

Deputy Editor- in-Chief: Dr. D.R. Aremu

International Editorial Advisory Board

1. Prof. F.J. Ogwu (Computer Science), University of Botswana.
2. Prof. Japheth Otiye (Library and Information Science), Moi University, Kenya.
3. Prof. Priti Jain (Library and Information Studies), University of Botswana.
4. Prof. Eno. Akpabio School of Journalism and Mass Communication, University of Da Es Salam, Tanzania.
5. Dr. Rasimah Aripin Universti Teknologi MARA, Malaysia.
6. Dr. C. Nengoomesh (Information and Communication Studies) University of Namibia, Namibia.
7. Dr. Kathrin. Figl, Institute for Information System and News Media,
Vienna University of Economics and Business, Austria.
8. Allan Hopkinson, Technical Manager (Library Services) Middlesex University.
9. Dr. Peter Warnings, Division of Information and Technology Studies, University of Hong Kong.
10. Dr. Ibrahim Farouk. Centre for Language Studies, E-learning Section, Otaru University of Commerce, Japan.
11. Dr. Bwalya, Kelvin Joseph (Information Management) University of Botswana, Gaborone.
12. Ilana Lavy, Emek Yezreel College, Afula. Haifa, Israel
13. Dr. Mohd Khairie Ahmad , University Utara Malaysia

National Editorial Advisory Board

1. Prof. M.A. Tihamiyu (Information Science) ARCIS, University of Ibadan.
2. Prof. F.A. Ehikhamenor (Information Science) ARCIS, University of Ibadan.
3. Prof. J.S. Sadiku (Computer Science) University of Ilorin.
4. Prof. T.S. Ibiyemi (Telecommunication), Electrical Engineering, University of Ilorin.
5. Prof. M.I. Ajibero (Library and Information Science), University of Ilorin.
6. Dr. O.A. Taiwo (Numerical Computing Mathematics), University of Ilorin.

Associate Editors

- | | |
|------------------------|-------------------------------|
| 1. Dr. A.L. Azeez | Business Manager |
| 2. Mr. A.A. Salman | Assistant Business Manager |
| 3. Dr. Amos Bajeh | Production Editor |
| 4. Dr. A.O. Tihamiyu | Assistant Production Editor |
| 5. Mr. O.W Bello | Editorial Secretary |
| 6. Dr. Mrs. K.K. Bello | Assistant Editorial Secretary |
| 7. Faculty IT Officer | Web Secretary |

ISSN 2141-3

BLE OF CONTENTS

Communication and Information Science and Technology Skills for the Lifelong Survival of the Nigerian University Undergraduate Mutawakilu A. Tiamiyu	pgs. 7 - 16
An HCI Speech-Based Architecture for Man-To-Machine and Machine-To Man Communication in Yorùbá Language Akintola A. G. Ibiyemi T. S.	pgs. 17 - 31
Simulation of Medical Diagnosis System for Malaria Using Fuzzy Logic Jimoh, R.G., Awotunde, J.B., Babatunde, A. O., Ameen, A. O & James, T.R. & Fatai, O.W.	pgs. 32 - 45
Computerized Point of Sale (POS) Systems in Management of Retail Stores in Ilorin Metropolis, Nigeria Mejabi, O.V. and Salihu, A.E.	pgs. 46--67
Introducing Computer Games to the teaching and Learning of Christian Religious Studies Kosoko-Oyedeko, G.A	pgs. 68 - 84
The Use of Mobile Phone by Undergraduate Students of Ekiti State Unvers Owoeye, Peter Olufemi, Familusi, Ezekiel Babatope, and Dahunsi, Florence Tope	pgs. 85 - 10
Social Media and Social Isolation among Students of Kogi State University, Anyigba, Nigeria Asemah, Ezekiel S.	pgs. 105 - 116
Newspapers Coverage of Climate Change in Nigeria Udende, Patrick and Chiakaan, Jacob Gbaden	pgs.117 - 128
TV Spectrum Usage profile and White Space for Nigeria AbdulRahman, T.A, Ayeni, A. A. & Faruk, N.	pgs. 129 -141
An Appraisal of Electronic Museum Readiness in National Commission for Museum andMonument of Nigeria Pedro, Taye Austin, & Olarongbe, Shuaib Agboola	pgs. 142 - 159
Information Utilization as Determinants of Organizational Effectiveness: A Study of Managers in Large Scale Manufacturing Industries in Nigeria Popoola, S.O. & Okiki, Olatokunbo Christopher	pgs. 160 - 177
An Implementation of Synchronous Virtual Learning System Bello, Olayiwola W., Ehira, David N., Ayeni, James K., Faruk, Nasir, & Balogun, Naeem A.	pgs. 178 ì 188

