A Collaborative eLearning Model for Secondary School Students

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Abstract: *E-learning is an attractive and efficient way for computer education. Students' interaction and collaboration also play an important role in e-learning. This study describes an interactive and collaborative web-based e-learning model, offering a variety of interactive and collaborative activities between students and teachers at remote locations. The different features of the system allow students to engage in group activities and collaborate with instructors on a platform where text; audio and video objects are added and collaborated online. The system was developed and deployed on a dedicated server to enable both onsite and remote users gain access to the e-learning system. Evaluation of the model was carried out by comparing the mean average score of both groups. The experimental group received lessons in a virtual learning environment, whereas the control group received the lessons structured in a traditional lecture form. To ensure similarity between groups, the average scores of all participants was compared using the Mean Average Value (MAV). The results of the study showed that virtual learning was more effective and feasible in learning to traditional mode of learning, where the traditional learning had MAV of 70.8 and Virtual Learning had MAV of 75.2.*
Keywords : *E-Learning, Virtual, Interactive, Collaborative, Traditional.*

I. Introduction

There has been a worldwide acceptance, in the educational sector, of the integration of electronic learning as a tool that can enhance the teaching and learning processes. In developing countries, students acquire the skills needed to join the knowledge society and become competitive in the labour market both within and outside their countries as a consequence of the integration of electronic learning to the educational system. Although e-learning is regarded as a new model in the passage of knowledge from acquisition to dissemination, its adoption and use in developing countries has been characterized by high occurrence of unsuccessful initiatives. (Usoro and Abid, 2006).

Tenekeci (2011) asserted that ICT diffusion in developing country contexts is still in the development stage. This diffusion is characterized by diversity in implementation strategies that have a negative impact on the adoption of ICT initiatives such as e-learning. These strategies have in many cases been too dependent on external factors and have been adopted from developed country contexts without consideration of societal needs (Kemppainen 2012); Sunden and Wicander, 2013). The inherent limitations of such implementations are that they are generally expensive, unrealistic, time wasting they do not deal with context specific problems (Wanyembi and Looijen, 2012).

Nevertheless, many education institutions in developing countries are gradually moving towards the integration of e-learning in their curricula. The drive towards this education intervention has been motivated by several factors: the need to support student learning, access to information, accommodating high student enrolment and competition among institutions (Kahiigi, 2012) document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website.

II. Literature Review

The limitations of several virtual classroom systems include lack of interactive response, live streaming and assignment management. An intranet-based virtual classroom system enhances the interactions between students and teachers (Harshit et al., 2012). The system presents a new design for e-learning and removes some of the problems of the existing systems as well as increased the interaction between teacher and students with the impression of a real life classroom. The system provides live streaming of lectures while assignments, questions and answers can be uploaded. Mahesh et al., (2011) proposed a virtual classroom system which incorporates several modules for live video lecture with whiteboard technology, chat-room and several teacher-students feedback modules.

A virtual classroom system using virtual image creation technique was proposed by Lertkulvanich, et al., (2012). This system comprises of three classrooms; the first classroom is for theory which contains video clip instructions for lecture, practice and online live lectures while the second classroom is a library that

connects the e-learning websites concerning radiographic testing and the third classroom is a laboratory for observing experiment results. All the three classrooms were designed virtually by using computer graphic technique. Characters representing learners were also formed in order to create interaction between learners and virtual classrooms.

A web-based collaborative system that serves as an add-on feature to the learning system for a post class sharing of resources by the teacher and student was also proposed by Ibam (2012). It was based on e-pedagogy with enhanced features for collaboration among participants that is instructors and students in a web-based learning environment. The instructor, course, student and learning performance formed the major objects used in developing the system model where the features include course outline, presentation, resources, assessment/opinion poll, chat, hands-up, students list, course information and collaborate, all bound to achieve experiential learning among students.

In Hsu et al., (2011), the primary steps towards building and implementing a successful concept of a virtual classroom was designed. Information on the assessment, planning, design, implementation and maintenance of a virtual classroom in ten easy steps was explicitly revealed which clearly shows that failure to follow these steps can ultimately lead to poor, incomplete, inadequate and ineffective solutions to Internet based distance education.

III. Research Methodology

Waterfall model of software development was used which follows a sequential order whereby a phase or stage is completed before another one is embarked upon. The administrator, students and instructors are users who contribute input to the system. The student's module provides the system with information such as the student's level of involvement; his inter activity in collaborative studies and other activities that involve learning. The instructor's module similarly provides data to the system such as the performance of the students in different forms of assessment such as testing, examinations, quizzes and project work on the students as well as the participation level of the instructor in the e-learning classroom activities. The administration module then provides information that determines how effectively the system has functioned, viz: system evaluation measures and performance statistics that have been incorporated into the system.

Registered students can join a collaborative study group and participate in class discussion. Instructors can see the groups students have created when they log in and also join in the class participation. Evaluation can be done by student as peer review and also by an instructor or an administrator by way of feedback to students. This impact positively on the overall learning output for students. Paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

IV. Study Design

The need to do a comparison between knowledge acquisition and its retention between two groups of students is the focus of this evaluation. The researcher used post-tests to analyse knowledge acquisition and its retention among students. Students in Year 7, Year 8, Year 9, Year 10 and Year11 were randomly assigned to the following two groups, experimental (virtual learning) and comparison (traditional learning).

