

*Full Length Research*

# Types and Use of Educational Support Systems by Library Educators in Universities in Nigeria: Towards Quality and Effective Teaching Practices

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This work is a review of the different types of Educational Support Systems (ESS) useful for teaching and the various ways they can be applied for teaching. Rationales for the use of ESS for teaching in the university-based library schools in Nigeria were provided while literature relevant to the study were reviewed to relate past research studies, opinions and thoughts to the discussion. An exposition was done on the importance and benefits of these resources when applied to teaching in the library schools. Finally, the author concluded that the selection and acquisition of software and related activities will demand a high level of computer, digital and information literacies from the educators and it may require their learning and understanding, once and again, the principles of courseware design and the relevance of different applications to the instructional task at hand, in order to shift the paradigm to ESS-enabled dynamic and interactive teaching and learning environment where there will be excitement, individuality and yet collaboration.

**Keywords:** Educational Support Systems, Use of ESS, Teaching, Library Educators, Library Schools, Universities, Nigeria.

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## INTRODUCTION

### The rationale for instructional technology

The evolution of computer and its application to education has resulted in a higher, faster, and friendlier means of knowledge transmission. In the past, little was known about the application of satellites, fibre optics, laser and silicon chips, and biochips to knowledge storage and dissemination. Nowadays, the advent of

computer vis-a-vis advanced telecommunication has accurately fused to produce the multimedia - a new wave of dynamism - in the world's means and methods of knowledge transfer which has led to an efficient, and more dynamic educational system.

The most peculiar attribute of multimedia use for education is its effective, quick and powerful capture of the learner's mind and the great potential for making a

profound impact and leaving a long lasting impression on the learners. Whatever the curriculum content is, the multimedia is now the driving force for knowledge acquisition, dissemination and preservation. According to Bee Theng and Chia Hua (2008), effective use of technology with multimedia elements (that is, visual, audio and graphics) may enrich teaching and enhance interactivity in learning.

The present development in technology has also brought a new packaging format (CD-ROM, DVD, tapes, flash drives, zips, external hard disks and other electronic forms) replacing the predominantly print form. Presently, educational packages could be captured; put into any of these secured storage media, and later uploaded to the Internet for e-learning. All these are made possible through technology and directed towards an enhanced instruction and learning processes and practices.

The rapid developments in Information and Communication Technologies (ICTs) over the last two decades have also resulted in many changes and reforms in education as well as in other sectors of society. Not more than a few decades ago, teacher, textbook and blackboard were the three most significant components of teaching and learning in classrooms while the role of the student in the past was to listen, learn and repeat. Today, teaching and learning no longer centres around the transfer of knowledge from educator to student. Learning now comes from student inquiry, critical thinking, and problem solving based on information accessed from a variety of sources (Demirci, 2009).

Akinde (2006) listed motionless pictures, posters, mock-ups, diagrams, schematic drawings and real objects as essential instructional aids of the past, but the advent and application of computers and other ICTs as instructional support tools with many features which are able to match the ultra-modern educational processes and practices has displaced these obsolete instructional devices. Online courses, virtual libraries and laboratories and web-based assessment tools, which are all elements of electronic learning, are now being employed by universities and higher institutions of learning all over the world to deliver the curriculum content of most practical-based and professional fields of learning like library and information science. With web-based learning tools, learners at various academic levels engage their minds in useful outcomes, involving in cognitively challenging tasks.

The body of knowledge as well as the instructional support tools is very important in imparting knowledge. According to Yusuf and Balogun (2011), it is now possible to design courses in new innovative ways using multimedia tools to support student and educator profiles and competencies, thereby meeting the level and individual needs of each student and staff. With multimedia tools, learners' need and characteristics are discovered and better focused upon in producing

necessary educational facilitators.

The synergy of computing and communication technologies significantly impact the way in which information resources are created, managed and used. Demirci (2009) advised that institutions need to plan and implement educational support systems and software which will take advantage of these developments. This is because educational support systems has now given educators more power in the classroom by changing how they access, gather, analyse, present and transmit information to their students and peers.

Educational Support Systems (ESS) provide an array of tools and resources for acquiring, organising, communicating, producing, promoting, presenting and using ideas and information for thinking, learning, teaching, decision-making, expressions and leisure. These tools and resources could also be used for collaborative knowledge building in the classroom while at the same time accessing a broader educational community and knowledge-base beyond the walls of the classroom. These technology experiences provide the skills that will enable educators and their students to perform effectively in the present global, digital, information-based world (Mumtaz, 2000; Onyebinama, 2007).

ESS are not only tools for transferring instructional material and rehearsal but a medium for learning, discovering, sharing and creating knowledge (Cavas, Cavas, Karaoglan and Kisla, 2009). They provide opportunities for the use of computer-assisted instructional packages to assist in the research and teaching activities of educators. In addition, the introduction of computer mediated instruction, another educational support system, as an intelligent innovation in the educational system, according to Ruthven, Nennesy and Deaney (2005), has beneficially revolutionised the system; creating e-classrooms where educators can teach with interactive boards, harnessing the computer technology on individualised basis.

Olagunju, Bolaji and Adesina (2012) maintained that computer mediated instruction has enabled the fusion of educators' training and retraining in technology and the production of new and innovative curriculum models. It has also enabled regular, enriching and remedial instructions, using computer which is known for its ability to reproduce information very fast and repeat activities without redundancy. Technology is changing educators' role from a traditional teacher to that of a coach and facilitator in the classroom (Paraskeva, Bouta and Papagianni, 2008; Abimbade, 2014) while at the same time developing students' skills for cooperation, problem solving and lifelong learning (Afshari, Abu Bakar, Su Luan, Abu Samah and Say Fooi, 2009).

