Editorial

African societies, organisations, and countries are currently, compared to almost all other regions of the world, least connected to Internet and Web resources. There is a clear urgent need for African organisations and countries to improve their Web presence not only as means for obtaining information, but also for publishing and sharing their own content. As noted by some of the articles in this issue, the African share of total Web content is presently very small. Many factors account for this limited African Web content, including: paucity of innovative data and research findings that other regions would value; African content is presently mostly born non-digital; computerisation and digitisation programmes have not yet achieved widespread support and success across the continent; there is inadequate national bibliographic control of local digital content; African digital content has low Web visibility because it is not, for various reasons, indexed by global indexing services, search engines, etc. Inadequate resources and collaboration often underlie most of these factors. Also worrying is that the currently small African share of Web content may decline due to much more vigorous efforts by other regions of the world than Africa to harness the opportunities offered by the Internet and the Web.

These factors and developments suggest that African countries and organisations, particularly universities, research institutions, and national and academic libraries, need to pool resources, as well as collaborate on strategies and projects to promote the bibliographic control, indexing, digitisation and Web publishing of African local content. Accordingly, the Professional News and Events section of this issue summarises efforts by the Council for the Development of Social Science Research in Africa (CODESRIA) to promote and support meetings and programmes for the indexation of African content for the Web, as well as for the online publication of African journals along the lines pioneered by the African Journals Online (AJOL) project.

There are eight articles in this issue. The lead article, by Stephen Mutula, reviews some of the evolving paradigms for information management in the equally evolving digital age. The paradigms include information society, e-government, e-learning, digital scholarship, and digital divide. Most of the remaining articles fit within some of the paradigms. Kemoni examines the role and nature of literature review and theoretical frameworks as basis for quality graduate records management research. Some of the frameworks presented illuminate issues and variables connected with the management of records in e-government systems.

The remaining five articles fit in different ways within the information society, digital scholarship and e-learning paradigms. Utulu analyses the information technology and Web presence characteristics of the three oldest Nigerian private universities. Agbonlahor reports on the relationships between demographic and job-related characteristics of Nigerian university academics and their uses of information technologies for research, teaching and learning. Uwaifo analyses the relationships between the computer anxiety exhibited by librarians in Nigerian universities and their perceived ease of use of the automated library systems. Lwehabura evaluates the delivery methods and effectiveness of information literacy programmes in Tanzanian universities. Ojokoh and Balogun report on the development of a Web-based virtual classroom system in a Nigerian university. This issue is concluded with a short communication, by Egbukole, on the how Nigerian libraries could provide information dissemination services in environmental protection programmes in Nigeria.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 89 - 102

Evolving Paradigms in the Networked World and their Implications for Information Management in African Libraries

Stephen M. Mutula

Department of Library and Information Studies,
University of Botswana,
Private Bag 0022,
Gaborone, Botswana
mutulasm@mopipi.ub.bw

Abstract

The networked world is characterised by the ubiquity and ever increasing application of Information and Communications Technologies (ICTs) in various sectors of an economy, including education, government, libraries, businesses, healthcare and homes. The networked world generates and moves large amounts of electronic information in the form of text, video, audio, graphics, and animations. A networked world affords opportunities for people, for example, to use e-mail for communication, use Web portals to access government information, access digital libraries from any point with a Web connection, and undertake formal and lifelong learning electronically. The evolving networked world has fuelled several paradigm shifts that are greatly impacting the way information and knowledge are created and managed. These paradigm shifts include information society, e-government, digital divide, and e-learning/digital scholarship. This paper provides an overview of the paradigm shifts sweeping the information landscape in the networked world and the implications for the creation and management of information, especially in African libraries.

Keywords

Networked world, information society, information management, digital divide, e-learning, digital scholarship, e-government, Africa

Introduction

The 'paradigm' concept originated with Thomas Kuhn in his book *The Structure of Scientific Revolutions*, where it is described as a set of beliefs, theories or world view that is unquestionably accepted and has become established as truth. According to Kuhn (1970), 'paradigm shift' is a change in the existing standard model, which creates transformation in the established truth (Kuhn, 1970). Bailey-Lloyd (2005) observes that a paradigm shift is when a significant change happens, usually from one fundamental view to a different view. In some cases, some type of major discontinuity occurs as well. Increasingly now, the paradigm shift concept is being used to connote revolution, emerging trend or change in pattern or transformation in the way humans perceive events, people, environment and life. In the context of this paper, a paradigm shift is used to describe major changes in conventional practices with regard to information management.

The concept of 'networked world' unlike that of 'paradigm shift' was originated during the latter part of 1990's by the Computer Systems Policy Project (CSPP) a public policy advocacy group in the United States, to refer to the Internet world, which is characterised by the prevalence and integration of ICTs in all sectors of a nation's economy (Bridges.org, 2001; Computer Systems Policy Projects, 2000). Such networked world is characterised by adequate and reliable physical ICT infrastructure; integration of ICTs throughout

businesses, communities, schools and government; pervasive availability and access to high-speed, quality and affordable network bandwidth; enabling national ICT policies; national and global commitment to universal access; and ubiquitous use of ICT in everyday life.

In a networked world, large amounts of e-content are being generated but the methods of managing such content remain inadequate. Besides, the networked world goes beyond the Internet and links people to people, people to business, people to information, and people to culture (The American Library Association, 2003). Such networked world encompasses traditional telecommunications and computing systems and employs new frameworks that move data, audio and video via increased bandwidth, wireless technologies and systems. In the unfolding networked world, libraries with the traditional responsibility of information management are increasingly called upon to perform roles related to generation, processing and dissemination of information in e-environments. The evolution of the networked world is both fuelling and being fuelled by paradigm shifts in the nature of the information-driven society (information society), governance (e-government), gaps between information 'haves' and 'have nots' (digital divide), increasing use of ICT for learning and research processes (e-learning and digital scholarship), and new technologies that are enhancing seamless connectivity (emerging technologies).

