGCSE, KCSE, SAT and more.

ChE Archive: Stanley et al. 2022 developed the educational website Che Archive. It is a website focused on providing specifically tailored materials for students of chemical engineering both in and outside the University of Benin.

WebNovel: Tencent 2018, developed an online literature website called Webnovel. It was established and has interactive online reading experience as its core while being an online literature platform that combines copyright licensing and cooperation. It provides content in six languages namely; English, Spanish, Bahasa Melayu, Vietnamese, Bahasa Indonesia, and Hindi.

UMM Resources: Iyortsuun 2019, developed an academic resource website called UMM resources. It provides it users with a considerable amount of academic resources such as articles, journal, textbooks and more. It was made to solve the problem of resource availability to students and encourage studying.

Plato.com by EMMCDA: EMMCDA 2021, launched an e-learning platform called Plato. It is a multilingual integrated platform designed to facilitate online training, e-library and discussion through a virtual community of practice. It is a product of the United Nations.

Inspire Education: The Federal Government of Nigeria 2021, launched a web-based e-website. It is meant to provide resource of over 20 Terabyte in size to teachers and students. Its purpose is to facilitate learning and improve education for Nigerian students and teachers alike.

ClassNotes: Olatunji 2020, developed ClassNotes. It provides every Junior and Senior Secondary School (JSS1 to SS3) student freedom to learn the curriculum-specific subjects and topics they want, when they want it, and at the pace they want.

WOLO: WOLO group 2020 developed an African E-Learning Project. It is a platform created to offer education and skills training to Africans. WOLO is a Ga word which means Book. The Wolo E-Learning project was designed and developed by Wolo Limited and several other organizations and individuals with diverse backgrounds.

Tachiyomi: Netify 2019, created one of the biggest e-library extension website. It connects to multiple site to provide the user with an enormous amount of eBooks. It provide books of various categories and genre for the user.

West40 Remote School: Avishai et al. 2022, created WIX. It is an eLearning website meant to educate and encourage student to study and improve them academically.

Tutor.ng: Olaogun and Ogedengbe 2019, developed Tutorial as an online tutoring platform providing tools for engaging and teaching learners and students with a mission to connect tutors and students all over the world. The platform wants to give its users a place to learn anything, teach anything, and collaborate and anytime, anywhere.

CHAPTER 3

SYSTEM ANALYSIS, DESIGN AND METHODOLOGY

3.1 System Analysis

This chapter will cover the development of the E-Library Management System, including an analysis of the software requirement specification (SRS) and a comparison of the proposed and current systems. In order to offer a thorough description and overview of the system requirements prior to the beginning of the creating process, the functional and non-functional needs are covered in the SRS portion. Additionally, comparing the existing system to the proposed one shows how much more effective the suggested system will be.

With the rising population of users of a library, the constant cost and damage of material, even then it limited copies among other reasons as stated in earlier chapters, we can come to the conclusion that the importance of the web based digital library in the University of Benin cannot be over emphasized. Its advantages are cannot be exhausted, hence its necessity.

3.2 Research Methodology

It is well known that research methodology has many different approaches and facets, and that it is more comprehensive than research methods. The methodology is the set of rules and principles that direct a system technique. For some acts, nevertheless, it is a deliberate procedure. As a result, every research approach is included in methodology.

An approach that adheres to the waterfall/agile model of the software development life cycle (SDLC) was used to create a web-based digital library system. System developers utilize it to design new software or alter existing information systems. It divides up the numerous

developmental phases and procedures. Once the previous stage is complete, it will logically go on to the following one. Going back to the prior stages can be necessary if the current stage fails.

System design techniques is a field of study in the software industry, tries to provide a framework for information gathering, storing, changing, and distributing so that computer systems can be built affordably and effectively.

3.3.0 Method of Data Collection:

3.3.1 Primary Source

The primary source refers to your original source of data for which visitations to the library, Cafes, notes from lecturers and exam question of different years which were digitalized.

3.4 Analysis of the Existing System

The University of Benin current library system operates manually and relies heavily on paper work. All library user information is captured on white and black paper by the current system. Every registered user's borrower information is collected while checking out a book from the library, and that user can sign out the book and return it when finished.

It also has the MTN digital library which provide internet access, e-books and more but is barely updated, inaccessible to majority of the students due to the limited number of system and local servers that can only be accessed when in the library physically due to its' LAN access. We also have the department of Chemical Engineering digital library website "<https://www.chearchive.tk>" but its resources are limited to that of its Department.

We must pay heed though, just because as system is digitized does not necessary mean it may be web-based, a document may be digitize but still limited to a local area network, which may be

just the Universities environment. A web based on the other hand will not be limited locally and can be accessed globally.

3.4.1 Problems of Existing Systems

- It is barely updated and is limited by LAN accessibility
- It can only be physically accessed when at the location of the library
- It is not available at all times
- Books are easily damaged, lost or misfiled

3.5 Analysis of Proposed System

The e-library System is a web-based system, it does not require the creation of an account for a regular user only that of an admin. It is divided into 2 sections, the material and past questions section. It is then broken into various faculties, which is further broken down into departments, and then the level. Hence, every student user no matter the faculty or department already has an understanding of where he or she to start from. There is a search bar where users can search for specific material if not found through the drop down menu /catalogues.

The user may fill a form to request for materials they need if not in the archive. The user may also upload article material and more but will need an approval by the administrator in order to be posted and accessible to the public. The administrator on the other hand has the permission to add or delete faculties, departments, levels, specific material, articles or past question. This permission of the administrator also includes editing, posting and approval.

For this project, a system was designed using a series of code from several script and programming languages. The use of software tools such as XAMPP as the server, visual studio code as the code or text editor, MySQL as the database, php as the backend scripting language,

html to fill the web page contents, CSS for design using specifically the Bootstrap framework, JavaScript to achieve a responsive and reactive website, CamScanner was also used in scanning material and past questions into the required PDF format to among others.

Below, is a flow chart describing the e-library system the user and administrator can exercise. The user has options to upload either past question or materials, view, download or visit the universities Kofa Page. Whereas the administrator must be verified and login to exercise right such as add or delete faculty, department, materials and past questions. The admin can also approve uploads from the user as well edit and log out.

3.5.1 Objectives of Proposed Systems

- i. Saving cost in purchasing of new physical books every time a new edition comes out or damage occurs to the old ones
- ii. No loss of books due to misfiling also quicker update
- iii. Faster and easier access to material at all times
- iv. Availability of any material digitalized at all times, i.e no burrowed out issues
- v. Easier management of the library system

3.5.2 Justification for New System

The e-library boast a wider coverage area compared to the current systems, it is not limited to specific locations, can be accessed on any web-able device plus its faster and easier to manage. The question here should be why we keep using the previous systems.

