VALLEY VIEW UNIVERSITY

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

TOPIC:

ONLINE LEARNING PLATFORM

CASE STUDY OF KOFORIDUA TECHNICAL UNIVERSITY,

COMPUTER SCIENCE DEPARTMENT

A PROJECT WORK SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE (BSC.) IN INFORMATION TECHNOLOGY.

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DECLARATION

This is to declare that, the research work underlying this senior research project has been carried out by the under mentioned student under the supervisor. Both student and the supervisor certify that the work documented in this thesis is the output of the research conducted by the student as part of his final year project work in partial fulfillment of the requirement of the Bachelor of Science in Information Technology degree.

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DATE: 27/10/2023   DATE: 27/10/2023

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ABSTRACT

The Online Learning Platform emerges as a disruptive answer in the ever-changing landscape of education. The goal of this project is to design and build a dynamic online learning environment for the Computer Science Department at Koforidua Technical University. The platform provides a wide range of functionality by leveraging the power of JavaScript, PHP, MySQL, CSS, and HTML. It provides students with access to high-quality video lectures, interactive quizzes, and a large collection of instructional resources. The online forum encourages debate and feedback, resulting in a lively virtual classroom. The project investigates the integration of multiple technologies in great detail, ending in a robust and user-friendly educational tool. A thorough examination of the proposed system highlights its key features, benefits, and a complete system context diagram. The platform is built with an emphasis on usability, accessibility, and scalability in mind. The conclusion highlights major achievements, while recommendations point the way forward for improving user advice, personalizing prediction models, and optimizing for mobile devices.

CHAPTER ONE

INTRODUCTION

1.0 Introduction and Opportunity Statement

The need for all-inclusive online learning platforms is more than ever in the current digital era. Online learning systems have become more widely used as a result of the swift growth of internet infrastructure, the accessibility of digital devices, and the increasing necessity for remote education during the COVID-19 epidemic. Through the design, development, and implementation of an online learning platform customized to the unique requirements of Koforidua Technical University's Computer Science Department, this research project seeks to close the gaps now present in the online learning environment.

1.1 Subject and Field of Study

The development of an online learning platform is the main objective of this project. With a special focus on educational technology, this platform will be classified under the category of information technology and work to improve the teaching and learning process for both teachers and students.

1.2 Study Objectives

1.2.1 Global (General) Objectives

The general objectives of this project are to design, develop, and implement an online learning platform that empowers students to access video lectures, participate in interactive quizzes, and monitor their academic performance.

1.2.2 Specific Objectives

The specific objectives include:

Creating an online learning platform that provides high-quality video lectures.

Ensuring that students have the capability to access previous lectures, thereby addressing the issue of missed classes.

Facilitating student access to educational materials to expand their knowledge on course topics.

Establishing a platform that enables tutors to assess student progress following each course.

1.3 Background to the Study

Due to technical developments, improved internet connectivity, and the need for distant learning during the COVID-19 epidemic, online education has grown significantly. These innovations have highlighted both the benefits and pitfalls of online learning.

Learners can now access educational resources at their leisure, eliminating geographical limitations and supporting a variety of learning preferences.

1.4 Scope of Study

The purpose of this research is to design and construct an online learning platform for the Computer Science Department at Koforidua Technical University. It seeks to address the department's issues with online education.

1.5 Significance of Study

The significance of this study depends in its ability to deliver a smooth and comprehensive online learning solution suited to the Computer Science Department's specific demands. This project has the potential to greatly impact the education sector by removing existing problems and improving the teaching and learning experience.

1.6 Methodology

The study methodology will include a mix of interviews, questionnaires, observations, and desktop evaluations. These methods will be used to collect data, analyze existing online learning systems, and inform the development process. Furthermore, the choice of a software development process model will be justified based on the project's requirements.

1.7 Expected Results of the Study & Possible Use

The expected results of this study include the successful development and implementation of an online learning platform, which will offer students video lectures, interactive quizzes, and performance tracking. The deliverables of this research will be a functional online learning platform, recommendations for its use, and insights into the software development process employed.

1.8 Presentation of Thesis

The study is divided into eight chapters which are as follows bellow:

1. Chapter one introduces the research study, the subject and field of study, the study objectives, providing the background to the study, the scope of the study, justification and significance of the study, Methodology, Expected results of study, presentation of thesis study work plan.

2. Chapter two presents a review of literature on the topic.

3. Chapter three presents the crystallization of the project.

4. Chapter four Analysis of the proposed System.

5. A detailed design of the proposed system is presented in Chapter five.

6. Chapter six constitutes Implementation of system design and testing.

7. Chapter seven comprises of system Documentation.

8. Finally, chapter eight presents the summary, conclusion, general recommendations of the study and further work.

1.9 Study work plan.

Project schedule is as outlined below.

CHAPTER 1: INTRODUCTION (10th – 15TH July 2023)

Describes the background of the project work. Discusses why this project is important and the need to solve the existing problem.

CHAPTER 2: LITERATURE REVIEW (15TH – 18TH July 2023)

Provide a survey and a critical review of work of other authors

CHAPTER 3: CRYSTALISATION OF RESEARCH PROBLEM (18TH -22ND JULY 2023)

Define project methodology, define project phases and how the project objective will be achieved.

CHAPTER 4: SYSTEM ANALYSIS AND DESIGN (23RD – 29TH JULY 2023)

Describes system analysis with respect to data collection and decision taking on the function and nonfunctional requirements

CHAPTER 5: DETAILED DESIGN OF THE PROPOSED SYSTEM (30TH JULY -5th AUGUST 2023)

Describes the detailed design such the usage of DFD, use cases, flow chart, databases and architectural design of the system

CHAPTER 6: SYSTEM IMPLEMENTATION AND TESTING 6TH -10TH AUGUST 2023

Describe the implementation approach, System testing techniques are all considered in this chapter

CHAPTER 7: SYSTEM DOCUMENTATION 11TH AUGUST, 2023 – 5TH SEPTEMBER, 2023

Describes system documentation, usages and guides to install and use the system and to apply changes

CHAPTER 8: SUMMARY, CONCLUSION AND RECOMMENDATION 10TH – 22ND SEPTEMBER 2023

Here is a summary of the entire project and what we have achieved. Future potential works are also recommended.

CHAPTR TWO

LITERATURE REVIEW

2.1 Online Learning Platforms: A Historical Perspective

Online learning platforms have evolved significantly over the years. They were first restricted to text-based content and simple communication facilities. With the introduction of multimedia, higher bandwidth, and enhanced internet infrastructure, more interactive and engaging platforms were created. Blackboard and Moodle were early pioneers in the subject, laying the groundwork for the present online learning environment.

University online education is gaining popularity, signaling a substantial shift in how students obtain educational content [1]. The increasing participation of students in online courses at universities reflects this transforming trend. An analysis of online courses offered in the United States since 2002, for example, demonstrates a significant growth in online student enrollment. In 2012, 1.6 million students enrolled in at least one online course, rising to 5.5 million in 2013 and 7.1 million in 2014. This tremendous development reflects the growing desire for flexible and accessible learning [2]. [4] [7].

One major development is the rise of Massive Open Online Courses (MOOCs), which have become uniting platforms available to learners worldwide. The launch of edX, a global learning platform that

provides free access to university-level courses, was a historic turning point in online education [3].

The impact of these platforms illustrates the potential of online learning to bridge educational barriers and provide diverse learners with cost-effective, high-quality education. This changing environment serves as the backdrop for the proposed online learning platform, emphasizing the importance of a complete and adaptive solution. [5][6][8].

2.3 Advantages and Drawbacks of Online Learning Platforms

Online learning platforms offer various advantages. They provide flexibility in terms of when and where students can access educational materials. This is especially beneficial for individuals who work, have family responsibilities, or cannot attend traditional in-person classes. Furthermore, online learning transcends geographical boundaries, making education accessible to a global audience.

However, the rapid transition to online education during the COVID-19 pandemic highlighted various challenges. Some students struggled with technology issues, while others faced difficulties in maintaining engagement and motivation in a virtual learning environment. This chapter delves into these advantages and drawbacks to provide context for the proposed project.

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2.4 Gaps in Existing Online Learning Platforms

Existing research has identified several shortcomings in current online learning platforms that this project aims to address. Notably, most platforms lack a unified solution that seamlessly integrates video lectures, interactive quizzes, and comprehensive performance tracking. These gaps in functionality create barriers for both educators and students in terms of effective engagement and learning.

2.5 The Significance of Tailored Online Learning Platforms

The significance of this study lies in its focus on creating a customized online learning platform for the Computer Science Department at Koforidua Technical University. Tailoring the platform to the unique needs of this department is expected to have a positive impact on student learning outcomes and educator efficiency.

2.6 Gaps and Contributions of This Study

This chapter's exploration of the existing literature helps identify gaps and challenges in current online learning platforms. These gaps underscore the importance of the proposed project. The contributions of this study will be the development and implementation of an integrated platform that addresses these

challenges, enhancing the teaching and learning experience within the Computer Science Department.

2.2 Review of existing System

2.2.1 Edmodo

All learners may connect with the people and resources they need to realize their full potential through Edmodo, a global education network. It is a free social networking tool for education. Universities, Ministries of Education, and schools all over the world use it as an alternative to LMSs because of its It is free and intended for online learning by teachers and students.

It does not contain or advocate for commercial material, and it allows low-bandwidth connections so that teachers and students can communicate synchronously (live or in real-time) and asynchronously (delayed) without consuming a lot of data. Instead of using a computer, smart phone users can access the Edmodo app and/or the course. This makes it a great course site because it enables small group discussions, the creation of archives for discussions, the use of third-party apps, and the posting of images and videos in addition to allowing for the storage of readings in a library. And Edmodo's structure and usage are extremely similar to those of Facebook, so learning how to use it shouldn't be a problem. It resembles an application that many teachers and

students are already familiar with and is taken into account by the current system.

Strength

- User-Friendly Interface

- It offers a central hub for communication

- Edmodo has mobile apps for iOS and Android, allowing users to access content and communicate on the go.

- Parents can access Edmodo to stay informed about their child's academic activities.

Weakness

- Edmodo's customization options are somewhat limited compared to other learning management systems.

- It may lack some advanced functionalities that more comprehensive platforms provide.

- Dependency on Internet Connectivity.

- Integrating Edmodo with other educational tools or systems may require additional effort and technical expertise.

Figure 1.1 interface of edmudo

2.2.2 Moodle

The term "Moodle" stands for "Modular Object-Oriented Dynamic Learning Environment". It is a platform for online education that offers students personalized learning settings. Moodle is a tool that teachers can use to build lessons, run courses, and communicate with both teachers and students. Reviewing the class schedule, turning in assignments, taking quizzes, and interacting with classmates are all things that students can do on Moodle. Thousands of educational institutions all over the world utilize Moodle to offer a centralized, well-organized interface for online learning. Students can access videos, documents, and examinations in virtual classrooms that teachers and class administrators can build and control. Students can communicate safely with the teacher

and other students during class chat. The class administrator can alter each Moodle classroom and course. For illustration While some teachers may only use Moodle to distribute documents to their students, others may utilize it as the main platform for quizzes and exams. Millions of users to a small group of pupils can be included in a single lesson. The Moodle software needs to be downloaded and installed on a web server in order to build a Moodle learning environment. Due to its open-source nature and modular construction, the Moodle platform is adaptable for advanced users. Individual users, including instructors and students, can create an account on the Moodle server and access content using either the web interface or the "Moodle Desktop" application.

Strengths

- Moodle offers a high degree of customization
- It's free to use and can be modified to meet specific requirements
- It provides support through forums and documentation
- It can handle a wide range of users and courses without significant performance issues.

Weakness

- Setting up and maintaining a Moodle instance may require technical expertise.

- Moodle can be resource-intensive in terms of server requirements.

- It may take time for users to become comfortable navigating Moodle.

- Learning how to use Moodle effectively can be time-consuming.

Figure 2.1 interface of Moodle

2.2.3Sakai

For learning, teaching, research, and collaboration, Sakai is a feature-rich, freely accessible technology solution. A varied and

international adopter group created the open source software package known as Sakai. People, institutions, and groups from all around the world who are dedicated to advancing teaching, learning, and research make up the Sakai project's community. This dedication is demonstrated by the way community members collaborate to share expertise, identify the requirements of academic users, develop and exchange software tools, and encourage one another in adopting and utilizing Sakai. seen in figure (1.3) Online tests are one of the essential components of a learning platform, and the Tests & Quizzes tool in Sakai 11 has undergone a lot of improvements.

Strengths

- It's freely available and customizable.
- Sakai emphasizes collaborative learning by offering a variety of tools
- It ensures that content and tools are accessible to a wide range of users.
- Sakai is designed to handle a large number of users and courses.

Weakness

- Sakai can be complex and overwhelming for both educators and students.

- Setting up and maintaining a Sakai instance may require technical expertise.

- Compatibility issues can hinder the seamless integration of external resources.

- Sakai may have a smaller user base and a more limited ecosystem of plugins and add-ons.

Figure 2.2 interface of Sakai

2.2.4 Degreed

An enterprise LMS solution is Degreed. For employees to learn at their own pace, it enables firms to manage thousands of courses and platforms in one location. Administrators have the ability to monitor an employee's development even when they are not following company requirements thanks to configurable learning routes. Since administrators can observe which individuals possess cross-functional skills, it facilitates the identification of talent. Employees can pick where to spend the dollars, which can be spent on any learning activity they desire, while administrators can buy

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and manage credits for numerous platforms in one location. If this option sounds interesting to you, you will need to request price and a demonstration because pricing information is not publicly available.

Strength:

- Degreed aggregates a wide range of learning content from various sources.
- Degreed uses data and algorithms to recommend personalized learning paths
- Users can track their skill development over time
- Degreed offers integrations with other learning tools

Weakness:

- Degreed is a paid platform, and the cost can vary depending on the size and needs of the organization.
- The platform can be complex to set up and configure, especially for organizations with specific requirements.

