

Development of a Learning Management System (LMS) Suite for Nwafor Orizu, College of Education, Nsugbe, Anambra State

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ABSTRACT

This study presents the development of a Learning Management System (LMS) for the Nwafor Orizu College of Education, Nsugbe, aimed at enhancing digital teaching and learning processes. The system was developed using Python as the core programming language for logic and application control, while MySQL was employed for efficient data storage, management and retrieval. The LMS supports essential academic functions, including course management, content delivery, assessment and communication between lecturers and students of the institution. A systematic evaluation of the developed LMS was conducted using key performance indicators, namely usability, reliability, flexibility, adaptability and portability. The results revealed a 96% usability performance, indicating a highly user-friendly interface; a 92% reliability score, demonstrating consistent and stable system operation; 87% flexibility, reflecting support for diverse instructional methods; 88% adaptability, showing the system's capacity for future upgrades and institutional changes and 95% portability, confirming effective performance across multiple devices and platforms. These indicators yielded an overall general performance rating of 92%. The findings demonstrate that the use of Python and MySQL for building an LMS is efficient, reliable and suitable for deployment of an LMS in an academic environment, the system provides a scalable and sustainable digital learning platform that can significantly improve academic delivery and institutional efficiency.

Keywords: Development, Learning, Management, System, Suite

INTRODUCTION

Nwafor Orizu College of Education, Nsugbe; was established in 1976 and is situated in Anambra State, Nigeria. It was formerly known as the Nsugbe College of Education. It was named in honour of Abyssinia Akweke Nwafor Orizu, the second President of Nigeria's Senate (Archive, 2021). Dr. Justina Anyadiegwu is the current Provost of the College of Education, whereas Professor Felix Ndu was the institution's first Provost.

Nwafor Orizu College of Education, Nsugbe (NOCEN) is a reputable Nigerian institution that attracts students from across the country because of its excellent academic reputation. It encourages students to develop critical thinking, problem-solving skills, and a passion for lifelong learning by offering a wide range of programs to suit various interests. Beyond academic achievement, the institution promotes students' overall growth, supported by a vibrant campus, modern facilities, and a diverse array of extracurricular activities. NOCEN maintains high educational standards and aims to be a leading centre for teaching, research, and community service in Nigeria. It has numerous departments offering both undergraduate courses and a Professional Diploma in Education (PDE) to local and international students. Courses for undergraduates include disciplines such as Agricultural Science, Biology, Chemistry, Physics, Mathematics, Business Education, Computer Education, Economics, Foreign Languages, Arts, and Social Sciences,

among others. Currently, these courses rely on traditional lecture methods, but there is an urgent need to adopt digital literacy aligned with the Sustainable Development Goals (Kalimuthu et al. 2025).

The fastest and simplest way to learn in the 21st Century is the adoption of a learning management system (Muhammad, 2021). A Learning Management System (LMS) is a software application designed for the purpose of teaching, learning, administration, documentation, reporting, and tracking academic records. It enables educational institutions to create, manage, and deliver training materials (Bradley, 2021). LMS platforms are widely used in various sectors, including schools, universities, and businesses, to streamline learning processes and enhance educational outcomes. In today's digital age, traditional methods of teaching and learning are increasingly challenged by the need for flexible, accessible and technology-driven instruction. Many institutions like Nwafor Orizu College of Education, Nsugbe, continue to rely on traditional classroom-based teaching and paper-based administrative systems for lecture delivery, attendance, grading, assignments and communication between teachers and students. These methods limit access to learning materials, reduce instructional efficiency, hinder tracking of student progress and lead to inadequate engagement, especially in blended or remote learning contexts.

Despite the growing demand for digital integration in education, the college currently lacks a centralized system to manage and deliver learning content, monitor academic performance, and support administrative tasks. This gap not only hampers effective teaching and learning but also makes it difficult to provide personalized instruction, timely feedback, and collaborative learning opportunities, which are essential for academic success in the 21st Century (Bharat et al., 2023).

Therefore, there is a need to implement a Learning Management System (LMS) that will serve as a unified platform for instructional delivery, academic record-keeping, communication, and student engagement. The adoption of an LMS aims to enhance teaching efficiency, improve learning outcomes, and ensure that the school aligns with modern educational standards and digital transformation goals (Jeffrey, 2021). The main motivation for developing this LMS system was to reduce the workload by helping lecturers and students of NOCEN to achieve a better educational outcome with easy learning. The study aims at developing a Learning Management System for Nwafor Orizu College of Education, Nsugbe, Anambra State.

REVIEW OF RELATED LITERATURE

A Learning Management System (LMS) is a software application designed to manage, deliver, track, and evaluate teaching and learning processes (Darren et al., 2020). It acts as a centralized platform that supports digital learning by enabling instructors to upload content, conduct assessments, communicate with students, and handle course administration. LMSs are increasingly adopted by educational institutions due to the need for flexible, accessible, and technology-driven learning environments, especially in blended and online education (Gift, 2021). LMS can also be seen as e-learning systems that serve the same purpose, transforming the educational landscape by offering a flexible, cost-effective, and accessible way to deliver instruction and training. The main difference between LMS and e-learning systems is that LMS focuses on formal education, while e-learning covers both formal and informal education (Sally, 2024). As internet access and digital technologies continue to expand worldwide, particularly in developing regions, the importance of a well-designed LMS in supporting formal education has become increasingly significant.

According to Sangrà (2012), e-learning systems began as computer-based training tools but have evolved into robust web-based platforms that support synchronous and asynchronous learning. Institutions now adopt Learning Management Systems (LMS) and Massive Open Online Courses (MOOCs) to reach learners across various demographics.

A Brief History of the LMS

The first LMS was created in the 1920s when Sidney L. Pressey designed the teaching machine or the Pressy Testing Machine, it was revolutionary. It was a perceptive device because it provided learners with multiple-choice questions, and they couldn't move to the next question until they got the answer right. Depending on how right or wrong they were, the process eventually ensured some reinforcement of

learning. (Easy, 2025). The Pressy Testing Machine was designed like a typewriter, which was very much in touch with the times in its day and was followed in 1929 by the Problem Cylinder, an invention of Milton Ezra LeZerte. (Donald, 2021). The Problem Cylinder gave instructions to students and evaluated them by providing problems and observing how they approached solving them. It focused on more than just the final answer, assessing learners' problem-solving thought processes. This method allowed the process to operate independently of the instructor and was seen as a time-saving approach for educators.

From then on, the tussle for innovation in the LMS space was between organisations and institutions of higher learning. In 2017, LMS software became customisable and dynamic, providing more flexibility to choose features and integrate with other software.

The History of Course Delivery

As of today, LMS is more than just providing learning and assessments through a device. It also encompasses course delivery, which was not a consideration in early learning management systems. Computer-Based Instruction (CBI), Computer-Assisted Instruction (CA), Computer-Assisted Learning (CAL), and Internet-Based Learning (IBL) were some of the tools that integrated education with technology (Mosammat, 2013). CAI and CBI served as the methods for running educational programs before the internet became widespread. These curricula primarily focused on in-person computer use. However, as the advantages of the internet became clearer and its adoption increased, educators adapted their design, formats, and delivery methods to suit online platforms (Nana et al, 2020). It saved time and reached a broader audience, making it highly appealing. As a result, curriculum design was modified to align with the technological advancements being implemented.

Types of Learning Management Systems

There are different types of LMS. Here are some types of learning management systems to consider:

Software as a Service (SaaS) or Cloud-Based LMS

A cloud-based program, or SaaS, is one that users can access online via a web browser. Systems built on SaaS can help the company in a number of ways. For instance, the vendor is in charge of providing updates and new features for the hardware and software, as well as making sure the system is safe (Imed, 2025).

Advantages:

- Easy to set up.
- automatic updates,
- accessible from anywhere

Disadvantages:

- Requires a stable internet connection.
- Limited customization.

On-Premise LMS

This is buying and installing on the institution's or organization's own servers, it provides an organization full control over data, customization, and security. Those responsible for managing the system are usually IT personnel of the company. The IT team may have more control over the timing of enhancements and new features with an on-premises system than when the vendor is applying them on their schedule. The IT team can also adjust the hardware to meet the company's needs. For example, if the system is too slow, the IT

team can potentially make changes internally to make it run more quickly, such as looking at bottlenecks on the network or adding newer hardware.

Advantages:

High data control,

Customizable

Disadvantages:

High setup and maintenance costs,

Needs IT support

Open Source LMS

An open-source LMS is a system built by multiple users who share the code so users can add new features and fix defects as required. Often, open source applications are more cost-effective, and users can modify them to meet their companies' needs if they possess the right skill sets. The open source LMS may be a SaaS product or an installed LMS (Daisyane et al., 2020). One consideration when using an open-source LMS is security. Users may insert unsecure code or make poorly written or untested changes to the codebase.

Advantages:

Easy modification

It may be free access

Flexible

Disadvantages:

Less secure

Difficulties in updating

Requires technical skills to maintain

Custom-built LMS

For a custom-built LMS, the company uses its own development team or hires external consultants to build an LMS. Typically, the functionality is much simpler than an LMS acquired through other means because fewer resources are dedicated to building the product (Geraldine, 2022). The example of a custom-built LMS is Academic LMS, that built for schools, colleges, and universities to support classroom management, assignment submission, discussion boards, and grading.

Advantage:

It is designed for teaching and learning

Simple to use

Data secure

Customisable

Disadvantage:

May not support complex corporate or intercompany training workflows

Learning Content Management System

An LCMS's primary functionality is content creation and managing the content assets. This includes file storage for a training program, version control, approval workflows, and security management for each asset (Alicescarl, 2023). However, some vendors have gone a step further and integrated LMS functionality into the system, which can potentially make it easier to transition from content creation to employees taking the courses.

Mobile Learning

The prevalence of smartphones and tablets has prompted LMS to adapt to mobile learning. Modern LMSs offer responsive design and mobile apps, allowing students to access course materials and participate in discussions on the go (Charles, 2025).

Gamification and Engagement

To enhance learner engagement, modern LMS incorporate gamification elements such as badges, leaderboards, and interactive simulations. These features make learning more interactive and enjoyable (Slamet, & Basthomi, 2024).

Limitations of Legacy LMSs

With the versatile nature and uses of learning management systems, you would find that using an LMS in the workplace has taken the lead, as even organisations without any LMS are trying to get one (Kapil, 2024). Despite inevitable change and development, the legacy LMS were limited compared to the ones we have today (Thomas, 2022). These limitations include:

Not customisable: They did not stand a chance against modern LMS, which can easily be customised to suit organisational goals and objectives.

Not user-friendly: The goal of the initial LMS programmes was to make learning possible via devices or by automating the learning process. The ease of use and user experience were not considered as far as the creation of the various equipment and software were concerned at the time.

Not mobile-friendly: The earlier devices were stationed in a specific location, and though the personal computer came along, it couldn't just be taken along with the user at will.

Complex administration: Managing an LMS was cumbersome, and there were restrictions on the scope of their capabilities. Sharing and exchanging information, allocating courses and providing user support were difficult to do efficiently.