3. 6 System Development Life-Cycle

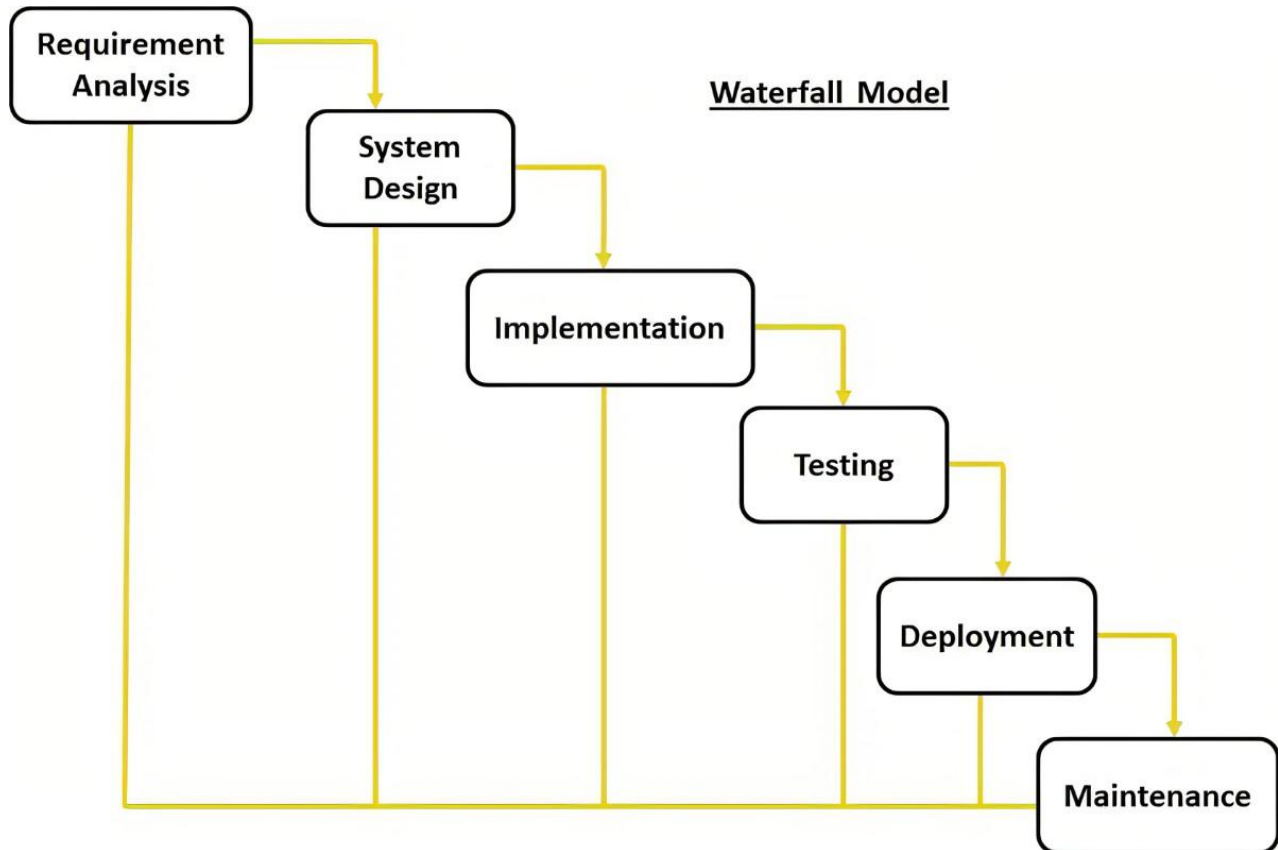


Fig3.1 the agile/waterfall model chosen in designing the e-library project

The classical waterfall model which is also known as the linear-sequential life cycle model is an essential software development model which can be understandable from the structure itself. The model is straightforward yet idealistic.

3.6.1 Requirement Analysis

This phase has the purpose to establish whether it would be monetarily as well as technically practicable to expand the development of software. This has the achievability study with the understanding of the problem as well as determines the diverse potential strategies used for solving the problem.

3.6.2 System Design

The system design is equipped after a thorough examination of all the first phase's requirement specifications. In order to characterize the system design as a whole, this phase assists developers in specifying hardware and the system's requirements.

3.6.3 Implementation

This phase is also known as the coding phase of software development where the idea is converted into source code and UI plus UX design using programming language and tools. Hence, every designed module needs to be coded.

3.6.4 Integration and Testing

After the application's coding is complete, all other modules with various functionalities are integrated. Before the entire system is tested, each integration step involves incorporating previously planned modules into the components that make up the software's structure.

3.6.5 Deployment

The software is installed on the customer's end, in the environment, or it is made available on the market after passing all functional and non-functional tests.

3.6.6 Maintenance

The maintenance model is a crucial component of this model. This stage involves updating the product, fixing any bugs and errors, and creating additional crucial components in response to user feedback.

3.7 Software and Hardware Design Requirements

This section describes the software and hardware requirements in the design of system.

3.7.1 Software Requirements

- Operating system- Windows 7/10 is used as these operating systems are stable, supports more features and is more user friendly.
- Database MYSQL-MYSQL is used as database as it easy to maintain and retrieve records by simple queries which are in English language which are easy to understand and easy to write.
- Development tools and Programming language- HTML is used to write the whole code and develop web pages with CSS, JavaScript using bootstrap framework for styling work

3.7.2 Hardware Requirements

- A minimum of Intel core i5 2nd generation is used as a processor because it is fast, reliable and stable and can run our pc for a longtime. By using this processor, we can keep on developing our project without any worries.
- A minimum of 2 gigabyte of ram is used as it will provide fast reading and writing capabilities and will in turn support in processing.
- A reliability 5G/4G/3G/EDGE/Wi-Fi internet connectivity
- PC's, smart phones and other web compatible devices.

This project was designed to consist of the following functional and non-functional requirements:

3.8 Functional Requirements

- Users will be able to upload and request resources (material, past questions or article).
- The system gives the administrator the ability to add, update and delete or approve books and their details.
- In general, the system will offer storage for the materials.
- The admin can approve books uploaded by the users. Also edit and delete publisher or categories (i.e. faculties, departments and levels).
- The user should be able to view, search and download resources.

3.8.1 Non Functional Requirements

- The system should have a user friendly interface such that users can navigate around it without any assistance from another person.
- In order to properly handle user requests, the system must be quick.
- The system should be accessible at all-time regardless of location, provided a reliable network access.
- It should be mobile friendly, and accessible on common devices to encourage users\

3.9 System Design

This section is divided into several parts namely; the frontend, the backend and software tools and framework used.

3.9.1 Frontend

The frontend is designed using HTML, CSS, Bootstrap framework technology and JavaScript.

3.9.2 HTML

The primary markup language for constructing web pages and other content that can be seen in a web browser is HTML, often known as Hyper Text Markup Language. HTML is authored using HTML components, which are made up of tags. The content of a web page can contain HTML in the form of HTML elements, which are made up of tags surrounded in angle brackets (like `<html>`). HTML tags usually come in pairs like `<h1>` and `<h2>` whereas some tags are unpaired because they represent empty items, like ``. Pair of tags' start tag and end tag are the first and second tags, respectively (they are also called opening tags and closing tags). Web designers are able to insert text, additional tags, comments, and other text-based material in between these tags. Reading HTML files and assembling them into visual or audio web pages is the function of a web browser. Although the HTML tags are not visible, the browser makes use of them to decipher the page's content. The fundamental units of every website are HTML elements. HTML enables the embedding of objects and images, allowing for the creation of interactive forms. By indicating structural semantics for text, such as headings, it gives a method for producing organized texts, paragraphs, lists, links, quotes and other items. It can include programs that modify the way HTML web pages behave and are written in languages like JavaScript.

3.9.3 Cascading Style Sheet

Cascading style sheet often referred to as CSS is a language for creating style sheets that describe how a markup-language-written document should be formatted and presented. Although most frequently utilized to style web pages and interfaces created in HTML and XHTML, the language can be applied to any sort comprising simple XML, SVG, and XUL, among others. Almost all web pages utilize CSS style sheets to specify their presentation since CSS is a fundamental web specification. The main purpose of CSS is to make it possible to separate a document's information from its presentation, which includes things like the layout, colors, and fonts.

This division can increase content accessibility, give the specification of presentation features greater freedom and control, allow numerous pages to share formatting, and minimize complexity and duplication in the structural content (for example, by allowing for table-less web design). Additionally, CSS enables the presentation of the same HTML page in several styles for various rendering techniques, such as on-screen, in print, and even by voice (when being read aloud by a screen reader or speech-based browser, as well as on tactile devices that use Braille.

Additionally, it can be used to enable the web page to show differently according on the screen size or viewing device. While a document's author normally includes a link to a CSS file, readers can override that link by using an alternative style sheet, possibly one that is stored on their own computer. But if the writer or reader didn't include a link to a specific style sheet, the browser's default style will be used. If many style rules match against the same element, CSS specifies a priority mechanism to determine which rules will be applied. Priorities or weights are determined and allocated to rules in this so-called cascade, making the outcomes more favorable.

3.9.4 JAVASCRIPT

JavaScript is flexible programming language for computers. It is most frequently utilized as a component of web browsers, whose implementations enable client-side scripts to engage in user interaction, manage browser functionality, exchange data asynchronously, and modify the presented content of displayed documents. Server-side programming, game development, and the development of desktop and mobile applications all make use of it. Dynamic typing and first-class functions are features of the prototype-based scripting language JavaScript. C had a big impact on its syntax.

Although the two languages are totally unrelated and have quite distinct semantics, JavaScript borrows many names and naming practices from Java. JavaScript's primary design tenets were inspired by the self and scheme programming languages. It is a multi-paradigm language that supports functional, imperative, and object-oriented programming. It is also important to employ JavaScript in applications other than web pages, such as desktop widgets, site-specific browsers, and PDF documents. The use of JavaScript for server-side web applications has grown in popularity as a result of newer and faster JavaScript VMs and the platforms based on them (particularly Node.js). JavaScript was previously implemented on the client side as an interpreted language, but more current (post-2012) browsers now conduct just-in-time compilation.

3.9.5 Advantages of JavaScript

Advantages of using JavaScript include:

- I. Less server interaction: You can validate user input before sending the page off to the server. This saves server traffic, which means fewer loads on your server.

- II. Immediate feedback to the visitors: They do not have to wait for a page to reload to see if they have forgotten to enter something.
- III. Increased interactivity: you can create interfaces that react when the user hovers over them with a mouse or activates them via the keyboard.