ESS have not only changed the role of educators in classrooms, but have also provided them with a large number of software, websites and resources which can

be utilised for instructional purposes (Ruthven et al., 2005; Demirci, 2009). Nowadays, educators use word processing software for production of documents (by typing and/or “cut and paste” technology which is fast removing the need to write, edit and type manuscripts), presentation software for lecturing, database creation and management tools to manage reports and students’ data (that is, results and demographic information) and search engines and browsers to retrieve easily the most recent and pertinent information on the Internet.

The number of new technologies and software which can be utilised for educational purposes is rapidly increasing. This rapid technological development is giving educators new opportunities to test many more educational software packages and websites in their lessons (Snelson, 2008). Google Apps/resources, RSS Feeds, RFID, QR codes, Massive Open Online Courses (MOOCs), online tutorials and demos, wikis, Geographical Information Systems (GIS), Turnitin®, Yahoo resources, online games, virtual reality and simulations, screen shooting and Webcasting applications, Flickr and YouTube are increasingly being used for lecture sourcing, acquisition or capturing, preparation or development, production, duplication, delivery or dissemination and updating or management.

Other technologies in use for instruction are Web technologies (Web 1.0, 2.0, 3.0 and the invisible Web (Cloud computing)); social networking media (for example, LinkedIn, Twitter, Facebook, Instagram, YouTube, WordPress, Foursquare, Pinterest, Last FM and Netlog) and mobile and hand-held technologies (for example, laptops, notebooks or e-notes, personal digital assistants (palmtops), tablets (tabs), iPhones or iPads, black/blueberries and phobeleets). The use of electronic resources on CDs and DVDs; institutional repositories and online databases, portals and virtual library which are accessed via Internet-ready computers are also becoming increasingly popular.

The use of tools such as e-mail, fax, teleconferencing and video conferencing (for example, Webinar) via Skype, Webcam, Wi-Fi, Wi-Max (and other peripherals)-enabled computers is increasing and has made it possible to overcome barriers of space and time between educators and their students and opens new possibilities for learning. According to Tella, Tella, Toyobo, Adika and Adeyinka (2007) and Onyebinama (2007), it is now possible to deliver training and teaching to a widely disperse audience by means of on-demand two-way video over terrestrial broadband networks.

Cavas, et al. (2009) submitted that technology is not only the backbone of the information age, but also an important catalyst and tool for inducing educational reforms that change our students into productive knowledge workers. This is because investments on educators are also anticipated to create a technologically literate workforce who in turn would produce a future

generation of competent and confident performers in an IT-intensive global work environment (Kumar, Che Rose and D’Silva, 2008).

Positive outcomes of ESS have led many governments to initiate programmes for the integration of technology into their tertiary institutions. Governments, especially in developed countries, according to Demirci (2009), are competing to equip institutions of higher learning with more computers, assessing progress in terms of computer-to-student ratio. Classrooms in developed countries, according to him, are often equipped with Internet-ready computers, projectors and electronic boards, allowing educators to benefit from many and varied materials and methods in their lessons. To make ESS appropriate for developing countries however, Afshari, Abu Bakar, Su Lan and Afshari (2010), suggested that there should be an effort to build a capacity to recognise the importance of implementing the systems according to national developmental needs.

The predominant method of instructional delivery observed in most of the library schools in Nigeria is the old fashioned oral or ‘chalk, board and talk’ and ‘put pen on paper’ strategy. An Internet-search for the library schools made when collecting data on staff roll also revealed that majority of them have no online presence. This may lead to communication gap among these educators and between them and their students (thus hindering research collaborations, resource sharing and cooperative and/or collaborative learning).

YuLi (2008) explained that with electronic documents enabled by educational support systems, educators can save paper for notes and handouts by sharing online (or providing links to) relevant materials without having to produce lots of hard copies. Thus circumventing possible copyright infringement and solving the storage or space problem inherent in the use of paper or print documents, which has long been a burden for educators, institutions and the environment. It is envisaged that the integration of holistic educational support systems into curricular content collection, development, delivery and management in university-based library schools in Nigeria will minimise all the stated problems, if not eliminate them.

This is because the introduction and implementation of educational support systems and courseware will make up for high student populations and limited number of trained and experienced educators (for students and educators can be reached where they are). It will also afford students the opportunities to work at different rates and levels and provide (tirelessly, without holding up other students) repetition when repetition is warranted to reinforce skills and learning. Easy updates to content ware made possible by technology will ensure that educators work with current and authentic sources during their encounters with students. Other advantages of using ESS for teaching include being able to present

more complex material to students, giving students more individual attention and allowing students to work more independently. The successful integration of ESS may lead to ease of sourcing, populating, updating and managing course content; covering more 'grounds' in no time and making the delivery of course content and teaching task easy and effortless.

### **Types of educational support systems useful for teaching**

Many different types of instructional technologies can be used to support and enhance learning in the real or remote classroom. This is because various technologies deliver different kinds of content and serve different purposes in the classroom and it is important to consider how these technologies differ and what characteristics make them important as vehicles for education (Lei and Zhao, 2007; Tella et al., 2007).