Susceptible to security and data breaches: The level of security was not as high on the legacy programmes. User data were not protected, and features like data encryption, IP blocker, safe signup, advanced password authentication and anti-spam were not in place at the time.

Poor analytics: The data generated by modern LMS is far more than what the original learning management systems could do. The primary data provided little or no insights about the learners, their behaviour or patterns. Modern learning management systems are more intelligent and help to learn, and development teams monitor and improve the systems, amongst several other functions.

The Core Features of a Modern LMS for Digital Transformation

Most Learning Management Systems share a set of core functionalities, which include:

1. Content Delivery: Uploading and organizing learning materials (PDFs, videos, and audio presentations).
2. Assessment and Evaluation: Online quizzes, tests, assignments, and grade books.
3. Communication Tools: Messaging, announcements, discussion boards.
4. Attendance, Tracking and Reporting: Monitoring student progress and generating analytics.
5. Administrative Control: Course enrollment, permissions, and calendar scheduling.
6. Live Class System
7. CBT Examination System (Objective & Theory + AI Marking)
8. Project Submission & Academic Workflow

These features support both synchronous and asynchronous learning modalities, enhancing instructional flexibility (Thangavel, 2024).

CONCEPTUAL FRAMEWORK

According to Fathira (2024), the systematic review examines the use of LMS technology in studying the English language learning process. Some students perceive that the introduction of LMS assists learning activities when traditional methods are not possible. He pointed out that Learning Management Systems (LMS) have become an important tool in the 21st century, transforming traditional education into digital learning. He noted in his study that LMS can add more value to the learning process through easy and flexible methods. He considered 24 Indonesian national articles published in 2024 for evaluation and found that many results regarding LMS use are positive. He further concluded that the utilization of LMS in the academic process has great potential to improve teaching and learning.

The traditional teaching and learning approach has been reshaped by digital technology, which has revolutionized the education sector. Innovative teaching strategies that accommodate various learning styles are made possible by digital technologies. Videos, graphics, and animations are examples of multimedia tools that have improved education by making it more dynamic and interesting for students. Additionally, teachers may now customize lessons to meet the requirements and skills of each student due to digital tools. Teachers may now identify students' strengths and weaknesses and create individualized learning experiences that improve their academic performance by using online exams and data analytics. Teachers may now create courses that are flexible and adaptable to various learning situations through digital technologies (Bharat et al., 2023). The flexibility of digital learning has transformed education by making it more accessible to students who may not have access to traditional educational resources.

In order to facilitate blended learning methods Yul et al. (2025) created the Physics Learning Management System (PLMS). The software works on both desktop and mobile platforms and is only focused on physics to support blended learning at the senior high school level. Teaching physics theory and practical skills was successful using the PLMS. Feedback on the viability of the content was of extremely high quality, and the system's usability demonstrated that it is interesting for users and easy to learn, comprehend, and utilize. All things considered, these results demonstrate how useful and successful the PLMS is at facilitating blended learning in high school physics instruction.

Yaser et al. (2023) utilize TPB and UTAUT techniques to examine factors impacting Saudi students' intention to adopt learning management systems. The Unified Theory of Acceptance and use of Technology (UTAUT) and the Theory of Planned Behaviour (TPB) were used together to form a model. The outcome of the research revealed that Effort Expectancy (EE), Subjective Norm (SN), Attitude Toward Behaviour (ATB), and Perceived Behavioural Control (PBC), the 445 students from four institutions in Saudi Arabia engaged in filling a structured questionnaire, and their interest is aligned with Intentions To Use (ITU) LMSs.

Benefits of LMS in Education

- a. Accessibility: Allows students to access learning content anytime, anywhere.
- b. Efficiency: Reduces administrative workload and streamlines grading.
- c. Engagement: Encourages interactive and collaborative learning.
- d. Data-Driven Decisions: Provides insights into learner performance for educators.

Challenges of LMS Adoption

Despite their benefits, LMS platforms also pose challenges:

- a. Technical Barriers: Poor infrastructure, internet connectivity, and lack of devices.
- b. User Resistance: Reluctance by teachers or students to embrace new technologies.
- c. Training Gaps: Lack of proper orientation and support for system usage.
- d. Cost: Licensing and maintenance of proprietary LMS platforms can be expensive.

Emerging Trends in LMS

Recent trends in LMS design and usage include:

- a. Mobile Learning (m-Learning): Access via smartphones and tablets.
- b. Gamification: Using game-like elements to increase motivation.
- c. AI Integration: Personalized learning paths and smart tutoring systems.
- d. Open-Source Platforms: Moodle, Canvas, and Google Classroom are gaining popularity due to flexibility and cost-effectiveness.

METHODOLOGY

The research methodology employs an object-oriented programming Language, a MySQL database and a descriptive survey design to gather a comprehensive users view on the adoption of the LMS at Nwafor College of Education, Nsugbe. To facilitate this, the study administered google form questionnaires, to various NOCEN platform comprising undergraduate students, Professional Diploma in Education (PDE) students and lecturer through random sampling techniques.

Choice of Programming Language

Python, a programming language, was crafted to encompass various high-level programming paradigms, including object-oriented, procedural, and functional programming. It emphasises code reusability and readability. Python stands as a robust high-level interpreter programming paradigm renowned for its simplicity in learning and comprehension. Guido van Rossum is credited as its creator, with its initial release dating back to 1991. Key attributes of Python include:

1. Its user-friendly syntax facilitates easy comprehension, making it an ideal choice for beginners. Its semantics are transparent and akin to pseudo-code, simplifying the learning curve.
2. Python's interactive and interpretable nature allows for easier testing and debugging, with code executed line by line. Additionally, it features an interactive mode enabling swift testing of code snippets with instant feedback.
3. Being multipurpose, Python serves as a versatile language employed across various domains such as web development, data science, artificial intelligence, machine learning, automation, and more. It boasts an extensive standard library and a vast ecosystem of third-party packages.
4. Python employs dynamic typing, eliminating the need for explicit declaration of variable data types. Variable types are determined at runtime based on assigned values.
5. Python utilizes indentation to delineate code blocks like loops and functions, promoting a clean and consistent coding style. However, improper indentation can result in errors.

6. Python supports Object-Oriented Programming (OOP) principles such as classes, objects, inheritance, and polymorphism. Moreover, it accommodates procedural and functional programming styles.

Sample Size and Sampling Technique

The sampling technique serves as a methodological tool for identifying a representative population for a study. In this research, a random sampling method was employed to select respondents comprising 150 undergraduate students 24 postgraduate students and 6 lecturers from various departments.

Research Instruments

The research instrument to be employed are:

- a. Object-Oriented Programming was used to design the LMS user friendliness interface.
- b. Object-Oriented Programming and MySQL database was used for the implementation of the LMS.
- c. A structured questionnaire was used to evaluate the usability, reliability, adaptability, flexibility and portability of the LMS.

Validation of the Research Instruments

Validity is the ability of the instrument to measure what it is supposed to measure, validity determines whether the research instruments truly measure what it is intended to measure and how truthful the research results are. For this study, the supervisor, department of educational psychology (measurement and evaluation) NOCEN, director of research NOCEN, director of degree NOCEN and department of ICT NOCEN examined the questionnaires and give feedback to the researcher.

Reliability of the Instruments

Reliability is the consistency of an instrument in producing reliable results. It focuses on the degree to which empirical indicators are consistent in measuring a theoretical concept (Orodho, 2021). To determine the reliability of the instruments, Lecturers and Students of Nwafor Orizu College of Education, Nsubge were given questionnaires to fill through Google Forms. The reliability of the instruments was based on the consistency of the responses given.

Method of Data Collection

The primary data collection technique which is face-to-face engagement with lecturers and students, was used to gather significant information such as (for lecturers) full name, email, phone no., gender, departments, date of employment, designation, qualification and bio (optional), (for students) full name, mat number, email, date of birth, gender, department, and level for this study.

Analysis of Existing System

The traditional learning method in Nigerian tertiary institutions is a lecturer-centred instructional approach where the lecturer is the primary source of knowledge and authority, while students are passive recipients of information. General teaching is typically delivered through lecture notes or course materials, dictation and writing on the board, with limited room for interaction or collaboration. Students move from their various locations, hostels, and off-campus accommodations to attend lectures in the classroom, where lecturers deliver lectures and students listen attentively.

Problem of Existing Teaching and Learning Method

The traditional method of lecturing in general is the lecture method, where the lecturer speaks and students listen in a physical classroom, has been widely criticized because it does not fully meet the needs of modern education, especially in this digital age and 21st Century (Mahnaz et al., 2021). The major problems of the

traditional method of lecturing in Nigera tertiary education is lecturer-centred, not student-centred, it focuses on the lecturer delivering lecture contents, while students remain passive listeners. Classrooms in the Colleges are often overcrowded and many departments have very large class sizes (sometimes 100–200 students per lecture), which makes interaction, individual attention and assessment difficult. As a result, students are often disengaged, as they only listen without participating, leading to low motivation and a shallow understanding of lecture concepts. Lecturer overload and poor feedback mechanisms are other critical issues to the traditional lecture delivery, lecturers do most of the work (lecturing, dictating, explaining), while students remain passive, this reduces opportunities for student independence and students rarely get timely or personalised feedback on their performance. The only way to assess students' heavy reliance on paper-based exams and tests. Lectures and students transported themselves with financial, energy and time costs to the classroom on daily basis.

Analysis of the Proposed Customized Learning System Structure

The Learning Management System aims to address the challenges associated with traditional learning in NOCEN. The LMS is poised to facilitate a Lecturer-Computer-Student interaction model, diverging from the traditional Lecturer-Student interaction model. Upon learning delivery with the LMS, Lecturers and Students are expected to engage with the system via a user interface through the use of Information Communication Technology (ICT) devices. They will be prompted to provide essential registration information and log-in using their valid credentials. Subsequently, the system will present a comprehensive virtual classroom environment, where users (lecturers and students) can interact with the LMS using voice, video, text, and images for easy communication. In this proposed model, the Lecturers of NOCEN are the actors who can initiate class for learning engagement, while students are the audience or active participants who can participate by joining the virtual classroom, listening, asking questions, and providing real-time answers to the lecturer's questions.

System Design

System design is the art of designing how the program works which is the process of defining the architecture, modules, interfaces, and data for the system to satisfy specific requirements of the LMS. The design phases consist of the input interface design, output design, and storage.

Input Interface Design for Registration

Input interface design for student registration is the environment where raw data of students are fed or input into the system in order to perform an operation. What is specified by the input specification design is what goes into the system. These specifications include students' registration number, surname, first name, gender, date of birth, state of origin, L.G.A., department, level, phone number, and password. The figure 3.3. The input devices for this LMS are the electronic keyboard, screen touch and mouse.