3.9.6 Limitations of JavaScript

- i. JavaScript cannot be treated as a full-flagged programming language. It lacks the following important features:
- ii. Client-side JavaScript does not allow the reading or writing of files. This has been kept for security reasons.
- iii. JavaScript cannot be used for networking applications because there is no such support available.
- iv. JavaScript lacks multithreading or multiprocessor capabilities

3.10 BACKEND

3.10.1 PHP - is an intuitive, server side scripting language, it is a recursive acronym for “PHP: Hypertext Preprocessor”. It is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. PHP is now installed on more than 244 million websites and 2.1 million web servers. Being an open source any individual can easily develop a web application. It has become a vast platform now for all kind free sourcing development. This backend workspace plays a very vital role in the development of a web technology and Content Management Systems.

PHP is an intuitive, server side scripting language. Like any other scripting language it allows developers to build logic into the creation of web page content and handle data returned from a web browser. PHP also contains a number of extensions that make it easy to interact with databases, extracting data to be displayed on a web page and storing information entered by a web site visitor back into the database.

PHP consists of a scripting language and an interpreter. Like other scripting languages, PHP enables web developers to define the behavior and logic they need in a web page. These scripts are embedded into the HTML documents that are served by the web server. The interpreter takes the form of a module that integrates into the web server, converting the scripts into commands the computer then executes to achieve the results defined in the script by the web developer.

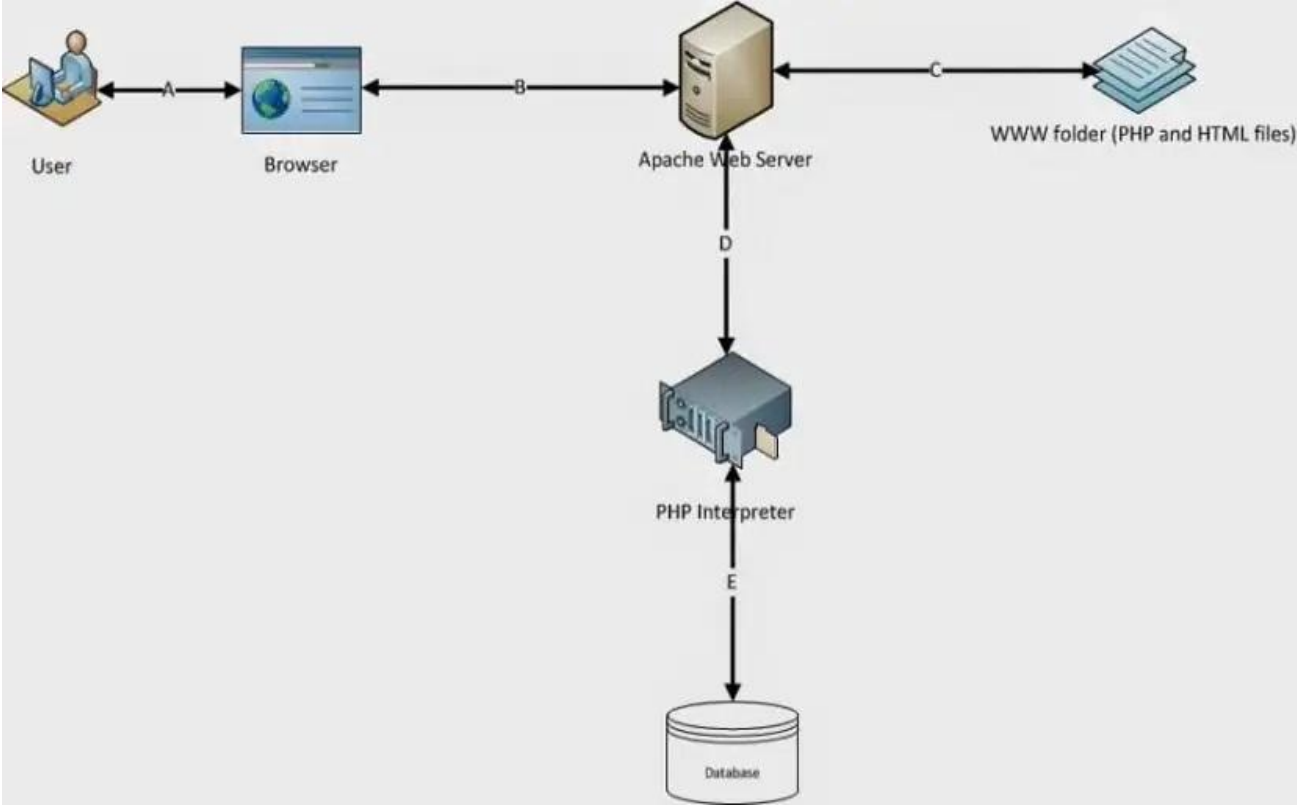


Fig 3.2 Illustration of how PHP works

3.10.3 How PHP works

To develop an understanding of how PHP works, it is useful to first explore what happens when a web page is served to a user's browser.

This process can easily be explained with the use of the diagram above;

Step 1: The user enters a website into their browser and taps/hits 'enter'.

Step 2: After the user has tapped/hit 'enter', the browser sends the page request over the Internet to the web server.

Step 3: The web server gets the request and analyzes the request information. Apache realizes that we didn't specify a file, so it looks for a directory index and finds `index.php`.

Step 4: Since Apache knows to send files that end with the `.php` file extension to the PHP interpreter, it asks PHP to execute the file.

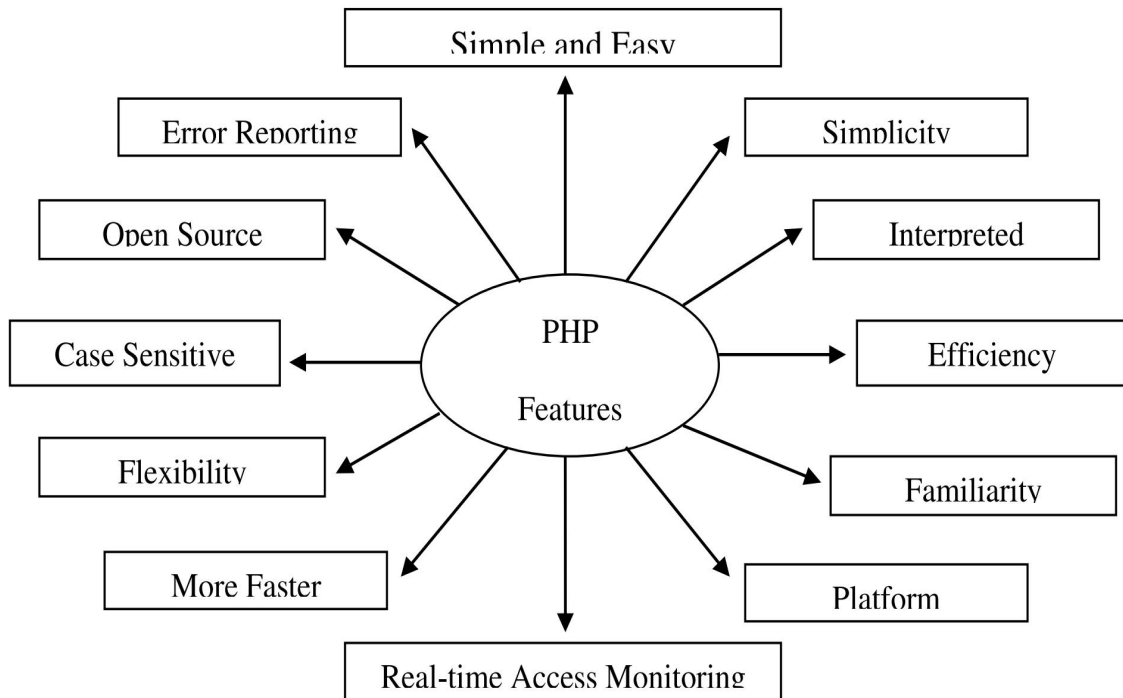
Step 5: In this step, PHP is executing the code contained in the `index.php` file from the request. During this step, PHP may interact with databases, the file system or make external API calls, amongst other things.

Step 6: After PHP has finished executing the `index.php` file, it sends the output back to Apache.

Step 7: Apache receives the output from PHP and sends it back over the Internet to a user's web browser. This is called the `web response`.

Step 8: The user's web browser receives the response from the server, and renders the web page on a computer or device.

Fig 3.3 a Features of PHP



3.10.4 Features of PHP

It is most popular and frequently used worldwide scripting language, the main reason of popularity is; It is open source and very simple. Compared to other scripting languages it is very simple and easy.