Some niche or specialized topics may have limited content available in Degreed's library.

Figure 2.3 is the degreed.

2.2.5 Bizlibrary

The BizLibrary LMS provides social learning, virtual classroom management, bespoke content management, and certification administration. This is an excellent choice if the regulatory environment in which your company operates necessitates any form of continuing licenses, certifications, or security training in order to maintain good standing. Everything is customizable and can be given a white label for your company.

The platform will allow for self-enrollment, and business owners can decide which courses they require for their employees. Although there is no publicly available pricing information, you can join up for a free trial.

Strength:

- Provide a quick way for user activate the application by one click.

- It saves time and effort compared to manual methods.

- It makes it easier to analyze and interpret the results.

- It enables tasks to work together in real-time

Weakness:

- It can save organizations time and effort in creating their training materials.

- The platform is accessible on various devices, including smartphones and tablets.

- BizLibrary provides robust reporting and analytics tools that enable organizations to track learner progress.

- Organizations can customize and brand the training content to align with their unique needs and culture.

Figure 2.4 is the interface for biz library
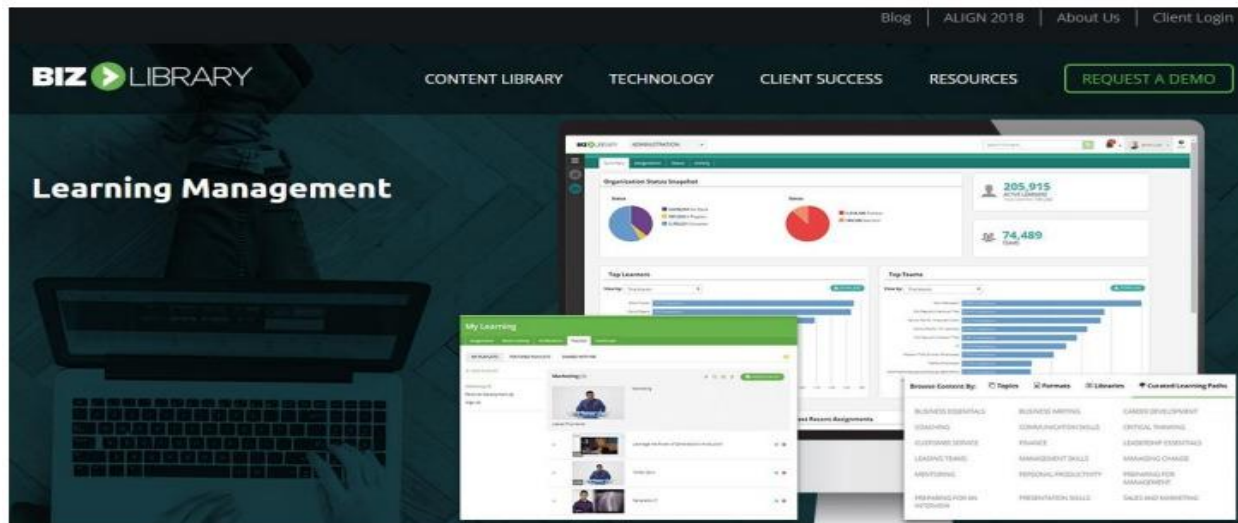
2.3 Differences between systems

To address some of the shortcomings of the current systems, this solution is being developed. All of the currently available software cannot be categorized as intuitive.

A web-based application that will be appropriate for solving the aforementioned issues will be deployed by this software. An intuitive user interface will be built into the software.

The goal of creating the online learning platform is to give users access to a flexible, convenient, and effective learning experience that empowers them to acquire new skills, knowledge, and competencies. Here are some more details on the objectives and features of the platform.

2.3.1 Differences

1. The reviewed system uses can assign task which is automatic. But the proposed system allows users to enter manually when needed

2. The reviewed system only uses plain-text in reporting an issue but the proposed system allows user to add photo of issues.

2.3.2 Functions of the proposed system

The main functions of the online learning

platform are;

- Access to Virtual Lectures

- Course Creation and Management

- User Registration and Profile Management

- Content Delivery

- Communication and Collaboration Generate reports.

2.3.4 Merits of the Proposed System

- To Minimize user, wait time

- To deliver solutions as quickly as possible

- To manage and handle requests

- To enhance internal assessment.

2.4 Conclusion

In conclusion, this chapter has pointed out the strength, weakness and limitation for each existing system that have been reviewed. Next the proposed system with its strength has being rolled down having in it some of the combining strength of the existing systems. The proposed solution is definitely provided to solve the limitation and weakness of the existing systems.

The next chapter will be focusing on background and history of the case study, how they operate (components/features of the system they use, processes or procedures involved), the system context diagram and the process or data flow diagrams, the strength/advantages and the weaknesses/disadvantages of the system they use.

2.7 Summary

In summary, this chapter has provided a comprehensive review of the existing literature related to online learning platforms, emphasizing the historical evolution, advantages, drawbacks, gaps, and significance of tailored platforms. This foundation sets the stage for the subsequent chapters, which will delve into the analysis, design, implementation, and documentation of the proposed online learning platform.

CHAPTER THREE

CRYSTALLIZATION OF THE PROBLEM

3.1 Background/History

The crystallization of the problem begins with a historical perspective on the online learning system implemented by the Computer Science Department at Koforidua Technical University. Understanding the origins and evolution of the existing system is essential to recognize its strengths and weaknesses and to identify potential areas for improvement.

The Computer Science Department's online teaching has expanded dramatically in recent years, reflecting broader global trends. Initially, the department depended on traditional teaching methods such as in-person lectures, physical textbooks, and manual assessment systems. Because of technology improvements and the growing demand for flexible learning choices, the department decided to switch to an online learning system.

The department's journey towards online learning began with the adoption of a Virtual Learning Environment (VLE) as its primary platform. The goal of this transformation was to improve students' access to instructional materials, to encourage interaction between students and teachers, and to streamline the assessment

and grading processes. To adapt to the evolving environment of online education, the system has undergone significant modifications and changes over time.

3.2 System Operation and Components

3.2.1 Features of the Current System.

The online learning platform in use encompasses several key components and features:

- ➢ Virtual Learning Environment (VLE): The system's heart, hosting course materials, tests, and student-teacher interaction.
- ➢ Video Lecture Repository: A video lecture library that allows students to view prior classes.
- ➢ Assessment Module: A tool for administering quizzes and assignments in order to evaluate student performance.
- ➢ Discussion Forum: A forum for students and teachers to interact and share feedback.
- ➢ A content repository is a collection of educational materials such as e-books and additional resources.
- ➢ Performance tracking tools are used to monitor and evaluate students' progress and performance throughout their courses.

3.2.2 System Context Diagram

Students, Lectures from various units, and the report department are examples of external entities in the current system. A typical System Context Diagram in the context of the Computer Science Department's online learning system would look like this:
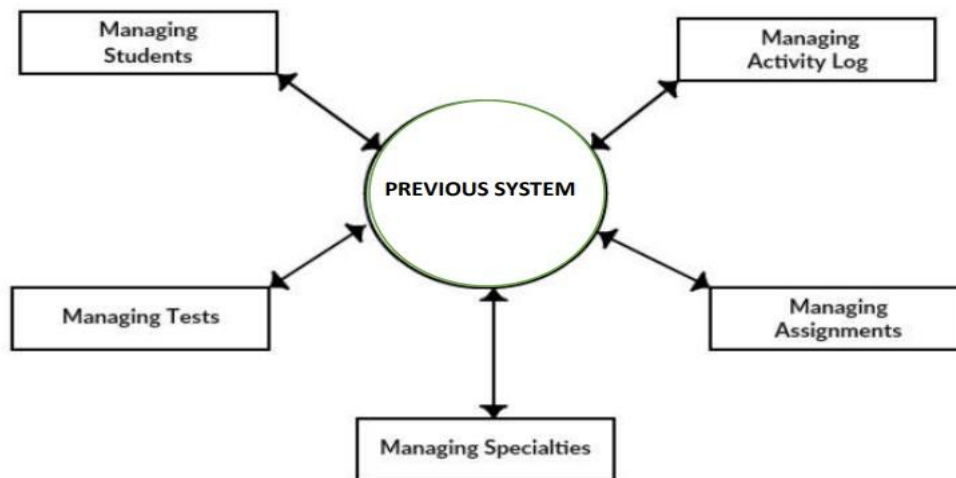

Figure 3.1: DFD of existing system

3.3 Advantages and Disadvantages

3.3.1 Strengths/Advantages

The existing online learning system in use at the Computer Science Department has various benefits, including:

Accessibility: Students have the freedom to access course materials and lectures whenever they want, removing geographical boundaries.

Quizzes, assignments, and discussion forums encourage active engagement in the system. Teachers can more efficiently monitor and assess student development via performance tracking.

Availability of Resources: The system allows access to a wide selection of educational materials.

3.3.2 Weaknesses/Disadvantages

Despite its benefits, the current system has certain drawbacks and limitations:

- ➢ The system lacks a cohesive platform that smoothly integrates video lectures, quizzes, and performance tracking.

- ➢ Interactivity is limited: The existing approach may not fully use the potential for interactive learning.

- ➢ User Experience: User experience and interface design may need improvement.

- ➢ Scalability: The system's ability to handle a growing number of students and courses requires assessment.

3.4 Comparative Study

A comparative study will be conducted to juxtapose the features and performance of the existing online learning system within the Computer Science Department with the state-of-the-art practices and systems documented in the existing body of knowledge. This

comparative analysis will help identify areas where the department's system excels and areas that require enhancement, drawing insights from best practices and emerging trends in the field of online education.

This chapter crystallizes the problem by providing a comprehensive understanding of the existing online learning system's history, components, strengths, weaknesses, and a comparative analysis with industry standards. These insights will inform the subsequent phases of the project, particularly in proposing improvements to the current system.

CHAPTER FOUR

ANALYSIS OF THE PROPOSED SYSTEM

4.0 Overview of the Proposed System

The analysis of the proposed online learning platform for the Computer Science Department at Koforidua Technical University delves into the functional and non-functional requirements, major components, and the benefits of the system. This chapter provides a thorough explanation of the structure, purpose, and benefits of the proposed system.

4.0.1 Functional Requirements

The proposed system is designed to fulfill the following functional requirements:

➢ User Registration and Authentication: The system must allow students and instructors to securely register and authenticate their identities.

➢ Video Lecture Repository: A simple platform for uploading, managing, and viewing video lectures.

➢ Assessment Module: A module for creating and managing quizzes and assignments, with automated grading capabilities.

➢ Discussion Forum: A comprehensive discussion platform that allows for interactive involvement between learners and lecturers.

- ➢ Content Repository: A repository for storing and distributing educational content, such as e-books and additional resources.

- ➢ Performance Tracking: Tools for tracking and evaluating student performance and growth.

4.0.2 Non-functional Requirements

The proposed system must meet the non-functional requirements listed below:

- ➢ Scalability: The system should be able to handle an increasing number of students, courses, and resources.

- ➢ User-Friendly Interface: The user interface should be straightforward, making it simple for both students and teachers to navigate and use the platform.

- ➢ Security: Strong security mechanisms to protect user data and system integrity.

- ➢ Performance: The system should provide responsive and flawless performance even under large user loads.

- ➢ Compatibility: Compatibility with a variety of devices and web browsers to enable accessibility for all users.

4.1 Major Features/Components of the Proposed System

The proposed online learning platform comprises the following major features and components:

➢ User Management: A comprehensive user management system, including user registration, authentication, and profile management.

➢ Video Lecture Platform: An efficient platform for uploading, categorizing, and viewing video lectures.

➢ Interactive Assessments: Tools for creating, managing, and grading quizzes and assignments.

➢ Engagement and Collaboration: A discussion forum for interactive engagement, discussion, and feedback.

➢ Content Repository: A centralized repository for storing educational materials, accessible to all users.

➢ Performance Monitoring: Mechanisms for tracking and evaluating student performance, offering insights for improvement.

4.2 Benefits/Advantages of the Proposed System

The proposed online learning platform offers several significant benefits and advantages:

- ➤ Enhanced Learning Experience: Students gain access to a comprehensive and interactive learning environment, fostering engagement and knowledge retention.

- ➤ Flexibility and Accessibility: The platform breaks geographical barriers, allowing students to learn at their own pace, anytime, and from anywhere.

- ➤ Efficient Assessment: Automation of assessments and performance tracking simplifies the evaluation process for instructors.

- ➤ Resource Centralization: The system centralizes educational materials, making them readily available to students.

- ➤ Scalability and Adaptability: The platform can accommodate a growing number of users and resources, ensuring long-term effectiveness.

4.3 Feature/Components of the proposed system.

The system would have the following features:

- ➤ **User Interface (UI)**
  The user interface (UI) is the platform's front end with where users interact. It includes design, layout, and navigation elements that allow users to easily access courses, material, and tools.

- ➢ **User Authentication and Profiles**
  User authentication allows users to create accounts, log in securely, and access their personalized profiles. Profiles often include user information, course history, and progress tracking.

- ➢ **Course Management System**

This component allows educators and administrators to design, organize, and manage courses. It has tools for adding course content, creating exams, and tracking learner progress.

- ➢ **Content Delivery System**

Content delivery ensures that educational materials, such as lectures, videos, text-based content, and interactive modules, are accessible to learners. It should support various formats and be optimized for different devices.

- ➢ **Assessment and Grading Tools**

Instructors can use these tools to create and deliver quizzes, assignments, examinations, and assessments. They also contain grading functionality that can be human or automatic, as well as feedback to students.

- ➢ **Communication and Collaboration Tools**

Online learning platforms incorporate communication tools such as discussion forums, chat rooms, messaging systems, and email

notifications. These features facilitate interaction among learners and with instructors.

➢ **Analytics and Reporting**

Data about user behavior, engagement, and performance is collected and processed by this system. This data is presented in dashboards and reports, allowing instructors and administrators to monitor and improve course contents.