According to Tasouris (2009), different information and communication technology tools can increase students' participation in the classroom and transform them to active learners working towards the construction of their own understanding. However, from the review of relevant literature, the most common or popular type of educational support systems are divided into two categories, the technologies used for lecture preparation and those useful for lecture delivery, though, some of these technologies may be useful for both purposes.

### **Types of educational support systems for lecture preparation and their relevance**

Online Public Access Catalogue (OPAC) is an automated library catalogue system which can be accessed via library computers within parent institutions and also remotely via personal computers. The catalogues of other libraries of the world can be accessed through OPAC if they are so configured. This can be of a great help to educators in literature search and retrieval, in requesting library resources of interest and in booking reservations. It gives information on bibliographic details, references and directions on the location of organised local and remote resources.

Offline literature searching and retrieval technologies which are found on stand-alone computers, CD-ROMs, DVDs, hard disks, flash drives and other portable external storage or backup devices are useful for searching e-books, e-journals, e-maps, e-reference materials and multimedia found in electronic databases for current and relevant teaching materials. Large volumes of data can be stored on or copied from these devices and accessed from a computer screen or sent to printer for direct printing via a computer system.

Database on CDROM, DVD, flash drives, tapes and external hard disk requires minimal physical storage space; gives more information at lesser cost; does not require telecommunication or laying cables for access and is user friendly. Access to the current journals included in some of these databases is improving the quality of materials sourced for teaching in universities around the world (Aina, 2003). Ebsco Host is an example of databases on CD-ROMs which can be searched on a single stand-alone computer or installed on a dedicated server and searched via connected computers (clients) for multiple access or use in a Local Area Network (LAN) (for instance, within the department). Ebsco Host can also be searched online. Information on databases can be accessed in an easy and rapid manner. Educators and their students no longer have to manually look through card catalogs. They can query the database and retrieve necessary information.

Similarly, repositories and centralised databases with server-clients or workstations arrangement connected to a Wide Area Network (WAN) (for instance, within the institution) could be searched by educators for contents useful for instructional purposes. Institutional repositories are intellectual output of institutions held on the local servers and later uploaded on Digital Asset Repository (DAR) for wider visibility and use. In addition, local e-mail enabled by Outlook can be installed or configured on the LAN or WAN for information sharing and consultations among staff and students on the departmental and/or institutional network.

Educators can search for relevant literature via online or live searching of databanks for curricular resources on the Internet. Databanks are collections of databases or collections of logically related data elements that may be structured in various ways to meet multiple processing and retrieval needs of institutions and individuals. These databanks can be visited as a guest or subscriber via the Internet. SAGE, JSTOR, Science Direct and Emerald are examples of online databases that may be useful to library educators for searching full-text teaching materials. Retrieval of required information from any electronic database however, requires the use of computer.

To know whether the document (retrieved from the online database) is current and/or useful or not, a user can check the number of citations on the article of interest via links provided on the page. Links are also provided from some of the articles on the databases to similar article of different author or articles of authors with similar interest. A user of these online databases can also view author's profile; communicate with the author; copy and paste text, images, tables, citations and references directly into his work and save and recall last search through links provided on these online databases. This saves time and enhances research.

Library educators can also search portals in their bid to

source for teaching material. Portals are online electronic collections or collation of links, articles or works in related or same discipline or field. However, while some databases can be stored outside the system (for instance, in CDs, external hard disks and flash drives) and searched offline, a portal can only be accessed online. Examples of portals that may be useful for library educators are AJOL and DATAD (Nwogu, Akinde and Onyebinama, 2008).

Virtual library is another resource that can be used for instructional purposes. It is a collection of e-journals; e-books; digitized manuscripts and rare books; e-reference materials; e-catalogue (and/or metadata) and other electronic or digital resources stored in a server and available online on the Internet, either on portals or databank basis, or offline on internal and/or external computer hard disks, CD-ROMs, zips and flash drives. They are made accessible to readers for literature search either through a computer system, a reader or a thin-client. Virtual library may "house" every other resources found in a conventional library but in a digital or soft form. Users can browse a whole library at the click of a mouse and download the latest idea needed for their work. After each search, a user may decide to copy relevant portion to his portable storage device, his personal computer or print out for further consultation.

Virtual libraries are becoming popular by the day in universities and are increasingly being consulted by educators and students for teaching and learning purposes. For the virtual libraries that are hosted on the Net, a user can consult them independently through personal computers and modems or through the university or library network. Those offline can be consulted on portable storage devices via computer(s). Password and/or code for user identity are often given by institutional libraries to students and staff who may wish to access these collections of resources online (if they are secured). Loan privileges of some hours or days may be given to users for some of the portable resources that can be searched offline (for example, on CDROM) depending on the library or institutional policy.

Referencing and abstracting technologies on CD-ROMs and the Web provide bibliographic sourcing for instructional tasks and activities. Examples are: online dictionaries (for instance, Cambridge Dictionaries Online and Link Everything Online); encyclopedias on CD-ROM (for instance, Encarta, Encyclopedia Britannica and World Book Encyclopedia); backlogs or past issues of newspapers and magazines on the Web (for instance, The Guardian, Kidon Media-Link); the wikis (for instance, Wikipedia); online concordance and thesauri; Mendeley (free-web and desk-based reference manager that can help educators to import or export citations and references to or from their works once they have registered and obtained their online Mendeley accounts/libraries) and Scopus (the largest online

abstract and citation database of peer-reviewed literature).

