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DEVELOPMENT OF COURSE AUTHORING SYSTEM

[1]Akomolafe, D. T., [2] Yerokun, O. M. and [1]Omololu E.

[1]Dept. of Mathematical Sciences, Ondo State University of Science and Technology, Okitipupa.
[2]Dept. of Computer Education, Federal College of Education (Technical), Asaba.

Abstract
There is a wide range of e-learning solutions in the software market tailored to suit corporate and educational needs. Authoring system being a subset of e-learning is designed for both technical and non-technical users to create, organize and manage the content of their courses. Course materials are made accessible to registered and authenticated users (students) to access educational resources anywhere, anytime in an asynchronous manner. The limitations of the traditional learning system are considered in the development process of these e-learning solutions. Literature review was conducted to determine the best approach that can help to blend traditional learning and e-learning and in identifying the platform upon which this work is built. An authoring system is developed using HTML, CSS for users and PHP as the web server and MySQL is integrated with the system to store and retrieve data. The system is easy to install, customize, use and cost-effective. The system was tested using real live data and the result showed that the interface is responsive and mobile friendly across different devices.
Keywords: E-learning, Module, Course material, Traditional learning system, Educational resource, Web based authoring system

Introduction

Technology has changed the way we live, think and work. Technology has revolutionized business and now it has revolutionized teaching and learning. ICT otherwise known as Information Communication Technology has widely spread across the globe not only changing the way we learn but also in the aspect of how humans live. In the context of learning, ICT (World Wide Web, high capacity networks, high computing speed among others) is an integral tool for students to learn more effectively. This is supported by (Mohamed and Bakar, 2008) that viewed computer technology as an important integral tool in teaching field where the use of computer technology is said to benefit both students and teachers.

Authoring systems can be defined as software that allows its user to create multimedia applications for manipulating multimedia objects. In the development of educational software, an authoring system is a program that allows a non-programmer, usually an instructional designer or technologist, to easily create software with programming features. The programming features are built in but hidden behind buttons and other tools, so the author does not need to know how to program.

In developing the authoring system, the

shortcomings of the present teaching and learning style (the traditional blackboard and paper system) were identified and they include:

- A student misses a lot of information that cannot be easily passed to him by his fellow students if he is absent from or late to a lecture.
- Traditional blackboard lecture delivery method is not tailored to suit the different learning paces of the different students in a classroom.
- The unstable educational environments of tertiary institutions caused by strikes and riots make it almost impossible for any lecturer to effectively teach all the topics in his course scheme of work.

Consequently, the need to develop a system that can address these shortcomings becomes inevitable

This research is aimed at developing an integrated learning system which provides a good transition from classroom learning to e-learning that is blending of a face to face and online learning.

Web Based Authoring System Versus Traditional Teaching And Learning Methods

Traditional learning gives the tutor a chance to create interest in a subject and clarify the confusion immediately. Tutor can understand student's psychology during learning. Tutors can deal with questions, unanticipated student ideas and comments. Tutors can give complements to the students when they perform well. Text materials can be provided and discussed then and there. It allows the tutor to influence students when they are actively working with the relevant materials.

Beyond the context of course materials, students can also learn from shared experiences from tutors in different aspect of life – careers, academics et al. There is also a synergistic influence as learner is involved in extra-curriculum activities which could possibly shape their social characters and professional ethics. They learn to be independent, learn to feed and shop for themselves and so on (Saini et al, 2014).

The emergence of internet has paved way for a platform (online learning) that allows interested individual to acquire knowledge without distance barriers. Limitations of the educational system such as inadequate colleges, cost of transportation and even time barriers have held back so many students to learn as desired. The availability of electronic gadgets such as laptops, tablets and smartphones brings ease for learners. (Dunlosky et al, 2013) states that web based learning is affordable and effective way of learning. With the effective learning techniques Students' Learning can be improved. The Internet is playing a vital role in providing learning in effective way. The major advantage of Web-Based Learning (WBL) in higher education is that it overcomes barriers of time, distance and time (Saini et al, 2014).