These paradigm shifts are inextricably intertwined and interrelated. The close relationship among these paradigms is reflected in the similarity of metrics with which all of them are measured, namely: PC penetration, number of Internet users, number of home Internet users, number of mobile Internet users, number of broadband households, number of wireless subscribers, secondary and tertiary education levels, civil liberties, and government corruption levels to mention but just a few (West, 2006; Economist Intelligence Unit, 2006; Martin, 1995). The World Summit on Information Society (WSIS) meetings held in Geneva, Switzerland and Tunis, Tunisia in 2003 and 2005 respectively were conceived to provide a framework that would harness the potential of ICT to realise the information society. WSIS was conceived against the backdrop of the widening gap between information "haves" and "have-nots" (digital divide), as well as the recognition of the increasingly important role of telecommunications in the political, economic, social and cultural sphere (WSIS, 2003), and also for the delivery of formal education and acquisition of lifelong learning (e-learning). On the other hand, e-government is emerging as one of the key strategies in the realisation of an information society because of its ability to provide expansive infrastructure through which citizens can gain access to information in the custody of government and other Web portals.

The importance of information management in a networked world is crucial and should start from the basic unit and building blocks of information which are data. Nicholas and Rowlands (2000) developed a model of the progression of information, knowledge and wisdom from data. Data occupies the basic level of the model and represents raw facts or observations upon which no meaningful decision can be made until these have been processed into information. According to the model, once data has been refined, it evolves into information, which ideally can be interpreted clearly, so that meaningful decisions can be made out of it. The third stage of the model is knowledge, which is a value-added derivative of information and according to Leonard and Sensiper (1998), is relevant and actionable. The final stage on the Nicholas-Rowlands model is wisdom, which implies the ability to perceive or determine what is good, true or sound. The focus of this article is on information and its management. Information management in organisations involves a number of different tasks, including creation and maintenance of meta information, searching for documents and other data objects, viewing and retrieving information (Information Management Consultants, 2003). From the perspectives of libraries, information management, especially in e-environments, may include subject indexing, cataloguing, classification and coding; database design and data structures; storage and retrieval of information resources; information audits and reviews; uploading of information into the system; and information extraction, publishing, distribution and access.

It is from the above perspectives that this paper provides an overview of the paradigm shifts sweeping the information landscape in the networked world and their implications for the creation and

management of information, especially in libraries in Africa

Evolving Paradigms in the Networked World

The networked world engenders several transformations in the way information is produced and managed. Information on the Internet is growing at phenomenal rate without adequate tools for bibliographic control, searching, filtering and retrieval. The search engines are inadequate tools as they do not adequately review the documents. Moreover, subject directories and gateways which make attempts to review documents only cover limited materials. Libraries are expected to develop tools that make it easier to organise and access information on the Internet. But the scientific journals that were a few years ago produced largely in print form are now rolled out, first, as e-versions before the print versions can appear. In addition, libraries are transforming their print collections into electronic formats through digitisation or subscription to e-journals with or without print alternatives as a strategy to make them more accessible and to enhance resource sharing. Concomitant with the transformation of what was previously largely a print environment into mega digital collections, several issues arise that must be addressed, such as integrity of the scholarly research process, intellectual property rights, privacy, security, etc.

The networked world has also occasioned transformation in the role of librarians. Stueart (2006) notes that in the new digital environment, the change in responsibilities of librarians is from intense effort to preserve one's own collections in one medium (print) to purveying information in multiple formats through virtual means. From the perspective of services, libraries are moving from being perceived as warehouses where materials are bought just in case they might be needed to a supermarket where emphasis is placed on access and just in time delivery. Similarly, the shift in the professional sphere relates to changes from the attitude of waiting for users to request for service, to staff having authority to promote technological and traditional links to current and potential users.

Additionally, the librarian's role now extends to include participating in the management and regulation of technological infrastructure, ensuring technological interoperability and open standards, promoting partnerships and collaboration among diverse communities, negotiating terms that reflect user protections under copyright law, developing and imparting information literacy, content development, Web design and more (Stueart, 2006).

In addition, there is increasing demand for librarians to vigorously select, catalogue and classify Internet resources to make them more accessible to users. OPACs are now being used as gateways to information within and outside libraries. The catalogue is no longer just an inventory or finding aid that used to be for what the library owns; but rather, it is now a portal to everything within and outside the library (Stueart, 2006). Likewise, publishers have also transformed to become not only suppliers but providers of information directly to the users. In addition, some journal publishers have terminated their print versions, and, now concentrate on Web accessible versions, making libraries' work more challenging. Moreover, publishers and database vendors are moving their information products to the Internet and targeting libraries as a significant market. Because these information resources can be accessed conveniently from any location with a Web connection, subscriptions to them have become increasingly popular, especially in research environments.

Furthermore, the library has, in the last decade, experienced increasing pressures to transform from placing emphasis on access to focusing on quality of information accessed. This is partly because information resources are being transformed into electronic formats or being born digital, and such electronic or digital formats are becoming more and more accessible outside than within the library. Secondly, the proliferation of e-resources on the Internet has created problems of how to identify and sift between information of high and low quality, and libraries are being called upon to provide intermediary functions in this respect.

Information Society Paradigm

Martin (1995) defined an information society as characterised by rapid growth and use of information, widespread exploitation of varied information sources, where people know and appreciate what information

they need, where to get it, how to get the information, and in the end, how to use it. Such a society realises the importance of information for all aspects of life, and is fully conversant with how to seek and use the information. Moreover, an information society caters for all, including children, by providing them with information in many formats and exposing them to the different technologies used for collecting, manipulating and disseminating the information. Furthermore, an information society is also one in which the quality of life and economic development depend largely on information and its exploitation.

The 2003 WSIS meeting in Geneva, Switzerland provided a clear vision of an information society when it declared a common desire and commitment of all the nations to build a people-centred, inclusive and development-oriented information society, where everyone can create, access, utilise and share information enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life…'Additionally, the 2005 WSIS in Tunis, Tunisia recognised cultural and linguistic diversity, identity, local content, and ethical dimensions as being critical for an inclusive information society (International Telecommunication Union, 2005). The International Federation of Library Association (IFLA) in the manifesto it submitted to WSIS underscored the importance of connecting villages and establishing community access points; connecting universities, colleges, secondary schools and primary schools; creating scientific and research centres; and providing public libraries, cultural centres, museums, post offices and archives with ICT (International Federation of Library Associations, 2003).