Registration number:		Department:	
Surname:		Level:	
First name:		Gender:	
Date of Birth:		Phone:	
State:		Password:	
L.G.A:		Confirm Password	

Fig. 3.3: Input Design Interface

Login Interface Design

The design login interface allows users to login and access the learning management system virtual environment. The design is in Figure 3.4

Registration number:

Surname:

Login

Fig. 3.4: Login Interface Design

Output Design

Output design refers to the information produced after processing the data from end-to-end live stream communication which is virtual classroom, video, voice and text messages that are sent by the users (lecturers/students) into the system through video camera and system microphone, the output devices are the computer monitor screen and speaker. The diagram in Figure 3.5 is the output design interface.

The outputs expected from the system are:

1. Live stream
2. Voice
3. Images
4. Text.

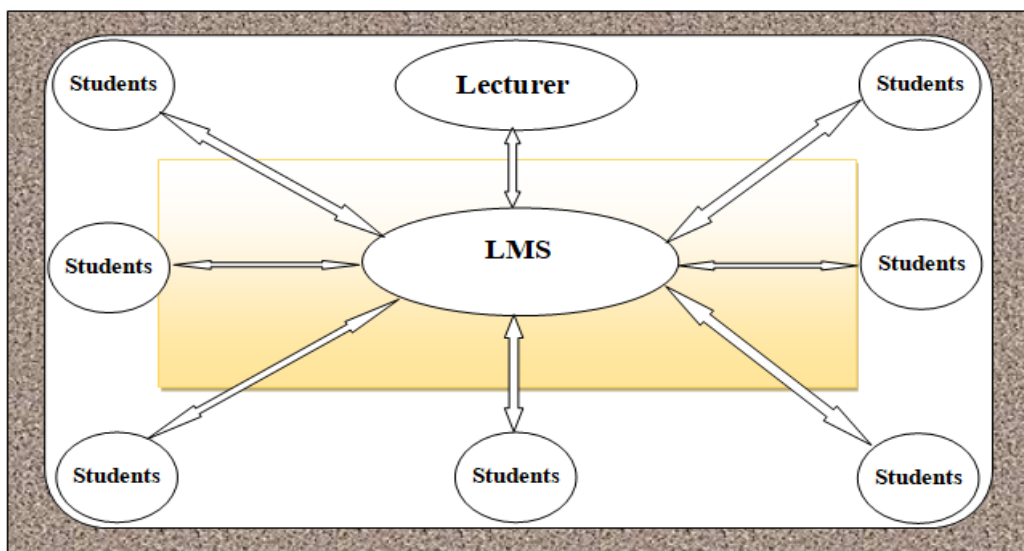


Fig. 3.5: Output Design Interface

Storage

Storage is the database where LMS information is stored and retrievable when necessary. The system expects users to enter accurate data into the designated data field because these data are defined based on the data type. The storage is shown in Figure 3.6

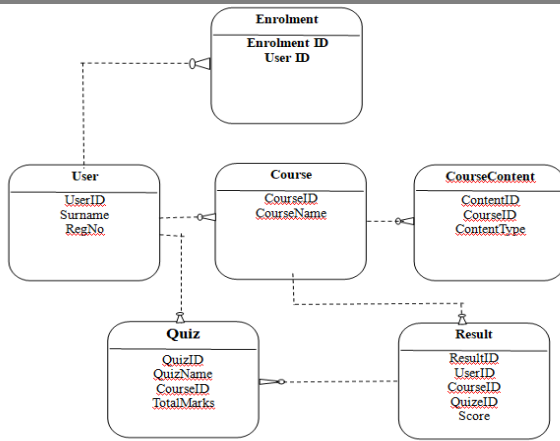


Fig. 3.6: Storage

System Flowchart

The system flowchart for the design is shown in Figure 3.7. The system requires a lecturer and students to login to their virtual classroom with their login details, the lecturer's virtual classroom presents a teaching environment where many students can join the class and have access to learning resources at the same time, uploading learning materials, quizzes and grading of quizzes. The student's virtual classroom presents a learning environment where students can communicate with the lecturer, download learning materials, submit assignments and view assignment grades .

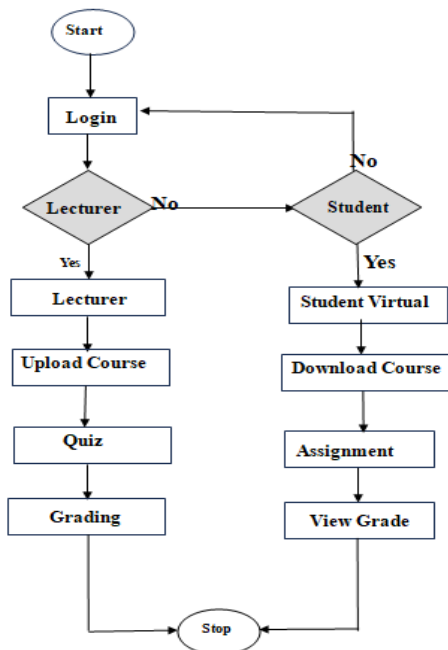


Figure 3.7: Program Flowchart

System Implementation, Testing, Integration Data Presentation an Analysis

System Implementation

The implementation phase of the Systems Development Life Cycle (SDLC) is usually a vital phase where the designed product are made operational for end-user, it involves in turning concepts into a full functional systems through coding, testing, integration and deployment. This process ensures that the software meets its intended objectives and operates seamlessly within the existing infrastructure. In this study, six design tasks were carried out. They were:

1. The web application design.
2. The database implementation.
3. Module testing.
4. Module and sub-system integration.
5. Full system testing.
6. Integration into web server.

Web Application Development

Web application development is a process of turning the physical plan specifications into a working online computer program that runs on the web through a reliable internet connectivity. The programming of the application was done alongside testing, as each programming module was made, it was tested independently. The Model View Controller (MVC) approach was utilized during the program execution. It made it feasible for the application programming and database environment to be done on a similar coordinated improvement condition. The model unit was utilized to execute the database; the regulator modules were utilized to actualize the query result, while the user interfaces were rendered utilizing the views.

Software Requirements

The software requirements for implementing the database were:

- a. Window 10/11, IOS and Mac operating system which is compatible with the server database software
- b. Web browser: it allows users access the web application on any device.

Hardware Requirements

The following are the hardware requirements for implementing the database:

- a. Stable and reliable internet connection.
- b. A processor of i core3 upward with 2.5 GHz processor speed, 4-8GB RAM and 500GB storage.
- c. Smart phones android version 6 upward.
- d. A good screen monitor.
- e. Mouse and keyboard or touch screen.

Modules Implementation

The LMS web application has been implemented with several modules, here welcome page presents more details about these modules shown in the Figure 4.1



Figure 4.1: Home page

The home page of the application serves as the landing page of the application. This is the first page the user interacts with the LMS web application system. The page presents the following main modules:

1. Home
2. About
3. Academics
4. Admission
5. Contact
6. Portal login

The LMS web application system is divided into three segments that comprises of admin, lecturer and students side that can be login separately and share resources together within the site.

Admin side:

The admin controls and manage the LMS application system resources and tools such as creating of account for users, course management, results management, payment management and key settings. The figure 4.2 shows the admin dashboard with various module

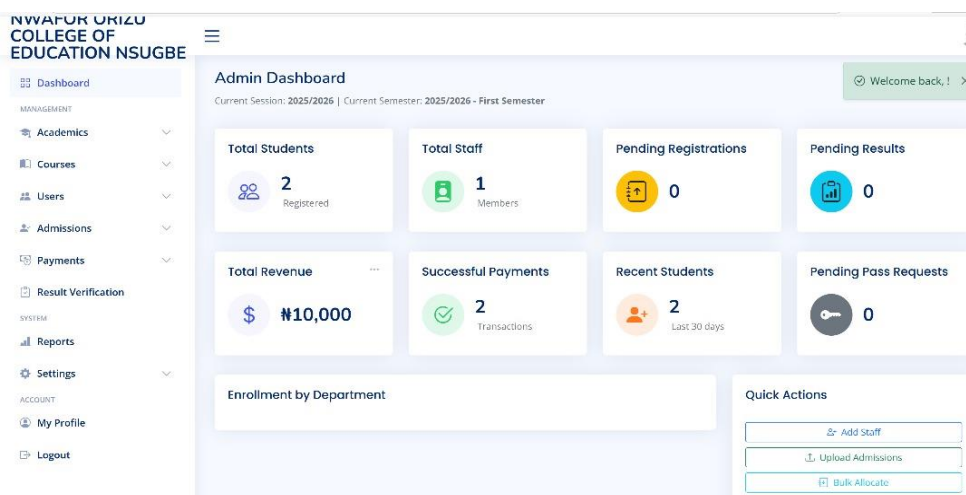


Figure 4.2: Admin Dashboard

The admin modules comprises of academics, courses, users, admissions, payments, result verification, reports, settings, my profile and logout as shown in the figure 4.3 – 4.14.

Academics Modules

The academics contain the sub-modules of session, semester, departments, programs and levels.

Academic Session Management

This module present academic session setting for example shown in the figure 4.3 below.

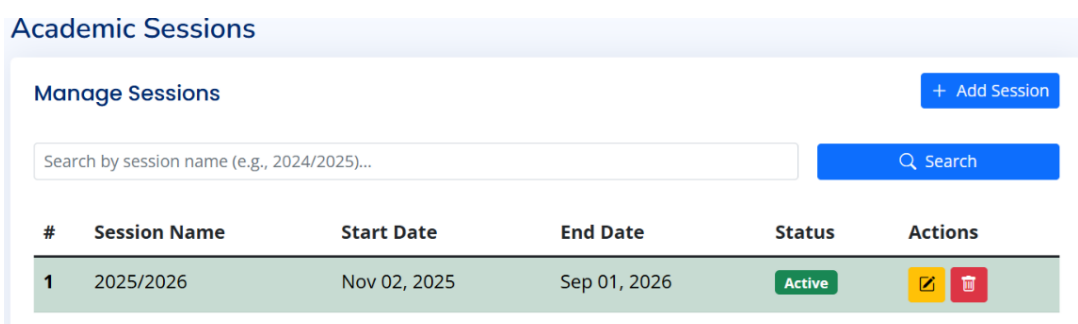


Figure 4.3: Academic Session Management

Semester Management:

This module presents a semester setting shown in Figure 4.4 below.

Semesters

Manage Semesters

+ Add Semester

Filter by Session

All Sessions

Filter

#	Session	Semester	Start Date	End Date	Registration Period	Status	Actions
1	2025/2026	First Semester	Nov 03, 2025	Mar 09, 2026	Nov 03 - Dec 08, 2025	Inactive	Activate

Figure 4.4: Semester Management

Departmental Management:

This module present a departmental setting and management such as add, edit and remove shown in Figure 4.5 below.

Departments

Manage Departments

+ Add Department

Search by name or code...

Search

computer science

csc

HOD: Not Assigned

2

 Staff

2

 Students

3

 Programs

Figure 4.5: Departmental Management

Academic Programs Management:

This module present an academic programs setting and management such as add, edit and remove shown in Figure 4.6 below.

Academic Programs

Manage Programs

+ Add Program

Filter by Department

All Departments

Search by program name...