Moodle

The name Moodle is an acronym for Modular Object Oriented Developmental Learning Environment and is a course management system (Course Management System - CMS) through the Internet, also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). This system was developed in 1999 by Martin Dougiamas. It is a free web application that educators can use to create effective online learning sites. Moodle can be installed at no cost at many servers. This platform is widely used worldwide by universities, communities, schools, instructors, courses, teachers and even businesses (Lopes, 2011).

Blackboard LMS

Blackboard-learn is the product of

Blackboard Inc., which was founded in 1997 by two educational advisors; Matthew Pittinsky and Michael Chasen. They were working under a consulting firm, providing technical standards for online learning applications (Bradford et al, 2007).

Blackboard provides powerful and easy-to-use systems for educational instruction, communication, and assessment. Blackboard Learn is the core academic program, which is used in course management system for online and online educational assistance.

Related Studies

(Douidi, et al 2006) defines an authoring system as a computer tool which makes it possible for users who are not necessarily information specialists to create, modify and delete training material in a convenient and fast way.

(Inyiama et al, 2011) explains a web based authoring system to be a user-friendly and interactive system that allows both technical and non-technical users to develop their teaching modules and make it accessible remotely to target audience. Many authoring systems proposed either a compatibility with HTML environment, or an extension allowing the applications deployment on the network.

(Douidi et al, 2006) enumerated some characteristics expected in an Authoring System as:

- Accessibility to non-programmers
- Possibility of structuring the presentation: linear structure, hierarchical, topic, star
- Implementation of various resources: image, text, sound, video
- Interactivity
- Updated easily via a local area network or Internet

Methodology

Architectural Design Of The Authoring System

System Design

System design is the specification or construction of a technical, computer-based solution for the business requirements identified in 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).

Output Design

The output design contains all the necessary details of the processed input by the system which is drawn from different tables of the database. In this case, the lesson structure of each course and their respective multimedia objects are the output.

Input Design

The input design is the interaction point between the user and the system. There are eight major input forms/design

- Courses input design
- Lecturer input design.
- Department input design.
- Programme input design.
- Course information input design.
- Lesson structure input design.
- Lesson content input design
- Student Registration Module

Program Design

The web-based authoring and presentation system consists of various program modules. Each module of the system is a complete module and part of the entire system. Below are the various modules contained in the application:

- Course Module
  The course module is the interface (subsystem) that manages the courses available in the database. To create a new course, the course name (title), course code, course description,

course load unit, department, programme and course lecturer are required fields.

- Lecturer Module
  This subsystem manages available lecturers in the database. To add a new lecturer, the lecturer name, title, contract type and department is required field
- Department Module
  This subsystem manages available department in the database. To add a new department, the department name, the Head of department and faculty are required fields.
- Programme Module
  This subsystem manages available programmes in the database. To add a new programme, the programme name, department and faculty are required fields.
- Course Information Module
  This module manages the information (course image, description) of each courses in the database. To create a new record, the course image and the description of course are required fields.
- Lesson Structure Module
  This subsystem manages the lesson structure for each course. To create a structured outline for any course, the lesson name is the only required field
- Student Registration Module
  The student registration subsystem manages available students in the database. To register new student, name of student, faculty, department, programme, matriculation number, level, username and password are required fields.
- Lesson Content Module
  The lecture content module dynamically manages the content of each lesson outline of a course. The topic of lesson, overview/summary of lecture, video link and document files are the required fields to have content for each lesson outline.

Database

This is an organized collection and manipulation of data. The data are typically organized to model relevant aspect of reality in a way that supports the process requiring the information.

Database Specification

The program's database is built using MySQL.