The information society is evolving in tandem with the networked world and sometimes the two phenomena, as pointed out earlier, are inextricably intertwined, especially from the perspective of the variables that are used to measure their ubiquity and pervasiveness (West, 2006; Economist Intelligence Unit, 2006; Martin, 1995). Since the turn of the 21st century, governments have been preoccupied with putting in place strategies on how to achieve an information society for all. One of the key catalysts in the attainment of an information society is the inclusive access to, and effective use of, ICTs by the entire populace of every country on the globe (Souter, 2007). The Information Society Index (ISI) is used to examine how nations are positioning themselves to compete in the global information economy. The ISI is calculated based on 15 key data variables such as: IT spending as a percentage of GDP, software spending, IT services spending, PC penetration, Internet users, mobile Internet users, e-commerce spending, broadband households and wireless subscribers, secondary and tertiary education levels, civil liberties, and government corruption levels.

In 2006, of the 70 nations that were surveyed (International Data Corporation, 2007), most countries that were found to be leaders in information society index included South Korea (1st), Japan (2nd), Denmark (3rd), Iceland (4th), Hong Kong (5th), Sweden (6th), United Kingdom (7th), Norway (8th), Netherlands (9th) and Taiwan (10th). These countries were characterised by conditions necessary for high take-up of broadband connectivity, 3G mobile services, access to the Internet over mobile phones, and gains in infrastructure development. Africa featured poorly in this ranking. A similar IS index ranking of 53 countries worldwide in 2003 and 2004 placed South Africa and Egypt (the only countries from Africa) at position 34 and 46 respectively (International Data Corporation, 2004).

In a manifesto it submitted to the second WSIS in Tunis in 2005, the International Federation of Library Associations and Institutions (IFLA), implicitly highlighted the problems that developing countries, including Africa, must overcome in order to participate in the information society. IFLA underlined the following information readiness issues as pre-conditions for participating in an information society (Commonwealth Telecommunications Organisation, 2004; Berry, 2006):

- Providing affordable or free-of-charge access for their citizens to the Internet.
- Providing specific training programmes in the use of ICTs.
- Enabling national policies and laws to enhance content creation.
- Enabling appropriate, authentic, and timely content in languages people understand.
- Commitment of national government to connect all their public libraries to the Internet by 2006.
- Ensuring that intellectual property laws for electronic publications do not prevent public access.

- Public investment in information and telecommunication technologies.
- Enhancing intellectual freedom by providing access to information.
- Helping to safeguard democratic values and universal civil rights.
- Opposing any form of censorship.
- Building capacity by promoting information literacy, providing support and training for the effective use of information resources.

IFLA's manifesto to WSIS demonstrated that librarians are vitally involved with the creation of the information society and its consequences. The manifesto recognises that libraries and information services are essential to the roll out of the inclusive information society, with regard to safeguarding universal civil rights and intellectual freedom. Moreover, libraries and information services respond to the particular questions and needs of individuals, complementing the general transmission of knowledge by the mass media. Libraries and its supporting profession build capacity and provide support and training for effective use of digital and other information resources. Moreover, IFLA underlined the libraries role in helping to build capacity by promoting information literacy, providing support and training for the effective use of information resources (Berry, 2006).

The information readiness issues raised by IFLA at WSIS, especially those relating to training, content creation, ensuring intellectual property rights, promoting access to information, opposing any form of censorship, providing information access and enhancing intellectual freedom, all fall within the domain and jurisdictions of libraries. It is incumbent upon librarians to ensure these issues are addressed to enable the libraries they manage benefit from the networked world. Moreover, the role of librarians from the perspective of a networked world extends beyond the custodial roles for information and now includes: participating in information literacy; teaching in partnership with faculty; content creation and management; protecting the right of users to access varied resources; acting as intermediaries or facilitators; extending services to current and potential users; and selecting, cataloguing and classifying Internet resources.

E-Government Paradigm

E-government is emerging as one of the catalysts in the realisation of an information society or networked world because of its ability to provide expansive infrastructure, through which citizens can gain access to information in the custody of government and other Web portals. UNESCO-I (2004) defines e-government as the public sector's use of ICT with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process, and making government more accountable, transparent and efficient. E-government is being perceived as a panacea to the deficiencies of the traditional form of government where citizens physically go to government offices to seek services, such as applying for passport, birth certificate, death certificate or filing tax returns (with the usually attendant delays, arising from long queues, lost files, or the absence of relevant officials).

The Digital Opportunity Index (DOI) can be used to measure and evaluate the opportunity, infrastructure and utilisation of ICTs by government and its people. DOI monitors recent technologies such as broadband and mobile Internet access, falling price of broadband, and increasing broadband speeds (World Information Society Report, 2006). The DOI ranking of Southern African Development Community (SADC) member states for 2004/5 in general showed that though great opportunities exist for most SADC member states to partake in e-government, little is being done in terms of taking advantage of such opportunities.

The E-government Readiness Index of 2005 showed that of the 191 member states of the UN surveyed, Europe follows North America in e-government leadership while South Asia, Central Asia and Africa are ranked last. The United Nations Report (United Nations, 2005) noted that despite the progress made in the last three years with regard to e-government implementation, a serious access-divide exists across the world between the developed and the developing countries. Of particular concern were countries belonging to the regions of Africa and South and Central Asia. These countries showed little relative progress in 2005 with respect to outreach and access to citizens. The Centre for Public Policy, Brown University, Rhode Island, in

2006, in a global e-government ranking of countries, found that sub-Saharan Africa member states performed dismally among 198 countries that were ranked. In this assessment, government Websites were evaluated for the presence of various features dealing with information availability, public access, online publications, online database, audio clips, video clips, number of different services, etc. The resulting e-government index ran along a scale from zero (having none of these features and no online services) to 100 (having all features). The top country in the ranking was South Korea at 60.3 percent. Other nations that scored highly were: Taiwan (49.8%), Singapore (47.5%), United States (47.4%), Canada (43.5%), Britain (42.6%), Ireland (41.9%), Germany (41.5%), Japan (41.5%) and Spain (40.6%) (West, 2006).

