Development of a Web-Based Material for Teaching and Learning of Physics Courses in Abia State College of Education Technical, Arochukwu.

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Abstract- ***Interest on paper reading among the youths is gradually dwindling since the emergence of technology especially Information and Communication Technology. It is evident that most people today spend more time in the internet as it has been made easy with the use of mobile devices like cell phones, tablet pcs, etc. The bright and colorful prints, the elaborate pictorial and video illustrations on this media makes reading and learning interesting and enhances assimilation as it improves cognition. Taking learning to the level that interest students is of utmost importance in education today especially in the teaching of science, hence the need for the development of a web-based material for teaching and learning of Physics courses with emphasis on Abia State College of Education Technical, Arochukwu, which is the basis for this research work. The outcome is a fully functional web-based resource that enhances students' engagement and understanding of Physics concepts leading to improved academic performance. These were achieved through development, implementation and evaluation.***

Index Terms - Web-Based Material, Learning Management System (LMS),

I. INTRODUCTION

Physics courses in Nigeria and other developing countries is difficult to understand by so many students due to many units, symbols, Greek letters and words that seems abstract to them, in addition to lack of equipment, instructional materials and inadequate texts books due to poor funding of students and the education sector. It is evident that there is lack of man power to teach and conduct Physics practical effectively coupled with inadequate power supply to perform experiments at the desired time. These poor educational practices especially in teaching and learning of science subjects such as Physics is being enhanced with the advancement of technology. In Nigeria, particularly at the Abia State College of Education Technical, there is a growing need to enhance the quality of education through the integration of web-based learning materials. This proposal aims to develop a comprehensive web-based platform that will facilitate the teaching and learning of Physics courses, thereby improving students' engagement, understanding, and performance.

II. LEARNING MANAGEMENT SYSTEM (LMS)

A Learning Management System (LMS) is an educational software (online or offline) platform designed to develop, teach, manage, track courses and training programs. It is widely used to streamline the learning process in schools, universities, corporations, and online learning environments.

III. INTERACTIVE LEARNING MANAGEMENT SYSTEM

An Interactive Learning System (ILS) is a digital or technology-based educational platform that engages learners to actively participate through feedback, and dynamic content. These systems leverage multimedia, simulations, quizzes, gamification, and real-time interactions to enhance understanding and retention.

IV. A WEB-BASED MATERIAL

A web-based material is any educational content or resource that is delivered and accessed through the internet using web technologies, such as websites or

online platforms. Web-based materials form the core component of web-based learning (also known as e-learning or online learning), enabling students to access information, complete assignments, and participate in discussions from any location with internet access. These materials can include written documents, interactive videos and simulations, slide presentations, objective test, e.t.c all designed to support learning outside of traditional classroom settings especially valuable for distance education and lifelong learning, allowing learners to study at their own pace and convenience. Effective web-based materials are carefully designed to be user-friendly, motivating, and aligned with educational goals, often using multimedia and interactive tools to facilitate deeper learning and retention.

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This material consists of different course content selected from the new minimum standard to suite the academic needs of NCE students on Physics. The lessons were coded in Html thereby converting them to a web based which can be read using mobile phones, tablets and computers. It can be read online with the use of internet or can be sent or copied to devices to be read offline.

The Home Page

This page as shown in figure 1 is colourful (embedded on a blue background color fill) with the inscription "ABIA STATE COLLEGE OF EDUCATION (TECHNICAL) AROCHUKWU. This is the page that both lecturer and students have in common as it is where the log in details for both lecturer and students is imputed. This page navigates into the lecturers or student's domain depending on which button clicked and credentials inputted in the username and password segment.

The Lecturer Domain

In this domain, the lecturer is able to do different things ranging from adding lessons, quiz, to students' assessment.

- Add Content: on this page in figure 2 below, the lecturer can add content from different sources. There are options for the lecturer to type in manuscript, upload already saved document from computer, source content from the internet (url) or use artificial intelligence. Once the add content icon is clicked, the content moves over to the student domain and appears as a lecture note for the student to study.
- Add Quiz: the segment shown in figure 3 bellow allows the lecturer to test the students by giving them quiz on the topic learnt. Here the lecturer types in quiz questions in an objective form. The lecturer also provides the correct option in a different box. The correct option pops up once the student clicks any option. The essence of this is to automatically give the students feedback on their assessment.
- Student Performance Dashboard: this dashboard on figure 4 serves as a report card for all the students. It shows the entire class performance on a course, shows the individual students performance and reveals the areas of weakness as it analyses the failed questions. This dashboard greatly reduces the lecturer's work load as it does the marking, scoring and recording of assessment automatically.