➢ **Certification and Credentialing**

The delivery of digital certificates or certificates to learners following course completion or milestone achievement is one of the certification aspects. These credentials can be added to professional profiles or shared on social media.

➢ **Access Control and Security**

Access control mechanisms define user roles and permissions, ensuring that users have the appropriate level of access to courses and features. Security measures protect user data and privacy.

4.4 Benefits /Advantages of Proposed system.

This project will focus on developing a Web based application

software, and the software providing the listed functional
requirement below:

➢ Flexibility and Convenience

➢ Access to a Wide Range of Content

➢ Self-Paced Learning:

➢ Interactive and Engaging Content

➢ Skill Development

➢ Access to Expert Instructors

➢ Career Advancement

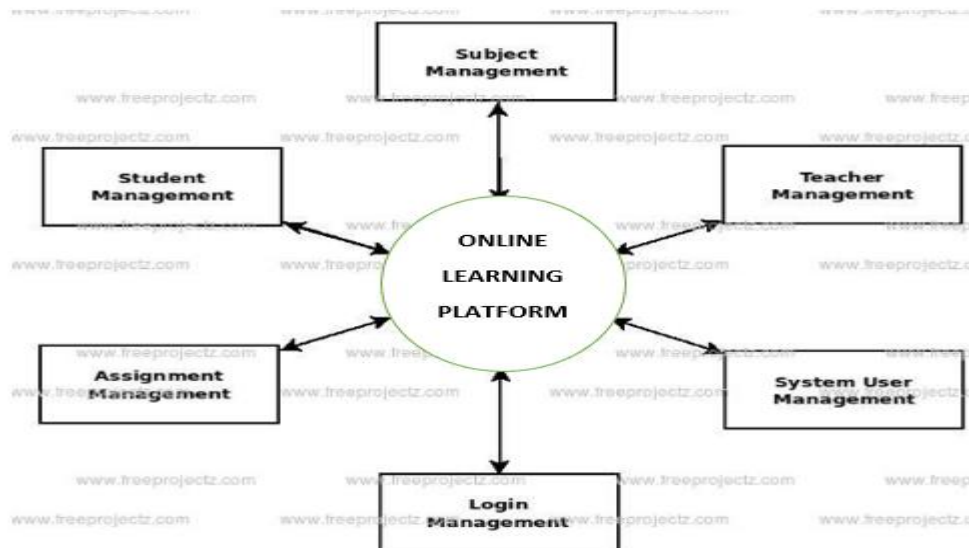4.5 System Context Diagram of the proposed system.

Figure 4.1: Data Diagram of Current System

4.6 Summary

This chapter offers a thorough analysis of the proposed online learning system, emphasizing functional and non-functional requirements, key components, and the benefits it presents. The inclusion of implementation strategy and external interfaces enhances the understanding of how the system will be developed and integrated into the existing educational environment. These insights serve as a strong foundation for the subsequent stages of development and implementation.

CHAPTER FIVE

DESIGN OF THE PROPOSED SYSTEM

The detailed design phase describes how the system will operate in terms of hardware software and network infrastructure, user interface, forms, database, programs and reports that will be used. An architectural design is created which describe the system and their flows and processes. In this section discussed about data flow diagram, Entity relationship diagram. These things are represented as diagrams with proper notation.

5.1 Data Flow Diagram

The data flow diagram is one of the most improvement tools used by the system analyst popularized the use if the data flow diagram as modelling tools through their structured system analysis methodologies. A data flow diagram should be the first tool used by system analyst to model system components. These components are the system processes the data used by these processes and external entities that interact with the system and the information flows in the system. There are four kinds of system components

5.1.1 Process

Process show what system does. Each process has one or more data inputs and produce one or more data output, Circles in a data flow

diagram represent process. Each process has unique name and number. This name and number appear inside the circle that represents the processes in a data flow diagram. This process is represented as circle.

5.1.2 Data Stores

File or data store is depositary of data. They contain data that is retained in the system. Processes can enter the data into a data store or retrieve data from the data store. Each data store is represented by thin line in the data flow diagram and each data store has a unique name.

The data store is represented in form of a line

5.1.3 External Entities

External entities are outside the system but they either supply input data into the system or use the system output, they are entities which the designer has no control. Square or rectangle may represent external entities that supply data into a system or sometimes called sources. External entities that use the system data are sometimes called sinks.

Dataflow model the passage of data in the system and are represented lines joining system components. An arrow indicates the direction of the flow and the line labelled by the name of the data flow.

5.1.4 System design

Is the specification or construction of a technical, computer-based solution for the business requirements identified in a system analysis? It gives the overall plan or model of a system consisting of all specifications that give the system its form and structure i.e. the structural implementation of the system analysis.

5.2 Detailed Design

Modeling a system is the process of abstracting and organizing significant features of how the system would look like. Modeling is the designing of the software applications before coding. Unified Modeling Language (UML) tools were used in modeling this system.

5.2.1 UML (Unified Modelling Language) Modelling

The Unified modeling language is an object-oriented system notation that provides a set of modeling conventions that is used to specify or describe a software system in terms of objects. The Unified Modeling Language (UML) has become an object modeling standard and adds a variety of techniques to the field of systems analysis and development hence its choice for this project.

In this project, the Use case diagram, Class diagram, Sequence diagram, Activity diagram, Collaboration diagram, Component diagram and State diagram will be used for system modeling.

5.2.2 Decision Tree

A decision tree takes as input an object or situation described by a set of properties, and outputs a yes/no decision. Decision trees therefore represent Boolean functions. It is also a method of showing the relationship of each condition and its permissible actions. The diagram resembles branches on a tree, hence the name. A decision table is a matrix of rows and columns. Decision rules included in a decision table, state what action to take when certain events occur. The decision table is made up of four sections: condition statements, condition entries, action statements, and action entries.

1. The condition statement identifies the relevant conditions.
2. Condition entries tell which values, if any, applies for a particular condition.
3. Action statements list the set of all steps that can be taken when a certain condition occurs.
4. Action entries show what specific actions in the set to take when selected conditions or combinations are true.

5.2.3 SYSTEM MODEL

Based on the user requirements and the analysis of the existing system, the new system was designed. The system model presents the logical operations that was designed to be used by the users and the administrator which revolves around system designing. The logical system designed was, as a result of systems analysis which were brought together to design the physical system. This introduces a general system model which will explains to users the entire structure of the system showing each level of operations.

5.4 Functional Processes of the proposed system

This is a step-by-step process of how the system using user accessed.

1. Visit the online learning platform's website.
2. Click on the "Sign Up" or "Register" button to create a new account.
3. Provide the required information, which may include a username, email address, password, and personal details.
4. Agree to the platform's terms and conditions and privacy policy.
5. Click "Submit" to complete the registration process.
6. Return to the platform's website.
7. Click on the "Log In" or "Sign In" button.
8. Enter your registered email address and password.
9. Click "Log In" to access your account.

5.5 Context Diagram of the Proposed System.
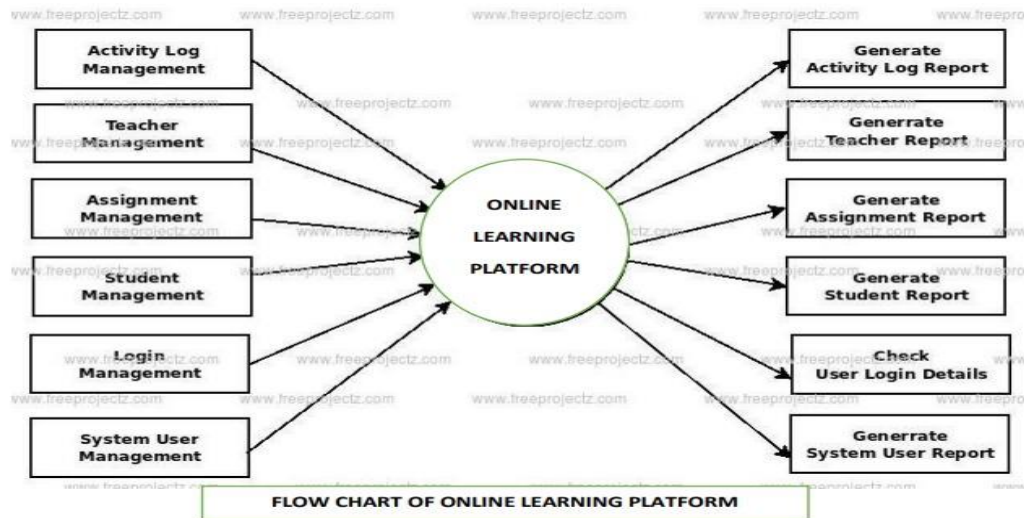
Figure 5.1: Context diagram of the proposed system.

5.3 Flowchart of the Proposed System

The flowchart of the system is a diagram that represents the workflow or process of the system.
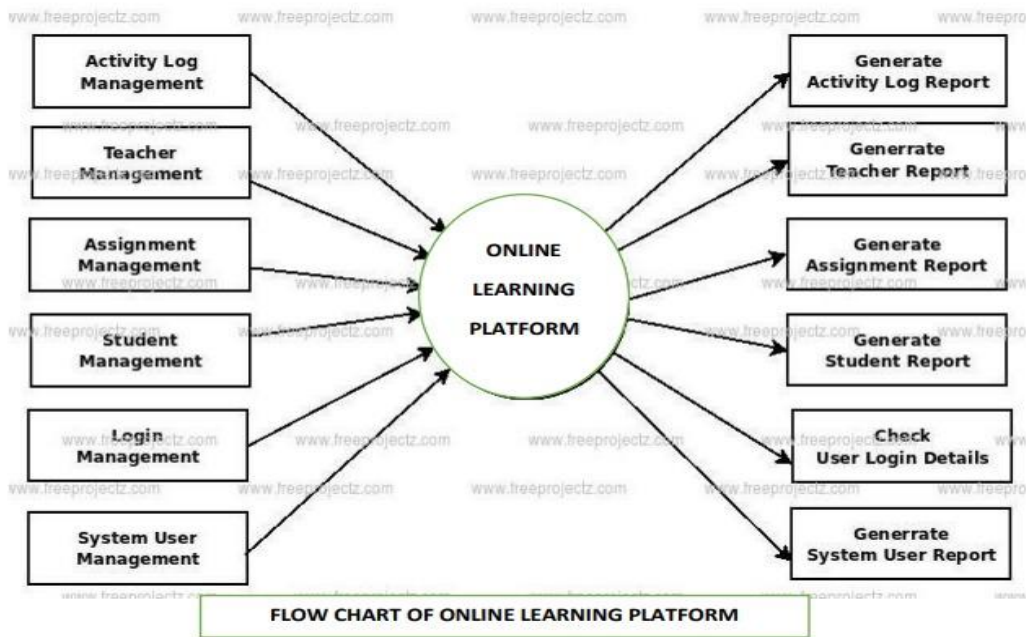

Figure 5.2: Flow Chart Diagram of Proposed System

5.5.1 Design Process

1. Gathers all information to be populated in the database such as, user details, officer details, ticket details etc. for each includes the id and name etc.

2. Groups the information based on entities of the database which includes, admin, users.

3. Each entity becomes a table in the database.

4. Stores the appropriate information required in the table. Each information becomes a field, and is displayed as a column in the table.

5. Each table in the database was assigned a primary key which uniquely identifies record in each table.

5.5.2 Database Normalization

All data in the database has been organized to avoid data redundancy and to improve data integrity. The system adapted to the first, second and third normal form.

5.6 Entity Relationship Diagram

The figure below depicts the Entity Relationship Diagram of the data.

An Entity Relationship Diagram is a technique that Database Designers use to represent the logical structure of a database

system. It can also be defined as the diagrammatic representation of a database design. In a software development environment, a

Systems Analyst interviews a client for all the project specifications, draws the ER Diagram, and gets it verified by the client. If the diagram is as per requirements and fulfills all the

ER DIGRAM OF ONLINE LEARNING PLATFORM
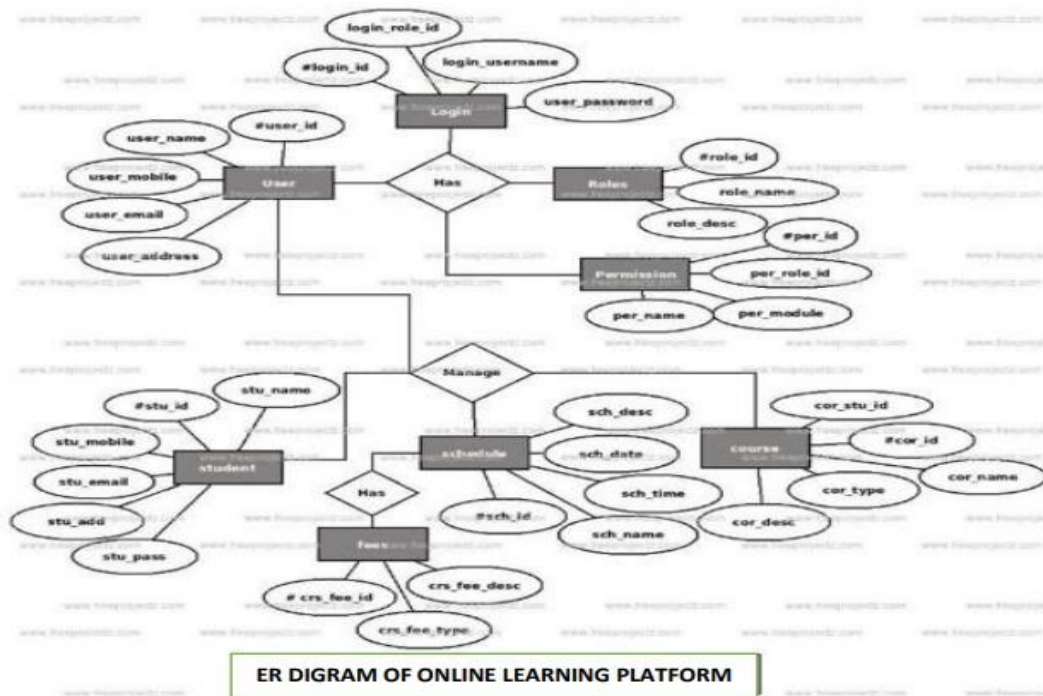
needs of the client, then the database and its objects can be created.