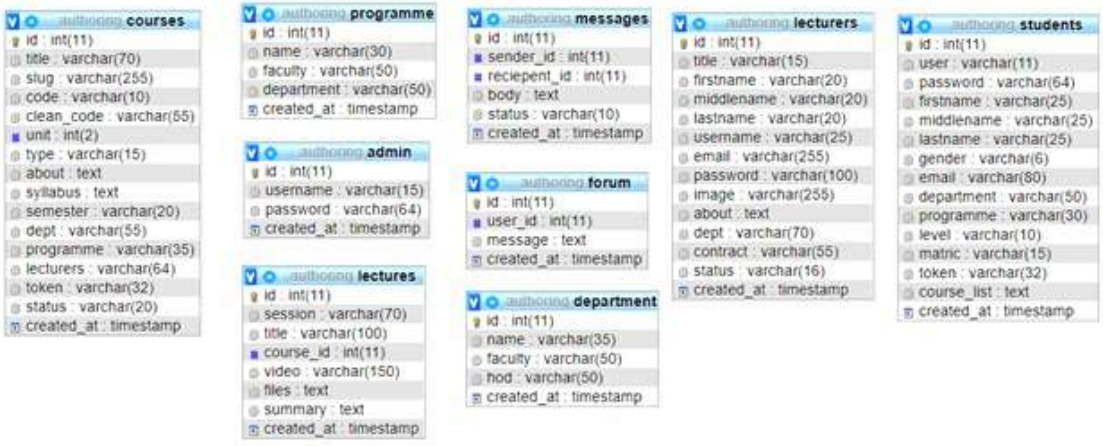

Figure 1: Database Design

Modeling the System

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 application before coding. Unified Modeling Language (UML) tools were used in modeling the system.

The Components of the system

The component of the system design is 3-level stack – front-end design (HTML, CSS and JavaScript), Backend development (PHP running on an Apache Server). PHP integrates the system interface and database. The Database Management System is handled by phpMyAdmin and its query language is MySQL. What is at the backend? The PHP as mentioned is a connector between the backend and the interface.

The Block Diagram and Flowchart

Use Case Diagram

Use case diagrams describe what a system does from an external observer's standpoint. The emphasis of use case diagrams is on what a system does rather than how. They are used to show the interactions between users of the system and the system. A use case represents the several users called actors and the different ways in which they interact with the system. The primary actors are the administrator, lecturer and students

Activity Diagram

Activity diagrams describe the sequential flow of activities of either a business process or use case. They can also be used to model actions that will be performed when an operation is executed as well as the result of those actions. It shows how activities depend on one another