Mendeley and Research Gate are examples of academic social networks that can help in organising research and collaborating with other researchers. From Mendeley desktop, a researcher can access another database or computer, Iphone or Ipad; import, organise and share articles with other Mendeley users. Mendeley started only in 2009 and had a high growth in its user base. The articles, provided by users around the world, are crowd-sourced into a single collection called the Mendeley research catalogue. This catalogue contains more than 110 million unique articles, crowd-sourced from over 2.5 million users, making it an interesting source of data for lecture sourcing, preparation, development and research (Schlögl, Gorraiz, Gumpfenberger, Jack and Krake, 2014). Researchers around the world submit articles to Scopus for abstracting, citation counts and other bibliographical analysis. Elsevier is the main owner of both Mendeley and Scopus. These services provide citations counts and alerts and this enable researcher to know current articles, research and thoughts.

Furthermore, communication technologies such as tele-facsimile (fax), intercom and fixed line telephone, Global System of Mobile communications (GSM), wireless technologies and other handheld and mobile technologies (e.g. cellular phones, black/blueberries, iPhones, iPods, tab/tablets, palmtops or personal digital assistants (PDAs), notebooks and laptops) are increasingly becoming useful for instructional purposes. They can be useful for consultations, content sourcing and updating before, during and after the lecture (Fetaji, Abazi, Dika and Fetaji, 2009; Ritter, 2012; Adedoja and Abimbade, 2013). The study of Adedoja, Adelere, Egbokhare, and Oluleye (2013) revealed that educators' use of mobile tutorials, especially for distance education, enhances teaching and learning.

The now easy worldwide communication, for instance, via Internet-enabled electronic mail services on Yahooemail, gmail, hotmail and others can also be used to contact students, consult with colleagues, send queries (soft copies as file attachment(s) to e-mails or via survey monkey links) and source for data and information across the world and there is the inherent safeguard of certain delivery and spontaneity or instantaneity in consultations (Nwogu et.al., 2008). Electronic mail ensures that messages (and/or feedbacks) get across in no time. Other services provided on the Internet via e-mail by publishers and learned societies are: Table of Content (ToC) services, Journal Alerts, Conference Announcements, Call for Papers and other current awareness services which may be useful to update educators on current developments and provide current thoughts for lectures. This makes instructional efforts easy and simple.

Cooperative or collaborative learning technology made possible by social networking media on the Net like LinkedIn, Twitter, Facebook, Netlog, Flickr, Twoo and blogsites (Gregory, 2007; Beuschel and Draheim, 2011; Adedoja and Abimbade, 2013; Abimbade, 2014) can be used to seek and collect varying or differing opinions and resources from educators and researchers from same or other disciplines, institutions, nations and continents on the topic or project at hand. Talk of invisible college!

Another ESS which is very useful and popular for instructional purposes is the Web technology. In the World Wide Web, users can roam through databases around the world starting from a "home-page" similar to a table of content in a book. The Web, according to Onyebinama (2007), is not the same as the Internet, nor is it a particular computer program; rather it is a portion of the Internet, an interface and a navigation tool that provides a means of structuring documents and relating them to other documents so that maximum use can be made of the Internet. Access to the web is provided by browsers, which are programs that allow users to search for information and to view documents on the Web. Example of browsers includes Lynx, Mosaic, Netscape, Mozilla Firefox, CometBird, Opera and Microsoft Internet Explorer.

The Web as it is today is evolving, from the static web (Web 1.0) to interactive web which allows user interactions with the system (Web 2.0) to collaborative web which in addition to user interaction with the system allows networking with other users (Web 3.0) and now to the Invisible Web (Cloud Computing) which allows resource sharing and consortium among institutions and organisations. The development of hypertext, hypermedia and hyperlinks within the context of the World Wide Web offers a vast array of resources and authentic materials for educators to access, search and use for lecture preparation. According to YuLi (2008), hyperlinks allow educators' visiting or "branching" to similar sites and materials of interest while searching for teaching materials on a particular site. Hypermedia and hypertext allow the integration of graphic, audio, visual and text materials into a particular article that is being searched, accessed or downloaded online. This has brought convenience to teaching and learning.

Search engines (like Google, Yahoo!, bing, msn, Alta Vista, Devil finder, Mamma and Planet Search) query servers and server farms in order to retrieve resources, enable downloading of relevant materials (including graphic, sound and video) needed for teaching and/or discussing a subject, from the Web (Yusuf and Balogun, 2011; Fadoju, 2012). Lesson plans and activities can be obtained from electronic or Internet sources and a website to share classroom activities can be created and managed with FrontPage and Dreamweaver software.

Capturing, processing, storing and preserving technologies as found in video devices, camera,

webcam, camcorder, radio recorder, voice and discussion boards, copiers, scanners, slides, films, tapes and readers (with their accompanying software) can create, duplicate or copy; process, edit, store and manage information (images, voices and texts) that educators may find useful to prepare (for) lessons (Tella et al., 2007; Gulbahar and Guvan, 2008; Dermici, 2009; Yusuf and Balogun, 2011). For instance, audio recording tools can be used to record interviews and discussions while visual tools such as digital video, cameras and camcorders may be useful in recording presentations and role-plays.

Authoring technology is another evolving instructional technology of note that can be used to prepare or produce lesson. Instead of purchasing ready-made materials, library educators may wish to create their own exercises and activities using a variety of authoring tools. Examples of authoring applications include Camsoft's Fun with Texts and GapKit packages; Wida Software's multi-purpose package; The Authoring Suite and Hot Potatoes (a popular multi-purpose Web-based interactive authoring tool, developed at the University of Victoria, Canada), among others (Gulbahar and Guven, 2008; YuLi, 2008).