- **Interpreted:** It is an interpreted language, i.e. there is no need for compilation.
- **Faster:** It is faster than other scripting languages e.g. asp and jsp.
- **Open Source:** Open source means you no need to pay for use php, you can free download and use.
- **Platform Independent:** PHP code will be run on every platform, Linux, Unix, Mac OS, Windows.

- **Case Sensitive:** PHP is case sensitive scripting language at time of variable declaration. In PHP, all keywords (e.g. if, else, while, echo, etc.), classes, functions, and user-defined functions are NOT case-sensitive.
- **Error Reporting:** PHP have some predefined error reporting constants to generate a warning or error notice.
- **Real-Time Access Monitoring:** PHP provides access logging by creating the summary of recent accesses for the user.
- **Loosely Typed Language:** PHP supports variable usage without declaring its data type.

3.11 Tools Used in Developing the System

3.11.1 MySQL

The database utilized in the creation of the web-based e-library system is MySQL, a relational database management system. When necessary, it stores, retrieves, and manipulates data entries. It is the recommended option for the construction of a system like this because it is open source and has a very strong support community.

3.11.2 BOOTSTRAP - Bootstrap is a modern, simple, mobile first front end framework that makes developing websites quicker and easier. It employs JavaScript, HTML, and CSS .Mark Otto and Jacob Thornton from Twitter created Bootstrap. In August 2011 via GitHub, it was made available as an open source product. It has a number of styles, animation codes, and other features to make the program's work simpler, quicker, and better.

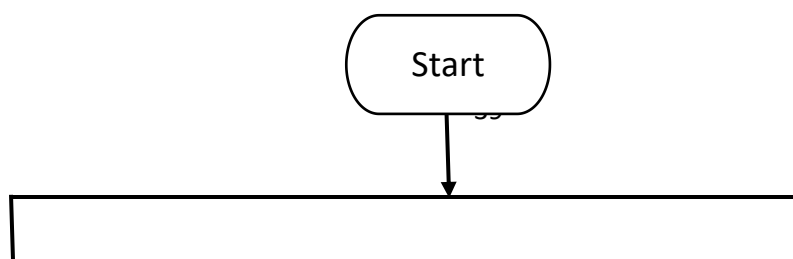
3.11.3 Why use Bootstrap

- i. Mobile-first strategy: Instead of having mobile first styles in separate files, the Bootstrap3 framework includes the macros the entire library.
- ii. Browser Support: It is compatible with all widely used browsers.
- iii. Easy to get started: With just the knowledge of HTML and CSS, anyone can get started with Bootstrap. Also, the Bootstrap official site has a good documentation.
- iv. Gives developers a simple, standardized way to construct an interface.
- v. It has elegant and practical built-in elements that are simple to customize.
- vi. Responsive design: Bootstrap's responsive CSS adjusts to Desktops, Tablets and Mobiles.
- vii. It also provides web-based customization.
- viii. It is an open source.

3.11.4 Visual Studio Code - also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

3.11.5 XAMPP Server

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.



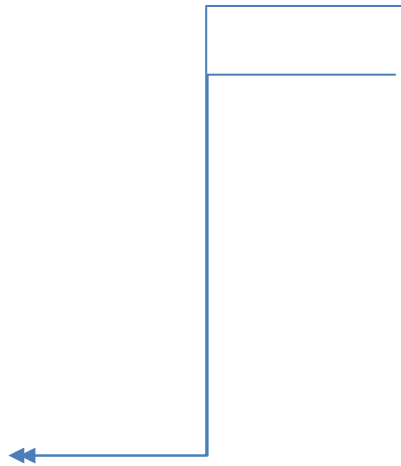


Fig 3.4 a flow chart for the digital library management system

3.12 System Architecture

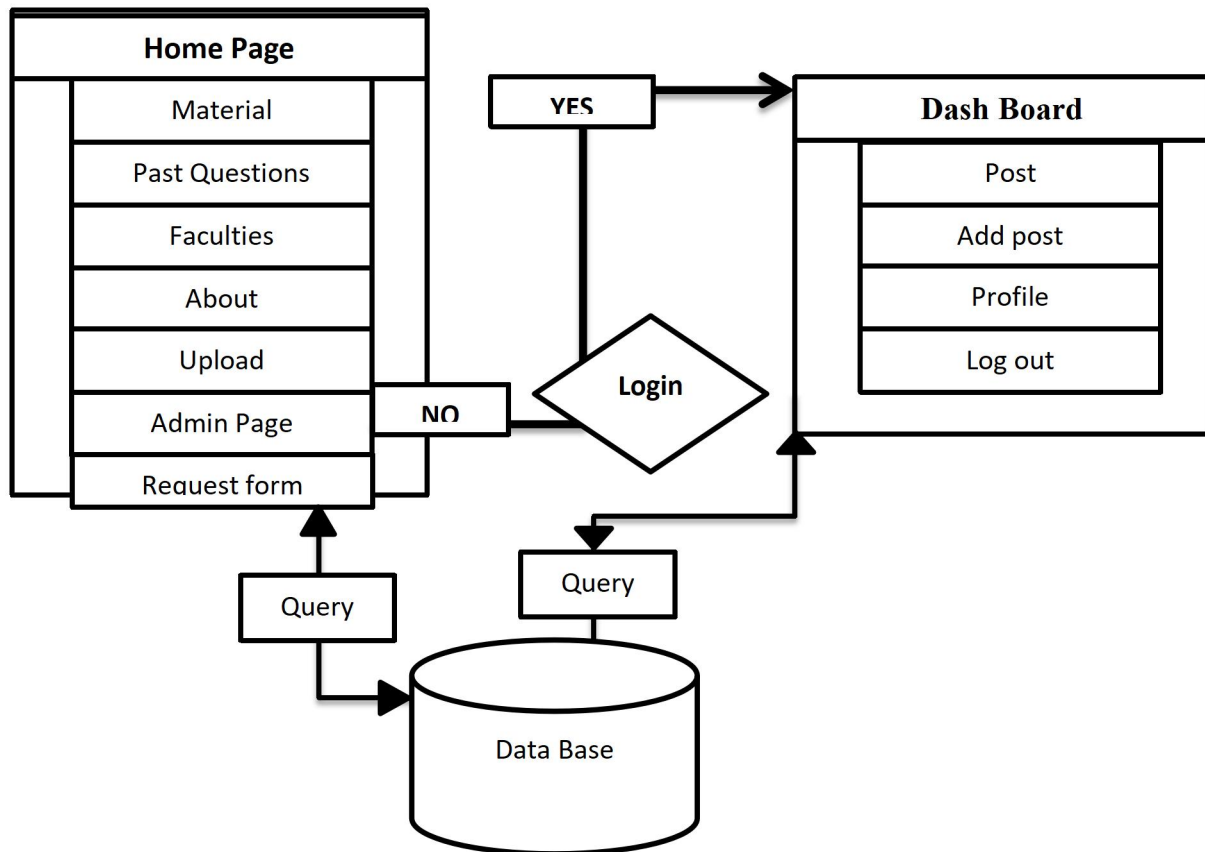


Fig 3.5 System Architecture

The system architecture consists of the;

Home Page: This is the landing page. It contains activities such as new as other detail like contacts but its real purpose is to connect either the user or administrator to the various sub divisions of it page namely:

Material: this section is the part of the website that connects to the books, journals and article

Past questions: this section is the part of the website that connects to the past questions

Faculties: this section is the part of the website that connects to the various faculties then their sub departments

About: this contains the details and identity of the website.

Upload: this connects you to the upload section of the website

Request: this connects to the page to request for material or past question on the website

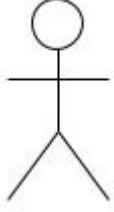
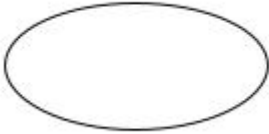

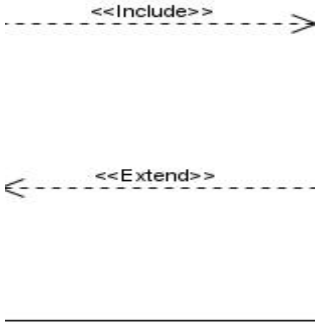
Admin: this is an important part of the website it connects to a login in page, which upon authenticated send the user to the dash board which contains the add, post, profile and log out page.

UML - Use Case Diagram

Use case diagrams aid in capturing the requirements for a system by modeling its behavior. The scope and high-level functions of a system are described and its actors are also depicted in these diagrams. It shows what the system does and how the actors use it, but they do not show the system works.

Below is a table of use case diagram notations and descriptions.