1 Scheme for Intrusion Detection in Wireless

Onidare Samuel O., Ayeni Adeseko A., Ayeni Olumuyiwa B. and Adeniran, T.C
pgs. 189 - 203

Information and Communication Technology and Audiovisual Resources Management in Selected Academic Libraries in Ondo State, Nigeria

Afolabi, K
pgs. 204 - 211

Services Provision in Special Libraries: Survey of Selected Special Libraries in Kaduna State, Nigeria

Esohe Amenaghawon Abraham CLN, & Manasseh Tyungu Sambe
pgs. 212 - 219

Wide Area Netork (WAN) And Its Comparative Study

Memudu, Suleiman Ajala
pgs. 220 - 223

EDITORIAL PREFACE

There are sixteen articles in this issue. The first one which is a lead paper presented during the Faculty of Communication and Information Sciences fifth anniversary in 2012 focuses on Communication and Information Science and Technology Skills for the Lifelong Survival of the Nigerian University Undergraduate. In this article Prof. Mutawakilu Tiamiyu explained the the task of producing smart entrepreneurs, managers and workers for Nigeria, the disciplinary group known as the ñCommunication and Information Sciencesò, Nigerian University undergraduate and the digital age challenges and digital age knowledge and skill requirements for the university undergraduate. Akintola and Ibiyemi examines an HCI speech-based architecture for Man-To-Machine and Machine-To-Man communication in Yorùbá language to carry Yorùbá people along in the advancement taking place in the world of Information Technology. Dynamic Time Warp was specified in the model to measure the similarity between the voice utterances in the sound library. In addition, Vector Quantization, Guassian Mixture Model and Hidden Markov Model are incorporated in the proposed architecture for compression and observation. Jimoh Awotunde, Babatunde, Ameen, James and Fataipresents a rule based Expert System for diagnosis of malaria fever. The proposed medical diagnostic system was developed using Visual Prolog Programming language. They concluded that more advance medical diagnosis system can be designed to help in the area like drugs prescription, registering of patients as well as keeping of patientsòdetails and records in the medical sector.

The fourth article by Mejabi and Salihu examines the use of computerised sales systems in retail stores in Ilorin metropolis, Nigeria, with the aim of identifying the extent of deployment and to determine how the staff of the stores feel about the use of such systems. The study reveals that while 80% of the stores had very few computers connected to printers, bar code readers or debit/credit card readers. According to the study, gender had no influence on respondent opinions, but educational qualifications did, and this gave rise to capacity building as one of the recommendations from the

An Implementation of Synchronous Virtual Learning System

Olayiwola W. Bello¹, David N. Ehira¹, James K. Ayeni², Nasir Faruk³, & Naeem A. Balogun¹

¹Department of Information and Communication Science, University of Ilorin, Ilorin, Nigeria.

²Department of Computer Science, Kwara State Polytechnic, Ilorin, Nigeria

³Department of Telecommunication Science, University of Ilorin, Ilorin, Nigeria.

laibello@gmail.com, ehiradavid@gmail.com, kennybetty2006@gmail.com, faruk.n@unilorin.edu.ng and neembaloo@yahoo.com

ABSTRACT

The attendant escalating demand for education at all levels, and the compelling need to provide education for all irrespective of environmental, social or cultural circumstances have meant that the country must of necessity find the most appropriate and cost effective means to respond adequately to the huge unmet demand for education. Thus, this paper presents the implementation of a robust, reliable, efficient, effective, and cost-effective Synchronous Virtual Learning Solution. The Virtual Learning system consists of basically the e-learning portal and a virtual conference room. The e-learning portal was built using PHP server side scripting language, while the conference room was developed by adopting BigBlueButton (an open source video conference server) to facilitate Synchronous communication between the students and the lecturer. The video conference server (BigBlueButton), configured with a live Internet Protocol address was hosted on a dedicated server at the campus network operating center in the University of Ilorin, to enable both onsite and remote users gain access to the e-learning system. The result of its implementation, when tested with both onsite and remote users, proves its feasibility for future deployment.