Filter/Search

#	Program Name	Department	Duration	Students	Actions
1	computer science	computer scince (csc)	3 Years	2	

Figure 4.6: Academic Programs

Academic Levels Management:

This module present an academic programs setting and management such as add, edit and remove shown in Figure 4.7 below.

Academic Levels

Manage Levels

+ Add Level

Filter by Program

All Programs

Filter

#	Program	Level Name	Order	Type	Students	Actions
1	computer science	100L	1	Entry	2	 

Figure

4.7: Academic Levels

Academic Courses: It contains sub-modules of manage courses, course allocation and registration

Manage Courses:

This module presents course setting and management such as add, edit and remove shown in the figure 4.8 below.

Courses

Manage Courses

+ Add Course

Department

Level

Semester

All

All

All

Search code or title...

Q

Code	Title	Units	Dept.	Level	Semester	Type	Actions
csc 101	Into to coputer	3	csc	100L	First Semester	Core	  

Figure 4.8: Courses Management

Courses Allocation: This module presents courses allocation and management to the lecturers shown in the figure 4.9 below.

Course Allocations

Manage Course Allocations

Allocate Single

Bulk Allocate

Session

Semester

Department

Lecturer

All

All

All

All

Filter

#	Course	Lecturer	Session	Semester	Actions
1	csc 101 - Into to coputer	Adegoke Eyinade	2025/2026	First Semester	

Figure 4.9: Courses Allocation

Courses Registration:

This module presents courses registration and management to the students shown in the figure 4.10 below.

Course Registrations

Manage Student Course Registrations

Status

Session

Semester

Department

☐ Select All Visible

Matric No.	Student Name	Course	Session	Semester	Registered On	Status	Actions
No course registrations found matching your criteria.							

Figure 4.10: Courses Registration

Users: Consists of sub-modules of staff and students

Staff Module: The staff module allows admins to create login details and manage an account for lecturers shown in Figure 4.11, with the required information.

Create Staff

Enter New Staff Information

User Account

Username

Email

First name

Last name

Phone number

Gender

Password

Confirm Password

Figure 4.11: Staff module

Student Module: The module provides an environment where admitted and registered students' information can be controlled and managed by the admin shown in Figure 4.12.

Staff Management

Staff Members

#	Staff ID	Name	Department	Designation	Email	Status	Actions
1	STAFF/2025/0002		Computer Science	lecturer		Active	View Edit Delete
2	STAFF/2025/0004		French	Lecturer 1	r	Active	View Edit Delete
3	STAFF/2025/0005		Provost Office	Principal Assistant Registrar		Active	View Edit Delete
4	STAFF/2025/0006		English Language	PROVOST		Active	View Edit Delete

Figure 4.12: Student Module

Admission Module: It consists of admitted students and the upload of a new admission list.

Admitted student: This module presents a list of admitted and registered students shown in Figure 4.13.

Admitted Students List

Manage Admitted Students

Upload List (Excel)

Status

Session

Department

All

All

All

Search JAMB No, Name, Email...

#

JAMB No.

Full Name

Department

Program

PIN

Status

Actions

1	2877148019		csc	computer science	97F*****	Registration Completed	
2	2212247926		csc	computer science	3AD*****	Registration Completed	

Figure 4.13: Admitted Students

Upload Admission List:

It allows an Excel spreadsheet of admission lists to be uploaded shown in Figure 4.14.

Upload Admitted Students

Upload List via Excel

Instructions

Please prepare an Excel file (.xlsx) with the following columns (case-sensitive headers):

- JAMB_No (Required, Unique)
- First_Name (Required)
- Last_Name (Required)
- Email (Required)
- Phone (Required)
- Department (Required - Use Department Code e.g., CSC, MTH)
- Program (Required - Use Full Program Name e.g., NCE Computer Science)
- Course_Codes (Required - Comma-separated course codes for admission offer)

Each row represents one student. The system will generate a unique Admission PIN and send an email to the student upon successful upload.

Session *

Excel file *

2025/2026

Choose File

admission.xlsx

Upload and Process File

Cancel

Figure 4.14: Upload Admitted Students List.

Staff side, also referred to as Lecturer side:

This is an environment where lecturers can perform academic activities virtually. The environment contains the staff dashboard and several modules shown in Figure 4.15 below.

Dashboard

ACADEMIC TOOLS

Allocated Courses

Materials

Assignments

Attendance

Result Entry

Virtual Class

ACCOUNT

My Profile

Logout

Staff Dashboard

Welcome back, Adegoke Eyinade!

Current Session: 2025/2026 | Current Semester: 2025/2026 - First Semester

Allocated Courses | This Semester

1

Total Students | In Your Courses

2

Pending Assignments | To Grade

0

Quick Actions

Mark Attendance

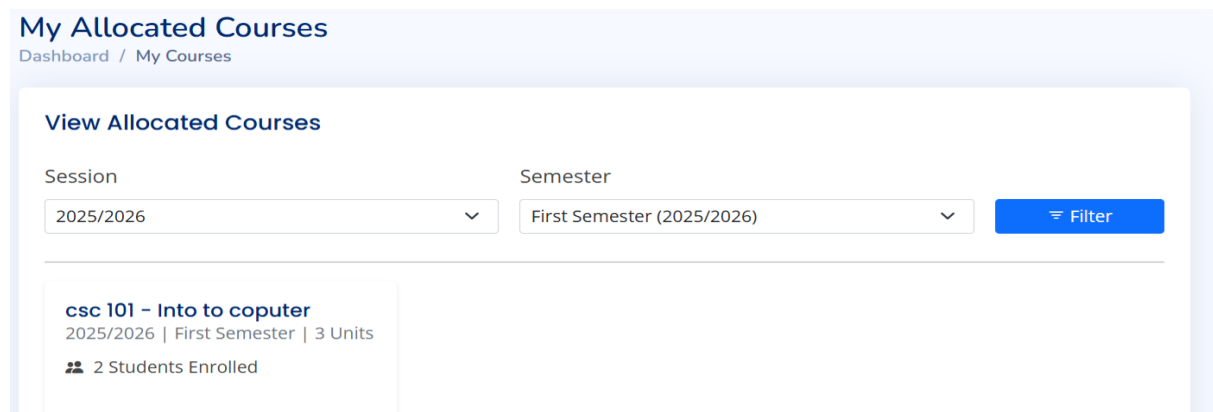
Upload Material

View Courses

Figure 4.15: Staff Dashboard

Allocated Courses:

It presents the courses allocated to the lecturer in Figure 4.16 shown below.



My Allocated Courses
Dashboard / My Courses

View Allocated Courses

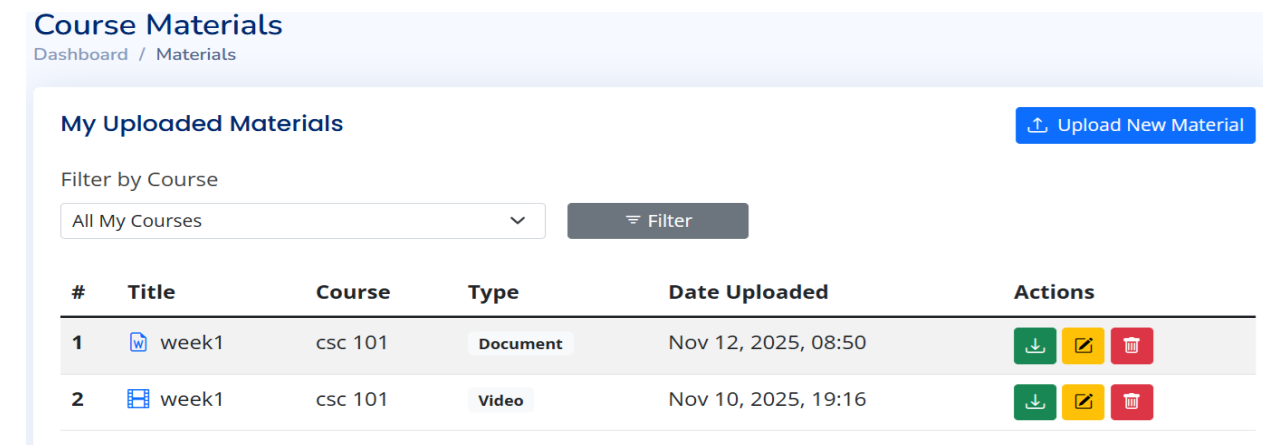
Session: 2025/2026 Semester: First Semester (2025/2026) [Filter](#)

Course Title	Session	Semester	Units	Students Enrolled
csc 101 - Into to coputer	2025/2026	First Semester	3 Units	2 Students Enrolled

Figure 4.16: Allocated Courses

Course Materials:

This module allows lecturers to upload course materials of different types video, audio, document and pdf shown in Figure 4.17.



Course Materials
Dashboard / Materials

My Uploaded Materials [Upload New Material](#)

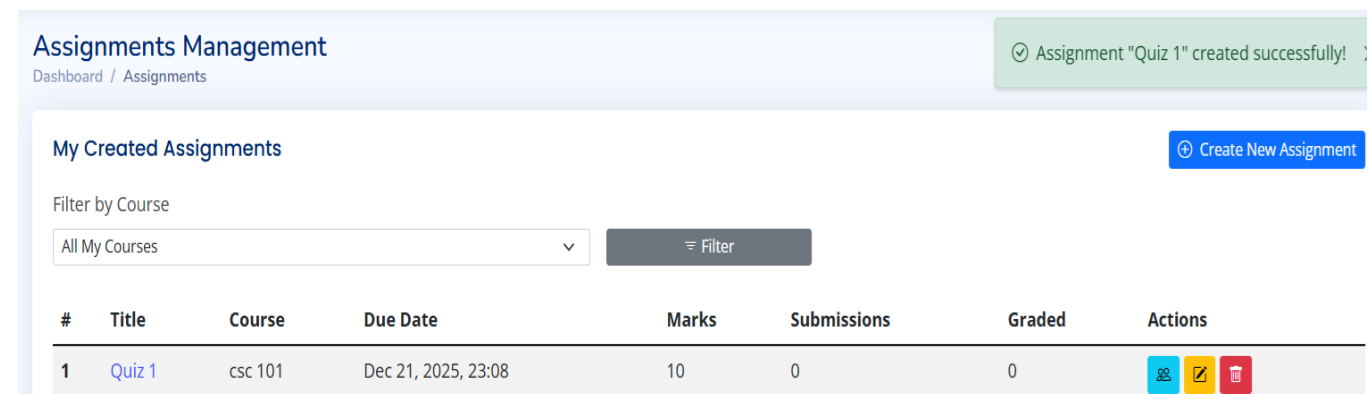
Filter by Course: All My Courses [Filter](#)

#	Title	Course	Type	Date Uploaded	Actions
1	week1	csc 101	Document	Nov 12, 2025, 08:50	Download Edit Delete
2	week1	csc 101	Video	Nov 10, 2025, 19:16	Download Edit Delete

Figure 4.17: Course Materials

Assignments

This module allows lecturers to create and view assignments for students, shown in Figure 4.18 below.