Table 3.1 Use Case Diagram Notations and Descriptions

Objects	Symbol	Description
Actor		They are the systems users. The actor could be a person, organization or external system. They perform a role in the system.
Use Case		Use case is a list of steps, typically defining interacts between an actor and a system to achieve a goal.
System		A system is a rectangle spanning all the use cases in the system that defines the scope of your system. Anything within the box represents a functionality that is in scope and anything outside is not
Relationship		Illustrates the relationship between an actor and a use case with a simple line. It also illustrates the relationship between use cases (include & extend)

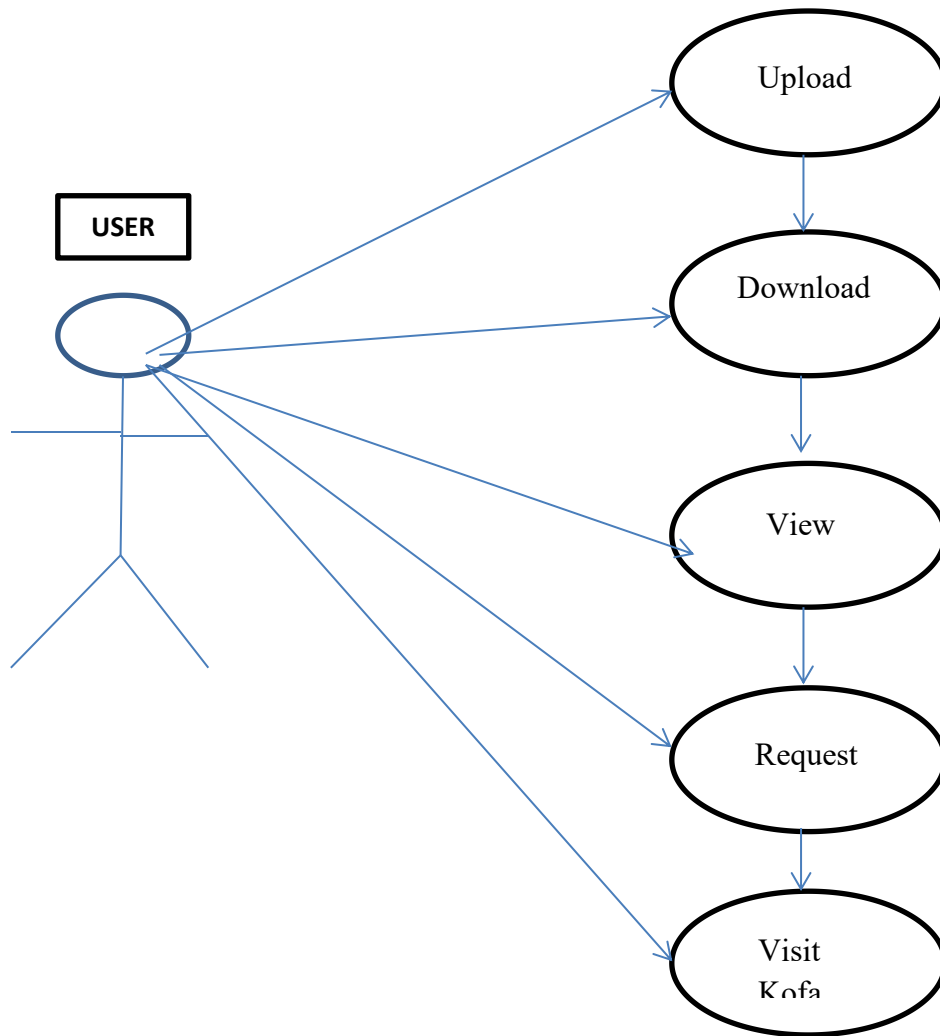


Fig 3.5 Use Case Diagram for E-Library

CHAPTER 4

SYSTEM IMPLEMENTATION AND RESULT ANALYSIS

4.0 Introduction

This chapter includes a quantitative and qualitative analysis of the work and data analysis results. It focuses on how the designed system communicates with the system's user interface and utilizes its many features.

4.1 System Testing

The developed system is checked for accuracy before being evaluated to ensure that it is functional and serves the intended goal. Raw data were used to test the software, and the application performed as expected.

4.2 Output and Input designs of the System

The output that must be obtained from the suggested system is depicted below.

4.2.1 Home Page

When the URL (uniform resource locator) is entered into the address bar, the web browser loads this page first. It offers the default page that administrators and users can view to access the library system. Figure 4.1 and 4.2 displays a screenshot of the system's home page and its attributes. The About page, Admin login, Kofa portal, Request form, Upload form, Contact, News, and Events are all found on the system's home page.

When a user loads into the system, he or she can view new about events, view the latest posted past questions or materials. Below is an image of the Home Page

Website: “<http://kadu400.epizy.com/kadu/index.php?paper=1>”

