

## Research Article

## An Improved E-Learning System

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**Abstract:** This research deals with the design and implementation of an improved e-learning system taking Computer Science Unit, Mathematics Department of Usmanu Danfodiyo University, Sokoto as the case study. It allows upload of learning materials online and give room for one-on-one interaction with the lecturer by creating an avenue for the students to ask questions and get their answers online. The system is aimed at being user-friendly, reliable and improved with better specifications. The e-learning system is designed using HTML, CSS, PHP, Ajax, and MySQL. To ensure proper interaction between students and lecturers, this proposed system incorporate audio calls to lecturers through Skype and also video conferencing through webinar (Web Based Seminar); a software that enables lecturers deliver lecture live. It gives the system the ability to give, receive, and discuss information in real time.

**Keywords:** E-Learning, Web Application, improved e-learning, e-learning model, layered architecture, system implementation.

### INTRODUCTION

The increase of e-learning systems is likely to be considerable based on economic factors, but it is made to grow exponentially by learner's demands for flexibility and more learner-centered learning. E-learning is seen to provide a flexible and innovative ways of supporting and enabling quality learning and teaching. E-learning is defined as the systemic use of networked, multimedia computer technologies to improve learning; empower learners; connect learners to people and resources supportive of their needs; integrate learning with performance and link individuals with organizational goals [1].

Distance education is in fact an opportunity for those who have no time to continue their education in normal mode, attending classes regularly, due to some reasons. Some of the disadvantages of distance education which does not include direct provision of regular interaction between a student and a teacher, no question of revision, and so on can be solved by employing e-learning.

E-learning has completely changed the view of both academic education and corporate training. E-learning has the ability to change the way we study, and to bring high quality, easy to get learning to everyone – so that every learner can achieve his or her full potential [2].

There are several problems with the current way of training and learning in tertiary institutions and other cooperate training. These include: lack of adequate training and required commitment by the lecturers, unreliable technology that hinder lecturers' ability to monitor student's activities, students technical limitations were not put into consideration, students may find that lecturers are not sufficiently responsive because of the lecturers' workload or unfamiliarity with new technology and the requirements of reading, following instructions, reducing distractions, and exercising self-discipline have been found difficult to communicate to the students that need to understand the perils of enrolling in online courses if they are not equipped to handle the different learning environments.

As a result of these problems, this research is undertaken to deliver an e-learning system for universities and other learning institutions and organizations. It allows upload of learning materials online and give room for one-on-one interaction with the lecturer by creating an avenue for the students to ask questions and get their answers online. The system is aimed at being user-friendly, reliable and improved with better specifications. The e-learning system is designed such using HTML, CSS, PHP, Ajax and MySQL.

## RELATED WORKS

The reputation of e-learning intervention is growing rapidly. To remain competitive in today's tight labor market, organizations and companies are employing advances in technology to train staffs more quickly, more effectively, and at less expense than the past [3]. Many researches have been conducted in the field e-learning system. These researches will be reviewed in this section.

Jabr & Al-omari in [4] proposed an e-Learning management system with Web services oriented framework. This proposed framework increased the efficiency and effectiveness of collaborative learning in terms of Reusability, Interoperability, Accessibility and Modularization [5].

Siddiqui & Masud in [6] proposed an e-learning model to deliver better lectures and contents to the students studying in the remote areas, and hence to improve the quality of education and interest. They present an interactive system for e-learning. This system includes a dedicated educational satellite. The satellite is responsible to distribute the e-learning contents to the universities connected to it. To improve the performance the proposed system is using satellite that is working on spot beam technology [7] supported with VSAT terminals. The limitation of the proposed system is inability to provide quiz component and attendance.

Salihu in [8] designed and implemented an e-learning system for a vocational study Centre, Jedo Computer Institute. The system was developed using tools such as PHP, MySQL and apache. The system was developed with text and audio supports with capabilities for taking attendance which are easier to use, affordable and convenient. Some of the limitations of this system are the inability to provide the quiz component, assignment component and non-synchronization of text displayed with audio.

From the above previous works, this study is undertaken to deliver an e-learning system for universities and other learning institutions and organizations and implement the use of innovative computer technology in teaching and learning in order to keep up with the changing needs of the modern society and to maintain a high profile in the market area. The proposed system will then improve on visuals, audio and text files as well as interaction between users to ensure that e-learning session are appropriately undertaken.

## PROPOSED E-LEARNING SYSTEM DESIGN

The architecture of the proposed e-learning system is shown in figure 1. It uses the layered model; partitions the concerns of the application into stacked groups (layers). It enables the different components to effectively work at various levels of abstractions. This model makes it easy for changes to be made in one layer without affecting the other layers.