V. Method for Selection of Participants in The Examination

Two hundred and sixty (260) students were officially selected to voluntarily participate. Of these, two hundred and forty eight (248) (i.e. 95.38%) agreed to participate and were assigned to both the experimental and the control groups. A test score based on 100% grade was used to measure achievement to ensure similarity among participants. The control group (n = 124) attended a traditional lessons designed coursework in the first term of the academic session while the experimental group (n = 124) participated in virtual learning of the same lesson. Both groups successfully completed the lessons and participated in the examinations.

A. Instrument for Data Collections

The following was considered when considering the results of 124 students after their first and second end of term examination:
- The same teacher planned and presented both lessons,
- Both groups of students completed the scheme of work in the same time frame although the first group completed their lessons in the first term while the second group completed their lessons in the second term,
- For both groups, the basic variable taken into consideration was the method of teaching, conventional versus virtual education. Knowledge acquisition and retention were examined according to students' scores in the designed post-test.

B. Methods of Data Collections

No In this research, descriptive survey was adopted to gather information on the perception of the respondents and. Two hundred and sixty (260) respondents were registered to test the developed model and each

of the respondents was presented with a questionnaire; to be filled and returned. Out of the two hundred and sixty (260) respondents, two hundred and forty eight (248) (i.e. 95.38%) forms were retrieved and used for the evaluation. Others questionnaires were either not returned or not properly filled which made the forms not suitable for use.

VI. System Implementation, Testing And Results
The Home Page as shown in Fig. 1 is a PHP form with no input field. It contains a brief description of the Web-based e-Learning System as well as some menu buttons that will take the system user to other parts of the system.
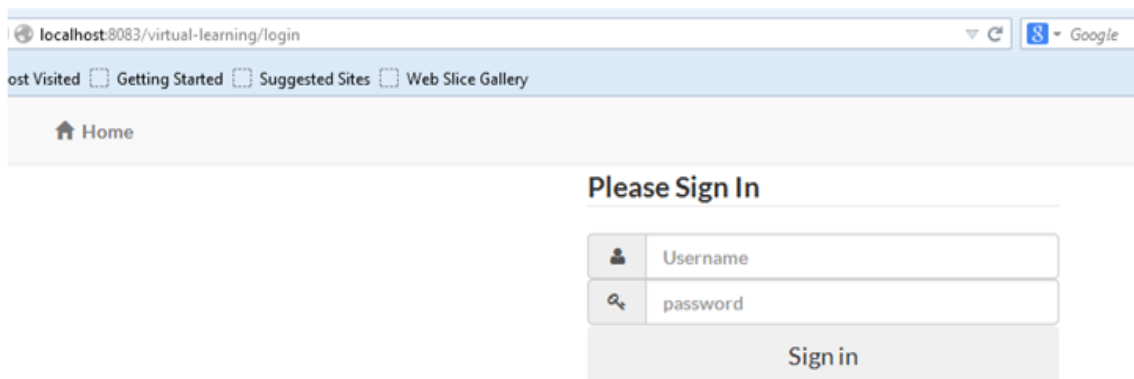

Fig. 1: Screenshot of "AduvieCVLS" HomePage in English

A. The Tutor Login
The Tutor Login page as shown in Fig.2 is a form with two textboxes and a login button for input data. It collects the Tutor ID and password for registered tutors and allows them to login and create or edit learning content.

Fig. 2: Screenshot of "AduvieCVLS" Sign In Page

B. Tutor Registration
The Tutor Registration page as shown in Fig 3 is a form with textboxes and a register button for input data. It collects the tutor's relevant particulars, it is used to assign Tutor ID and Password for new tutors who can now use their profile to login and create or edit learning content.
Fig.3: Screenshot of "AduvieCVLS" Teacher Registration Page

C. Teachers List
Fig. 4 shows the list of teachers that are presently registered to teach in the school.

Fig. 4: Screenshot of "AduvieCVLS" Teachers List

VII. Performance Evaluation

For the post study evaluation of the virtual learning system based on comparison with the traditional method of teaching, this study recorded the scores of 100 secondary students from year 7 to year 11, from Aduvie International School Jahi, Abuja. The Mean Average Value for students' first term scores and in the experimental and second term scores for the different year group is presented.

Result and findings of the research sample shows a 2% significant increase in the end of term scores of year 7 students in the school after the implementation of the virtual learning system. Result and findings of the research sample shows an 8% significant increase in the end of term scores of year 8 students in the school after the implementation of the virtual learning system. Result and findings of the research sample shows a 3% significant increase in the end of term scores of year 9 students in the school after the implementation of the virtual learning system. Result and findings of the research sample shows a 6% significant increase in the end of term scores of year 10 students in the school after the implementation of the virtual learning system. Result and findings of the research sample shows a 20% significant increase in the end of term scores of year 11 students in the school after the implementation of the virtual learning system.

Fig.5 sample shows that there is a positive degree of difference in all the post-test results in favour of electronic learning when the two learning methods where compared. The result of this finding has supported the theory that contents of lesson delivery provided by e-learning can be better learned and retrieved.

Fig. 5: Comparison between Traditional Teaching Method and Virtual Learning Method using Mean Average Value (MAV)

VIII. Conclusion

This research work involved the study and overview of e-learning and the evolving trends of its implementation in the teaching and learning process. It further made a case for the student-centered paradigm shift towards instruction, with active, collaborative, and personalized learning as key principles based on the client-centered philosophy of business. This research work shows that the implementation of a collaborative web based learning model within the Nigerian academic system will be of immense benefit in alleviating the challenges such as limited classroom infrastructure and limited academic and human resources and improve the academic achievements of students. In support of this assertion it has presented the essential features of an operational design, network architecture and a pragmatic, functional model of an e-learning system.

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