Most of the obstacles in e-government environments relate to poor organisation and management of content, which librarians can help address. E-government is, by and large, an information intensive environment that consists of decision support systems such as records management systems, integrated financial management systems, human resource management systems, communication systems, databases and portals. Information management in e-government therefore needs to be given priority. Citizens in an e-government environment expect that their rights are as well protected and documented as in a paper-based environment. Consequently, preserving the combination of content, context, and structure which give electronic records meaning over time to protect the fragile media from degradation and to ensure efficient access is of critical importance. Moreover, the purpose of e-government is the provision of information for citizens to hold their governments accountable; promote integrity in government and enable government to improve service delivery (International Records Management Trust, 2004). Information in e-government settings should therefore be effectively managed.

The importance of effective information management in e-government setting is evident. Schuppan (2007) points out that e-government in developing countries, including Africa, is still in infancy, going by paucity of content on government Web portals. Likewise the Ibrahim Index on African Governance (Rotberg, 2007) reported the difficulties that were faced in collecting secondary data from government Websites saying 'not all African countries have Websites and where they do, they may not post useful data'. Heeks (2002) has noted that only about 25% of e-government projects are successful, while the rest fail. Most of the e-government projects failure may be attributed to inability to define any measures necessary for implementing information management good practices that are critical for success of such e-governments. Sawe (2005) observes that e-governments are expected to develop content of immediate local relevance, preserve national history or heritage and traditional knowledge. E-government systems through information management systems can effectively acquire, create, disseminate, integrate, maintain and exploit information for the benefit of citizens and other clients. Wimmer (2002) points out that e-government, through informatisation, supports information processes such as decision making, communication and decision implementation.

E-Learning and Digital Scholarship Paradigms

E-learning is the use of variety of information and communication technologies to facilitate student-oriented, active, open and life-long learning (University of Botswana, 2001). Education institutions, especially universities, are increasingly implementing various forms of e-learning to enhance classroom teaching and improve the quality of research (Department of Education and Youth Affairs, 2001). Through e-learning, group work, self-directed learning and maintenance of students electronic portfolios of their work (Livingstone, 2004) can well be managed.

Libraries are expected to transform, in order to cater for this emerging learning dispensation. In the academic sphere, digital scholarship is gaining currency. Marcum and George (2004), citing Kirsten Foot, refers to digital scholarship as "any element of knowledge or art that is created, produced, analysed, distributed, published, and/or displayed in a digital medium, for the purpose of research or teaching." Digital scholarship may include submission of articles, peer review and publication, all done electronically; teaching, using purely or blended electronic means;

evaluation and assessment of academic work electronically; collaborative research by electronic means; and electronic communications.

The Deputy Vice Chancellor of the University of Botswana, Prof. Frank Youngman, in opening up a digital scholarship conference at the University in December 2007, observed that the teaching and research work of academic institutions has been based historically on the printed page and that libraries, with their physical collections of books, journals and documents, have been at the heart of universities. He noted further that the academic environment in universities the world over is, however, undergoing tremendous transformation, as the shift takes place from print media such as books to the Internet and digital media including graphics, audio and video. Prof. Youngman continued:

> 'The rapid development of digital technologies, open courseware, open access publishing and the emergence of Web 2.0 are revolutionising scholarship, publishing, and the storing and preservation of information. A different kind of student is also emerging ("the iPod generation") with greater computer literacy and different kinds of expectations from the university experience. This transformation has been brought about by globalisation and the revolution in technology, especially the Internet and World Wide Web. The deployment of powerful computers, high-speed networks, and large scale storage technologies has made the academic landscape increasingly dynamic. The information environment epitomised by digital spaces, institutional repositories, new publishing models, digital libraries have, in the last decade, proliferated taking advantage of increased storage capacities, using different platforms such as DSpace, Fedora, Greenstone and ePrints. Similarly, collaborative spaces such as blogs, wikis, social networking sites, RSSs, mobile technologies have evolved in tandem, making it possible to integrate multimedia services in learning, teaching and research.' (Youngman, 2007)

Prof. Youngman's remarks capture, succinctly, the digital scholarship paradigm. Within universities and similar academic environments, increasingly now than before, there is a trend toward online delivery of information with libraries responding by making attempts to digitise materials that were once in print formats. This action is necessary so that the collections may be delivered to users 24/7 via intranets, the Internet, and other fast and emerging networks. Similarly, digital information resources are increasingly being relied upon as primary or complementary information sources of scholarship for teaching, research and administration purposes. However, in Africa, though universities are increasingly generating large amounts of research output, such output hardly reaches the international audiences because most of this content is stored offline.

Digital scholarship, in general, has the benefits of increasing visibility of universities on the Web and enhancing their competitiveness. It can also facilitate access to wide range of literature in electronic databases, digital libraries and institutional repositories of other universities, and consequently help address the dearth of information resources that universities in Africa are faced with. Through digital scholarship, it is possible for universities to:

- Enhance quality research.
- Enhance collaboration, sharing and dissemination of knowledge.
- Make contribution to global knowledge.
- Enhance content development.
- Help bridge the knowledge gap between the north and the south.
- Provide access for greater numbers of students to a well-supported and effective higher education.
- Make access to higher education more democratic and liberalised.

Implementation of e-learning and digital scholarship within academic environments will need to address a number of challenges. Mutula et al. (2006), in an empirical study of e-learning at the University of Botswana, asked respondents to identify problems that they faced in learning online. From the 86 respondents who answered this item, 35 (40.7%) identified shortage of computers, 22 (25.6%) decried the lack of clarity and difficulty of questions, 13 (15.1%) cited poor Internet connectivity, nine (10.5%) identified difficulty of locating information on the Internet, and four (4.7%) noted that they had difficulties coping with the workload. Finally, three (3.5%) had problems presenting information in

particular formats such as tables. Respondents further identified several learning content design issues including lack of clarity of questions, too many readings to cope with, lack of appeal of content, etc. On the question of how well materials were presented online, out of 86 respondents who answered this item, 70 (81.4%) said materials were usefully presented, 14 (16.3%) felt that materials were not well presented, while two respondents did not respond to the query. As to whether the online course was designed with their needs in mind, from the 86 respondents who answered this item, 58 (67.4%) said yes, 17 (19.8%) said no, and 11 (12.8%) did not know. Furthermore, Gerhan and Mutula (2005), in their study of bandwidths problems at the University of Botswana, found that shortage of computers is often cited at the university as one major factor hampering effective e-learning. In addition, students often complain of poor connectivity to the Internet. The University of Botswana is one of the most well resourced higher education institutions in Africa with regard to ICT; but given these infrastructure problems that it faces, the other African universities could be much worse off.