5.6.1 Use Case Diagram of the proposed system.

Use case diagram is a representation of the user's interaction with the system which shows the different use cases in which the user is involved. The actors include Users, Admin

Officers. The users, officers and Admins have their own function.

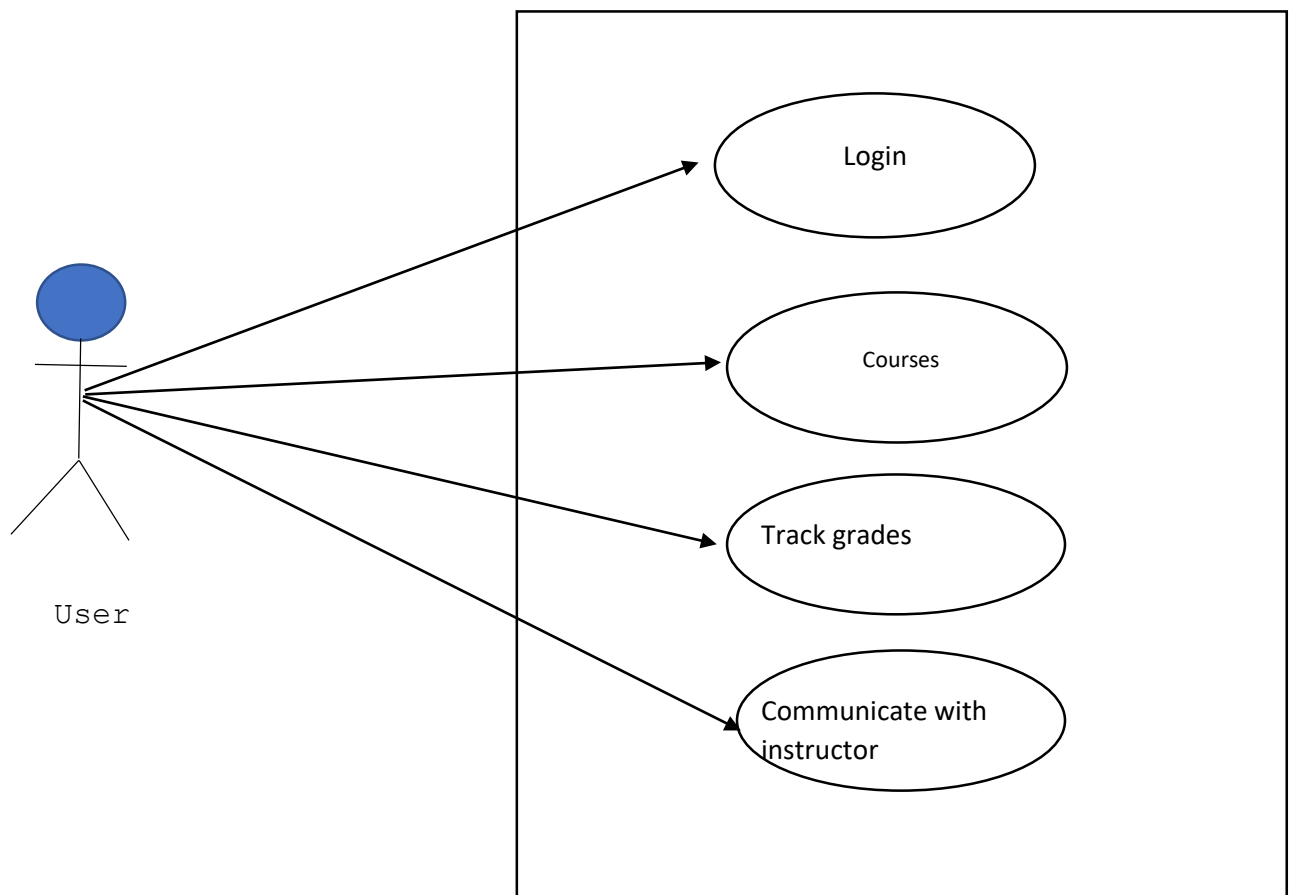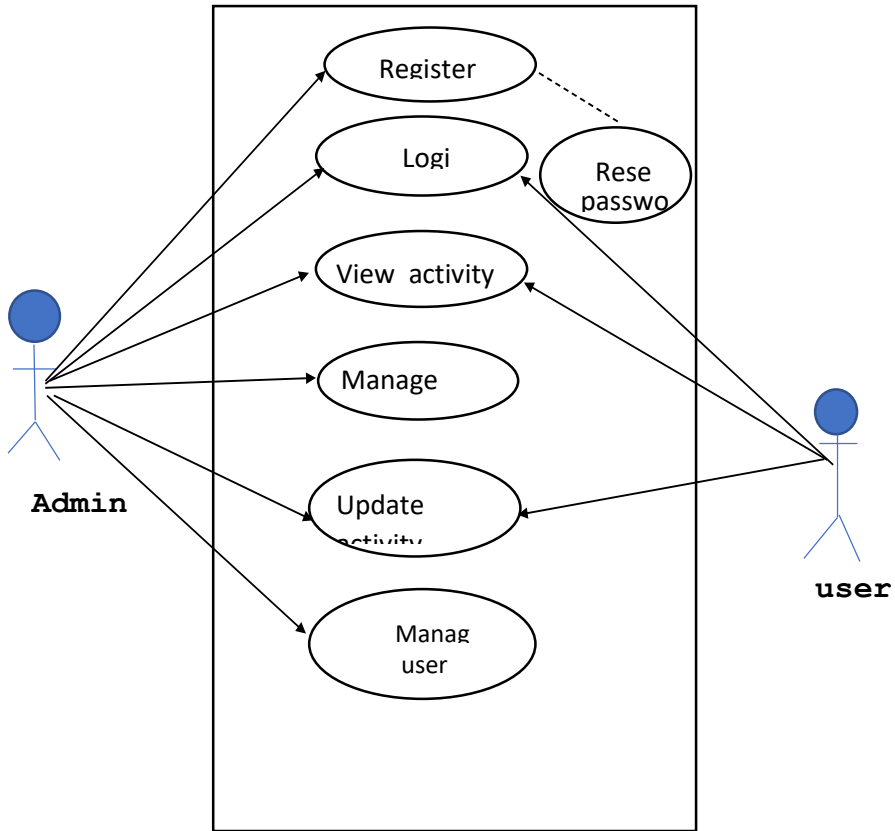The use case diagram below will show the function that can be performed by all entities.

Figure 5.4: Functions are represented in the circles.

CHAPTER SIX

IMPLEMENTATION OF SYSTEM DESIGN AND TESTING

6.1 Technologies and Tools Used

> Visual Studio

Visual Studio Code (VS Code) is a popular integrated development environment (IDE) used for coding, editing, and debugging software applications.it provides a lightweight, versatile, and highly customizable environment for developers. Visual Studio Code was likely used as the primary code editor for writing the source code of the web application. It offers features such as syntax highlighting, code completion, and debugging capabilities, making it ideal for web development.

6.1.2 Technologies

JavaScript

JavaScript was critical in improving the online learning platform's interactivity and usefulness. It was widely used to generate dynamic web pages, allowing for real-time features that improved user experience. Some of the project's notable JavaScript applications include:

> **User Interface Enhancement**: JavaScript was utilized to make the user interface more responsive and interactive. It enabled features such as dropdown menus, pop-up

dialogues, and dynamic content loading without the need for full page refreshes.

> **Form Validation:** To ensure data integrity, JavaScript was used to validate user input in forms. It gave users with immediate feedback, identifying any faults in their input.

> **JavaScript** was essential in the creation of interactive quizzes and tests. It allowed students to respond to questions, receive rapid feedback, and evaluate their results.

> **Real-Time Communication:** JavaScript was utilized to handle features such as live webinars and discussion boards that require real-time communication. It enabled synchronous online interactions between students and educators.

MySQL

> MySQL functioned as the online learning platform's relational database management system (RDBMS). It was used to efficiently manage and organise data, making it easily available to users. Data Storage: MySQL served as the repository for user profiles, course materials, video

lectures, student records, and system content. It provided safe and structured data storage.

➤ Query Processing: MySQL made it easier to retrieve specific data depending on user requests, guaranteeing that users could quickly access their courses and relevant content.

➤ Data Integrity: By imposing data constraints and relationships, MySQL preserved data integrity. It ensured the consistency and reliability of user records.

PHP

The backend of the online learning platform was built using PHP, a server-side programming language. It carried out many server-side processes, allowing the platform to be functional and dynamic. PHP's key roles included:

➤ **User authentication** was handled by PHP, which allowed registered users to log in securely and access their accounts.

➤ **Content Delivery**: Using their preferences and course enrollments, PHP retrieved and provided course materials, video lectures, and other content to users.

➤ **Database Interaction**: PHP connected to the MySQL database, ran queries, and processed the results. It made data retrieval and manipulation possible.

➢ PHP developed dynamic web pages by inserting content and user-specific information into HTML layouts. This enabled users to have more personalized experiences.

CSS

Cascading Style Sheets (CSS) were used to define the visual presentation and layout of the online learning platform. CSS brought aesthetics and consistency to the platform's design. Key applications of CSS included:

➢ **Layout Design**: CSS defined the layout structure of the platform, ensuring that content was organized in a user-friendly and visually appealing manner.

➢ **Styling Elements**: CSS applied styling to various elements, including fonts, colors, margins, and paddings, enhancing the platform's visual appeal.

➢ **Responsive Design**: CSS was used to create a responsive design, ensuring that the platform adapted to different screen sizes and devices, providing a consistent user experience.

HTML

HTML (Hypertext Markup Language) served as the foundation for the structure and content of the online learning platform. It offered

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the basis for constructing web pages and organizing content. Page Structure: HTML defines the structure of web pages, outlining headers, footers, navigation menus, and content regions.

➢ Hyperlinks: HTML permitted the introduction of hyperlinks, which allowed users to browse between pages and access other portions of the site.

➢ Multimedia Integration: HTML allowed for the incorporation of multimedia elements such as video lectures, photos, and document files, which enhanced the learning experience.

➢ Form Design: HTML was used to design and develop interactive forms for user registration, login, and data entry.

The seamless integration of these technologies ensured the successful development and operation of the online learning platform, creating an engaging and user-friendly environment for both students and educators at Koforidua Technical University's Computer Science Department.

6.2 Design and Development of App1

The proposed system was implemented using the codes below. Here are samples.

```
Keep me signed in                </label>

        </div>

        <a
href="https://www.virtual.guyguytv.com/dashboard/retrieve-
password" class="tutor-btn tutor-btn-ghost">

            Forgot?        </a>

    </div>



        <button   type="submit"   class="tutor-btn   tutor-btn-
primary tutor-btn-block">

        Sign In    </button>



                    <div class="tutor-text-center tutor-fs-6
tutor-color-secondary tutor-mt-20">

            Don&#039;t have an account? 

            <a href="https://www.virtual.guyguytv.com/student-
registration/?redirect_to=https://www.virtual.guyguytv.com/"
class="tutor-btn tutor-btn-link">

                Register Now             </a>

        </div>
```

```
        </form>

<script>

    document.addEventListener('DOMContentLoaded', function() {

        var { __ } = wp.i18n;

        var   loginModal   =   document.querySelector('.tutor-
modal.tutor-login-modal');

        var errors = [];

        if (loginModal && errors.length) {

            loginModal.classList.add('tutor-is-active');

        }

    });
</script>


">Enroll Course</a></div></div>
</div>                    </div>

                            <div class="etlms-course-list-
col">

                        <div class="tutor-card tutor-course-card
tutor-loop-course-container  etlms-course-card-classic     etlms-
has-hover-animation">

        <div class="tutor-course-thumbnail">

    <a

href="https://www.virtual.guyguytv.com/courses/entrepreneurship-
human-development/" class="tutor-d-block">
```

```
<div class="tutor-ratio tutor-ratio-16x9">

    <img   decoding="async"   class="tutor-card-image-
top"              src="https://www.virtual.guyguytv.com/wp-
content/uploads/2023/10/hqdefault-1.jpg"    alt="Entrepreneurship
&#038; Human Development" loading="lazy">

    </div>

  </a>

</div>
<div class="tutor-course-bookmark">

  <span   class="cart-required-login  save-bookmark-btn  tutor-
iconic-btn   tutor-iconic-btn-secondary"   data-course-id="430"
role="button">

    <i class="tutor-icon-bookmark-line"></i>

  </span></div>

  <span class="tutor-course-difficulty-level">

    Intermediate    </span>


  <div class="tutor-card-body">

    <div class="tutor-course-ratings tutor-mb-8">

  <div class="tutor-ratings">

    <div class="tutor-ratings-stars">

      <span    class="tutor-icon-star-line"    data-rating-
value="1"></span><span  class="tutor-icon-star-line"  data-rating-
value="2"></span><span  class="tutor-icon-star-line"  data-rating-
```

```
value="3"></span><span class="tutor-icon-star-line" data-rating-
value="4"></span><span class="tutor-icon-star-line" data-rating-
value="5"></span>          </div>


            </div>
</div>
<h3 class="tutor-course-name tutor-fs-5 tutor-fw-medium tutor-mb-
12" title="Entrepreneurship &#038; Human Development">
    <a
href="https://www.virtual.guyguytv.com/courses/entrepreneurship-
human-development/">Entrepreneurship &#038; Human Development</a>
</h3>
<div class="tutor-meta tutor-mt-auto">


    <div>
                <span class="etlms-course-author-meta tutor-
meta-key">By</span>
        <a class="etlms-course-author-meta tutor-meta-value"
href="https://www.virtual.guyguytv.com/profile/paul-
arhin?view=instructor">Paul Arhin</a>


        </div>
</div>
    </div>
```

```
<div class="tutor-card-footer">

<div                              class="tutor-course-list-btn"><a
href="https://www.virtual.guyguytv.com/courses/entrepreneurship-
human-development/"   class="tutor-btn   tutor-btn-outline-primary
tutor-btn-md   tutor-btn-block      tutor-open-login-modal  "  data-
course-id="430">Enroll Course</a></div></div>
</div>                          </div>

                                    <div class="etlms-course-list-
col">
```

6.3 User Interface Design

User Interface Design means the design of application with which the user interacts. This should be kept in mind that UI should be very simple and easy to use. It should be simple enough in look and feel. On this basis the proposed application uses HTML, CSS and JavaScript for the UI design.