Key words: Synchronous Learning, Virtual learning, Distance learning, ICTs.

Introduction

Synchronous technology gradually began to find its place in the millennium era, as the need for real time communication became increasingly essential to facilitate immediate feedback and response between the students and lecturers respectively (Charles et al., 2013). It emphasizes an instructor led training which requires the instructors and students to be present at scheduled times, via a real-time platform for instruction and discussion. In real time synchronous courses the instructor and participants are simultaneously logged on and can communicate directly with each other (Benshoff & Gibbons 2011). Example of Synchronous platform includes: chat room, video/audio conferencing platform and two-way live satellite broadcast.

problems abound in the education space of Africa. Share-document management system was used at, Nelson Mandela Metropolitan University to make courses available for sharing and collaboration in a blended environment.(Ssekakubo, 2011). In the University of Ilorin Moodle (a learning management System) was deployed in 2013 to facilitate learning and correspondence between the lecturers of university of Ilorin and its open distance learning students (Post-Doctoral Diploma in education), (CODL, 2013). The University of Zambia, has implemented two learning management systems: Moodle and CMAP (only for its Cisco programme). The university hoped to de-congest classrooms, conduct distance learning and reduce training costs by re-using training materials provided on Moodle. Ssekakubo (2011), however, noted that this objective has not been achieved and the system is only used by a few lecturers and students, mainly from the science faculty. It is also important to note that most of these initiatives were not synchronous learning based. With the improvement been witnessed in the internet penetration, better Internet service delivery as well as increasing support for broadband deployment, the development of a synchronous virtual learning system is not out of place.

Several works have been carried out in the creation and adoption of e-learning systems to enhance both teaching and learning pedagogy with respect to cognitive and collaborative learning, at different level of the educational system (Jethro, et al.,2012). Some further studies reveals e-learning project carried out to making learning accessible to the physically challenged (Nganji & Brayshaw 2014). However, while there seems to be a substantial growth in the pedagogy of e-learning systems, most e-learning systems have not being built to solve challenges peculiar to the socio-economic challenges of a society, which poses a threat to having a healthy educational environment as revealed with the issues of limited classroom infrastructure and limited human resource (teaching personnel).

Those seeking access to education at all levels primary, secondary, and tertiary in Africa are increasing. In spite of this fact, educational institutions in Africa are not expanding enough to accommodate the increasing number of students who would be seeking access to higher education. Africa therefore needs an educational environment that would make it more responsive to challenges confronting the continent (World economic forum on Africa, 2013). The academic sphere in Africa is presently dotted with conducting lectures in an overcrowded classroom which is usually unproductive due to the escalating number of applicants seeking admission into universities without the required academic infrastructure to accommodate them.

Therefore, alternative ways of providing access to higher education via virtual learning systems needs to be fully explored. Hence, a self-designed application was built in order to meet the peculiarity of Nigerian and other developing countries Universities and help adequately address the challenges of infrastructural deficiency as well as limited manpower.

Objectives

is to develop a synchronous virtual learning system to ameliorate the infrastructural deficiency obtainable in tertiary institutions in developing countries.