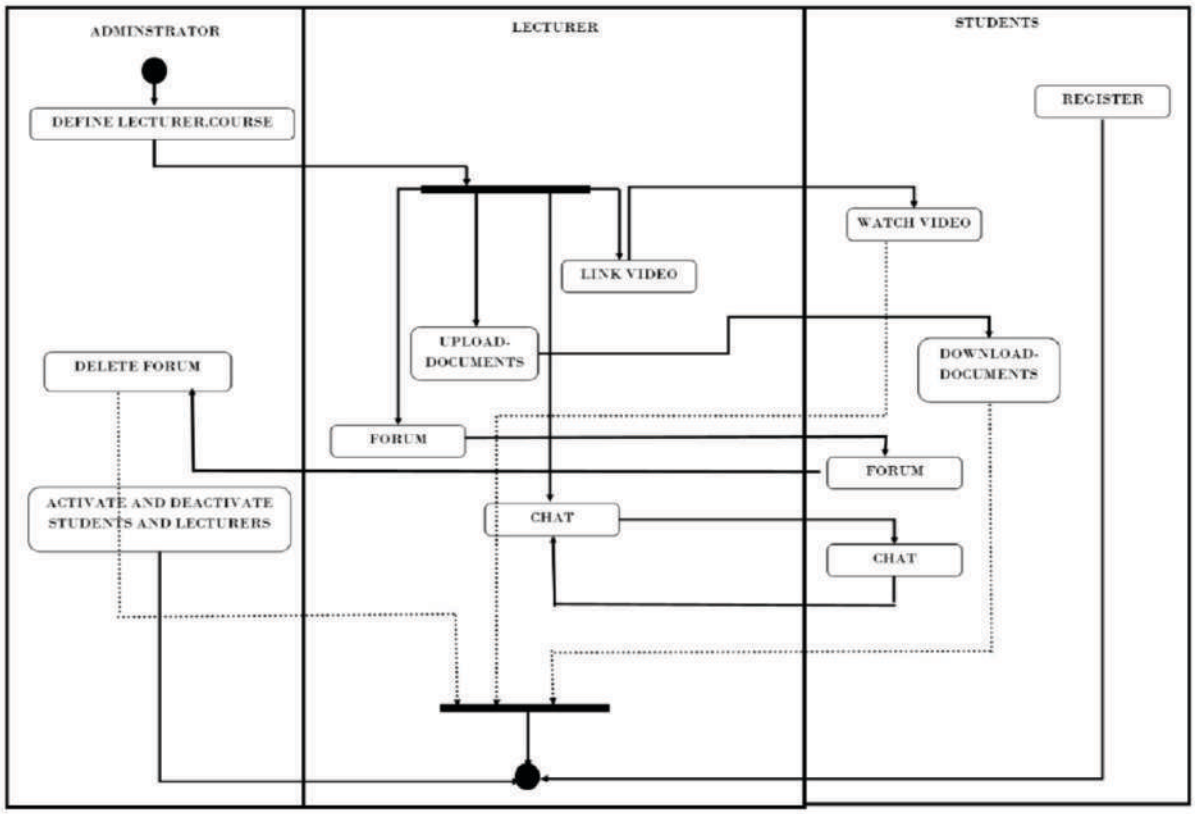

Figure 2: Activity Diagram

Implementation And Results

The web pages were designed using sublime text (text editor), PHP as the server-side language running on apache server which is integrated with MySQL database. The web-based authoring system is hosted on an online web hosting platform to make it accessible remotely.

Development Tools

In the course of design and implementing the system, the following development tools were used:

- HTML (Hypertext Markup Language)
- CSS (Cascading Style Sheets)
- JavaScript
- JQuery
- Ajax
- PHP (Hypertext Preprocessor)
- MySQL (RDBMS)

System Requirements

The system requirements are:

Hardware Requirements

The following are the minimum hardware requirements for effective running of the web-application on the computer system:

- A computer system (with peripheral devices such as keyboard, mouse and monitor)
- Minimum of 512 MB RAM
- Minimum of 50 GB hard disk size
- Minimum of 1.60 GHz Processor speed
- An Uninterrupted Power Supply (UPS)

Software Requirements

For this web-application to function efficiently, the following software needs to be running on the computer system:

A web server (Apache) – WAMP, MAMP, LAMP

A web browser (Mozilla Firefox, Google Chrome, Microsoft Edge)

Relational Database Management System (RDBMS): MySQL.

Using The Web-based Authoring System

The web-based authoring system is in three-level hierarchical system – which comprises of the students, lecturers and the departmental ICT coordinator (Admin).

Figure 3: Manage Lecturer

Figure 4: List of Departments (Manage Department)