Libraries can play a leading role in e-learning and digital scholarship. To support e-learning and digital scholarship, libraries can develop mechanisms to perfect tools and procedures for enhancing easy access to e-information and e-content by creating portals, gateways, and hypertext links to resources. Libraries can also transform their print collections into electronic formats through digitisation or subscription to e-journals. Libraries should also transform their collection development policies to support e-learning and digital scholarship because scientific journals that were a few years ago produced largely in print form are now rolled out first as e-versions. E-learning and digital scholarship processes are supported by variety of content in the form of e-journals, e-books, institutional repositories, databases, and digital libraries. These resources must be availed by libraries, if they have to meet their obligations in the digital environment. There is also need for libraries to put in place relevant infrastructure to support the integration of various media such as text, graphics, animations, video and audio in teaching, learning and research processes. Libraries can be involved in behind-the-scene activities such as helping software designers to develop systems that fit in with users' information-seeking behaviour. They can also take part in developing and delivering information literacy programmes.

The rising number of digital natives (a category to which most young students now belong), and digital immigrants (a category to which most experienced staff belong), oblige libraries to seriously develop interventions of policy and procedure so as to effectively address the needs of such groups of users. Libraries also need to develop resources such as institutional repositories to support e-leaning and digital scholarship. Institutional repositories contribute to the visibility and international standing of universities and research organisations, especially with regard to scholarly communications. Such repositories are also convenient for harnessing local content, which is necessary for building the knowledge society. For digital scholarship to thrive and become institutionalised in the universities in Africa, open access principles for increased benefits for individual scholars and facilitation of scholarly visibility of universities' research outputs on the Web should be pursued. Librarians and researchers are well positioned to champion open access initiatives within their institutions.

Digital Divide Paradigm

WSIS, as already stated, was conceived against the backdrop of the widening gap between information "haves" and "have-nots," as well as the recognition of the increasingly important role of telecommunications in the political, economic and social-cultural sphere (WSIS, 2003). The digital divide has often been perceived as the inequitable access to ICTs such as PCs, Internet, telephones, cable, and other Internet-related technologies by individuals or groups of people in a country or between countries (Spectar, 2000). Recent literature expands the dimension and scope of the digital divide into what is increasingly being referred to as 'new digital divide'.

The International Telecommunications Union (2003) observes that the so-called the "new" or the "quality" digital divide is not attributable to the lack of equipment or connections, but in its present form, the character of the phenomenon is changing from "basic to advanced communications and from quantity to quality". Warschauer (2002) observes that bridging the digital divide is much more than

providing Internet and computer connections, because access to ICT is embedded in a complex array of factors encompassing physical, digital, human and social relationships. Norris (2001) adds, "the digital divide is more than access to technology and there is need to look beyond the issue of access to technology." The "new digital divide" is also being attributed to the increasing use of new technologies by the youth (ipod generation or digital natives) compared to the elderly (digital immigrants) the world over. The youth use the Internet in all aspects of their life from researching new products to social interaction, compared to the elderly who are generally averse with technology. The new digital divide is also apparent in the level of usage of ICTs. Global Internet usage statistics shows that Africa, with 14.2% of world population, has only 2.9% of Internet usage, compared to Europe with 12.3% of world population and 37.2% usage (Internet World Statistics, 2007).

The new digital divide is evident in the implementation of intellectual property laws between the powerful capitalist west and the less powerful developing countries, including those in Africa. For example, conventional practice with regard to copyright law is that the duration of copyright is the life of the author and fifty years after his death. After 50 years, copyrighted materials move into the public domain and can be used freely without any charge (Kiggundu, 2007). The United States amended its law (Copyright Extension Act 1998) increasing the duration of copyright to 70 years (House and Senate, 1998), and now applies pressure on national governments, including those in Africa, to change their copyright laws to be in tandem with theirs (Kiggundu, 2007). This has implications in terms of the capacity of developing countries, especially those in Africa, to afford such copyrighted material for longer duration of time. At the same time, it gives the US leverage to allow its powerful multinational corporations to reap continuing profits at the expense of poor countries. Moreover, most of the content providers of digital material are domiciled in the developed world and insist, whenever they enter into negotiations with information providers in developing countries, on the inclusion in the contractual agreement clauses which override the traditional exceptions to copyright, such as fair use and fair dealing as contained in national legislations (Kiggundu, 2007). This makes it difficult for libraries to freely avail information for academic use without breaching licensing agreements.

The digital divide in Africa is exacerbated by the high cost of digital information reflected in the high costs of access to external databases and the procurement of digital information. This makes it increasingly difficult for libraries in Africa to subscribe to new journals, books and also maintain existing subscriptions. Libraries, the world over, have well established traditions of archiving hard copies of all materials that they acquire, be they journals, books, newspapers or pamphlets. But increasingly, it is becoming more and more difficult in the digital era for libraries to continue with this long established practice, because content providers are insisting that once subscription ceases, access to entire database also ceases. Whereas such restrictions are not applicable to print resources, they are being imposed on electronic resources.

The digital divide is increasingly becoming a complex phenomenon to unpack. Crump and Mcllroy (2003) discussing a community-based project in Wellington, New Zealand wonder why when computing is available in a socially situated, convenient environment, at no cost, some people choose not to compute. Similarly, Lenhart et al. (2003), in a research project also in Wellington, New Zealand with economic as well as social inclusion objectives, noted that not all "have nots" necessarily want to be "haves" and neither do they view engagement in ICTs as a positive force that would transform the quality of their life. Similarly, in Northern Ireland (UK), free provision of computers, fast Internet access and a Website to residents/ business in the town of Ennis, in 1997 to enhance ICT uptake and modernise society were of limited use. Three years later, there was little to show because technology had been thrust into people's hands with little preparation. Training programs had been run, but they were not sufficiently accompanied by awareness programs as to why people should use the new technology in the first place.