Methodology

Design

This study employs an iterative and incremental software development model to build the e-learning system. Implementation based on the work of Bello et al (2014). Thus the entire work was divided into three successive iterations thus: Development of the Video Conference Server, Development of the Digital Resource Center and the development of the learning management system which was integrated as a single Virtual learning system. Figure 1 shows the development overview of the entire system and the building blocks utilized in implementing a synchronous virtual learning system

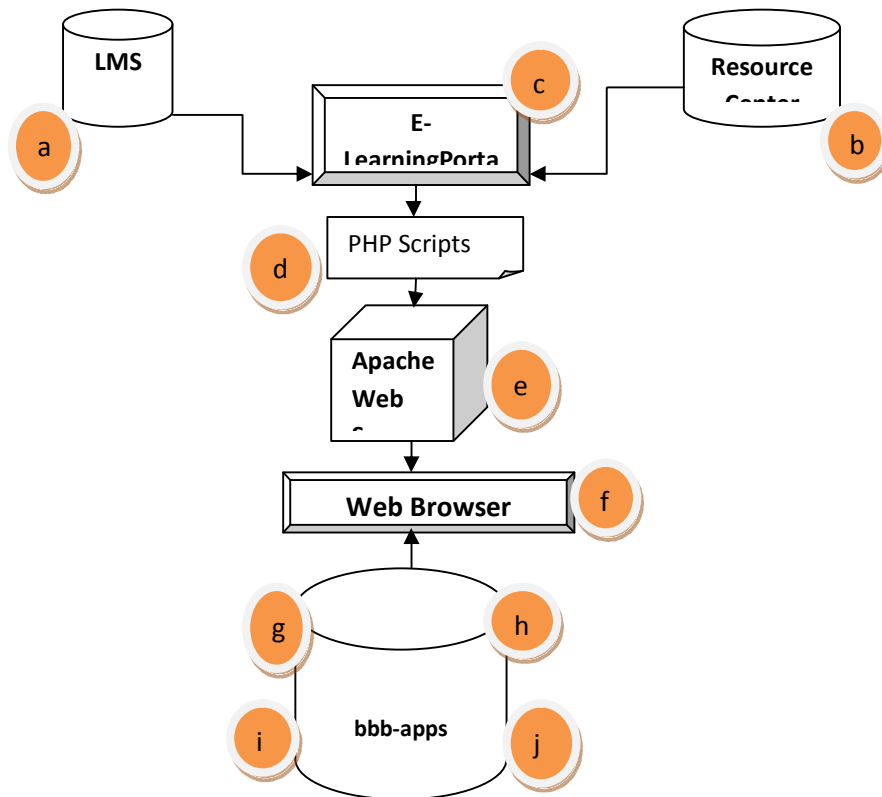


Figure 1: Development Overview

Operational Description

- While not designed with this platform, the learning management system can be custom built or adopted from existing Learning management systems to provide facilities such as creating and submitting assignments, sharing and collaboration of files and scheduling conference.

system built to enable students retrieve digital materials. Its library is built by integrating it with existing free books store and paid book stores like amazon.

- c. The e-learning Portal is an integrated system formed from the combination of the resource center and the learning management system.
- d. PHP Server side scripting language was used in building both the resource centre and the learning management system and also for integrating the e-learning portal with the video conference server, which facilitates the real time virtual classroom.
- e. Apache Web server processes all request from the client (Students/Instructors), either to perform authentication against the database or to add or retrieve content to it.
- f. Web browser is the user interface via which student, lecturers and guest log on to utilize the virtual learning service.
- g. BBB-app is responsible for synchronizing all the participants in the conference room.
- h. It listens for user events (joined/left/mute/un-mute/talk) and issues command to FREESWITCH.
- i. An application for desktop sharing.
- j. An application for video conferencing.

System technologies and software

Apache, MySQL database and PHP server side scripting language have been used in order to develop the e-learning portal system. These technologies were used because of the flexibility and scalability that it proffers as open source platforms. However, BigBlueButton was used to develop the Virtual conference room. It was adopted because of its interoperability in integrating seamlessly with any learning management system, its ability to be utilized both locally (intranet) without the internet and remotely over the internet. Additionally it has a significantly low cost of implementation. The following software versions were used:

- a. Apache 2.4.4
- b. MySQL version 5.6.12
- c. PHP version 5.4.16
- d. BigBlueButton version 0.8
- e. Ubuntu version 10.04.4
- f. A Tablet pad, with a stylus pen (Recommended) for lecturers to make it easier to write on the interactive whiteboard, instead of using a mouse.