Assignments Management
Dashboard / Assignments

Assignment "Quiz 1" created successfully!

My Created Assignments [Create New Assignment](#)

Filter by Course: All My Courses [Filter](#)

#	Title	Course	Due Date	Marks	Submissions	Graded	Actions
1	Quiz 1	csc 101	Dec 21, 2025, 23:08	10	0	0	View Edit Delete

Figure 4.18: Course Materials

Attendance

This module enables lecturer to mark attendance present, absent or late shown in the figure 4.19 below

Mark New Attendance
Dashboard / Attendance / Mark

Attendance Details & Marking

Course * Date * Topic covered *

Registered Students (2) ✓ Mark All Present

#	Matric No.	Name	Present	Absent	Late
1	COE/2025/csc/0002	ade goke	☒	☐	☐
2	COE/2025/csc/0001	Kunle bayo	☒	☐	☐

Save Attendance Cancel

Figure 4.19: Attendance Module

Result Entry

This module allows lecturers to enter students' exams and continuous assessment scores and generate grades automatically shown in the 4.20.

Enter Results
Dashboard / Result Entry / csc 101

Enter Results for csc 101 - Into to coputer

Session: 2025/2026 | Semester: First Semester

Enter Continuous Assessment (CA) scores (Max 40) and Exam scores (Max 60). Total and Grade are calculated automatically. Use the 'Save' icon  to save individual rows (auto-saves on change), or use the 'Save All Drafts' button. Submit only when all results are entered and saved.

#	Matric No.	Name	CA (40)	Exam (60)	Total	Grade	Remarks	Status
1	COE/2025/csc/0001		10.00	30.00	40.0	E	fair	
2	COE/2025/csc/0002		20.00	30.00	50.0	C	fair	

Save All Drafts Submit for Verification Back to List

Figure 4.20: Result Entry.

Virtual Class

This is the module that present live interactive session between lecturer and students via video, audio and whiteboard in the figure 4.21 below.

Select Course Session*    Color: Width: 

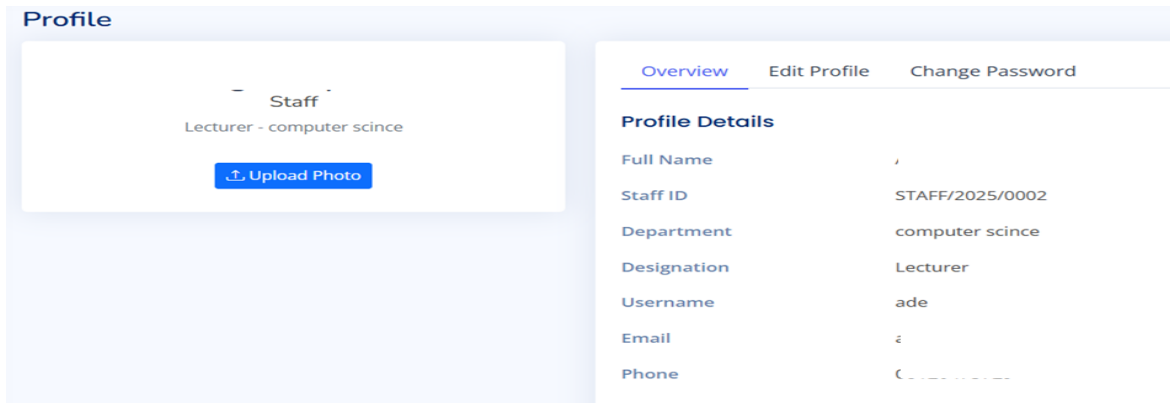
Clear Save Load/Manage Select Course!

You are welcome
to this
learning forum

Figure 4.21: Virtual Class Environment.

Profile

This module allows staff to view, edit and change of password shown in Figure 4.22.



Profile

Staff
Lecturer - computer science

[Upload Photo](#)

[Overview](#) [Edit Profile](#) [Change Password](#)

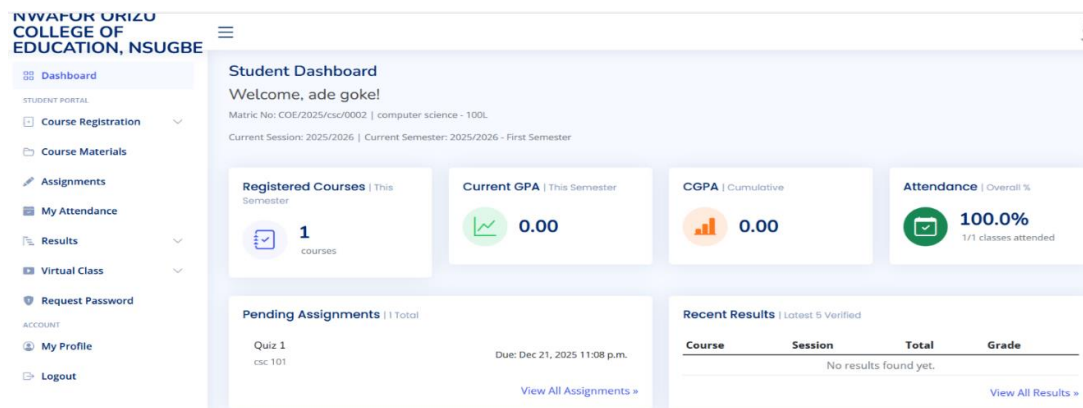
Profile Details

Full Name	/
Staff ID	STAFF/2025/0002
Department	computer science
Designation	Lecturer
Username	ade
Email	@
Phone	() - - - - -

Figure 4.22: Profile

Logout: The module allows the lecturer to exit from the site after activities.

Student side: The students' site presents an environment where students can receive lectures virtually and access learning resources. The figure 4.23 below shows the student dashboard and various modules.



NWAFOR ORIZO
COLLEGE OF
EDUCATION, NSUGBE

Student Dashboard
Welcome, ade goke!
Matric No: COE/2025/csc/0002 | computer science - 100L
Current Session: 2025/2026 | Current Semester: 2025/2026 - First Semester

Registered Courses This Semester 1 courses	Current GPA This Semester 0.00	CGPA Cumulative 0.00	Attendance Overall % 100.0% 1/1 classes attended
--	--	----------------------------------	---

Pending Assignments | Total

Quiz 1 csc 101	Due: Dec 21, 2025 11:08 p.m.
-------------------	------------------------------

[View All Assignments »](#)

Recent Results | Latest 5 Verified

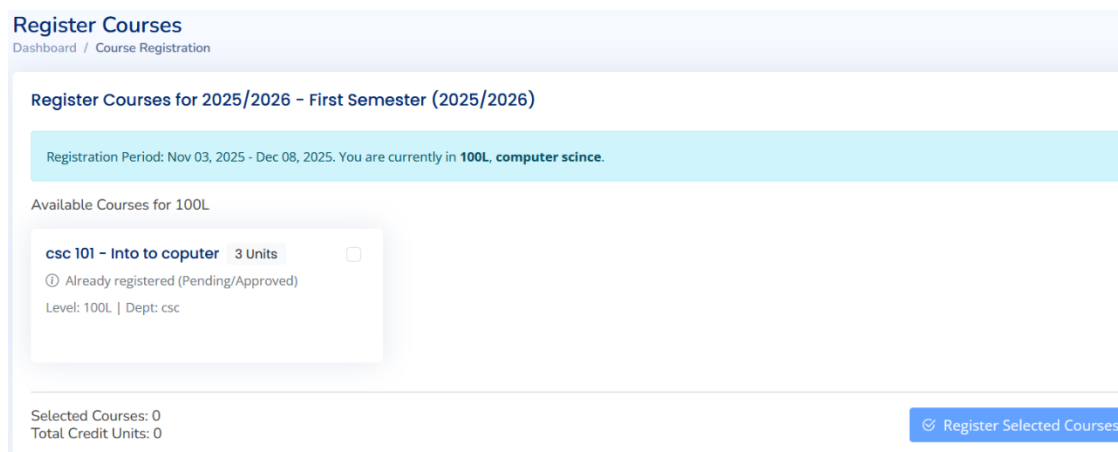
Course	Session	Total	Grade
No results found yet.			

[View All Results »](#)

Figure 4.23: Student Dashboard

Courses Registration

The module allows students to register their courses for a semester shown in Figure 4.24.



Register Courses
Dashboard / Course Registration

Register Courses for 2025/2026 - First Semester (2025/2026)

Registration Period: Nov 03, 2025 - Dec 08, 2025. You are currently in **100L, computer science**.

Available Courses for 100L

csc 101 - Into to coputer 3 Units	☐
ⓘ Already registered (Pending/Approved)	
Level: 100L Dept: csc	

Selected Courses: 0
Total Credit Units: 0

[Register Selected Courses](#)

Figure 4.24: Student Course Registration

Course Materials

This module allows students to download course materials of different type's video, audio, document and pdf shown in Figure 4.25.

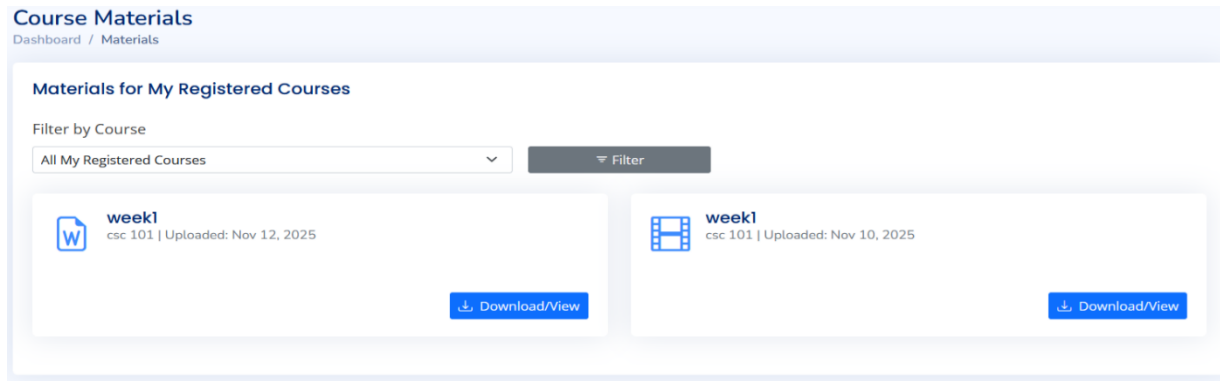


Figure 4.25: Student Course Materials

Assignments

This module allows students to submit their assignments digitally. Figure 2.26 below is the menu for assignment submission.