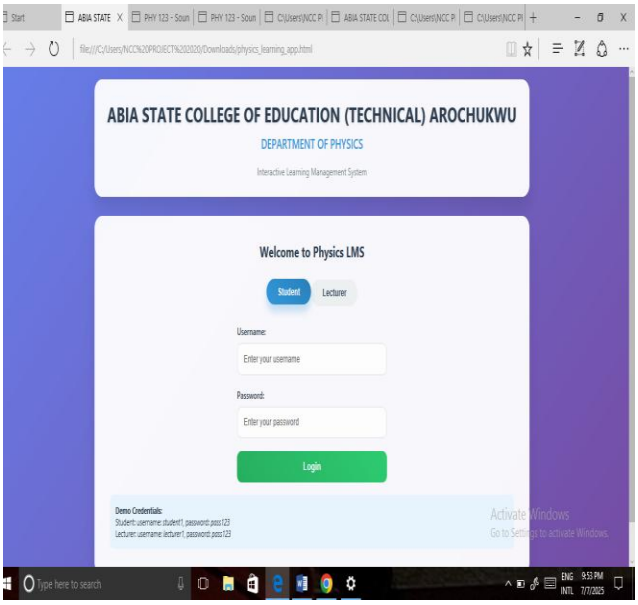

Figure 1: Home Page

Figure 2: Add Learning Content

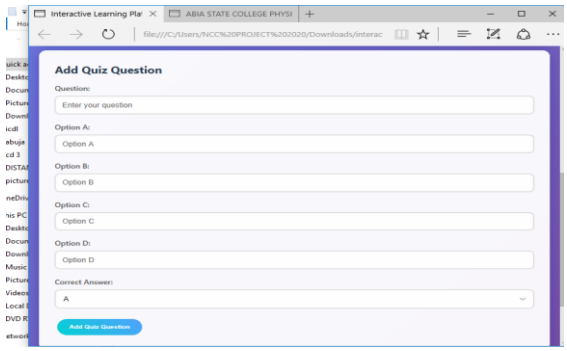

Figure 3: Add Quiz Questions

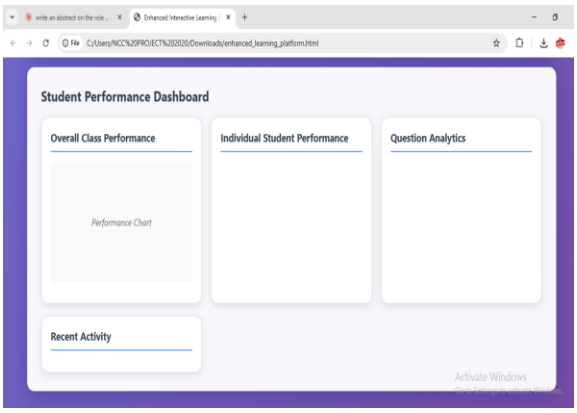

Figure 4: Sudents Performance Dashboard

Student Domain

After thestudents log in the home page as shown iin the figure 1 above, the students is ushered into the student menu page where lessons, quiz and performance dash board are.

- Courses: this button on the student menu page takes the student to a page where courses are for him/her to select the desired one to study. The selected course will appear on a new page for onward study.
- Quiz: this icon when clicked takes the student to the interactive quiz section where the students answers the test question and the system automatically supplies the correct answers after the test.
- Performance Dashboard: this is where the student sees self performance in relation to the performance of the entire class. This is invariably student self assessment portal.

Figure 5 : Students Menu Page

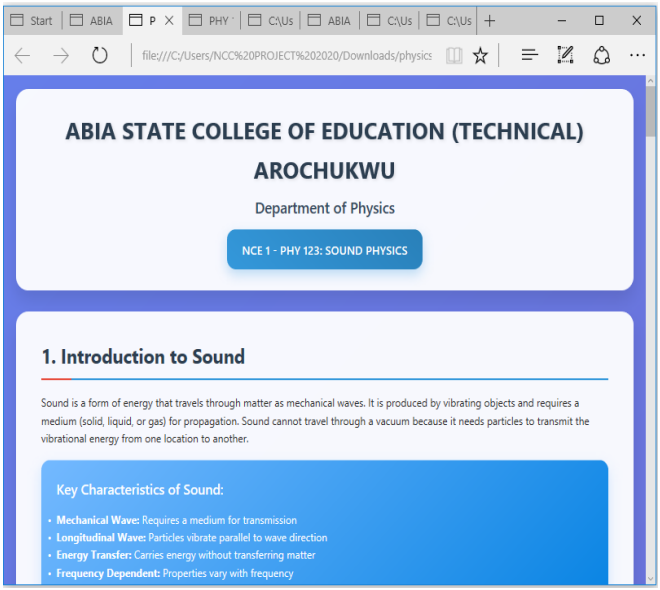

Figure 6: Lesson Content

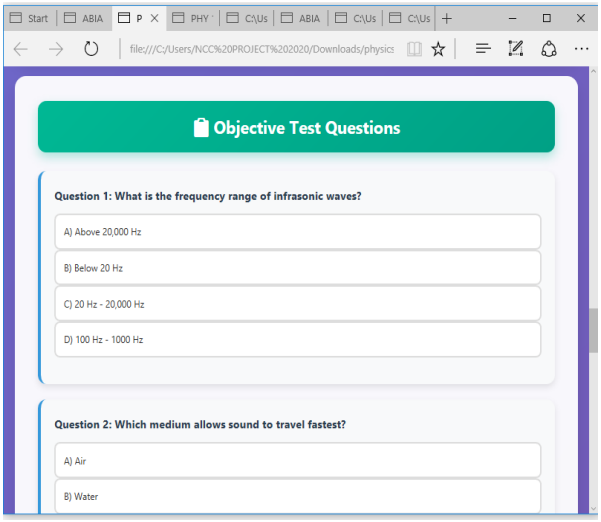

Figure 7: Quiz (Objective Test Questions)

Outcome

The outcomes of this research include:

- A fully functional web-based Learning Management System (LMS) for NCE Physics education.
- Increased student engagement and participation in Physics courses.
- Improved understanding of Physics concepts among students.
- Promotion of student centered teaching and learning.
- Enhanced teaching skills of educators through training in the use of digital resources.

CONCLUSION

The development of a web-based material for teaching and learning Physics at Abia State College of Education Technical represents an innovative approach to enhance educational practices. By leveraging technology, this project aims to create a more engaging and effective learning environment for students, ultimately contributing to the advancement of science education in Nigeri

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