Application Presentation

This section exemplifies the functional output of the Synchronous Virtual learning system, in response to the input specifications for the system. It comprises web pages in the virtual learning portal system and shows how a synchronous virtual classroom takes place in real time using the platform.

Login Page to the Virtual Learning System

Figure 3: Lecturers Profile Page

The student profile page shows a presentation of the student's name, Level, Department, matric number and faculty. These details are also inherited from the existing school portal and automatically rendered on their profile page as soon as they are logged on to the eLearning platform. It is necessary also to establish a sense of identity on the eLearning platform.

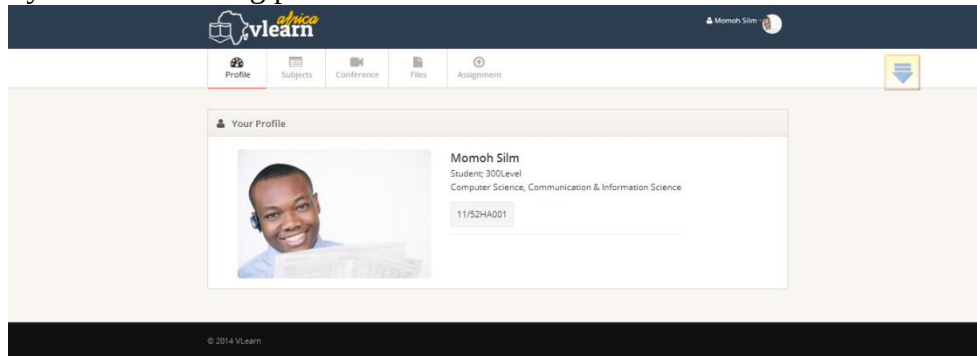


Figure 6: Students Profile Page

View Conference Pane

The View Conference pane displays the list of scheduled conferences, specifying at a glance its date, time description for the conference and the conference status of already scheduled conference, which serves as a source of reminder to both lecturers and students about the scheduled conference session. When the Conference schedule depicts gray it automatically tells that the conference date is passed and as such the conference would be inaccessible (thus it displays the conference status 'Session Closed'). However when the conference is in a future date it displays a red status colour (with the Conference status 'View Conference'), but on the due date for the conference, the conference status colour displays green (with the conference status 'View Conference'), signifying that the conference scheduled for that course is due for that day.

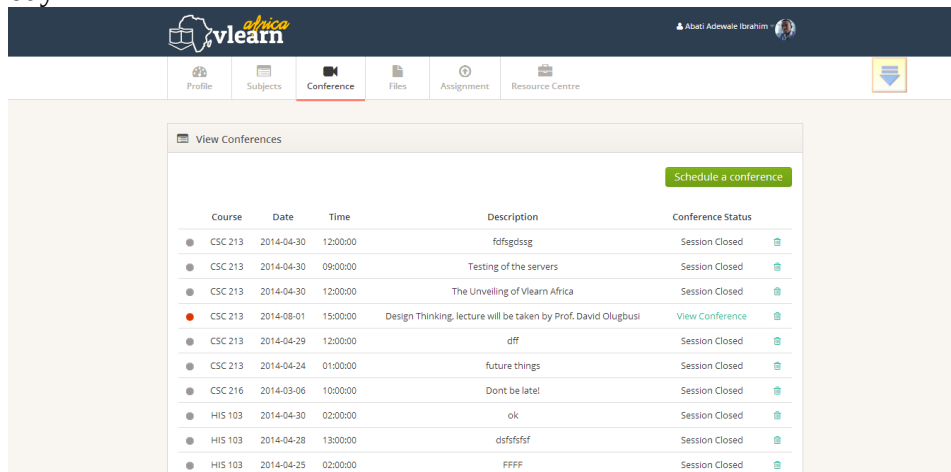


Figure 4: Conference Pane

File Share Page

of all the files shared between students and lecturers, . It specifies the course related to a particular shared file, its source and the link to download the shared file.