A number of computer software exists to help educators work on their writing or publishing either individually or collaboratively through networking after relevant materials might have been sourced and gotten. These are applications which are meant to accomplish tasks such as typing, designing, drawing and publishing in preparation for lecture delivery. Some of such software are Microsoft Office packages such as Word for creating lecture notes and "hand-outs"; PowerPoint for creating presentation slides; Excel for charts, graphs and calculations; Access for database creation and management; Outlook for local e-mails; Publisher and SharePoint for publishing and collaboration and Picture Manager and OneNote for image processing. Others are CorelDraw and Paint<sup>(R)</sup> for drawing and designing and Nero, Windows DVD Maker and Light Scribe for burning (producing or copying) works on Compact Disks (Joshua, 2005; Gulbahar and Guven, 2008; Yusuf and Balogun, 2011).

Microsoft Word, PowerPoint and Excel are among the most commonly used software packages in schools today and their pedagogical benefits and contributions to learning and teaching have been studied and tested (Hu, Clark and Ma, 2003; Joshua, 2005; Demirci, 2009; Ataran and Nami, 2011). Roxio, Flickr, Windows Media Players, Youcam, YouTube and some other online software (for instance, screen-o-matic) can be useful for creating, copying and/or duplicating videos, images, animations, screencasts, webcasts, vodcasts or podcasts which may be useful in preparing lessons and tutorials to be delivered to learners in real time and/or remotely (Godwin-Jones, 2002; Snelson, 2008).

### Types of educational support systems for lecture delivery and their relevance

Presentation and delivery technologies on hardware like LCD multimedia projectors, electronic boards (e-boards) and interactive whiteboard attached to personal computers (operated with accompanying software) may be useful to project or present lectures and course content to learners (Tella et.al. 2007; Gulbahar and Guven, 2008; Dermici, 2009, Yusuf and Balogun, 2011). The content or files saved in the computer connected to an e-board can be projected at the same time as the educator is teaching, illustrating and writing on the electronic board. The main advantage of this board is that it enables broadcast and interaction between the educator and students on one hand, and among students on the other hand. Each student can edit and save a copy of the lecture content into their personal computer if they are connected to the local area network.

According to Bee Theng and Chia Hua (2008), with e-board, teachers will be able to upload teaching materials, record grades and attendance, develop online assessments, make announcements and exchange messages. The e-board can be designed to display various sections or links, e.g. curriculum and syllabus, lesson plans, questions banks, teaching materials, discussion forum, research articles, communication and announcement. Some educative and informative databases, portals and websites can be visited or consulted while teaching electronically via e-boards through hyperlinks (branching). In other words, sharing of resources and good practice on the e-board will greatly promote communication and collaboration among educators and the possibility of analysing learners' responses given appropriate feedback. Teachers can also project slide presentations to share information with students as this facilitates teaching practices.

Audio, sound or voice technology could also be useful for lesson presentation (Godwin-Jones, 2002). Public Address Systems, headsets or headphones and mini-microphones (which can be attached to educators' dress or body) enhance and modulate their voice capacity for optimal performance during lecture delivery to a large class and keep distraction to the barest minimum. Furthermore, (past) lectures can be captured, stored, managed and played (or replayed) to same or other group of on-site or remote learners at the same or different times or locations using audio devices and recording technology (on tape, CD, MP3, MP4) (Gulbahar and Guven, 2008). Video and animation technology on analogue and digital video devices, for instance, video facilities on phones, PowerDVD, Window Media Player and webcam on computer and YouTube on the Net can be used to broadcast or disseminate a lecture recorded on them (either live or at a later date) (Tella et.al., 2007; Gulbahar and Guven, 2008; Almekhlafi and Almeqdad,

2010; Yusuf and Balogun, 2011).

Webcasting, screen casting and shooting technology (Godwin-Jones, 2002; McCready, 2013) and the attendant software which may be open sourced or on subscription (for instance, screen-o-matic) may be useful to capture a live lecture or tutorial and repeat, replay or relay at a later date to same, another or similar class or to those who were absent from the previous lecture. It may also be useful (1) to produce take-homes, tutorials or courseware and distribute on CD-ROMs to students (e.g. distance learners) or (2) for telework (lecturers working from home). Another educationally relevant technology that can be used for lecture delivery is online tutorials and virtual reality. These are ready-made (open source and proprietary or commercial) tutorials and educational courseware on virtually all branch of knowledge that can be found and downloaded from the Internet. They can be useful for teaching instead of an educator preparing his/her own scripts or lesson notes (for example, MARC 21 Online Tutorials for teaching e-Cataloguing).

Communication and telecommunication networking technology allows transmission of data and information through telephone, Very Small Aperture Terminal (VSAT) and related cables. This enables academic discussions and disseminations on electronic bulletin boards, listservs, online fora and discussion groups (e.g. Yahoo group) which bring people from the same disciplines or workplace together (Onyebinama, 2007). Included in this category is NEWS, another facility which allows for interaction between discussion groups.

Library educators can divide their students into groups which may be registered on, for instance, Yahoo group, in order to monitor and get feedback on lectures, evaluate and assess teaching and projects. Communication from the group may be synchronous with all parties communicating within the same time frame (for instance, Webinars, live streaming and live simulations); or it may be asynchronous, where there may be a time delay between the communicators when sending, receiving and replying to any given communicative event. Asynchronous communication may be collaborative (for instance, discussion fora and social networking) or self-paced (for instance, online self-tutorials (e.g. Massive Open Online Courses (MOOCs) and archived podcasts) (Agboola, 2006; McCready, 2013).