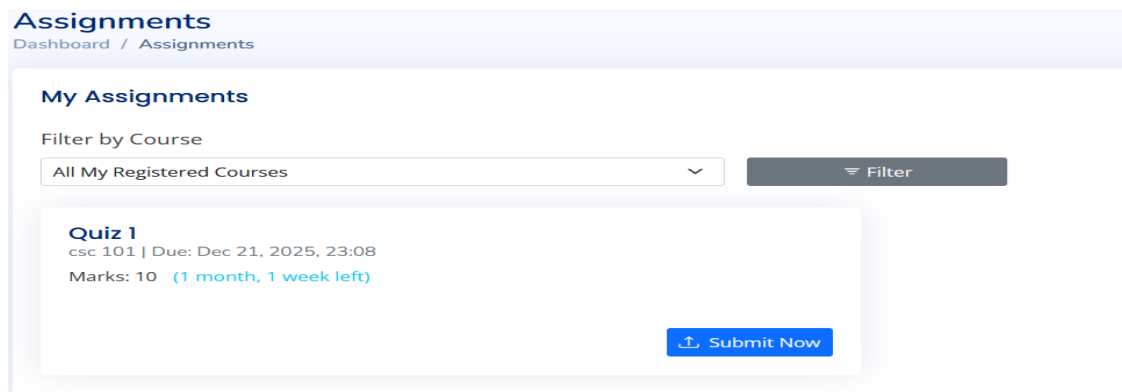


Figure 4.26: Student Assignments Submission.

My Attendance

This module enables students to view their attendance status in the figure 4.27

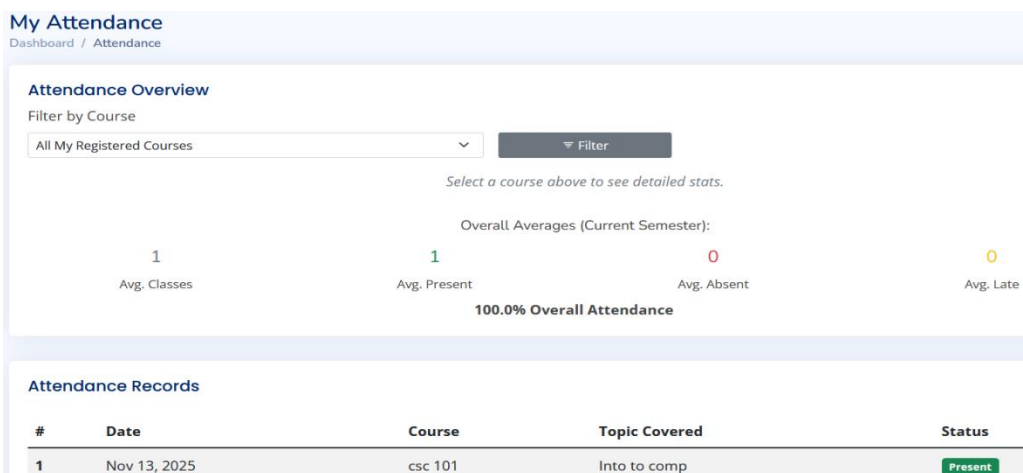


Figure 4.27: Student Attendance.

Result

This module allows students to view their semester results through the LMS shown in Figure 4.28

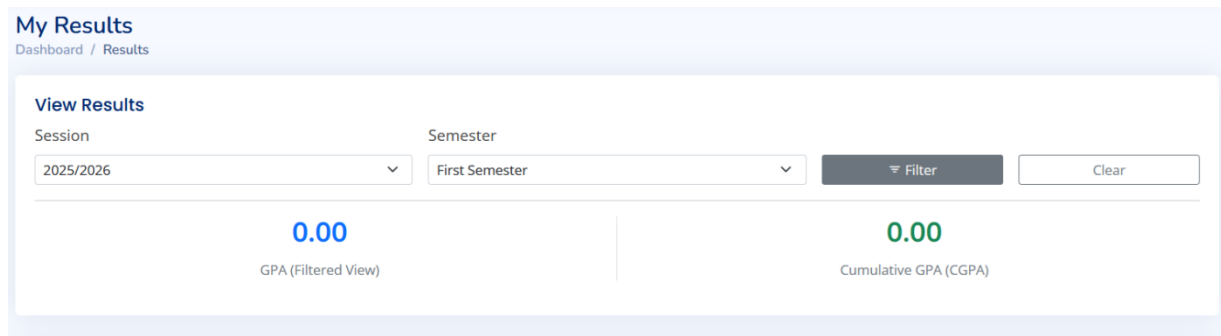


Figure 4.28: Student Assignments Submission.

Virtual Class

The module presents live interactive sessions between lecturers and students via video, audio and whiteboard. The lecturer will initiate class while students pay attention to the lecturer speech and write-up. The figure 4.29 shows the interactive area.

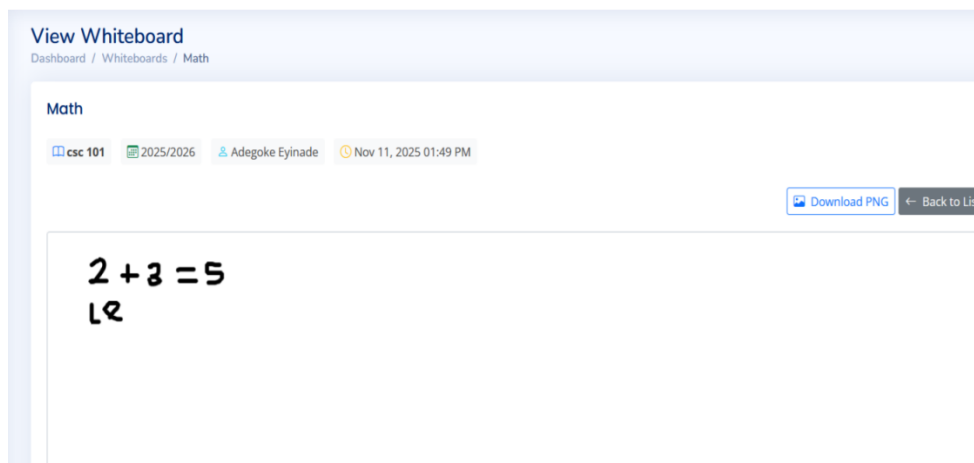


Figure 4.29: Virtual Classroom

Profile: This module allows students to view, edit and change of passwords shown in Figure 4.30

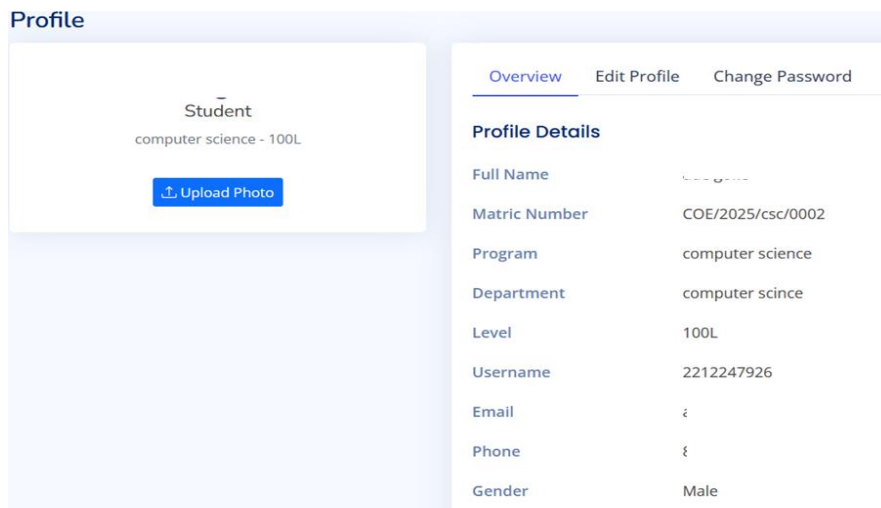


Figure 4.30: Student profile.

Logout

The module allows the student to exit from the site after class activities.

Unit Testing

Unit testing is the technique of checking and correcting errors made during the designing and coding of the program in order to enhance the best performance to system requirements and the specification. All the modules were tested independently and verified the correctness of each unit of the LMS.

System Testing

System testing is a method to check whether the actual system matches the expected output with the requirements. The purpose of software testing is to identify errors, gaps or missing requirements in contrast to actual requirements. Testing demonstrates that the software functions appear to be working according to specification and that behavioral and performance requirements appear to have been met. In addition, data collected as testing is conducted provide a good indication of system reliability, portability, flexibility, adaptability and usability. Testing started from the simpler modules and progress toward testing in the large. Testing ensures that internal operations are performed according to specifications and all internal components have been adequately exercised. This type of testing is called system testing which all components of the software work together to form a single system.

Integration

System integration is the successful assembly of a system's various components and subsystems working together to perform its intended function. The modules were merged to make up the complete system and made available for the end-users to access it. Integration follows the coding phase in the software development life cycle, as shown in Table 4.1 below, and is intertwined with testing.

LMS Evaluation, Data Presentation and Analysis

A google form structured questionnaire along with the LMS site (<https://nocenlms.name.ng/>) was distributed to various NOCEN students' platforms, which the total number of 150 undergraduate students, 24 postgraduate students and 6 lecturers of NOCEN responded to the questionnaire appropriately. The letter A-E in table 4.3 – 4.7 representing questions in each table.

Mathematical Formulas Used in Calculating the Percentages

Below are the formulas used to analyze the percentages for the LMS characteristics.

$$\text{Percentage Usability} = \frac{\text{SUM TOTAL OF STRONGLY AGREE AND AGREE}}{\text{SUM TOTAL OF ALL DATA}} \times \frac{100}{1} = \frac{862}{900} \times \frac{100}{1} = 96\% \quad (\text{Eq1}).$$

$$\text{Percentage Reliability} = \frac{\text{SUM TOTAL OF STRONGLY AGREE AND AGREE}}{\text{SUM TOTAL OF ALL DATA}} \times \frac{100}{1} = \frac{824}{900} \times \frac{100}{1} = 92\% \quad (\text{Eq. 2}).$$

$$\text{Percentage Adaptability} = \frac{\text{SUM TOTAL OF STRONGLY AGREE AND AGREE}}{\text{SUM TOTAL OF ALL DATA}} \times \frac{100}{1} = \frac{796}{900} \times \frac{100}{1} = 88\% \quad (\text{Eq 3}).$$

$$\text{Percentage Flexibility} = \frac{\text{SUM TOTAL OF STRONGLY AGREE AND AGREE}}{\text{SUM TOTAL OF ALL DATA}} \times \frac{100}{1} = \frac{786}{900} \times \frac{100}{1} = 87\% \quad (\text{Eq. 4})$$

$$\text{Percentage Portability} = \frac{\text{SUM TOTAL OF STRONGLY AGREE AND AGREE}}{\text{SUM TOTAL OF ALL DATA}} \times \frac{100}{1} = \frac{843}{890} \times \frac{100}{1} = 95\% \quad (\text{Eq 5})$$

$$\text{Overall Percentage} = \frac{\text{SUM TOTAL OF ALL THE PERCENTAGES}}{5} = \frac{96\%+92\%+88\%+87\%+95\%}{5} = 92\% \quad (\text{Eq.6})$$

Table 4.3: Usability of LMS (Measures user-friendliness, navigation, and satisfaction)

Item s	Questio n	Strongly agree	Agre e	Indiffere nt	Disagre e	Strongly Disagree	Percentage of Usability
1	A	165	10	0	4	1	96%
2	B	170	9	0	0	1	
3	C	157	11	2	8	2	
4	D	130	30	11	4	5	
5	E	172	8	0	0	0	

From Table 4.3, in item 1, 165 of the respondents strongly agreed that the designed LMS interface looks simple, attractive and easy to understand, 9 of the respondents agreed, indifferent, and disagreed are 0 while 1 respondent strongly disagreed.