The various interfaces designed for the web app include the following snapshots.

Figure 6.1, 6.2 and 6.3: App interface showing Home page.
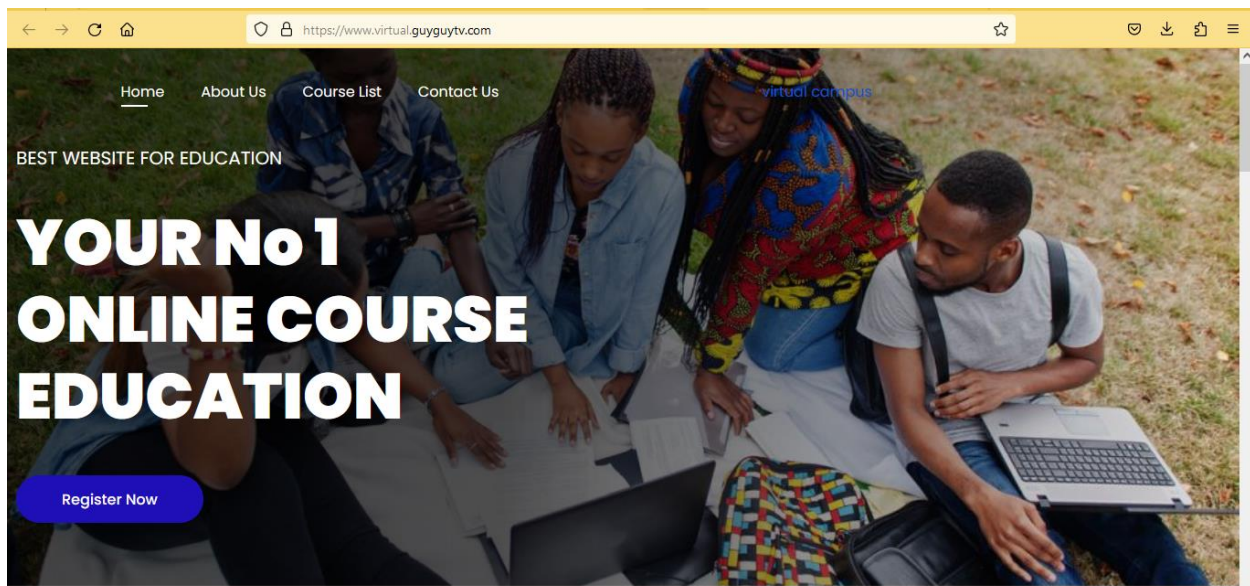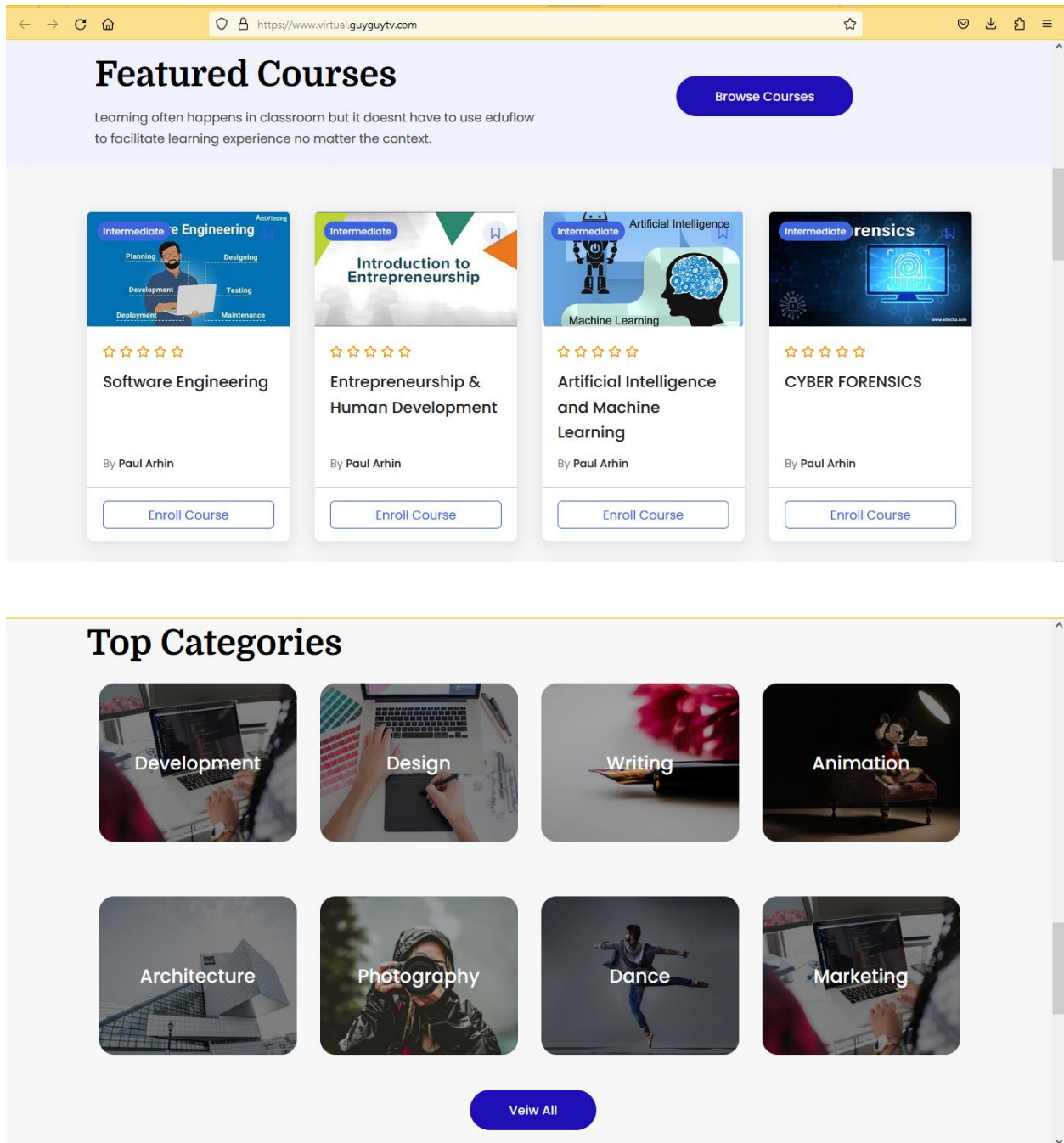
Figure 6.1, 6.2 and 6.3 show the Home page which displays a banner, featured courses, top categories of courses and other information.

Figure 6.4, and 6.5: App interface showing About Us page.
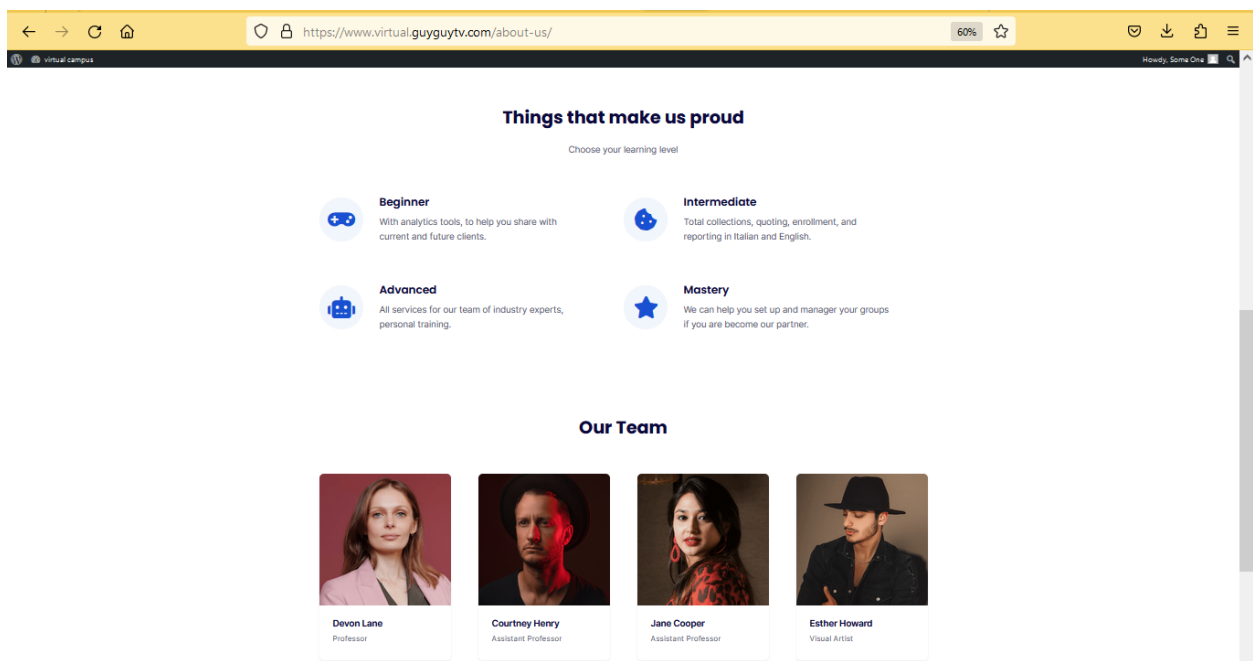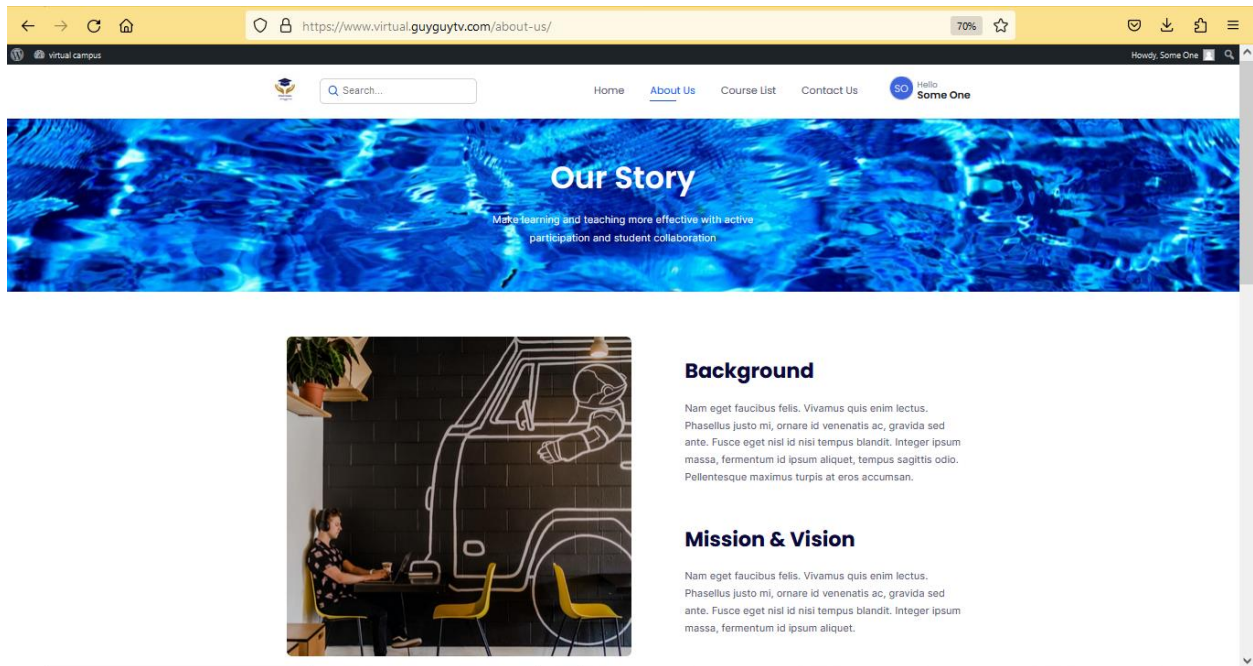
Figure 6.4, and 6.5 displays the About Us page which shows the
Background, Mission and Vision, Things that make us proud and Our
Team.