Other dissemination technologies are Internet-enabled e-mail services on Yahoo mail, Gmail, Hotmail and Web mail. These can reduce lecture notes to file attachment forwarded to class members with known e-mail box addresses before the class or for a lecture that will not hold. In addition, educators and learners can use this technology to help them communicate with "Web pals" in other countries via discussions and/or chats messengers. Library educators can also communicate with one another via 2go and WhatsApp applications on cellular phones. In addition, completed class projects or research

works done by individual and/or group members can be uploaded or published on the World Wide Web (WWW) for worldwide visibility and use, either for free or with the payment of a little token (Gulbahar and Guven, 2008; Macharia and Nyakwende, 2010).

The advancement of new Wi-Fi, Wi-Max and videotext technologies, according to Volery and Lord (2000), has made easy the wireless transmission of texts, graphics, chats, pictures, audio and video content via the Internet. They opined that participating in live discussions about teaching and learning (e.g. through Webinar) and consulting with colleagues and exchanging ideas with students is no longer a problem. Video-conferencing, teleconferencing or e-conferencing is another application with immense benefit for remote teaching and learning. Onyebinama (2007) explained that in video-conferencing, teleconferencing or e-conferencing (for instance, via Skype), a computer user who wishes to communicate live with a colleague 'sees' the colleague in a window on the computer's monitor (screen) and vice versa, allowing them to talk face to face as if in real time, on a round table. This is enabled through the use of computer and some peripherals like webcam, camcorder, and voice and discussion board. This could be useful for lecture delivery to open or distance learners.

Another technology that can be used for instructional delivery is simulations technology. Simulations are technologies which enables the creation of imitations or replications so well constructed that the product can pass for the real thing (Fadoju, 2012). Programs which include simulations are especially effective as stimuli to learners. Simulation allows teachers to show experiments that would not otherwise be possible and have great educational potential to enhance teaching and learning (Bee Theng and Chia Hua, 2008). The computer can also act as a stimulus which generates analysis, critical thinking, discussion and writing. Web Quests are examples of learning tasks which "simulate" real world tasks.

Institutional website supported by integrated learning management system; institutional radio, television and satellite broadcasting stations (for live and remote broadcasting, documenting or reporting e.g. via Plasma and/or Closed Circuit Television (CCTV) and podcasts) can also be used for lecture delivery (Gulbahar and Guven, 2008; Adegbija, Fakomogbon and Adebayo, 2013; Claar, Dias and Shields, 2014). Class projects and lecture notes could be published to the Internet by educators via a link on the institutional website and could be downloaded from same by students irrespective of time and location. In addition, some universities with independent radio stations and/or media houses can broadcast lectures through these media while airtime can be procured from government and/or commercial television houses for a broadcast or a repeat broadcast of lectures to a widely dispersed student population (for

instance, distance or open learners). According to Adegbija et al. (2013), there are 24 campus radio stations active within Nigerian's institutions of higher learning and there are no Campus-TV stations in any Nigerian higher education institution as at the year 2013.

The Internet, the chief of all information disseminators, offers a worldwide communication capability, a mechanism for information dissemination and a medium for collaboration between educators and students without regard for geographical location. Onyebinama (2007) described the Internet as a global network of computers connected to share information, accessories and even software, a remote server of servers with unlimited disc spaces for storing all the information users have uploaded to it.

Presently, educators' lesson notes, lecture plans, schemes of work, marking schemes, course syllabi, publications, Curriculum-Vitae, projects, theses and/or dissertations, research-in-progress and other private and/or institutional documents can be securely stored on (and retrieved from) the Internet (for example, using Dropbox® or Google drive) at the click of a mouse whenever and/or wherever there is connectivity, once the site address is inputted. Thus, enabling: (1) fast and easy access to the documents anywhere, anytime; (2) educators and academic managers travelling light (without load of publications and/or documents) to educational or professional events (for instance, to fellowships, visitations, external examinations, interviews and conferences) locally and abroad and (3) safety of such documents in face of natural disaster and system crash, loss or theft.

To achieve a stable Internet connectivity however, library schools in Nigeria may try the fibre optics option which has been reported to be more reliable. Moreover, besides the institutional arrangements and installations, these library schools can procure their own independent bandwidth, register and maintain independent URLs or domain names with any Internet Service Provider (ISP) of their choice. Modems can also be purchased (and loaded) from telecommunication companies (e.g. MTN, GLO, Airtel & Etisalat) for easy wireless access to the Internet. Institutional policy may however, allow or hinder such resourcefulness.

Notwithstanding, security policies and issues covering authentication, passwords and other access related problem may need to be attended to, in order to forestall any unauthorised access to the computers, devices, database, repository or networks implemented for instructional purposes. Moreover, good firewalls and antivirus should be installed to guide against spams, hacking and computer virus infestation and eventual corruption and loss of data and information. Decision on the use of open-access or licensed (proprietary) software, implications of choice and when or how to renew or upgrade such software when due and system and power



backup procedures may need to be considered. Finally, how to ensure human capital development and financial sustainability of the project may need to be resolved in order to successfully implement educational support systems for the instructional use of library educators in university-based library schools in Nigeria.