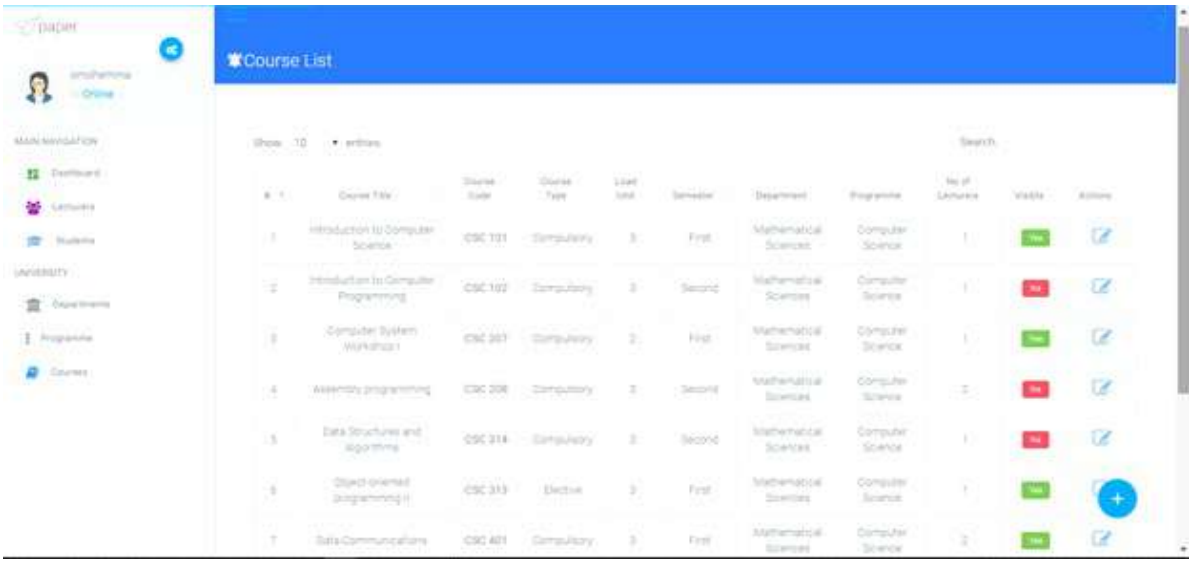

Figure 5: Manage Course

Figure 6: Dashboard (Lecturers)