In item 2: 170 of the respondents strongly agreed that it is easy to navigate learning materials and resources within the LMS, 9 agreed, while indifferent and disagreed were 0 and 1 of the respondent strongly disagreed.

In item 3: 157 of the respondents strongly agreed that it is easy to perform basic tasks such as joining a virtual classroom or submitting assignments, 11 agreed, 2 were indifferent, 8 disagreed and 2 of the respondents strongly disagreed. In item 4: 130 of the respondents strongly agreed that The LMS provides satisfactory ease of use and functionality, 30 agreed, 11 were indifferent, 4 respondents disagreed and 5 of the respondents strongly disagreed.

In overall, item 5: 172 of the respondents strongly agreed that the LMS is user-friendly and will promotes learning engagement, 8 agreed, while indifferent, disagreed and strongly disagreed were 0. The figure 4.31 is the graphical data representation.

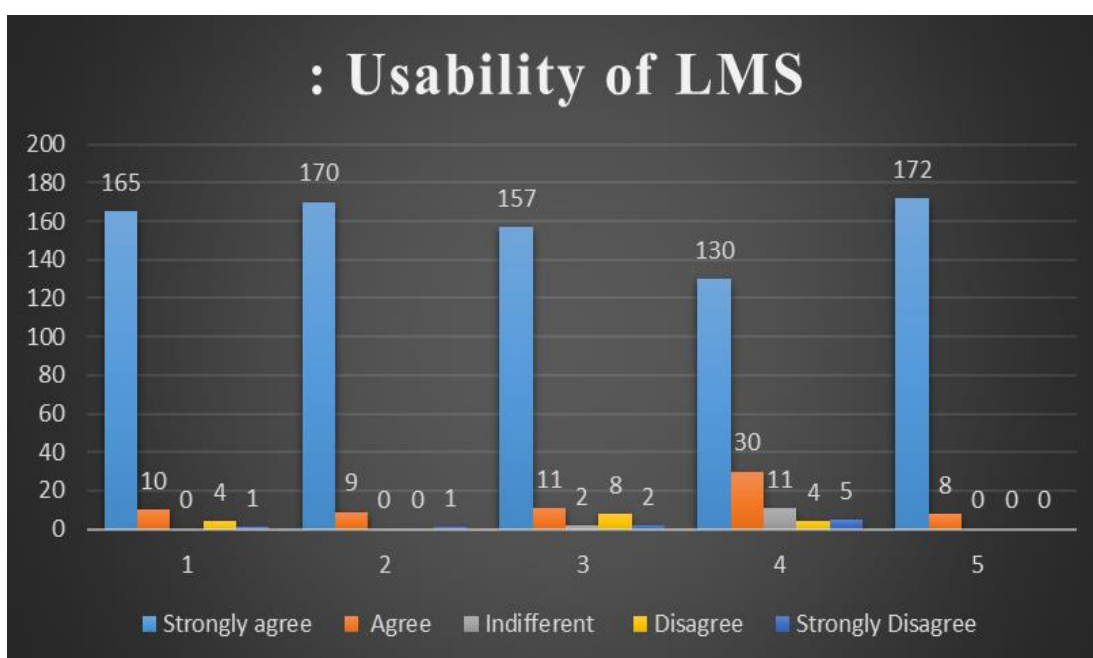


Figure 4.31: Table 4.3 Graphical data representation

Table 4.4: LMS Reliability (Assesses the system stability, performance, and dependability).

Item s	Questio n	Strongly agree	Agree	Indiffere nt	Disagre e	Strongly Disagree	Percentage of Reliability
1	A	131	20	15	9	5	92%
2	B	114	40	6	15	5	
3	C	157	15	0	5	3	
4	D	102	65	1	4	8	
5	E	169	11	0	0	0	

From Table 4.4, item 1: 131 respondents strongly agreed that the LMS operates smoothly without unexpected shutdowns or crashes; 20 agreed, 15 were indifferent, 9 disagreed, and 5 strongly disagreed.

In item 2: 114 of the respondents strongly agree that the LMS is dependable and available whenever it is needed to carry out learning activities, 40 agreed, 6 indifferent, 15 disagreed and 5 of the respondents strongly disagreed. In item 3: 157 of the respondents strongly agree that the LMS loads quickly and responds promptly to user commands, 15 agree, 0 indifferent, 5 disagreed and 3 of the respondents strongly disagreed. In item 4: 102 of the respondents strongly agreed that the system errors or bugs rarely occur while using the LMS, 65 agreed, 1 indifferent, 4 respondents disagreed and 8 of the respondents strongly disagreed. In item 5: 169 of the respondents strongly agreed that the LMS securely stores user data and learning records, 11 agreed, while indifferent, disagreed and strongly disagreed were 0. The figure 4.32 is the graphical data representation.

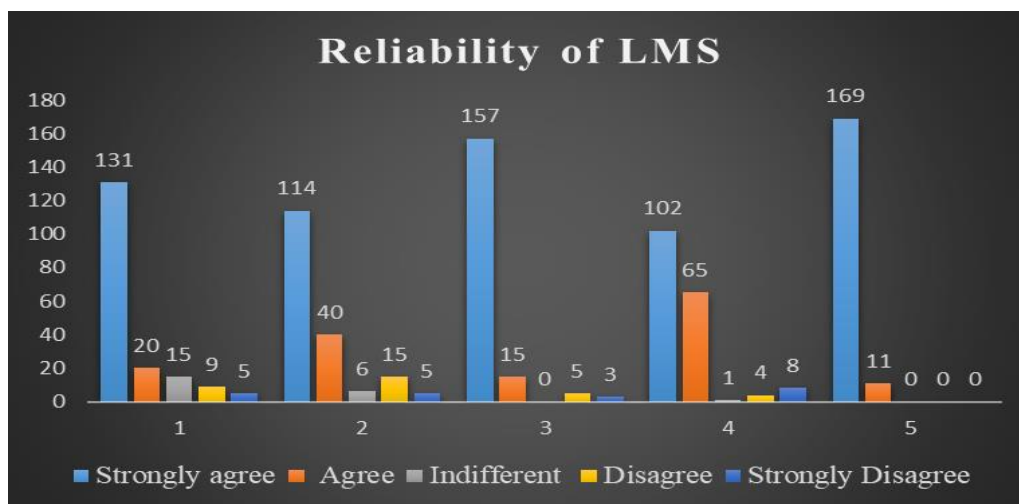


Figure 4.32: Table 4.4 Graphical data representation

Table 4.5: Adaptability (Measures system ability to integrate or accommodate changes).

Item	Question	Strongly agree	Agreed	Indifferent	Disagree	Strongly Disagree	Percentage of Adaptability
1	A	166	10	0	3	1	88%
2	B	86	35	13	35	11	

3	C	134	40	1	3	2
4	D	170	5	0	4	1
5	E	110	40	0	25	5

From Table 4.5, item 1: 166 respondents strongly agreed that the LMS allows students to join the class and learn easily, 10 agreed, 0 indifferent, 3 disagreed, and 1 strongly disagreed.

In item 2: 86 of the respondents strongly agree that the LMS supports integration with other learning tools or software, 35 agreed, 13 indifferent, 35 disagreed and 11 of the respondents strongly disagreed. In item 3: 134 of the respondents strongly agreed that the LMS can be easily updated or modified without technical issues, 40 agree, 1 indifferent, 3 disagreed and 3 of the respondents strongly disagreed.

In item 4: 170 of the respondents strongly agreed that the LMS accommodates different teaching and learning styles, 5 agreed, 0 indifferent, 4 respondents disagreed and 1 of the respondents strongly disagreed. In item 5: 110 of the respondents strongly agreed that the LMS adapts effectively to changes in technology or user requirements, 40 agreed, while indifferent, 25 disagreed and 5 respondents strongly disagreed. The figure 4.33 is the graphical data representation.

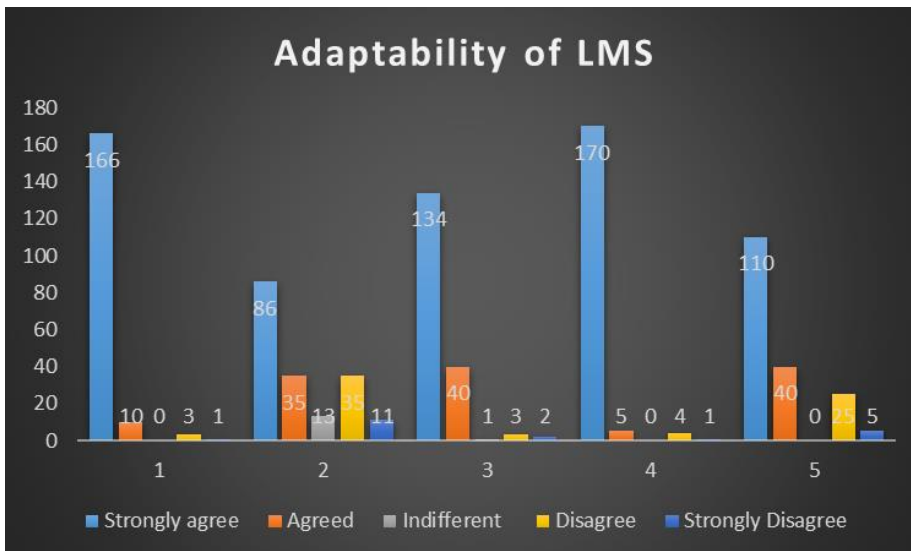


Figure 4.33: Table 4.5 Graphical data representation

Table 4.6: Flexibility (Assesses how well the LMS accommodates users' needs, preferences and learning styles.)

N o	Questio ns	Strongly agree	Agre e	Indiffere nt	Disagre e	Strongly Disagree	Percentage of Flexibility
1	A	178	2	0	0	0	87%
2	B	159	11	2	8	0	
3	C	134	28	10	6	2	
4	D	60	42	20	30	28	
5	E	162	10	0	5	3	

From Table 4.6, item 1: 178 respondents strongly agreed that the LMS allows students to login freely into the system, 2 agreed, 0 indifferent, 0 disagreed, and 0 strongly disagreed.

In item 2: 159 of the respondents strongly agreed that the LMS supports access to learning materials at any time and from any location, 11 agreed, 2 indifferent, 8 disagreed and 0 of the respondents strongly disagreed. In item 3: 134 of the respondents strongly agreed that the LMS accommodates multiple students, 28 agreed, 10 indifferent, 6 disagreed and 2 of the respondents strongly disagreed.