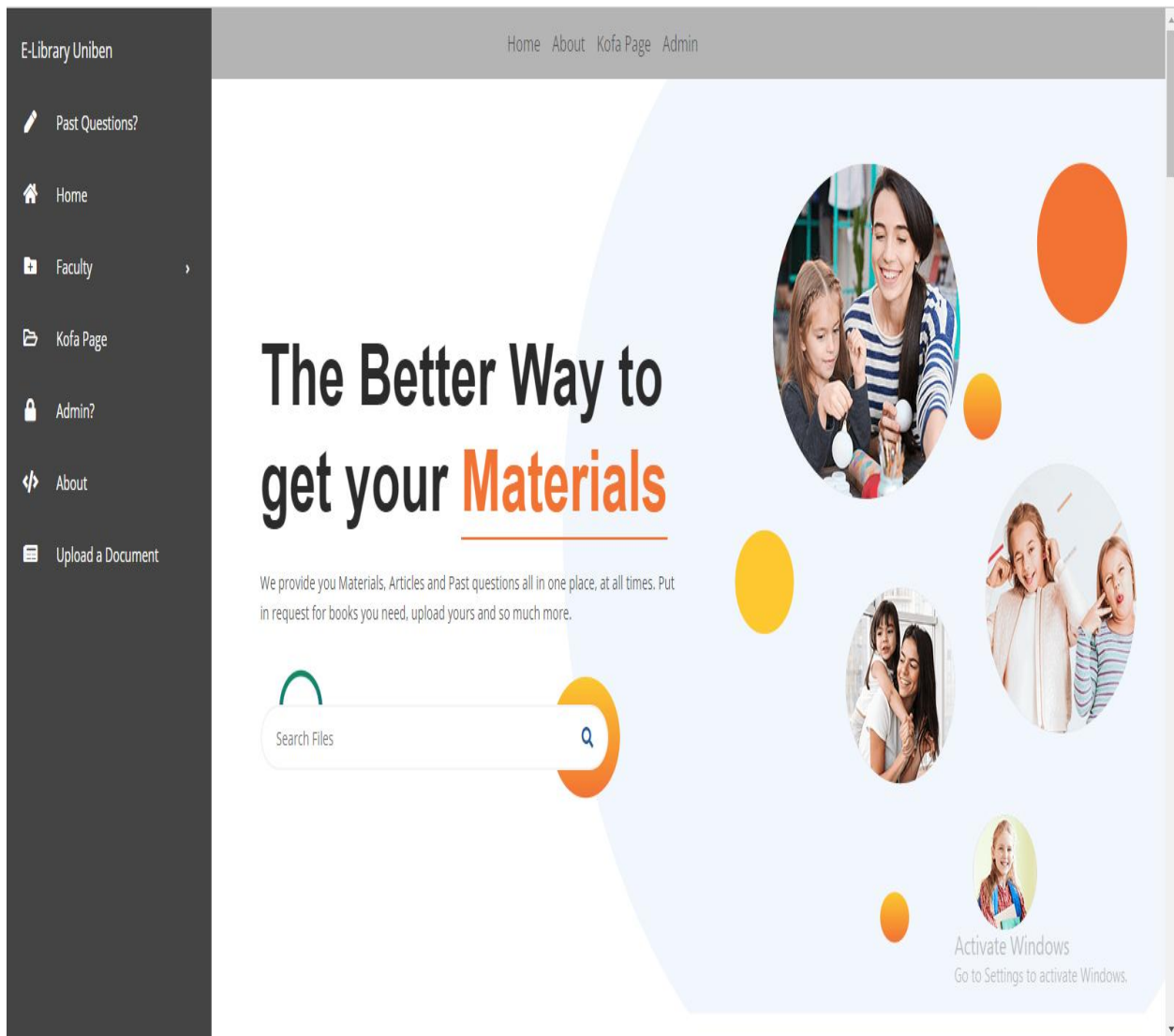


Fig 4.1 Screenshot of Home Page of the e-Library website

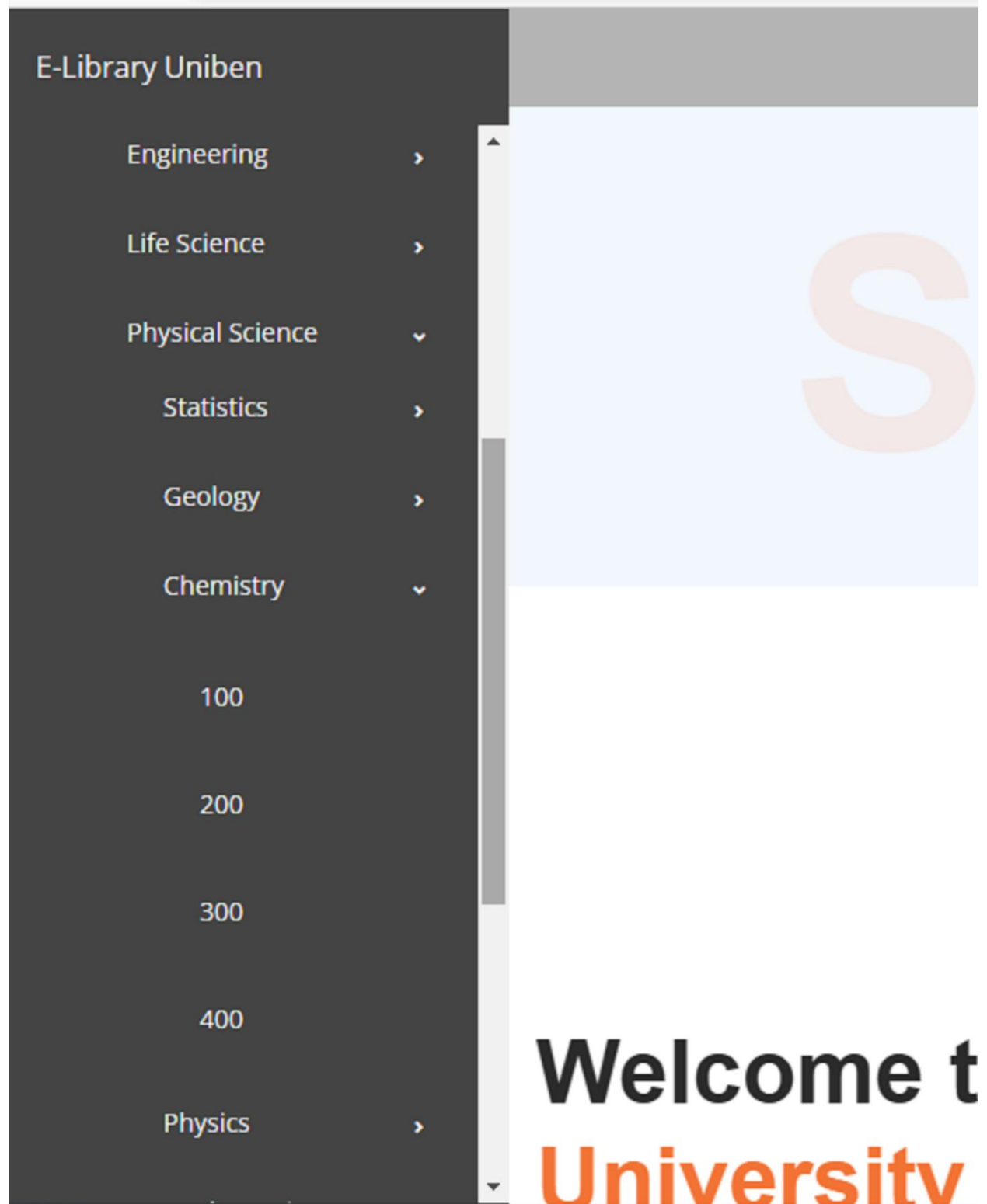


Fig 4.2 Home Page; drop down of faculties and departments and levels of the e-Library website

4.2.2 Admin Page

The admin login form is located in this section. This is the page that request a verification from the administrator to confirm his or her identity before giving access to the dash board. Below is a screenshot of the login page.

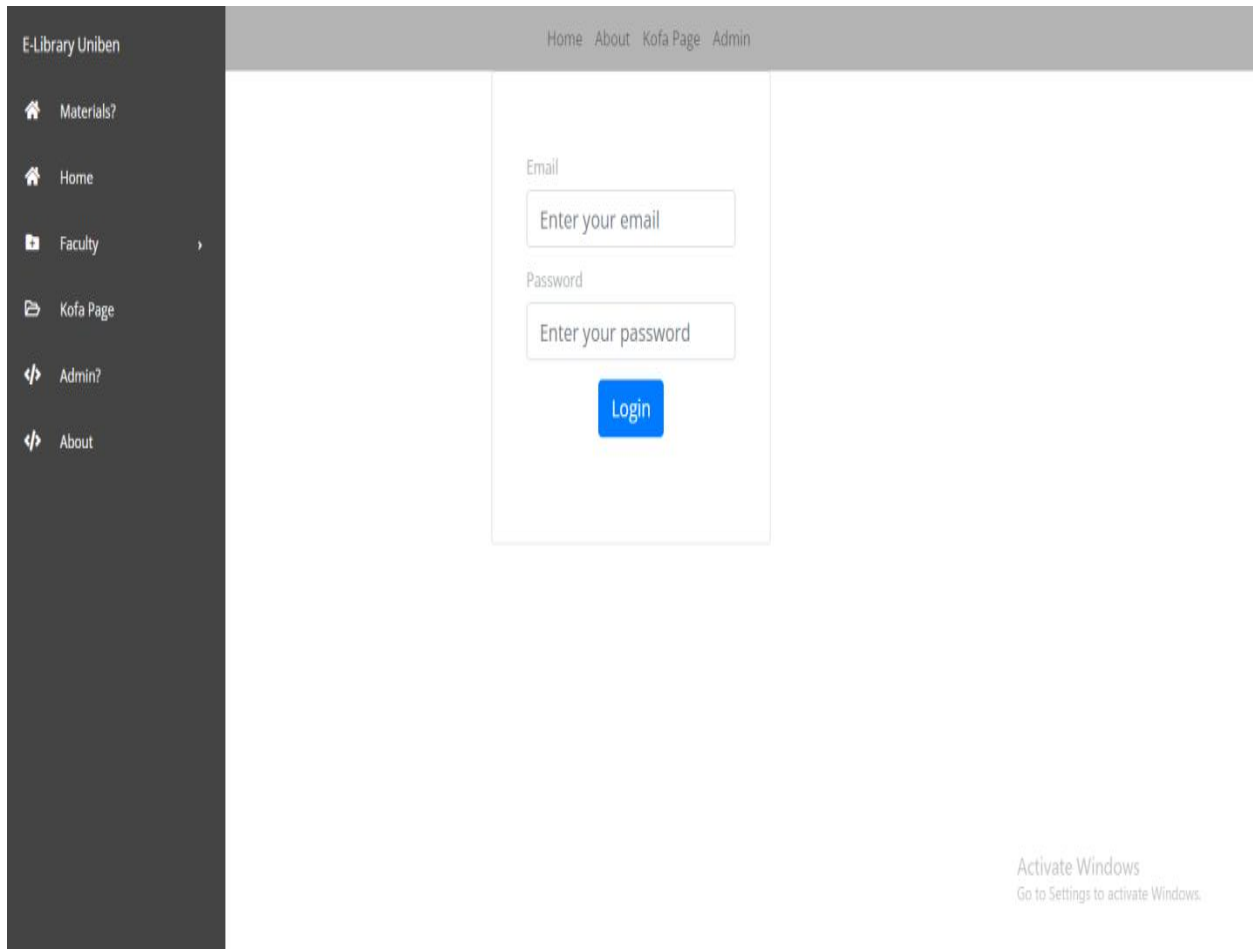


Fig 4.3 Screenshot of Login Page Admin of the e-Library website

4.2.3 Dashboard

This is the control panel for the admin. Here he can view then amount of available material, add, delete, edit and approve them. This is an important section of the website as without it the site will become stale. Below is a screenshot of the dashboard page.