In some regions of rural India, knowledge centres that were set up to provide information that is largely of local content nature such as market prices for crops, job listings, details of government welfare schemes and health advise, etc, have been reported as fuelling rural-rural digital divide. Some residents living in the centres' neighbourhood have

been reported not to know what the knowledge centres are all about. Likewise, in India, New Delhi's "Hole-in-the-Wall" project that was set up to provide computer access to the city's street children in one of the poorest slum, though well intentioned, did not achieve the desired outcome. The computers were connected to the Internet through dial-up access (Warschauer, 2002); however, Internet access was of little use since it seldom functioned. This was in part attributed to the fact that no special educational programs had been made available, and no special content was provided in Hindi, the only language the children knew. The project was perceived by some parents as a distraction of students from focusing on their school work. Similarly in Africa, telecentres were meant to enhance rural connectivity and help bridge the digital divide (Lenhart et al., 2003), but several years down the line, there is little to show in terms of bridging the rural-rural and rural-urban digital divide. These scenarios contrast with optimism of the 1990s that rural ICTs would leapfrog development, information societies and host of other electronic age applications for the excluded communities (Warschauer, 2002).

The access and use factors in digital divide equation need further research to be well understood. Green (2000), citing data from the Education Week (2000) teacher survey in the US, observed that when teachers were asked why they do not use software or the Internet for instruction, they reported the following reasons that have nothing to do with access:

- There is a lack of time to prepare and preview software or Websites.
- There is a lack of training on software.
- Too much time is needed to use technology.
- Technologies are not aligned with curriculum and assessment.
- It is difficult to find software to meet student needs.

The digital divide, especially in developing world, including Africa, is of global political and development concern. The United Nations 2005 Report (United Nations, 2005) observes that the spread of information technologies to a select group of people in the world was worsening the disparities between the e-haves and the e-have-nots, thus fuelling the danger that unequal diffusion of technology, far from fomenting cohesion by providing opportunity, would result in reinforcing the traditional patterns of economic and social inequalities which could lead to the weakening of social bonds and cultural organisation. Kofi Annan, former Secretary-General of the United Nations, during the 2003 World Summit on Information Society (WSIS) in Geneva, lamented that for too many people in developing countries, especially in Africa, the gains of ICT remained out of reach. The International Telecommunication Union (2005) in its publication 'ICT Opportunity Index' in time for the second WSIS meeting in Tunis in 2005 reported that digital opportunities are unequally distributed between developed and developing countries and suggested that the gap between the ICT-poorest countries and most others is actually growing. The publication concluded that, literally, the 'have' and 'have-not' countries are worlds apart. Moreover, countries most affected were heavily concentrated in Africa. Similarly, the G7 group of countries in a conference on 'information society and development' in South Africa in May 1996 concluded that a large gap existed between industrialised and less industrialised countries in terms of information infrastructure. The gap was occasioned by far the less investment in ICT infrastructure by developing countries. In sub-Saharan Africa, only a few countries are better Internet-bandwidth-supplied. In 2002, only ten African nations had more than 5 Mbps and the 23 other Internet-connected countries had less. Moreover, Africa lacks a regional network; but rather, each country separately connects to the more expensive overseas circuits using satellites (Information Technology Services, 2004). The resultant bottom line effect is the inequitable access to information (Internet World Statistics, 2007).

The role of libraries in helping close the digital divide cannot be overstated. Bill Gates observed that 99% of benefits of having a PC come when you have provided reasonable … literacy to a person going to sit down and use it (The Economist Newspaper and The Economist Group, 2005). Libraries have the capacity and competencies to effectively undertake such literacy to enhance ICT usage. Libraries can also do more, for example, Albert Gore, former US Vice President in the Clinton administration, used the phrase 'digital divide' for the first time in 1996 and observed that '… as part of our empowerment zone initiatives we launched this cyber-Ed Truck, a book mobile for the digital age … it is rolling into

communities, connecting schools in our poorest neighbourhoods and paving over the digital divide' (Miranda, 2006). Mobile library services are ways public libraries have traditionally used to reach the marginalised in society who have no access to information. They can use the same model to extend mobile Internet services to areas not served with fixed line Internet connectivity

Moreover, within the networked world, information, especially on the Internet, is growing at phenomenal rate without adequate tools for bibliographic control, searching, filtering and retrieval. The search engines, as already pointed out, are inadequate tools, as they do not review the documents, subject directories and gateways, and only cover limited materials. Libraries can help by developing tools that make it easier to organise and access information on the Internet. Likewise, libraries could help in promoting the services of telecentres that were established in most parts of Africa to help bridge the digital divide through information literacy provision, repackaging of information to suit different tastes and developing content of immediate relevance to the people.

Conclusion

The networked world fired by the engines of ICTs has fundamentally brought new ways of creating knowledge, educating people and disseminating information, running government, speedy information delivery mechanisms, etc. A networked world links people to people, people to business, people to information, and people to culture. It encompasses traditional telecommunications and computing systems, and also employs new frameworks that move data, audio and video via increased bandwidth, wireless technologies and systems. The consequence of the networked world is generation of large amounts of e-information and the accompanying challenges in managing such e-information in all sectors of nation's economy.

The role of libraries in the networked world should be perceived in the context of the four paradigm shifts discussed in this article that currently define the global information environment, namely: information society, e-government digital divide, and e-learning/digital scholarship. These paradigm shifts demand libraries to put in place mechanisms to harness e-information to effectively partake in the networked world. Moreover, as the networked world continues to evolve, it is occasioning improvements in network speed, seamless integration, network intelligence and security that will enable those libraries that have connectivity to reap the benefits of digital age. Africa's libraries should consult with authors, publishers, and other stakeholders to work together to develop suitable business models for Africa that would address issues of restrictive copyright regimes for enhanced access to digital content. For Africa's libraries to succeed in positioning themselves to effectively participate in the evolving networked world, they must address challenges related to infrastructure, content organisation, digital literacy, none use of available ICT facilities, capacity building, etc. However, libraries can play their rightful role in the networked world, if governments can also play their part by providing adequate infrastructure and enacting enabling policies that promote open Internet access to stem the widening digital divide that hampers implementation and support of e-government, e-learning, and move towards information society by Africa's libraries.