In item 4: 60 of the respondents strongly agreed that Lecturer can easily modify course content or settings. 42 agreed, 20 indifferent, 30 respondents disagreed and 28 of the respondents strongly disagreed. In item 5: 162 of the respondents strongly agreed that the LMS supports different content formats (videos, text, slides, etc.), 10 agreed, while indifferent is 0, 5 disagreed and 3 respondents strongly disagreed. The figure 4.34 is the graphical data representation.

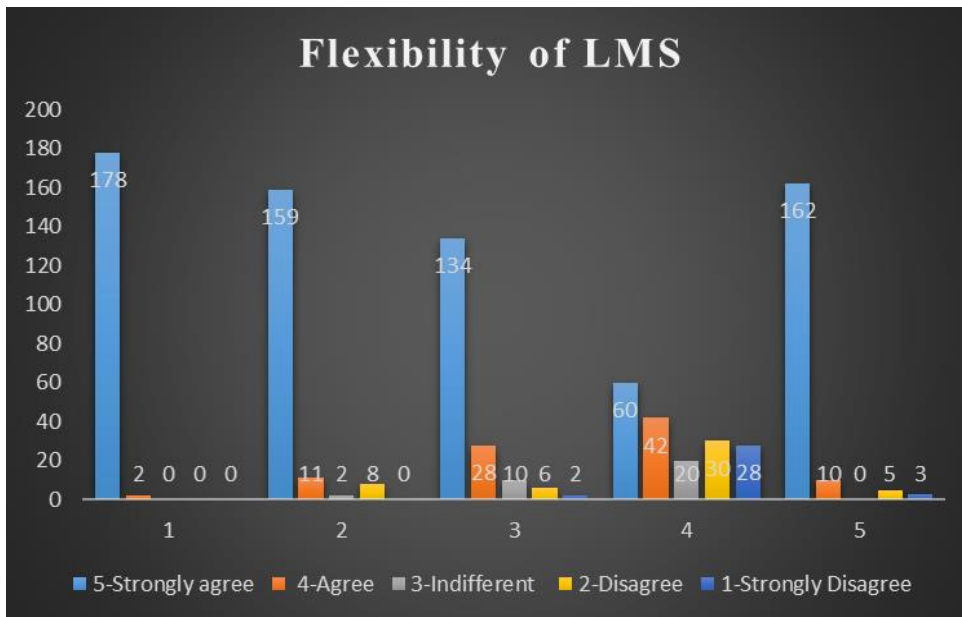


Figure 4.34: Table 4.6 Graphical data representation

Table 4.7: Portability (Measures the ease of use across various devices and operating environments)

Item s	Question	Strongly agree	Agreed	Indifferent	Disagree	Strongly Disagree	Percentage of Portability
1	A	157	13	0	5	5	95%
2	B	146	25	1	6	2	
3	C	124	50	3	2	1	
4	D	90	76	4	5	5	
5	E	118	44	0	7	1	

From Table 4.7, item 1: 157 respondents strongly agreed that the LMS can be accessed easily from different devices (e.g., mobile phones, tablets and computers). 13 agreed, 0 indifferent, 5 disagreed, and 5 strongly disagreed.

In item 2: 146 of the respondents strongly agreed that the LMS functions properly on various operating systems (Windows, Android, iOS), 25 agreed, 1 indifferent, 6 disagreed and 2 of the respondents strongly disagreed. In item 3: 124 of the respondents strongly agreed that the interface layout remains consistent across different devices, 50 agreed, 3 indifferent, 2 disagreed and 1 of the respondents strongly disagreed.

In item 4: 90 of the respondents strongly agreed that the LMS requires minimal configuration or setup to run on a new device, 76 agreed, 4 indifferent, 5 respondents disagreed and 5 of the respondents strongly disagreed. In item 5: 118 of the respondents strongly agreed that the LMS performs well regardless of internet speed or bandwidth differences, 44 agreed, while indifferent is 0, 7 disagreed and 1 respondents strongly disagreed. The figure 4.35 is the graphical data representation.

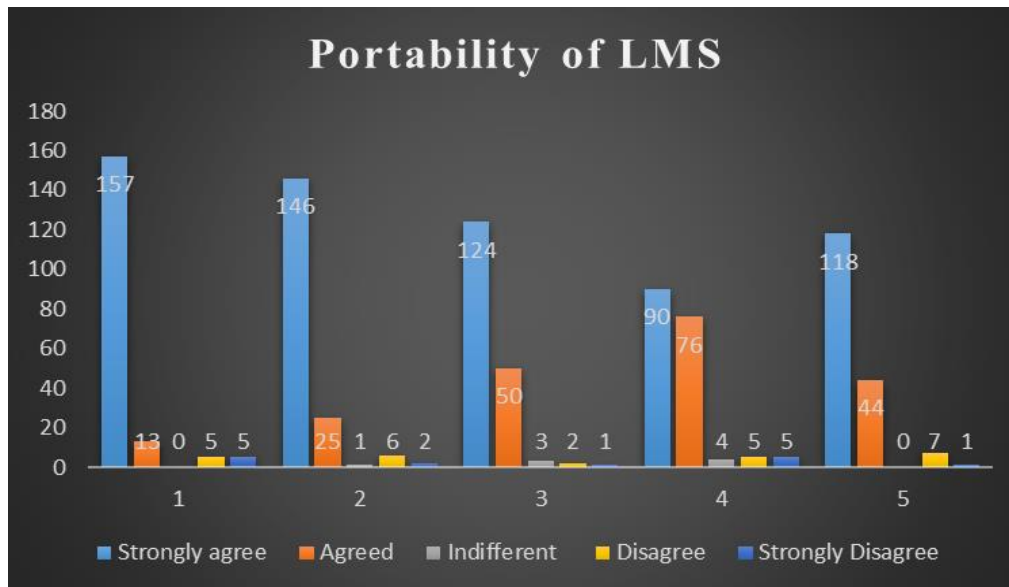


Figure 4.35: Table 4.7 Graphical data representation

RESULT DISCUSSION

The results obtained from the evaluation of the Learning Management System (LMS) developed for Nwafor Orizu College of Education, Nsugbe indicate a high level of effectiveness and overall system performance. The LMS recorded an overall general performance score of 92%, demonstrating that the system largely meets institutional and user requirements for digital teaching and learning. The usability performance score of 96% reflects a highly user-friendly system. This suggests that students and lecturers can easily navigate the LMS, access learning materials, submit assignments and interact with course content with minimal technical difficulty. High usability is critical in educational environments, as it encourages adoption and sustained use of the system. In terms of reliability, the LMS achieved a 92% performance rating, indicating that the system operates consistently with minimal downtime or technical failures. This level of reliability is essential for maintaining uninterrupted academic activities such as online lectures, assessments and resource access, thereby increasing users' confidence in the platform. The flexibility score of 88% shows that the LMS effectively supports different learning needs, teaching methods and course structures. This implies that the LMS can accommodate various instructional approaches, including blended learning and asynchronous learning. Although the score is slightly lower, it still reflects a strong capability to adapt to diverse academic requirements. The LMS also recorded an adaptability performance of 87%, suggesting that the system can be adjusted to evolving institutional needs, curriculum changes and technological advancements. This indicates that the LMS has the capacity for future upgrades and customization, which is vital for long-term sustainability. Furthermore, the portability score of 97% demonstrates that the LMS performs exceptionally well across multiple devices and platforms, including desktops, laptops, tablets and smartphones. This high level of portability enhances accessibility, allowing users to engage with learning resources anytime and anywhere, which is particularly important in modern educational settings. Overall, the combined performance indicators resulted in an overall LMS performance rating of 92%, confirming that the developed system is efficient, effective and suitable for deployment in the Nwafor Orizu College of Education, Nsugbe. The results suggest that the LMS has significantly improved digital learning delivery, institutional efficiency and user satisfaction. With minor improvements in flexibility and adaptability, the system has strong potential for long-term institutional adoption and scalability.

FINDINGS

The findings from this study are as follows:

The developed learning management system is perceived to reliably support NOCEN academic learning activities with a better friendly interface and ease of use.

The developed LMS showed an overall 92% for effective use and suitable deployment

The research work also established the integration of the system into a web application for a better user experience.

Summary

The development of a Learning Management System (LMS) involves the systematic design, creation, and implementation of a digital platform that supports teaching, learning, assessment, and administrative activities. The process begins with identifying educational needs, user requirements and institutional goals. This is followed by planning the system architecture, selecting appropriate technologies and determining essential features such as content management, user management, communication tools, assessment modules and data analytics. During development, software engineering principles were applied to create an intuitive, user-friendly, interactive modules and secure platform. The system is then tested and evaluated for usability, reliability, adaptability, flexibility and portability across devices. Feedback from lecturers, students, and administrators is integrated to refine system operations. The final stage includes using lecturers/students' dataset and established communication with students from various location joining virtual class remotely. The developed system indicate a high level of effectiveness, as reflected by an overall performance rating of 92%. This result demonstrates that the LMS successfully meets the institutional requirements for digital teaching, learning and academic management.

CONCLUSION

The development of a Learning Management System (LMS) represents a significant step toward modernizing teaching and learning processes within educational institutions. By integrating digital tools for content delivery, communication, assessment and administration, an LMS enhances accessibility, flexibility, and efficiency for both lecturers and students. The systematic approach used from requirement analysis, system design, implementation and evaluation ensures that the platform aligns with user requirements and institutional goals. Ultimately, a well-developed LMS not only supports effective learning but also fosters continuous improvement through data-driven insights and ongoing system updates. As education increasingly relies on technology, the LMS becomes an essential infrastructure for delivering quality, scalable and learner-centered education in today's digital environment.

RECOMMENDATIONS

It is strongly recommended that the NOCEN should adopt the developed Learning Management System (LMS) as a modern customized digital platform to enhance the effectiveness of teaching, learning and academic administration. The integration of an LMS to NOCEN will enable the institution to streamline course delivery, improve access to learning resources and support blended and fully online learning environments. The NOCEN should invest capital in a user friendly and secure platform that aligns with current educational technologies and meets the needs of students, lecturers and administrators. Adequate training should also be provided to staff and students to ensure effective utilization of the system. Furthermore, the institution should establish a dedicated technical support team to maintain the LMS, provide regular updates and monitor system performance. The NOCEN will not only improve academic quality and efficiency by adopting the LMS but also position itself competitively in the evolving digital education landscape. This strategic move will promote innovation, foster learner engagement and enable flexible learning opportunities for all students.

Contribution to Knowledge

Key contributions of this study are as follows:

The study develops a Learning Management System Suite using Object Oriented Programming Language that integrates essential educational functions such as course management, student registration, virtual class, learning materials, assignments, online assessment, grading, announcements, communication, and academic progress monitoring within a unified platform.

Implemented the LMS using MySQL database

Evaluation of the LMS usability, reliability, adaptability, flexibility and portability

Future Research Recommendation

Future research should explore additional ways the college can enhance and expand the effectiveness of its Learning Management System (LMS) after implementation. Studies should investigate how emerging technologies such as artificial intelligence and robotics systems can be integrated to improve personalized learning and instructional delivery.

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