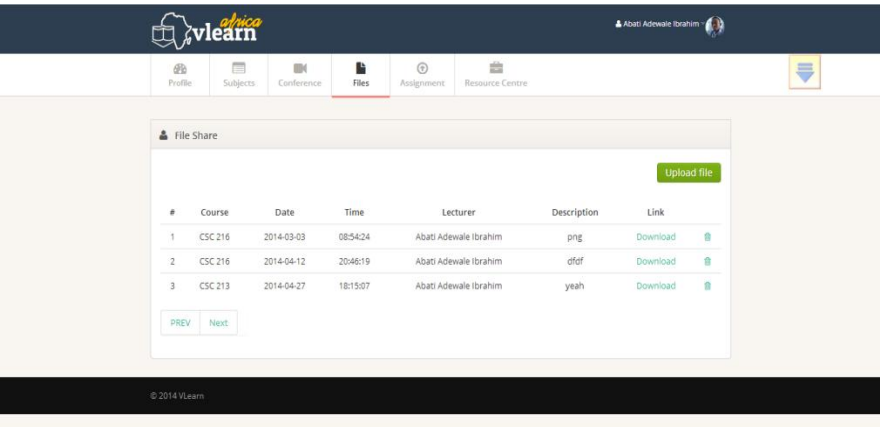


Figure 5: File Share Page

Assignment Detail page

The assignment detail page displays the detail of a particular assignment. It includes attributes such as: the date and time the assignment was posted and the due date and time for submission and also a link to download file attachment with respect to the assignment. It is on this page, that the submit button to make submission is found, however if the date of submission is passed it would display a message “Date of submission is elapsed” and the submit button would be unavailable.

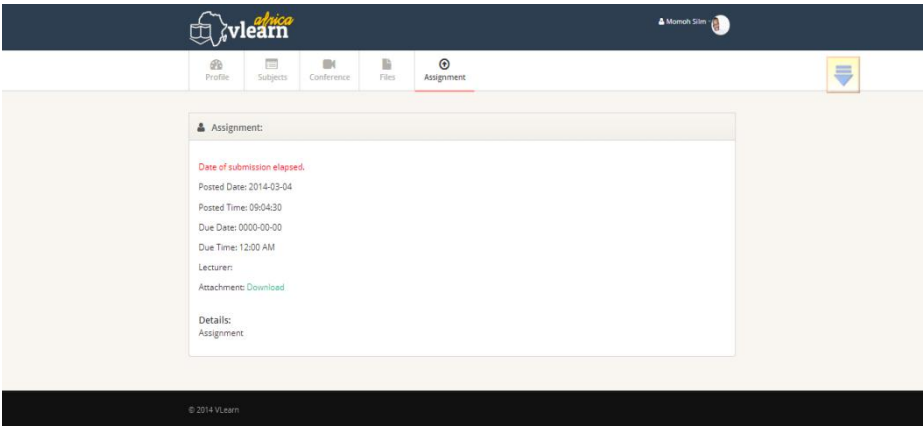


Figure 6: Assignment Detail page

Assignment Submissions Page

This is the page where the lecturer views all the submissions made with respect to a particular assignment, specifying the date and time that the assignment was submitted. From the view link, the lecturer is able to check specifically the contents of the assignment.

Expanded Features

Abasi Abisale Ibrahim

Profile Subjects Conference Files **Assignment**

Submissions

#	Course	Metric	Date	Time	Link
1	HIS 103	11/52HA001	2014-04-14	12:51:49	View
2	HIS 103	11/52HA001	2014-04-14	12:52:53	View
3	HIS 103	11/52HA001	2014-04-14	12:56:25	View

PREV Next

© 2014 VLearn

Figure 7: Assignment Submissions page

Resource Center Page

The resource page contains educational materials harvested from free e-book repository, paid e-book repository and educational materials added by lecturers to the resource center. And each of these sections can be accessed based on different subject categories.