User Dashboard

- > Dashboard
- » Posts
- > Add Post
- > Profile
- > Logout

Posts (Pass Questions & Materials)

COURSE CODE	COURSE TITLE	TYPE	LEVEL	DEPARTMENT	STATUS	YEAR
CSC421	SOFTWARE ENGINEERING	Past Question	400	Computer Science	Posted	2002
422	CONCEPTS OF PROGRAMMING LANGUAGE	Past Question	400	Computer Science	Posted	2013/14
Csc427	Data Communication	Past Question	400	Computer Science	Posted	2010/201
CSC427	Data Communication	Past Question	400	Computer Science	Posted	2011/12
CSC 222	Assembly Language	Material	200	Computer Science	Posted	2017
CSC422	CONCEPTS OF PROGRAMMING LANGUAGE	Past Question	400	Computer Science	Posted	2012/13

Fig 4.4 Screenshot of Admin Dashboard of the e-Library website

- › Dashboard
- › Posts
- › Add Post
- › Profile
- › Logout

Add A Past Question

Author	<input type="text" value="Admin"/>
Question/Material	<input type="text" value="Material"/>
Course Name	<input type="text"/>
Course Code	<input type="text"/>
Faculty	<input type="text" value="Select A Faculty"/>
Level	<input type="text" value="Select A Level"/>

Activate Windows
Go to Settings to activate Windows.

Fig 4.5 Screenshot of Admin Dashboard: add post the e-Library website



The screenshot shows a user profile page. On the left is a vertical navigation menu with the following items: Dashboard, Posts, Add Post, Profile (highlighted with an orange arrow), and Logout. The main content area is divided into two sections: Profile and Login Details.

Profile	
School Name	University Of Benin
Country / Region	Nigeria, Edo State
Year	400LVL
Category	Information
City/State	Benin-City, Edo State
Zip	300302

Login Details	
Email Address	{{UserEmail}}
Phone No.	{{UserPhone_number}}
Password	*****

On the right side of the page, there is a Windows watermark: "Activate Windows Go to Settings to activate Windows."

Fig 4.6 Screenshot of Admin profile of the e-Library website

4.2.4 Request Page

This is where users can request for material or questions that are not available in the library. These requests will be take care of by the administrator. Below is a screenshot of the request form page.

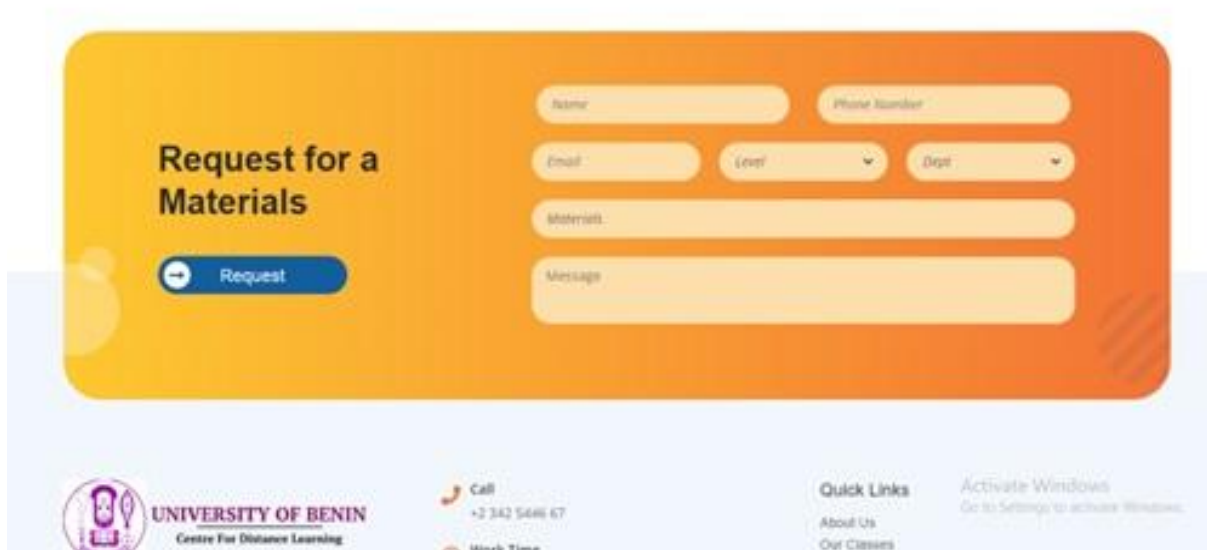


Fig 4.7 Request Page of the e-Library website

4.2.5 Materials and past questions

This part of the website contains the collections of past questions and material.

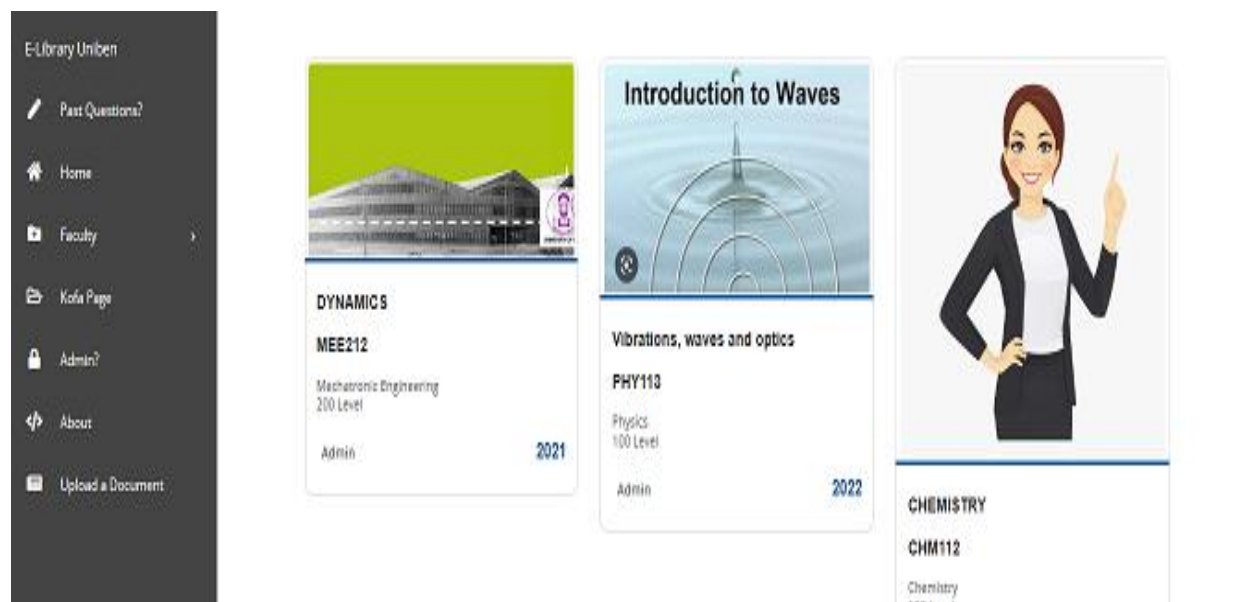


Fig 4.8 some material in the e-Library website

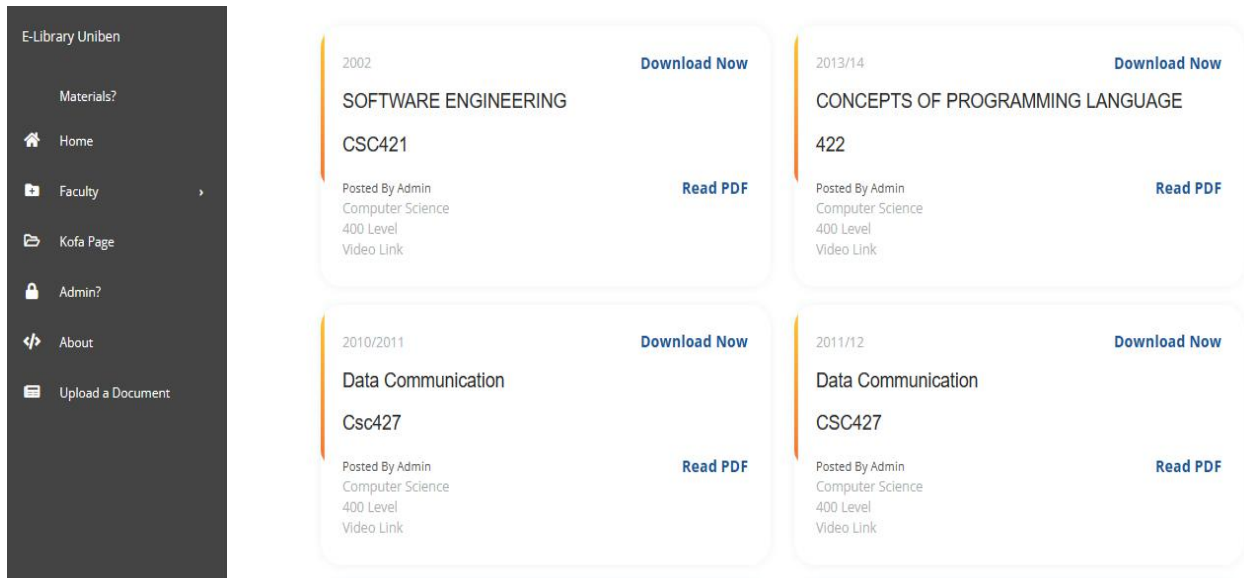


Fig 4.9 some past questions in the e-Library website

4.2.6 php dashboard

This is backend dashboard where our faculties, departments and so on where created and are manage. Below is an image of myPhp dashboard.