### Statements of Requirements

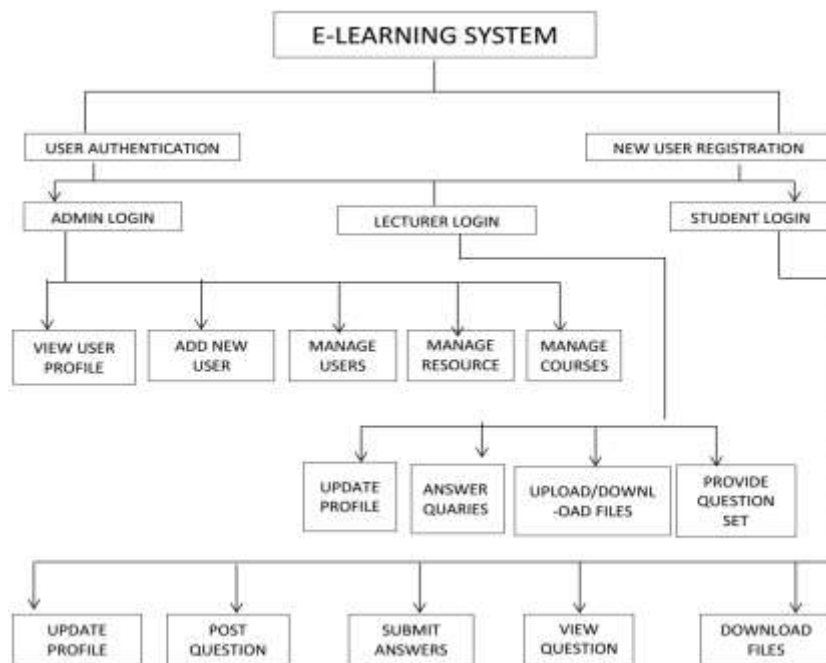
The proposed e-learning system requirements statements define the capabilities and performances that the system will provide. The requirements are used to guide the design of specific system deliverables, and to assess whether those deliverables are satisfactory for the intended purpose. The system requirements describe what is needed; the deliverables are how that is accomplished; and the outcomes describe why the system is worthwhile. These requirements are:

- The admin will be able to manage courses, levels, users, department or unit, students, lecturers, and contents.
- The lecturer will be able to manage classes for his/her classes, send and receives messages to and from his/her students and other lecturers, set conference using webinar and send the link to the intended class via notification, and manage downloads, announcements, assignments and quiz.
- The student will be able to view his/her class, view notifications, send and receive messages to and from his/her lecturers and other students, view and download lecture materials including audios and videos, and call and chat will the lecturers via Skype.
- Students can take quiz questions anytime they are ready.
- Notification can be put up by lecturer at any time and student can read once they logon.
- Students can attend classes live through software incorporated into the system called WEBINAR.
- Students can also contact lecturer through Skype.

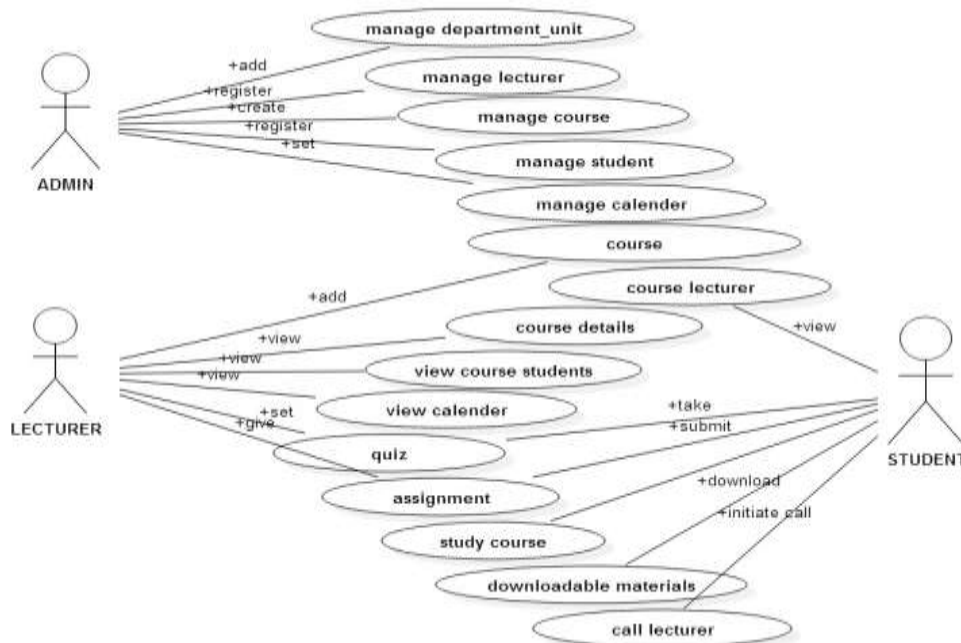
### Use Case Diagram of the Proposed System