### **Use of educational support systems by library educators in universities in Nigeria**

The first library school in Nigeria was established at the University College, Ibadan after the UNESCO Seminar in 1959. This was followed by the establishment of several other university-based library schools which award qualifications up to doctorate level at the end of the 1980s. However, the dawn of the 1990s saw many of these library schools, according to Igwe (2005:1) cited by Nwankuo (2006),

contending with inadequate infrastructure, out-dated curricula, poor human and financial resources, lack of access to necessary information and resources for learning and poor communication, among others. This posed great challenges for LIS education in Nigeria. Notwithstanding, developments in information and communications technologies, which opened new doors in every profession and segment of the society predisposes the library schools to source for alternative ways to look at both access to and quality of library education and learning. One way of transforming the teaching-learning process, it was later discovered, is to properly harness and integrate the efficacy of technology into library education and training in Nigeria.

The importance of providing opportunities and capacity building for educators to use instructional technologies to meet the teaching and learning needs in university-based library schools in Nigeria in this information age cannot be overemphasised. According to Edegbo (2011:1),

the relevance and viability of library and information science education in Nigeria requires looking at both the access to and quality in new ways to enhancing the quality of products turned out from the universities into the labour market. The survival of library and information science education in Nigeria depends largely on the quality of faculty and students. Library Information Science Education in Nigeria today cannot be relevant without effective preparation of new generation of librarians to effectively use the new information and communication technology in their professional practices. For many library and information science schools as enumerated by Nwalo (2000) this daunting task requires the acquisitions of new resources, expertise and careful planning.

In line with this thought, Shiloba (2005) noted that globally, library and information science schools are integrating technology into their curricula and/or classrooms in order to train future library educators, librarians and information managers that will remain relevant and important to the society they aim to serve and Nigeria should not be an exception.

Library and Information Science (LIS) as a discipline has to do with information and knowledge capturing and/or acquisition, processing and/or organisation, management, retrieval and dissemination. The discipline cannot do or survive without various information, communication and telecommunication technologies that can enable it perform or teach its students to perform all the afore-listed tasks. Not only that educational support systems can be used to perform these tasks, they can also be used in the discipline for tutorials, remediation, acceleration, drill and practice, enrichment activities, problem solving, presentation of new materials and information access via Internet and CD-ROMs.

The innovative use of educational support systems by library educators can facilitate student-centered learning. Hence, Afshari et al. (2009) submitted that every educator is to use learning technologies to enhance their students' learning in every subject, because technology can engage the thinking, decision making, problem solving and reasoning behaviours of students. These are cognitive behaviours that library science students need to learn in this information age. Tella et al. (2007) explained that teachers use educational software, not only to supplement instruction, as in the past, but to introduce topics, provide means for self-study, and offer opportunities to learn concepts otherwise inaccessible to students. The advantages that technology provides to learning according to Galagan (2002) cited in Agboola (2006) include not only the possibility of one-on-one interaction for every learner but the ability to simulate new ideas, the chance to try things out at one's own pace and to fail in private without the fear of ridicule from others.

Though, technology facilitates independent self-paced learning, the potential of educational technologies will not be optimised if there is no shift in the teaching and learning paradigm (Afshari et al., 2009). Needless to say, library educators in universities in Nigeria play an important role in this teaching and learning paradigm shift in library education. The shift is to a "student-centered" classroom, where there is collaboration, discussion, and excitement; thus transforming their classrooms from static environments, where a one-way flow of information from teacher to student typically occurs, into dynamic, interactive, stimulating and inquisitive learning environments in which learners interact with peers in teams and teachers take a more facilitating role (Hennessy, Harrison and Wamakote, 2010). Hence, library educators in universities in Nigeria need to

understand the role of ESS in library education and the need to become effective agents in making use of ESS in the classroom with learning becoming a process of discovery, expression and development. Agbonlahor (2005) opined that the use of technology in the teaching and learning processes could provide (LIS) educators and researchers in developing countries like Nigeria the opportunity to bridge the knowledge gap between them and their counterparts in developed countries. According to her, with the concept of the global village, (LIS) graduates are increasingly expected to compete for jobs globally, and universities are expected to prepare them for gainful employment. Moreover, the incursion of other information-providing disciplines into activities and jobs which hitherto were reserved for library and information science graduates, has remain a threat to the profession, hence library educators, practitioners, managers and students have to be proactive in integrating technology into the teaching and learning processes and practices in order not to be "left behind".

Nwankuo (2006) proffered that technology should be applied to LIS university education in Nigeria to better equip the educators and their students with appreciable level of practical knowledge necessary for rapid employment in this prevalent information age, thus improving the quality of LIS education in universities and widening their graduates employment opportunities. Earlier, Ochogwu (1986) had argued that the interdisciplinary nature of library and information science is expected to create multiple opportunities for the LIS students and/or graduates in the job market if computer technologies are well implemented in Nigerian university LIS curriculum since computer-based technology prepares students for the world of work which has been infiltrated with technology. Consequently, the use of technology will not only enhance learning environments, but also prepare next generation for future lives and careers.

According to YuLi (2008), educators want students to have more opportunities to learn and obtain more knowledge and skills and they expect students to practice more after class. The fixed time in the classroom may not be suitable, for those who do not feel well or who are physically tired. He opined that the flexibility made possible by ESS not only applies to expanding where the students can learn, but also provides opportunity for educators to engage a broader spectrum of students such as those on different proficiency levels and students who are away from class because of extended illness. With ESS fully implemented in university-based library schools in Nigeria, library educators and their students (whether able, differently able and/or impaired) can both teach and learn at their own time, pace and place. With ESS, students can listen as many times as they want to a session that the educator may not have time to say or play more than once in class.