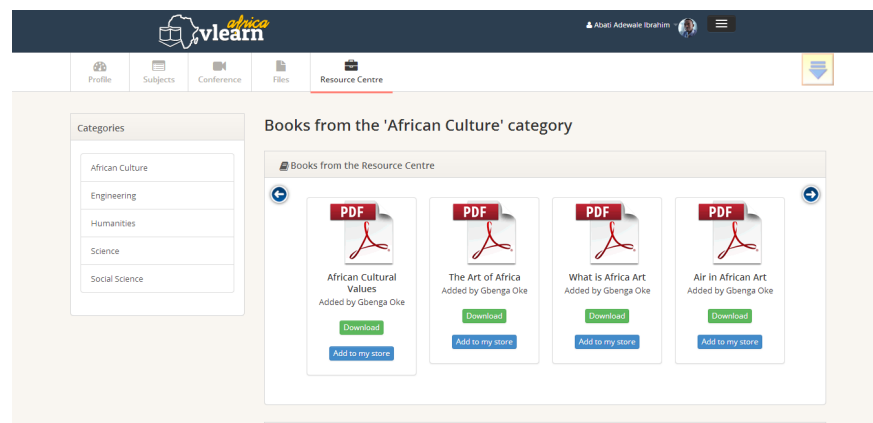


Figure 8: Resource Center Page

in the conference classroom both students and lecturers can view each other in real time, without respect to geographical proxy. This means that it could be used within the school premises and remotely.

Conference Room Environment

The environment is divided into four different pane. The First pane has the list of students and the instructor on board the virtual classroom. The second pane displays the webcam video of all participants. The third pane is used by the instructor to display all kind of all multimedia documents and also make nnotations and write as with a marker board, while the fourth pane enables text message transmission among participants