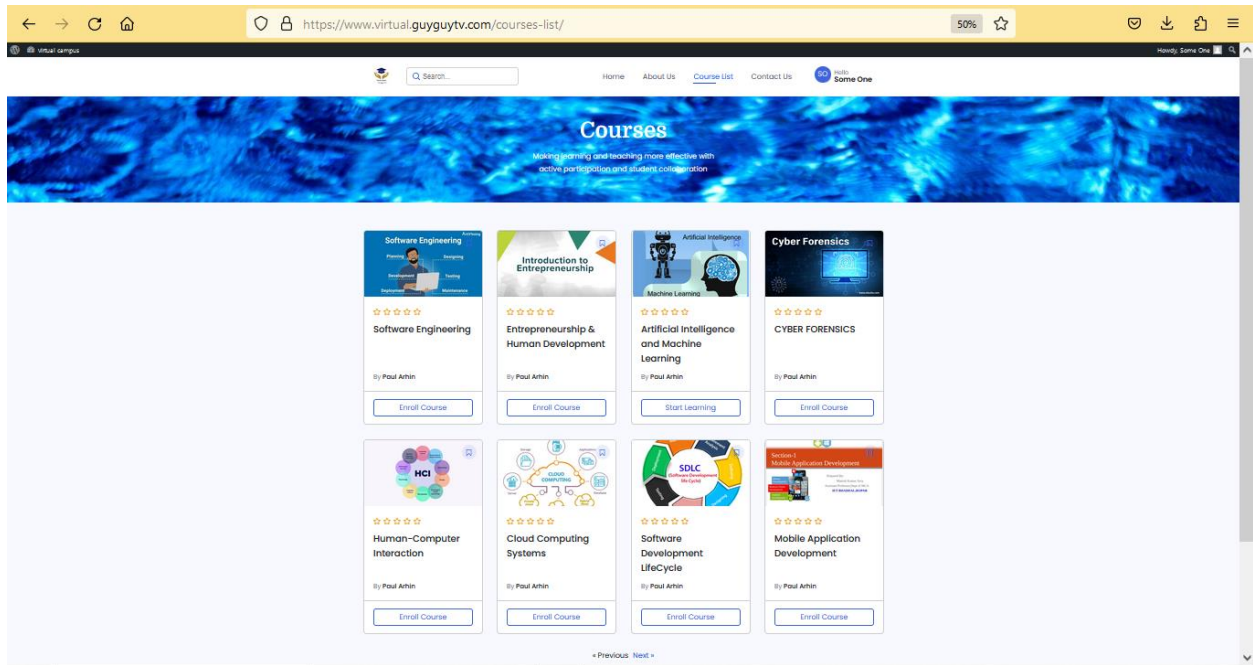Figure 6.6: App interface showing Course List page

Figure 6.6 shows the list of available courses that users can enroll in.
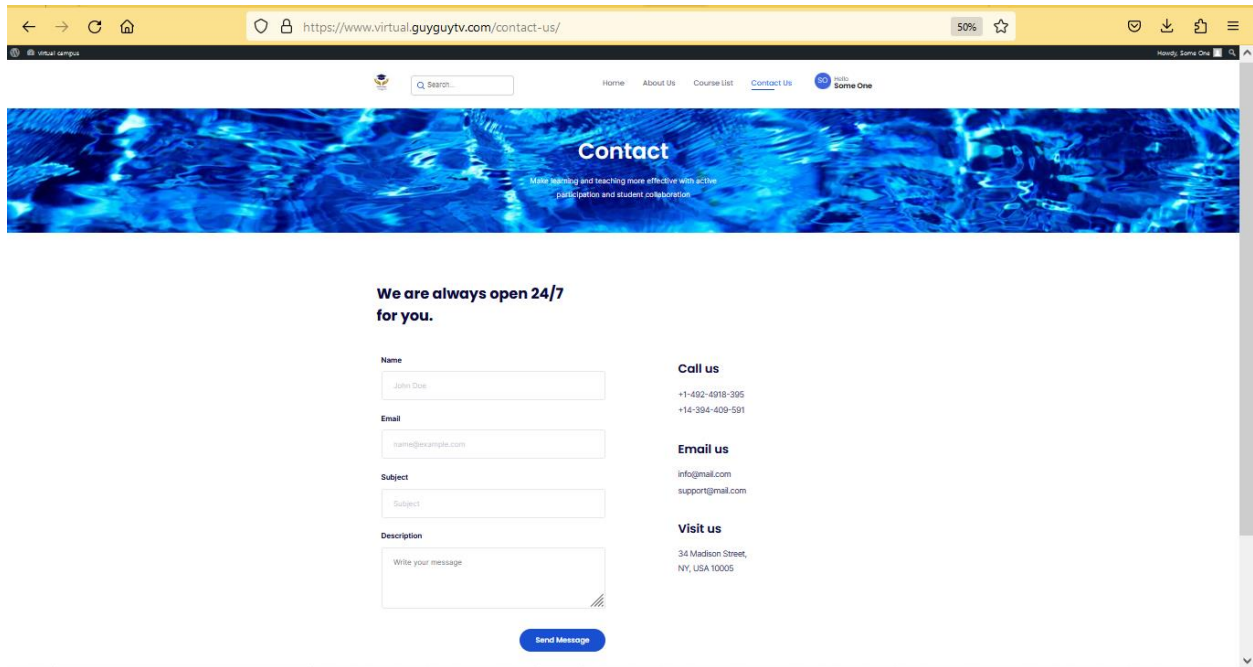
Figure 6.7: App interface showing Contact Us page

Figure 6.7 shows the Contact Us page where the user can get contact details and send enquiries.

Figure 6.8: App interface showing Registration page

Figure 6.8 show the Registration page where a user can sign up and taken into the dashboard to enroll into a course.
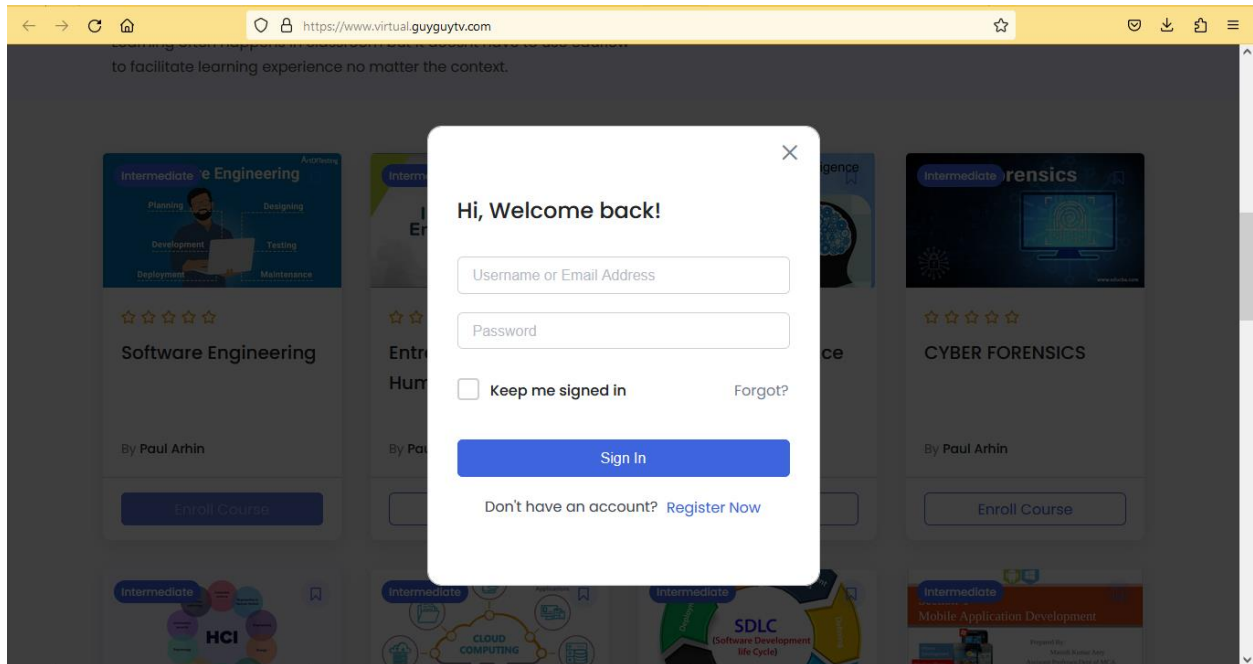
Figure 6.9: App interface showing Log In pop-up

Figure 6.9 shows the Log In pop-up interface where registered users can log back in to continue their courses or enroll into new courses.

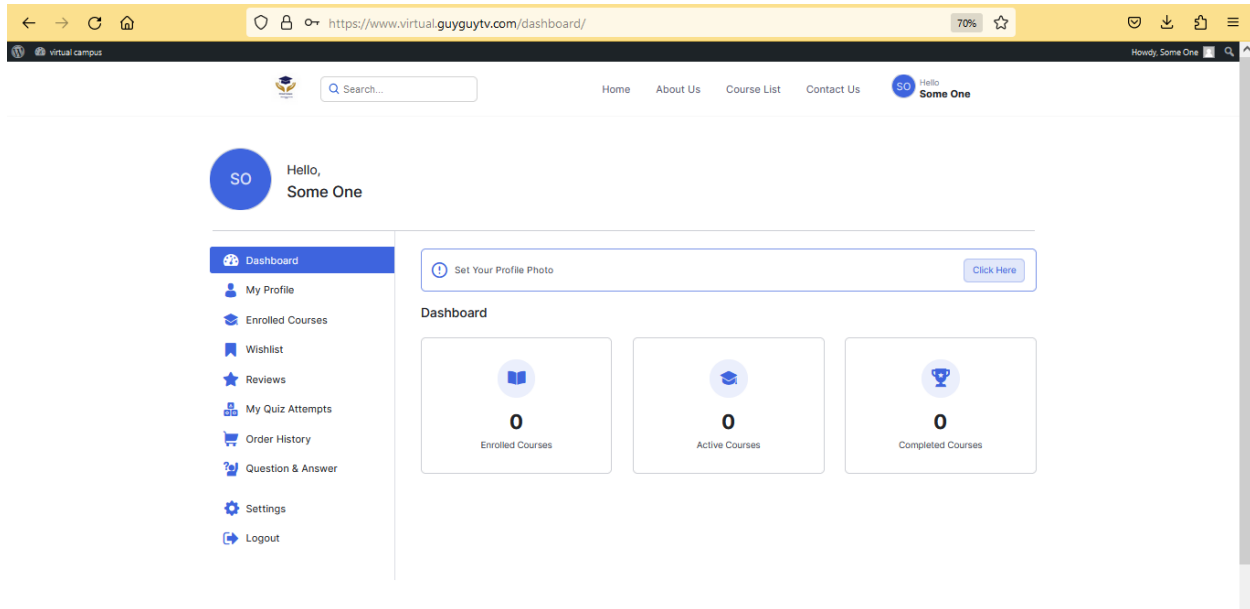Figure 6.10: App interface showing Dashboard page

Figure 6.10 shows the dashboard of all registered users. It displays the courses enrolled in and other details such as upcoming quizzes and others.

6.4 App Testing

Software testing is an integral component of ensuring the quality and reliability of the Online Learning Platform. Testing encompasses a range of techniques and strategies to confirm that the platform functions accurately, aligns with user expectations, and operates efficiently. The testing phase follows a well-planned series of procedures that incorporate multiple software test case design approaches.

6.4.1 Black Box Testing

➢ Black Box Testing is a software testing method that focuses on evaluating system functionality without the tester knowing the core code. Black Box Testing supported the following key purposes for the Online Learning Platform:

➢ Verify Functionality: The major goal was to ensure that the platform's operations were correct, guaranteeing that users could access course materials, participate in quizzes, and engage in conversations.

➢ Find Interface problems: The goal of Black Box Testing was to find and correct any shortcomings in the platform's user interface, allowing for seamless navigation and interaction.

➢ Detect Data Retrieval faults: This testing approach was used to look for any data retrieval errors, ensuring that students could access course content without interruptions.

➢ **Successfully Initialize and Terminate**: Black Box Testing was also used to check for any issues in initialization and termination, ensuring that the platform starts and closes smoothly.

Results:

The Online Learning Platform was carefully tested for its capacity to take input, such as user interaction and data retrieval, during the Black Box Testing phase. The system produced no errors, indicating that it performed as intended and that users could easily access and use its capabilities.

6.4.2 White Box Testing

White Box Testing is a way of developing test cases that delves into the internal code of software components. It evaluates the effectiveness of code utilization, resource management, and input/output handling.

Results:

White Box Testing was employed to scrutinize the internal code of the Online Learning Platform. This testing verified that the code was efficient in its execution and effectively managed system resources. The efficient utilization of code resources ensures that the platform is well-optimized for its intended purpose, delivering a smooth and responsive user experience.

6.4.3 Unit Testing

Unit testing focuses on the assessment of individual application sub-units. Each module, including the user

interface, was rigorously tested in the context of the Online Learning Platform.

Results:

Unit testing was carried out with the help of students from the BSc Information Technology class of 2023. The testing approach proved that each module inside the platform was designed precisely as specified in the system design. It guaranteed that data loading, processing, analysis, and performance statistics production were carried out accurately. This confirmed that the platform's modules functioned as anticipated, resulting in a smooth and effective learning environment for students and educators.

6.4.4 Unit Testing Procedure

The application was tested by testing the button click, form inputs and POST events and video player against the condition or the expected result. The result was tabulated for easy understanding as shown in Table 6.1 below.

Table 6.1: Results from Unit Tests

TEST	CONDITION	ACTION	RESULT

Button Click	Take user to new pages, POST user input data or pop-up menu	Show new pages or pop-up menu, send POST user input data	Users are taken to new pages and pop-up pages such as Log In show and send POST user input data.
Form Inputs	Allow user to input details such as name, username, password, etc.	Show various input types	Users can input required details
Video player	Play course videos	Play available course videos	Course videos are can be played

6.4.5 System Testing

System Testing is a comprehensive assessment of the entire Online Learning Platform to confirm that it meets the specified system requirements. This phase involved several subsets of testing to evaluate various aspects of the platform's performance.

➢ **Usability Testing**: Usability Testing focused on assessing the user-friendliness and overall convenience of the platform. The testing process examined the logical flow of the application and the organization of forms to ensure a smooth and intuitive user experience.

➢ **Performance Testing**: Performance Testing aimed to gauge the platform's ability to perform efficiently under varying conditions, including high loads and different web browsers. The application was tested with different browsers and subjected to resizing to analyze the behavior of its components.

Results: Performance Testing revealed that the Online Learning Platform demonstrated robust performance, even when tested under various web browser conditions. It confirmed the platform's ability to handle high loads efficiently and ensured that users could access and utilize its features seamlessly. The Usability Testing results affirmed that the platform was well-organized,

and the logical interconnection of forms provided a user-friendly and convenient learning experience.