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* Prof. Stephen Mutula is Associate Professor in the Department of Library and Information Studies, University of Botswana. He is currently a visiting professor at the Department of Information Science, University of Zululand, South Africa. He holds PhD (Information Science), MLIB, PGD Com Science, and B.Ed.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 103 - 117

Theoretical Framework and Literature Review in Graduate Records Management Research

Henry N. Kemoni

School of Information Sciences, Moi University, P. O. Box 3900 Eldoret, Kenya
hkemoni@yahoo.com

Abstract

The paper discusses the importance, characteristics and benefits of a good literature review, and highlights some of the models/ theories that may be adapted to develop the theoretical framework in graduate records management research or thesis/dissertation. The paper emanates from the author's experiences as a tutor of the research methodology module to graduate students at the School of Information Sciences, Moi University, Kenya, and of the very common problem of such graduate students being unable to undertake good reviews of the literature or develop adequate theoretical framework for their research. The paper explains the concepts of records management, models and theories, and explores the link between theories and models in scientific research. Some of the existing records management models/theories and their suitability in investigating issues relating to the management of paper and electronic records are subsequently described and analyzed. The discussion of the models presented in this paper should be of interest to students and researchers undertaking master's and doctoral programmes in records and archives management schools within and outside Africa. Students and researchers should however evaluate the models themselves, in terms of their adaptability and relevance to the African setting, and adapt them to fit their research objectives and contexts.

Keywords

Records management, research, literature review, models, theoretical framework.

Introduction

Most universities, colleges and schools offering graduate education and training in records and archives management require that students write a master's or doctoral thesis/dissertation. For example, the newly established Master of Philosophy degree programme in Information Sciences (Records and Archives Management) at Moi University, Kenya, requires students to undertake coursework, as well as write a thesis which is equivalent to 20 units of coursework. The full-time Master of Philosophy degree programme in Information Sciences (Records and Archives Management) option takes 24 months and extends over four semesters, and the programme consists of 55 lecture units or their equivalent. The first year of study is devoted to coursework, developing research proposal and to the practical project. In the second year, semester one is devoted to thesis work, while semester two is devoted to thesis work and coursework. Thus, the thesis takes 20 units, while coursework and the project take 35 units of the students' time.

Oliver (2004) points out that a thesis is a piece of academic writing which reports on a research study. However, there is much diversity in both the structure and the content of master's and doctoral theses. Oliver (2004) observes that the components of a research proposal include an overview of the

context and related literature. The author further observes that one of the characteristics of a good thesis is adequate review of the literature, which is sufficiently contemporary to demonstrate the way in which the thesis is building upon contemporary research.

The key aspects of a research proposal include conducting an extensive literature survey, in order for the researcher to get acquainted with the selected research problem (Kothari 2004). The author opines that there are two types of literature - the conceptual literature concerning the concepts and theories, and the empirical literature consisting of studies made earlier, which are similar to the one proposed. Wisker (2001) points out that one of the positive features of a successful MPhil or PhD thesis is the candidate's engagement with the literature. Often, however, graduate students experience problems in writing their literature review chapter and choosing an appropriate theoretical model or framework for their research.

The discussion that follows defines the term records management and presents what may constitute a good chapter on literature review. It also highlights the role of theories and models in scientific research and some of the existing records management theories/models and their application in graduate research in the field.

Records Management

There is no universally accepted definition of the term "records management" and this is an indication that the discipline of records management is dynamic (Yusof and Chell 1999). However, ISO 15489-1 (2001) issued by the International Standards Organisation defines records management as the field of management responsible for the efficient and systematic control of the creation, receipt, maintenance , use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records.

Government of South Australia (2005) notes that there are a multitude of benefits that can be expected from agencies and authorities achieving adequate records management such as:

- Ability to mitigate the considerable risks associated with inadequate records management practice, specifically, accountability, transparency, sound corporate governance, and public sector efficiency.
- Compliance with statutory requirements.
- Ability to provide enterprise-wide access to documents, records and information resources contained within multiple databases.
- Ability to manage electronic documents and records as inviolate and credible evidence.
- Knowledge of fundamental records management practices and how they relate to Freedom of Information and Information Privacy principles.
- Increased productivity and individual accountability.

Benefits and Characteristics of Literature Reviews

The benefits of conducting a literature review in any study were highlighted by various scholars (Peters, 1994; Saunders, Lewis and Thornhill, 1997; Birley and Moreland, 1998; Stilwell, 2000, 2004; Kaniki, 2002; Kothari, 2004; Pearce, 2005). Birley and Moreland (1998) pointed out that a literature review assisted in the achievement of a critical analysis of the existing literature in the proposed research area, in clarifying and framing research questions as it discovered what has been done and not done, prior to the proposed research, and in the provision of a comparative account of the suitability, advantages and disadvantages of particular research methodologies chosen in the past, which are relevant to the study. Other purposes include the literature review being useful in discovering research findings and how they relate to the existing appropriate literature.

A chapter on the literature review/theoretical framework needs to have boundaries, as one would not review everything, and there is also a need to state how one decided to limit the field (Bak 2004). According to Oliver (2004), the word "review" indicates that one should summarize the broad content of the research study, and also indicates clearly linkages with other studies in the field. Furthermore, the principle purpose of a literature review is to establish the academic and research areas that are of relevance to the subject of the research.

The characteristics of a good literature review include being exhaustive but not necessarily bulky, representative, directly related to the research

problem and being reviewed in chronological order (Peters 1994). Other characteristics are the review being critical and analytical and not resorting to castigating other scholars, if they fell short of a researcher's expectations. Saunders, Lewis and Thornhill (1997) observed that a literature review needed to be critical and should incorporate key academic theories within the chosen area of study and show how the research related to previous published research. It also needs to assess the strengths and weaknesses of previous work, including omissions or bias, taking into account central arguments and justifying arguments by referring to previous research.