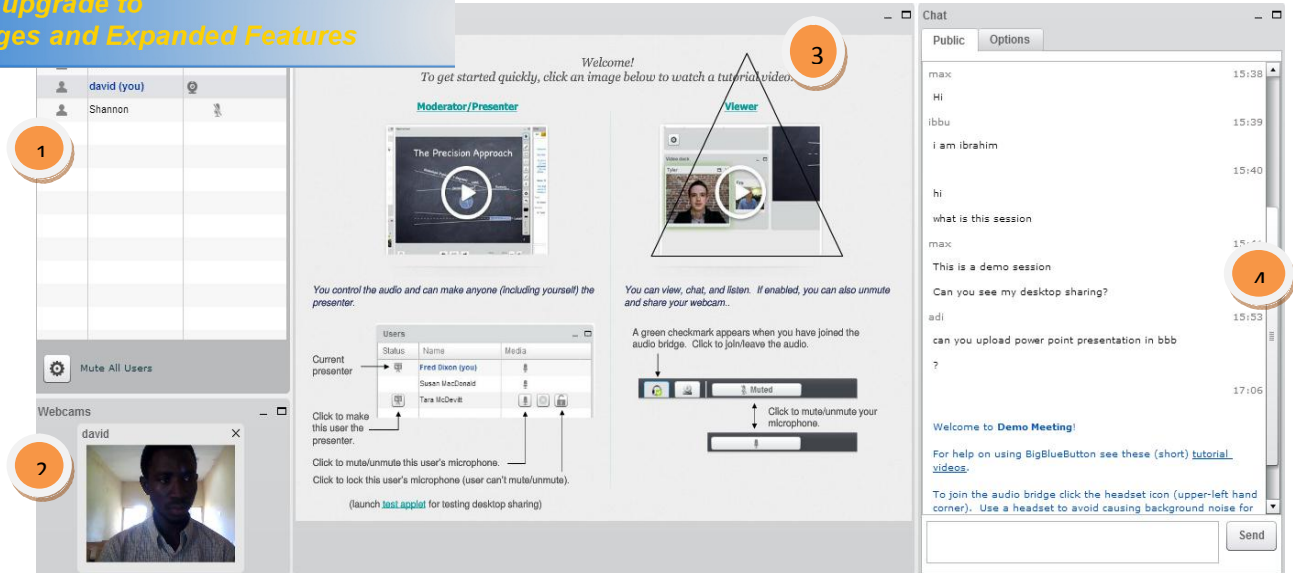


Figure 8: Conference Room Environment

Conclusion

In this paper, efforts has been made to show how the challenge of limited academic infrastructure and human resource can be mitigated by deploying a Synchronous Virtual Learning System built on an open source video conference server (BigBlueButton), integrated with a custom designed e-learning portal, which also has the propensity to be integrated with existing learning management system, in order to provide synchronous e-learning solutions. The learning management system and the resource center was integrated with a video conference server to provide e-learning services such as live web conferencing, file sharing, creation and submission of assignment, presentation of portable document format (pdf) and word documents, extended white board capabilities and desktop sharing. Futhermore, to enable both local and remote access to the virtual learning system, the video conference server (BigBlueButton), configured with a live Internet Protocol address was hosted on a dedicated server at a university campus network operating center, to enable both onsite and remote users gain access to the e-learning system, while the e-learning portal was hosted on the internet. Furtherance on this project would require that an empirical study be carried out on the quality of service metrics of this system to determine its efficiency with respect to access from remote areas in order to establish a research informed basis for its use in open and distance education.

Bello, O. W., Ehira, D. N., Ayeni, J. K., Faruk, N., & Balogun, N. (2014). Towards the Design of a Synchronous Virtual Learning System. *Covenant Journal of Informatics and Communication Technology (CJICT)*, 2 (2), 59-74.

Center for Open and Distance learning-University of Ilorin. (2013). Retrieved from <http://www.uilcodl.unilorin.edu.ng/>.

Charles, W.X., David, J., Jinxia, L., Xiaoning, G. & Nan, X. (2013). Using Synchronous Technology to Enrich Student Learning. *TechTrends Journal*, 57(1), 20-25.

Deperlioglu, O. & Kose, U. (2012). Design and Development of an E-Learning Environment for the Course of Electrical Circuit Analysis. *Interdisciplinary Journal of E-Learning and Learning Objects*, 8(2), 12-20.

Fatahi, S., Kazemifard, M. & Ghasem-Aghaee, N. (2009). Design and Implementation of an E-Learning Model by Considering Learner's Personality and Emotions. Retrieved from: www.appliedemotion.com/files/2009BookChapter.pdf.

Jethro, O.O., Grace, M.A & Thomas, K.A.(2012).E-Learning and Its Effects on Teaching and Learning in a Global Age. *International Journal of Academic Research in Business and Social Sciences*, 2(1), 25-34.

Koohang, A., Floyd, K. & Stewart, C. (2011). Design of an Open Source Learning Objects Authoring Tool – The LO Creator. *Interdisciplinary Journal of E-Learning and Learning Objects*, 7(1), 111-123.

Maguire, M., Osman, Z., Nicolle, C. & Elton, E. Design Of A Virtual Learning Environment For Students With Special Needs. *An Interdisciplinary Journal on Humans in ICT Environments*, 2 (2), 22-30.

Mursu, A. & Olufokunbi, K.(2002). Information systems development in developing countries. Risk management and sustainability analysis in Nigerian software companies. *Citeseer Journals*, doi=10.1.1.127.4743.

Nganji, J.T. & Brayshaw, M. Designing and Reflecting on Disability-Aware E-learning Systems: The Case of ONTODAPS. Advanced Learning Technologies (ICALT), 2014 IEEE 14th International Conference.doi: 10.1109/ICALT.2014.167.

Pankaja, N. & Mukund Raj, P.K(2013). Proprietary software versus Open Source Software for Education. *American Journal of Engineering Research*, 2(7), Retrieved from:<http://www.ajer.org>.



(2008). Design of Virtual learning environment using SCORM standards. *Journal of Theoretical and Applied Information Technology*, 2(3), 20-28.

Surjono, H.D. (nd*). Design of Adaptive e-learning System based on Student's learning Style.

Saeedikiya, M., Mooghali, A., & Setoodeh, B. (2010). Stages of the Implementation of e-learning in traditional universities. *EduLearn10 proceedings* Pages: 6620-6624 year: 2010 ISBN: 978-84-613-9386-2 ISSN: 2340-1117.

Ssekakubo, G., Suleman, H. and Marsden. G. (2011). Issues of Adoption: Have E-Learning Management Systems Fulfilled their Potential in Developing Countries? Retrieved from: <http://pubs.cs.uct.ac.za/archive/00000712/01/p231-ssekakubo.pdf>.