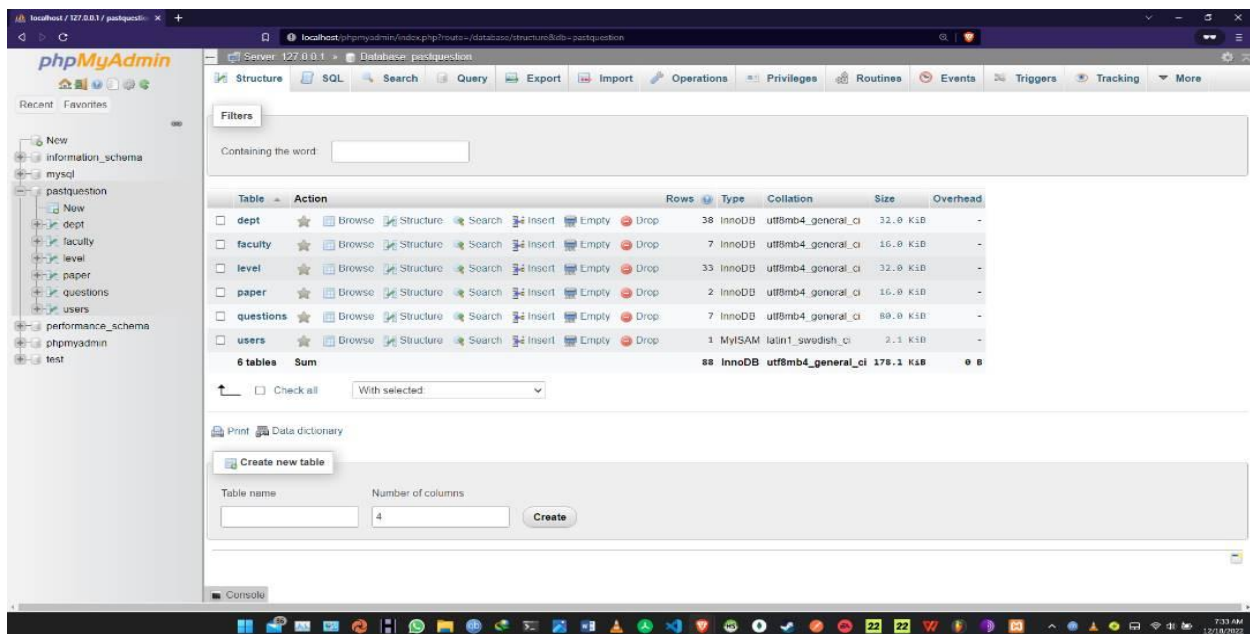


Fig 4.10 phpMy admin dashboard of the e-Library website

CHAPTER 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.0 Summary

Both the way that information is presented and how consumers seek it out have changed as a result of technology. Especially in the area of education, information technology has transformed a great number of spheres of life. A web-based electronic library system is created to support users' searching habits and to keep up with the rapid advancement of technology in an effort to keep up with the constant and rising change in technology in the educational field.

5.1 Conclusion

In conclusion, an in-depth analysis of the designed system reveals that it is an efficient and trustworthy E-Library system that operates correctly and adequately to meet the needs and expectations that the system was intended to meet. Both consumers and librarians will benefit from the new system's convenience features.

5.2 Recommendation

As it encourages the use of technology in education, this program is suggested to both higher and lower institutions as a safe, simple, and quick method of library assessment.

The following are recommended for the university:

- It is advised that the university implement an E-Library on campus given the benefits of e-libraries today and the growing need for technology, since this would make it simpler for students and employees to access library resources.

- The university's wireless internet capabilities should be strengthened, in order to permit a comprehensive evaluation of the campus's E-Library.
- An audio, video, and diagrammatic learning aid should be supported by the university library.
- Orientation on how to utilize the E-library and computers in general should be provided to university personnel as well as students.

References

- Madhusudhan, (2012). Use of web based library services in select university libraries in India: A study. *International Journal of Library and Information Studies*, 2 (1). Retrieved from http://ijlis.org/img/2012_2_issue_1/1_20.pdf. 9)
- White, M.D. (2001). Diffusion of an innovation: digital reference service in Carnegie Foundation master s (comprehensive) academic institution libraries. *Journal of Academic Librarianship*, 27 (3), 173-187. www.ijnlt.com. Page 8.
- Sangale,D.B. (2015). ICT application and web based services in Library and Information Science. *ASM s International E-Journal on ongoing research in Management and IT*, 9-14. (11). Retrieved 2018.
- Krasner-Khait, B. (2001). Survivor: The History of the Library. *History Magazine*. Retrieved 2022 from www.history-magazine.com/libraries.html.
- Frank C., (1966). The History of Libraries. *Encyclopedia Britannica*, Retrieved 2022 from www.britannica.com/topic/library/The-history-of-libraries.
- Stocker, Gerfried (2014). *Beyond Archives (or the Internet 100 years before the Internet)*. Possible Futures: Art, Museums and Digital Archives. Retrieved 2023 from <https://books.google.com/books?id=b3aCCwAAQBAJ>
- Bush, Vannevar (July 1945). "As We May Think" (PDF). *The Atlantic Monthly*: 101–108. Archived from the original (PDF) on 2018.
- Bourne, Charles P and Bellardo T. (2003). *A History of Online Information Services, 1963–1976*. MIT Press. pp. 169–170. Retrieved 2018.

Besser, Howard (2004). "The Past, Present, and Future of Digital Libraries". A Companion to Digital Humanities. Blackwell Publishing Ltd. pp. 557–575.

Schatz, Bruce (1996). "Building large-scale digital libraries". IEEE Computer. 29 (5): 22–25.

Gonçalves M., Edward A., Watson T., Kipp A. (2004). "Streams, structures, spaces, scenarios, societies (5s): A formal model for digital libraries". ACM Transactions on Information Systems. 22 (2): 270–312.

Castagné, Michel (2013). Institutional repository software comparison: DSpace, EPrints, Digital Commons, Islandora and Hydra (Report). University of British Columbia.
doi:10.14288/1.0075768.

Lemon B., Blinco K., Somes B., (2020). "Building NED: Open Access to Australia's Digital Documentary Heritage". Publications. 8 (2): 19. doi:10.3390/publications8020019

Pitti D. and Duff W. M. (2001). Introduction. Encoded Archival Description on the Internet, pages 1–6. The Haworth Press, Inc.

Kanik P. (2018). "Schoolap Web-based E-library". www.schoolap.com. Retrieved 2023.

Adewusi T., Ogunremi Y., and Amusu D. (2018). "9ijkids Web-based E-library". www.9ijkids.com. Retrieved 2022.

Oladipupo I. (2019). "Afrilearn Educational Streaming services". www.myafrilearn.com. Retrieved 2022.

Shagaya S. (2019). "uLesson educational app". www.ulesson.com. Retrieved 2022.

Stanley E., Mary T., Miracle J. and Margaret O. (2022). “Che Archive educational website”. www.chearchive.tk. Retrieved 2022.

Tencent (2018). “Webnovel online literature website”. www.webnovel.com. Retrieved 2022.

Iyortsuun K. (2019). “UMM Resource website”. www.ummresources.com. Retrieved 2022.

Federal Government of Nigeria (2021). “Inspire education Academic website”.

Inspire.Education.gov.ng. Retrieved 2022.

EMMCDA United Nations (2021). “Plato E-learning platform”. www.plato.com.

Retrieved 2022.

Olatunji G.(2020). “ClassNotes e-learning platform for secondary schools”.

www.classnotes.com . Retrieved 2022.

WOLO GROUP (2020). “Wolo E-Learning project”. www.woloafric.com. Retrieved 2023.

Netify 2019. “E-library extension website”.www.tachiyomi.com. Retrieved 2022.

Avishai A., Navada A. and Giora K. (2022). “WIX E-learning website”. www.wix.com.

Retrieved 2022.

Olaogun f., Ogedengbe P. (2019). “Tutorial website for E-learning”. www.tutorial.ng.

Retrieved 2022.

Tutorial Point (2018). Overview of JavaScript from: <https://www.tutorialspoint.com/>.

Retrieved 2022.

Hardey M. (2019)."PHP" from: <https://medium.com/@hardeylarning>. Retrieved 2022.