Use case diagram is a UML model that represents the dynamic behavior of a system. It is considered for high level requirement analysis of a system. So when the requirements of a system are analyzed the functionalities are captured in use cases. So, they are system functionalities written in an organized manner.

Taking Computer Science Unit, Department of Mathematics, Usmanu Danfodiyo University Sokoto as the case study there are three actors including: admin, lecturer and student.



**Fig-1: Proposed E-Learning System Architecture**



**Fig-2: Use Case Diagram of the Proposed E-learning System**

**PROPOSED E-LEARNING SYSTEM IMPLEMENTATION**

Implementation is the stage where the theoretical design is turned into a working system. It is the most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The proposed system is implemented using PHP, Ajax and MySQL. It is also made responsive through the use of bootstrap library. That is mobile first framework.

**Proposed System Procedure**

The proposed system is divided into three different modules integrated to work together as one

system. These modules include: Administrator, Lecturer and Student.

### Administrator Module

This module meant for the system administrator as shown in figure 3. It allows

administrator to manage courses, levels, departments, students, lecturers, portal menu contents, sessions and calendar. The admin can also view downloadable materials, uploaded assignments, user logs and activity logs.



Fig-3: Admin Page

### Lecturer Module

This module is meant for teachers as shown in figure 4. It allows them to change his password and picture. . It also allow them add class, add or remove

student for class, view and print student list, add and remove lecture notes and other downloadable materials, add and remove assignment.



Fig-4: Teacher Page

Grade the assignment, add announcements, setup quiz, set up conference using Webinar and submit the link as announcement to the student, send/receive message from student and other lecturers and schedule events.

### Student Module

This module is meant for students as shown in figure 5. It also allows students to change their

password and picture. It also allows students to view the list of their course mates for each course, view academic progress, download assignment and upload assignment solutions, take quiz, view calendar of scheduled events, also read announcements, call teachers via skype and send/receive messages to their class mates and teachers.



**Fig-5: Student Page**

## CONCLUSION AND RECOMMENDATION

This proposed system has been developed to meet and satisfy end user needs according to their specification. The system was developed to eradicate the problems in the traditional learning system by improving student and lecturers' interaction without having to be physically present in class during the course of study. The e-learning system developed is not totally free of flaws as the video upload aspect of the system is one of the limitations of this research. But the system after thorough test and evaluation was found to be efficient and effective enough within the scope of the research.

Further improvement can be made on this research as more work is to be done on the aspect of video uploads, quiz timing and automatic course selection according to students registered level with carry-overs into consideration.

To ensure proper interaction between students and lecturers, this proposed system incorporate audio calls to lecturers through Skype and also video conferencing through webinar (Web Based Seminar); a software that enables lecturers deliver lecture live. It gives the system the ability to give, receive, and discuss information in real time.

## REFERENCES

1. Goodyear, P., & Ellis, R. (2010). Expanding conceptions of study, context and educational design. *Rethinking learning for a digital age: How learners are shaping their own experiences*, 100-113.
2. Joy-Matthews, J., Megginson, D., & Surtees, M. (2004). *Human resource development*. Kogan Page Publishers.
3. Urdan, T. A., & Weggen, C. C. (2000). Corporate elearning: Exploring a new frontier.
4. Jabr, M. A., & Al-omari, H. K. (2010). e-Learning Management System Using Service Oriented Architecture.
5. Fang, C. F., & Sing, L. C. (2009). Collaborative learning using service-oriented architecture: A

framework design. *Knowledge-Based Systems*, 22(4), 271-274.

6. Siddiqui, A. T., & Masud, M. (2012). An e-learning system for quality education. *world*, 6(311), 96-9.
7. Spot Beam Technology. (n.d.). Retrieved December 30, 2016, from [http://www.sadoun.com/Sat/Products/Dishnetwork/Dishes/Spot\\_Beam\\_Short.pdf](http://www.sadoun.com/Sat/Products/Dishnetwork/Dishes/Spot_Beam_Short.pdf)
8. Salihu, A. (2013). Designed and implemented an e-learning system for a vocational study Centre, Jedo Computer Institute.