In summary, the systematic testing strategies employed during the System Testing phase have rigorously assessed the Online Learning Platform's functionality, efficiency in data handling, and overall performance. These tests ensure that the platform is well-designed, user-friendly, and robust, aligning with the project objectives and user expectations.
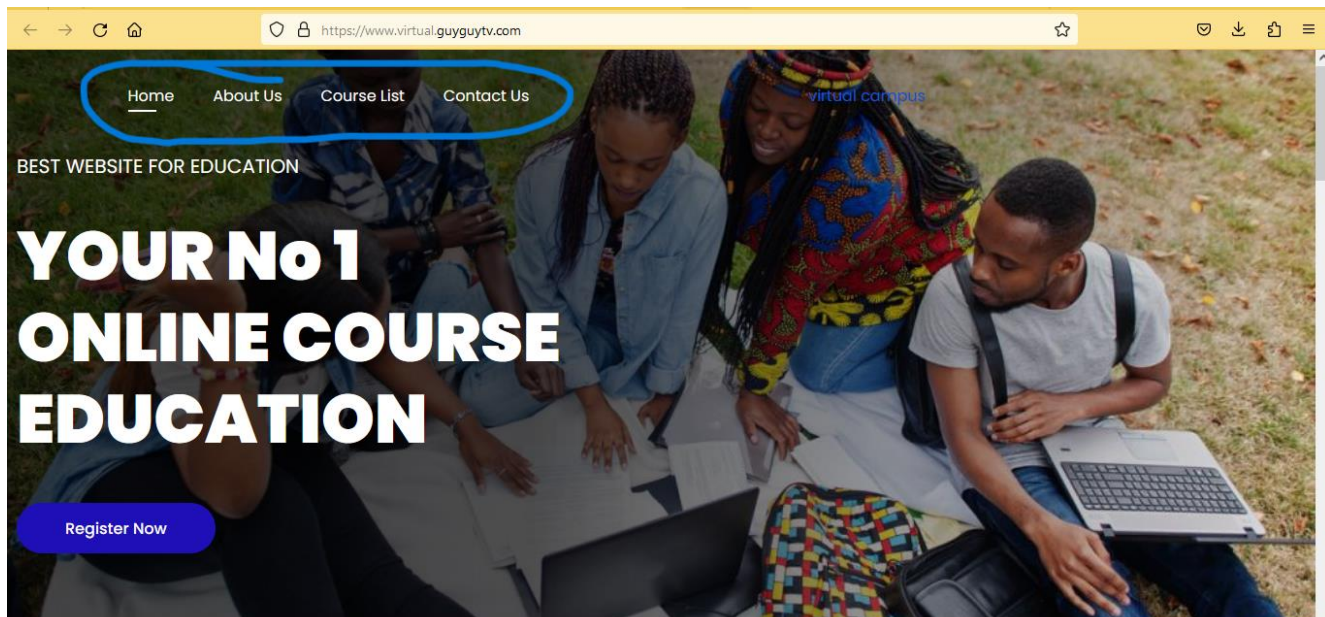
CHAPTER SEVEN
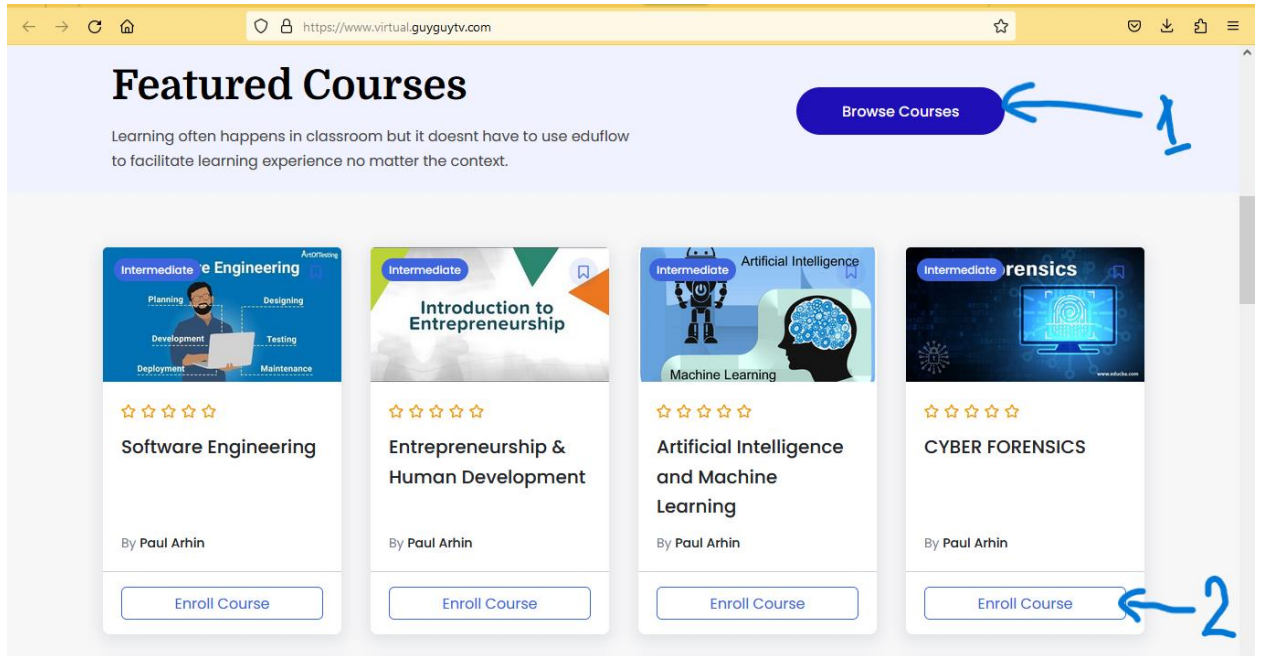
SYSTEM DOCUMENTATION

**7.1 User Manual for the System**

7.1.1 Navigation

Step 1: Navigate through the web app by clicking on each navigation menu item as shown in the screenshot.
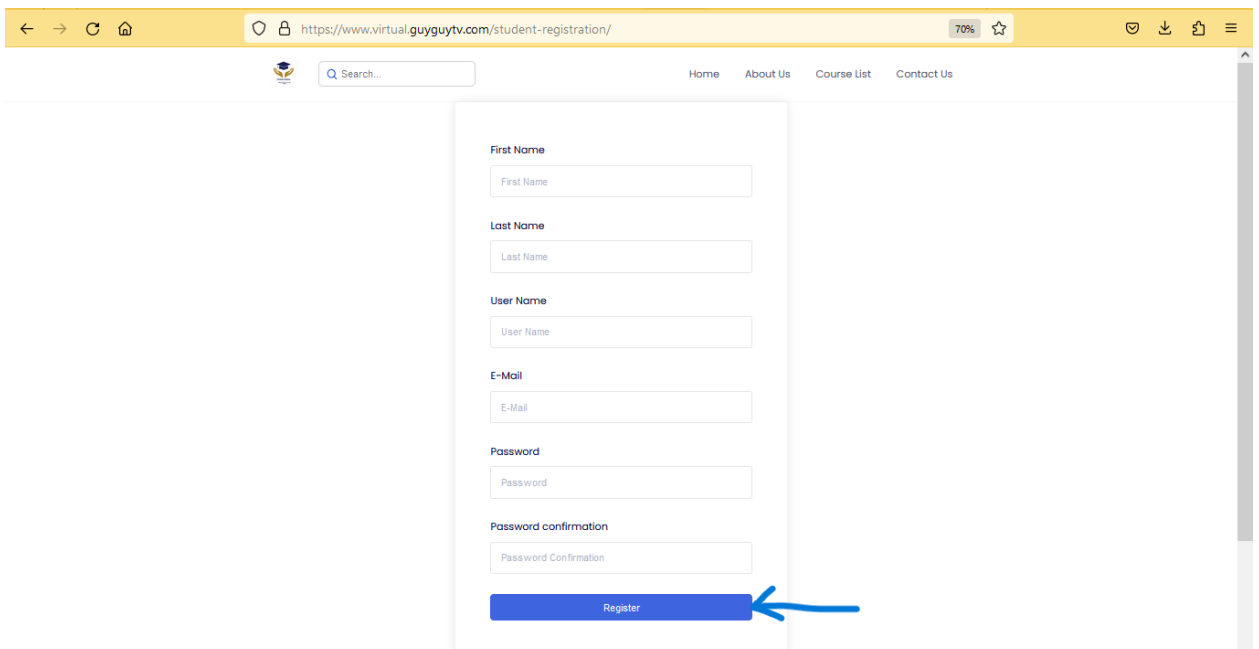
Step 2: Go to Featured course section or Course List page or click on the Browse Courses button. Click on the Enroll Course button to access or enroll in the course.


Step 3: After clicking on the Enroll Course button, if you are not logged in, the Log In pop-up would come for you to log in. Or you can click on Register Now to create a new account.
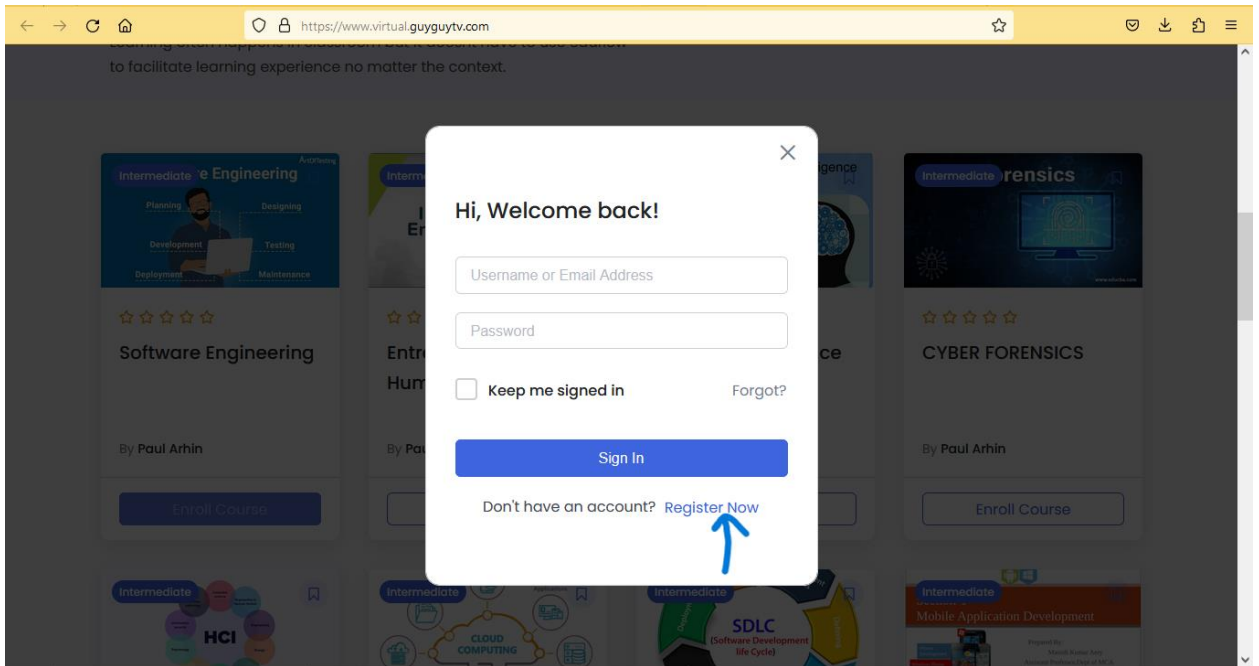
Step 4: Given that you are a new user, you will be taken to
the registration page where you will input the required
details and click on Register.

Step 5: After a successful registration or log in, you will be taken to your dashboard where you can access all the features or error in new courses.
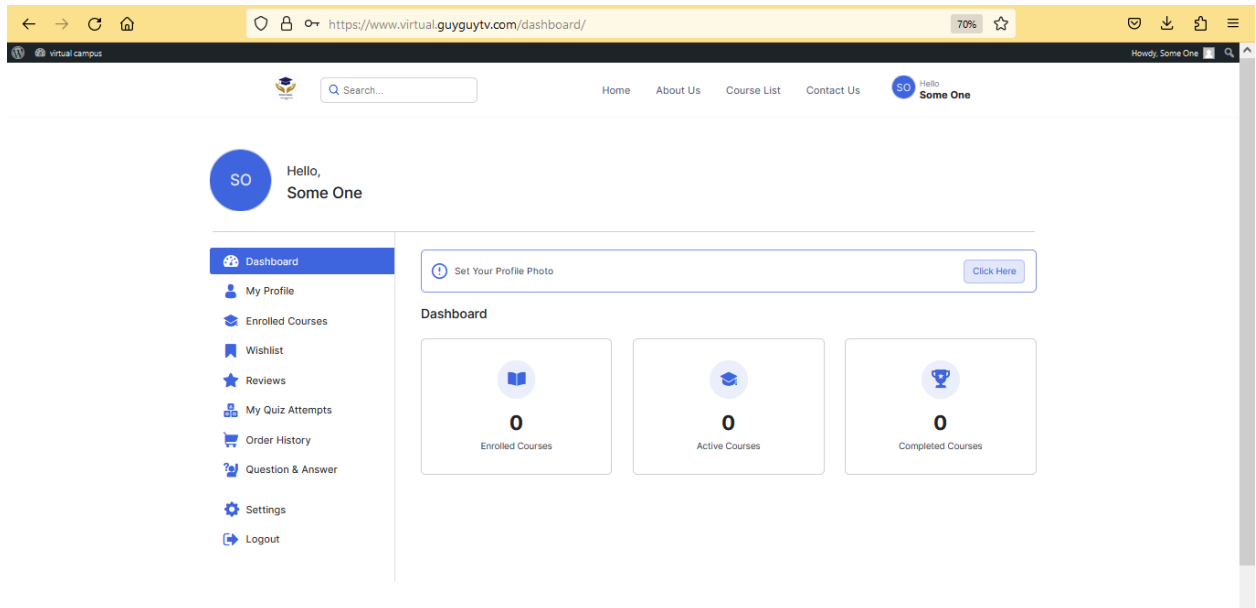