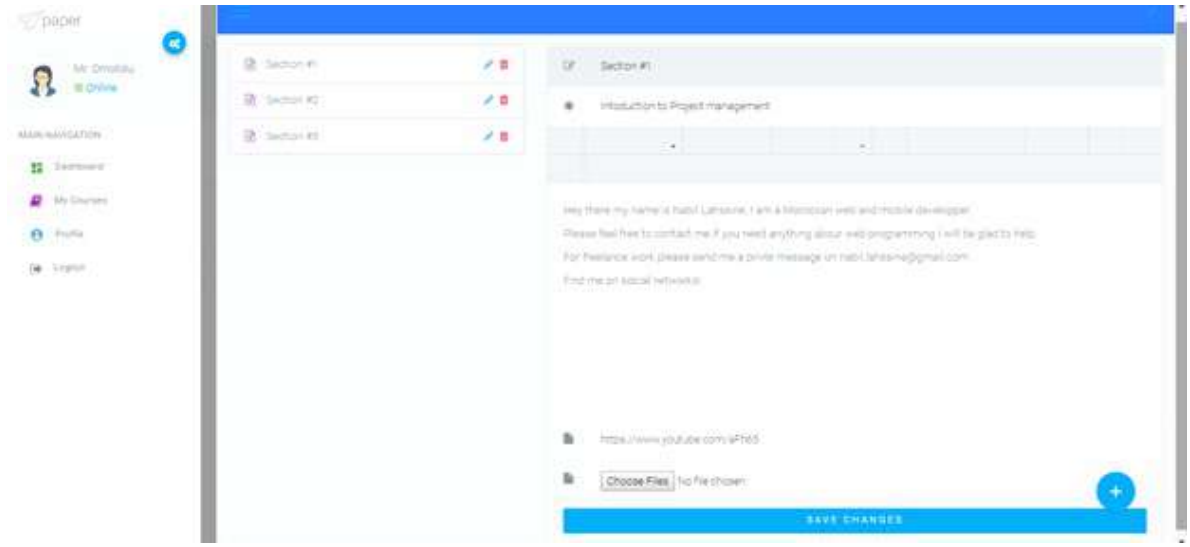

Figure 7: Create Course Content

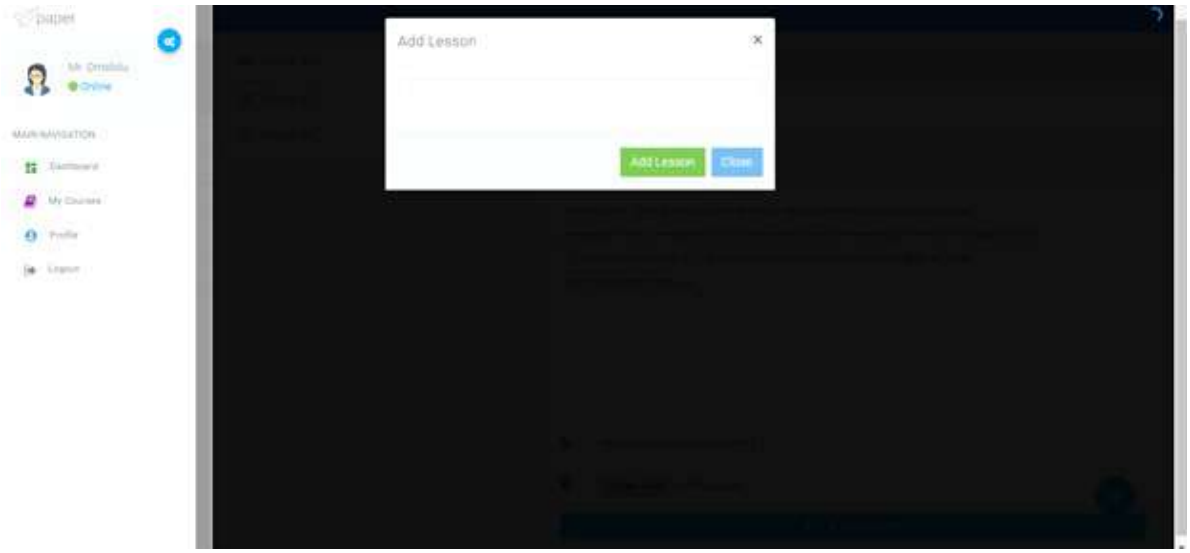

Figure 8: Add New Lecture Section

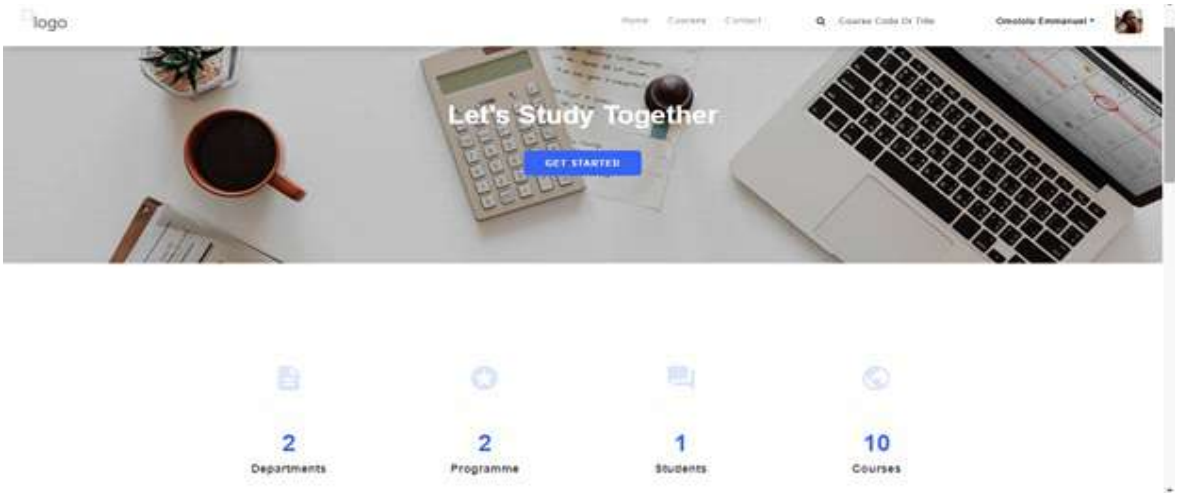

Figure 9: Student's Homepage

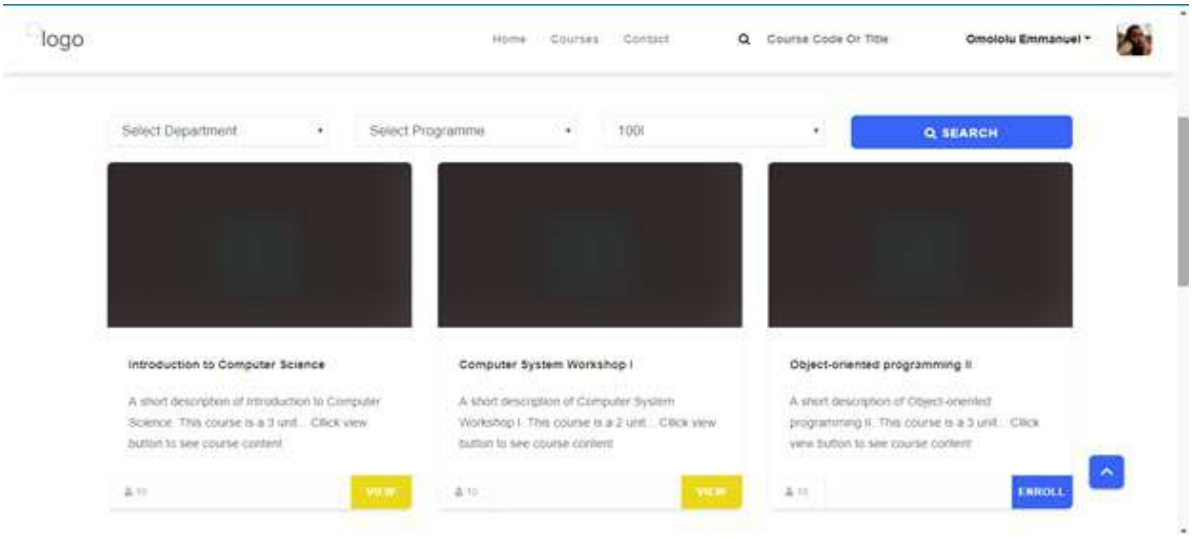

Figure 10: List of courses for the semester

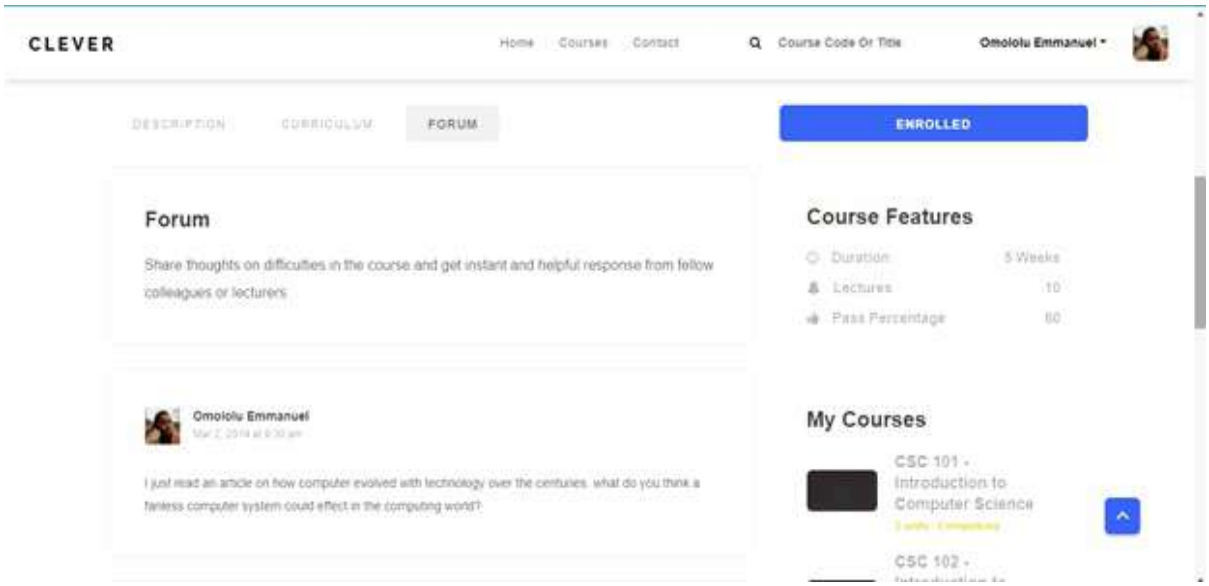

Figure 11: Forum

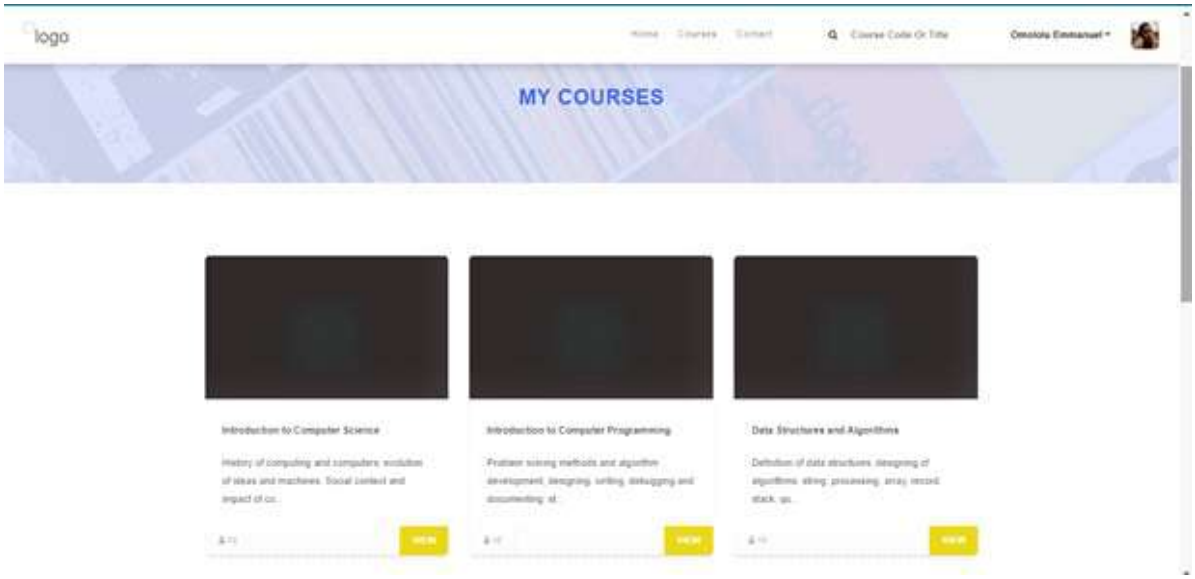

Figure 12: Registered Courses of Students

CONCLUSION

The era of technological advancement is revolutionizing the human society and learning should not be excluded. A web authoring system is software to produce web contents. They range from simple HTML editors to fairly sophisticated integrated development environments. Today, most web contents are not produced with web authoring systems, but with portal-ware of various kinds. In this research, the limitations of the traditional educational system currently in use were identified. From there, the web-based authoring system was developed. To ensure a robust system, HTML, CSS for users and PHP as the web server and MySQL is integrated with the system to store and retrieve data. The authoring system was tested with different systems and browsers and it worked seamlessly whilst deploying expected results. However, it does have its shortfalls in areas such as video conferencing, real-time online blackboard teaching, real-time question and answer forum using chat technology.

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