ESS provide good tools for library educators to expand students' learning beyond their classroom. This is self-directed learning for students, unlimited by time and space. ESS also facilitate direct feedback; encourage learners to take on teaching functions; enable contents to be continually updated with minimum efforts; provide greater opportunities for individual forms of learning and at the same time demand more social learning in group and afford opportunity for interdisciplinary project-based instruction. ESS will help library educators in Nigeria to keep up with what is happening in contemporary practice. Students can see what is happening overseas, information can be used and reused and bulky files can be reduced to a smarter Zip and/or Portable Document Format (PDF) file in minutes with ESS. This saves storage space for course content.

Other usefulness of ESS as cited by Tella et al. (2007) were improving presentation of materials; allowing greater access to computers for personal use; giving more power to the teacher in the school; giving the teacher more prestige; making the teachers' administration more efficient and providing professional support through the Internet. In addition, the application of technology may facilitate information transfer and resource sharing among educators and between educators and their students in LIS schools in Nigeria, enabling library educators to be sophisticated and heavy users of information and communication technologies for information, research, teaching, communication, professional development and recreational purposes.

Abdo and Semela (2010) listed the benefits of teachers' use of instructional media to include sustaining students' attention; increasing the meaningfulness of abstract concepts; encouraging deep processing and boosting class performance through increased content acquisition. According to Tasouris (2009), teachers employ instructional technology in order for students to achieve thinking skills and acquire knowledge avoiding memorising, rote and surface learning. Trucano (2005) and Hennessy et al. (2010) explained that the effect on attainment is greatest when students are challenged to think and to question their own understanding, rather than on exposure to new and additional information. However, Bee Theng and Chia Hua (2008) revealed that not only that the use of technology in education would promote deep learning, it will also enable schools to respond better to the varying needs of their students with diverse background and abilities.

ESS enable the address of specific needs of learners, as against the 'one size fits all' approach of the past (Leach, 2008; Davis, Preston and Sahin, 2009; Hennessy et al., 2010). In this regard, Hennessy et al. (2010) opined that not only do educators need to change their roles and class organisation; they also need to (along with their students) prepare, introduce and manage new learning arrangements. The use of ESS for teaching will

help students experience times, places, people and events that cannot be otherwise incorporated into the class by the teacher. With ESS, students can visualize phenomena that are too small or too dynamic to be conveyed effectively with print, static models or hand-waving. Record keeping improvements also allow teachers to provide students with more information in an efficient manner that improve student motivation.

Library educators, as learning facilitators or coach, must be aware of a variety of resources available for improving students' skill, not just one or two texts. Textbook is no longer the sole source of information (Lynch and Ratto, 2012; Caraher, 2015). Multimedia programmes offer sound and vision; electronic dictionaries and encyclopaedias are available for instant reference; online newspapers provide up-to-date information on issues of current affairs and (official) websites offer background information on policy, tourism and political views. Library educators need to know how to teach learners to use all these resources effectively. They must not only know and understand the functions of different media in a media-rich environment, they should also know when best to deploy them. In the joint construction of projects with their learners, they need to guide them in the use of different hard/software and when it is appropriate for them to be applied. They also have to be flexible, responding to students' needs, not just what has been set up ahead of time based on a curriculum developer's idea of who will be in the classroom.

Library educators' motivation to implement, continue to develop, or to share innovative practices depend on their need to know how and where they can access information for their own and their learners' use. Knowledge of and competent use of search engines and reliable information sources are essential to this information access. Hennessy et al. (2010) maintained that educators need an understanding of how particular topics can be taught with technology (which technology for which topic), for specific learners, in specific contexts, and in ways that signify the added value of technology. Personal teaching styles and instructional philosophy of educators also play major roles in classroom technology integration (Zhao and Frank, 2003). Most educators teach as they were taught. The educator is viewed as the dispenser of knowledge and the student the recipient of that knowledge. ESS allow educators to move from the role of dispenser of knowledge to a facilitator or coach, allowing them to encourage and guide students in becoming active learners.

According to Hennessy et al. (2010), ESS will do well with topics that students cannot easily comprehend, or, teachers face difficulties in teaching effectively in class; topics that are difficult or impossible to be supported or implemented by traditional means (such as application of ideas into contexts not possible to be experienced in real life) and in enriching and augmenting all courses by

supplying current and adequate materials (including texts, graphics, images, sound and videos). According to Tella et al. (2007), the most successful teachers are those who use examples and counter examples and involve students in explaining and modelling in the class. This success can be better achieved through the integration of ESS into classroom instruction.

## CONCLUSION

Though, the use of educational support systems for teaching has been found to be of immense benefit to educators and their students; however, this benefit cannot accrue without the acquisition of necessary software or application. The selection and acquisition of software and related activities must be carefully taken into consideration before the software are deployed in the classroom. This will demand a high level of computer, digital and information literacies from library educators in university-based library schools in Nigeria and it may require the educators learning and understanding the principles of courseware design and the relevance of different applications to the instructional task at hand. In other words, they may need to determine which applications have added value for learning in their subject area. Since the information environment is changing continuously, they may need to know that determining which application to use for which subject should not be a one-time activity. It should be an activity that will be subjected to regular review. Nevertheless, library educators' knowledge of the appropriate contexts for ESS use and individualisation of learning and their attitude towards the use of ESS for teaching may determine whether the desired outcomes will be achieved and whether a major shift in the culture of teaching and learning is possible in university-based library schools in Nigeria.

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