Step 6: Enroll in new course by accessing the Course List page or at the featured courses section on the Home page. When successfully logged in, you can click on the Enroll Course button and be taken to this page.
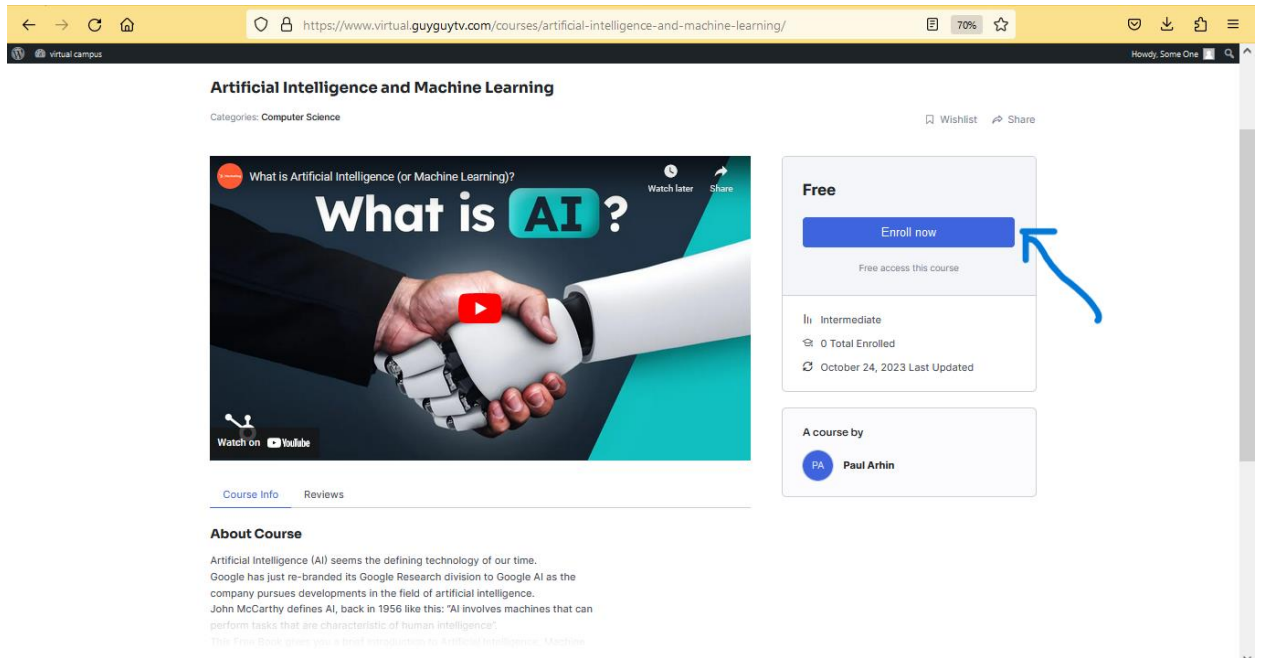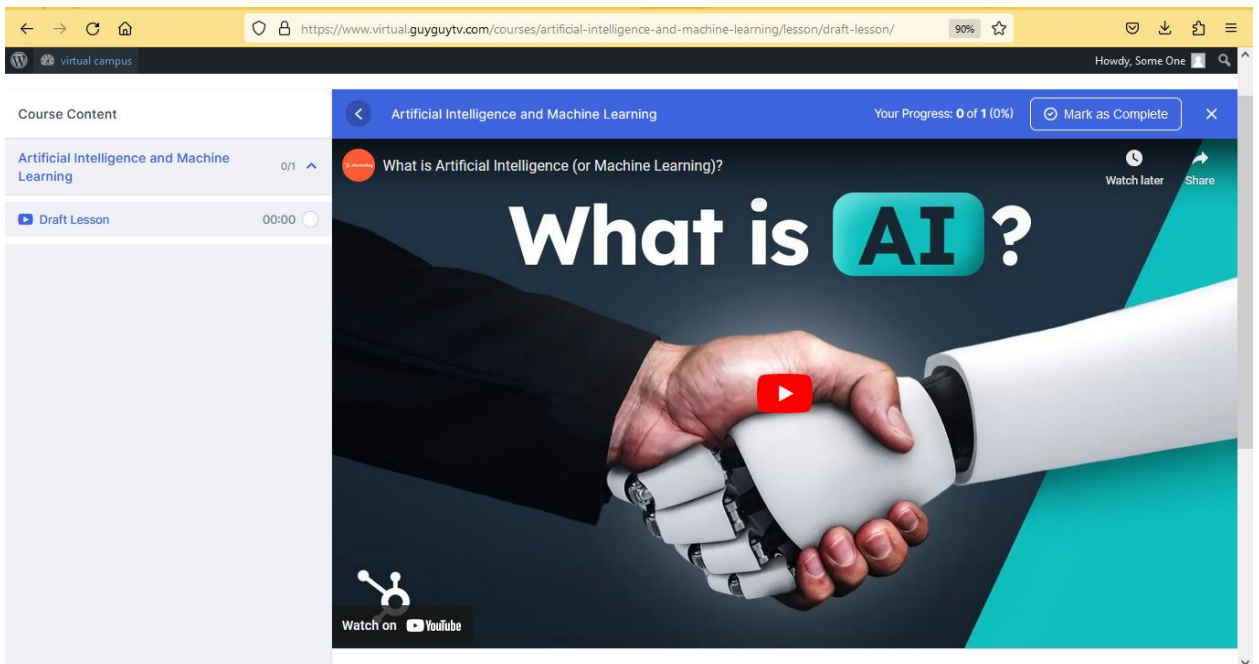
From here, click on the Enroll now button as shown in the screenshot above.

Step 7: Click on the Start Learning button as shown in the screenshot and go to the course page.
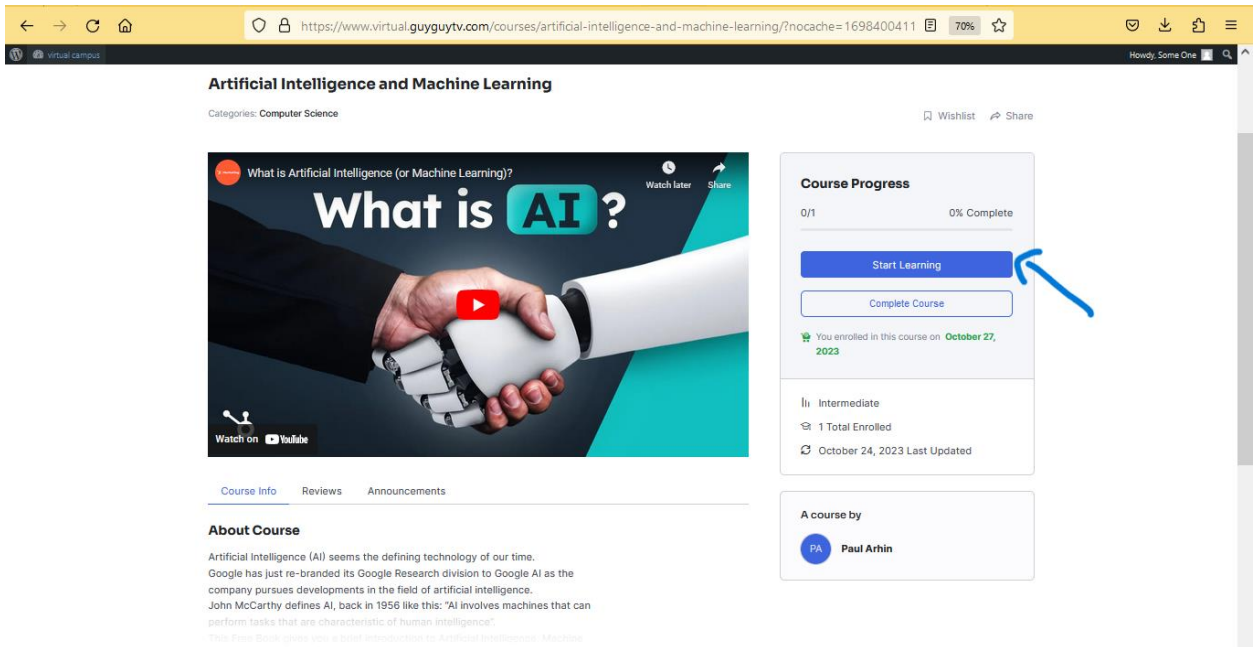
Step 8: Access the course videos, leaning materials, quizzes, discussions and many more functions from the course page.

7.2 Hardware Requirements for User Access

To access the online learning platform, users need the following hardware requirements:

- ➤ Device: Users can access the system using a desktop computer, laptop, tablet, or smartphone.

- ➤ Internet Connectivity: A reliable internet connection is essential to access course materials, video lectures, and other resources. Users should have access to a stable internet connection, either through Wi-Fi or mobile data.

- ➤ Web Browser: Users should have access to a modern web browser (e.g., Google Chrome, Mozilla Firefox, Safari, Microsoft Edge) to navigate the online platform. The browser should be up to date for optimal performance.

- ➤ Display: The device should have a display screen, which can be a monitor, laptop screen, tablet screen, or smartphone screen, depending on the user's choice of device.

7.3 Software Requirements for User Access

Users need specific software to access the online learning platform:

➢ Operating System: The user's device should be equipped with a compatible operating system. Common operating systems for accessing the platform include Windows, macOS, Android, or iOS, depending on the user's device.

➢ Web Browser: Users should have an up-to-date web browser installed on their device. The browser should be compatible with the platform and have JavaScript enabled for full functionality.

➢ Security Software: Users should have antivirus and firewall software installed and updated on their device to ensure a secure online learning experience.

These hardware and software requirements ensure that users can access the online learning system with ease, ensuring a seamless and secure learning experience.

CHAPTER EIGHT

CONCLUSION, RECOMMENDATION, AND FURTHER WORK

8.1 Conclusion

I successfully designed, built, and implemented an online learning platform for the Computer Science Department at Koforidua Technical University as part of this project. This platform provides students and instructors with a comprehensive, accessible, and interactive system that improves teaching and learning.

Key Achievements

Throughout this project, we have accomplished several significant milestones:

- ➢ **Robust Learning Environment**: Our online learning platform provides a robust and user-friendly environment for students to access course materials, video lectures, quizzes, and interactive discussions, fostering a conducive atmosphere for learning.

- ➢ **Accessibility and Flexibility**: The platform removes geographical barriers, granting students the flexibility to access educational resources at any time and from anywhere, catering to diverse learning preferences and lifestyles.

- ➢ **Interaction and Collaboration**: It facilitates interaction between students and educators through discussion boards, live webinars, and assignment submissions, promoting active engagement in the learning process.

- ➢ **Efficient Management**: The system enables educators to efficiently manage courses, track student progress, and assess student performance, streamlining the teaching process.

8.2 Recommendations

Building on the outcomes of this project, we present the following recommendations:

- ➢ **User Support and Training**: Implement extensive user support and training programme for both students and educators to ensure they make the most of the platform's features. This may include tutorials, FAQs, and dedicated help channels.

- ➢ **Content Expansion**: Constantly update and increase existing learning materials, such as video lectures, quizzes, and additional resources, to provide a greater selection of courses and topic matter.

- ➢ **Feedback Mechanisms**: Create feedback mechanisms for students and instructors to submit comments on the platform's

functioning, user experience, and content relevancy, enabling for incremental changes.

> **Data Analytics Integration**: Integrate data analytics technologies to obtain insights on user engagement and performance, allowing for data-driven improvements to platform features and content.

8.3 Future Enhancements

While this project has achieved its primary objectives, it sets the stage for future opportunities and enhancements:

> **Integration with Learning Management Systems**: Look into integrating with learning management systems (LMS) to simplify administrative duties and provide a more comprehensive educational experience.

> **Personalized Learning Paths**: Create personalized learning paths for students, providing customized course and resource recommendations based on their academic interests and success.

> **Incorporate virtual reality (VR) and augmented reality (AR)** technologies to create immersive learning experiences, particularly in complicated subjects that benefit from visual and interactive information.

- Implement features that promote collaborative projects and group assignments, developing teamwork and improving students' real-world problem-solving abilities.

- **Enhanced Assessment Tools:** Implement advanced assessment tools such as automated grading and AI-driven evaluations to offer students with immediate and positive criticism.

- **Block chain Credential Verification:** Investigate the application of block chain technology for securely verifying and exchanging academic credentials, providing a future-proof and transparent credential management solution.

This project lays the groundwork for an innovative online learning environment at Koforidua Technical University's Computer Science Department, aiming to revolutionize education by providing powerful information transmission and acquisition tools.

REFERENCE

1. Liu, Z. Y., Lomovtseva, N., & Korobeynikova, E. (2020). Online learning platforms: Reconstructing modern higher education. International Journal of Emerging Technologies in Learning (iJET), 15(13), 4-21.

2. Abuhassna, H., Al-Rahmi, W. M., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. B. M., & Darwish, M. (2020). Development of a new model on utilizing online learning platforms to improve students' academic achievements and satisfaction. International Journal of Educational Technology in Higher Education, 17, 1-23.

3. Nawrot, I., & Doucet, A. (2014, April). Building engagement for MOOC students: introducing support for time management on online learning platforms. In Proceedings of the 23rd International Conference on world wide web (pp. 1077-1082).

4. Panigrahi, R., Srivastava, P. R., & Sharma, D. (2018). Online learning: Adoption, continuance, and learning outcome—A review of literature. International Journal of Information Management, 43, 1-14.

5. Ch, S. K., & Popuri, S. (2013, December). Impact of online education: A study on online learning platforms and edX. In 2013 IEEE International Conference in MOOC, Innovation and Technology in Education (MITE) (pp. 366-370). IEEE.

6. Andel, S. A., de Vreede, T., Spector, P. E., Padmanabhan, B., Singh, V. K., & De Vreede, G. J. (2020). Do social features help in video-centric online learning platforms? A social presence perspective. Computers in Human Behavior, 113, 106505.

7. Keengwe, J., & Kidd, T. T. (2010). Towards best practices in online learning and teaching in higher education. MERLOT Journal of Online Learning and Teaching, 6(2), 533-541.

8. Sari, F. M., & Oktaviani, L. (2021). Undergraduate Students' Views on the Use of Online Learning Platform during COVID-19 Pandemic. Teknosastik, 19(1), 41-47.