A good literature review needs to indicate the different views, agreements, disagreements, and trends of thought on the topic of research and be accurately portrayed and acknowledged in the text (Stilwell 2000). It needs to produce a conceptual framework, including philosophical stances and theoretical assumptions and key assumptions and theoretical problems or contradictions; that is, the problems or issues set on the theory and structured around a clear focus on the research objectives. The essential requirements of a successful literature review are its evaluation, as well as its citation of the field, and its attempt to relate the work(s) reviewed to the thesis itself, either directly or indirectly (Pearce, 2005).

There are various types of literature review (Kaniki, 2002). These are:

- Historical reviews, which consider the chronological development of the literature, and breaks the literature into stages or phases.
- Thematic reviews, which are structured around different themes or perspectives, and often focus on debates between different schools.
- Theoretical reviews, which trace the theoretical developments in a particular area, often showing how each theory is supported by empirical evidence.
- Empirical reviews, which attempt to summarize the empirical findings on different methodologies.

Bak (2004) gives guidelines on what constitutes a literature review/theoretical framework chapter, namely:

- It should indicate the boundaries of the literature review.
- Clarify the way in which key concepts which the study draws from are used.
- Discuss the literature consulted in an organised and structured manner by grouping readings together under suitable themes. and
- End chapter with an overview of the main points that have emerged from the literature review.

Wisker (2001) notes that engagement with the literature constitutes one positive feature of postgraduate research work. A chapter on literature review should:

- Display comprehensive coverage of the field.
- Show breadth of contextual knowledge in the discipline.
- Successfully critique established positions.
- Engage critically with other significant work in the field.
- Draw on literature with a focus different from the viewpoint pursued in the thesis.
- Include scholarly notes, a comprehensive bibliography and use accurately academic conventions in citations.

The following discussion highlights the role of theories in research and the need for a theoretical framework. It also presents the link between theories and models in graduate research.

Theories, Models and the Theoretical Framework

According to Zeidler (n.d), doctoral students fear to hear those now famous words from a supervisor: "that sounds like a promising study, but what is your theoretical framework?" The author further points out that a theoretical framework may be a theory, and it answers two basic questions: what is the problem and why is your approach a feasible solution? The answers to these two questions can only come from one source, a thorough review of the literature.

The role of theories in scientific research has been highlighted by various scholars (Dale 1998; Mugenda and Mugenda 1999; Stacks and Hocking 1999; Cozby, 2001). According to Dale (1998), theories enabled researchers to draw new conclusions, improve action, and generate more sophisticated theories. Theories were drawn from observation and confirmed by observation, for example, Isaac Newton, who saw the apple fall and developed the theory of gravity.

A theory is a system for explaining phenomena which states constructs and the laws that interrelate the constructs to one another (Mugenda and Mugenda, 1999). Scientific theory serves several purposes, namely: to show commonalities in phenomena that may seem isolated at a glance; to help in making predictions and controlling events; to help to organize isolated findings from different research studies into an explanatory framework; and to help researchers to maintain consistency in any field of study. Theories are a set of interrelated constructs (concepts, definitions and prepositions) that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena (Stacks and Hocking, 1999).

Theories have four purposes in scientific research, namely: description, explanation, prediction, and control. Theories generate new knowledge and new hypotheses about behaviour, which could be confirmed or contested through research, and research could reveal weaknesses in a theory and force researchers to modify or develop a new and more comprehensive theory (Cozby, 2001).

Models can be used to explain theories. The role of models in research is documented (Koutsoyiannis, 1979; Katz and Harvey, 1994; Dwivedi, 2001; Kebede, 2002). A model is a simplified representation of a real situation, including the main features of the real situation it represented. There are two main purposes of a model, namely: analysis and prediction (Koutsoyiannis, 1979). The validity of a model could be judged on several criteria, namely: its predictive power, the consistency and realism of its assumptions, the extent of information it provided, and its generality and simplicity. The physical world is too complicated to be studied without recourse to models.

According to Stockburger (2004), a model is a representation containing the essential structure of some objects or events in the real world and the representation of models may take two major forms, namely: physical, as in model airplane or architect's model of a building; or symbolic, as in a natural language, a computer program, or a set of mathematical equations. The author opines that the goal of the scientist is to create simple models that have a great deal of explanatory power, and models are necessarily incomplete and may be changed or manipulated with relative ease. Furthermore, the construction and verification of models involves four steps, namely: simplification/idealization, representation/measurement, manipulation/ transformation, and verification.

A model is a description of phenomena that is abstracted from the details of reality (Katz and Harvey, 1994). "Abstracting" from details means ignoring those details that are not directly essential to the understanding of the phenomenon at hand, hence enabling individuals to concentrate on important factors. Katz and Harvey (1994) established the link between theories and models by quoting the great theoretical physicist, Stephen Hawking, who noted that a theory was a good theory if it satisfied two requirements: accurately describing a large class of observations on the basis of a model that contains a few arbitrary elements and making definite predictions about the results of future observation.

The relevance and applicability of models to the real world depends on three factors, namely: realism of the model assumptions, consistency of the assumptions with one another, and accuracy of the data to validate the assumptions (Dwivedi, 2001). Kebede (2002) posited that models are useful for specifying what constituted the phenomena of interest, identifying research focuses, and advancing theory in relation to the phenomena they modelled.

Some Existing Records Management Models

Various records management models have been developed by national archival institutions, archives schools, international professional records and archives management organisations, and records and archives management scholars. According to Shepherd and Yeo (2003), all the models originated from the records life-cycle and records continuum approaches. Models focus on the management of electronic records, while others emphasize the management of both paper and electronic records. Tough and Moss (2006) point out, however, that among record-keeping professionals, the life cycle and the records continuum models have dominated discourse, with the life cycle approach challenged by the records continuum model. A literature search nevertheless revealed the following as some of the existing records management models:

- The Records Life-cycle Concept/Theory

- The Records Continuum Model
- The International Council on Archives (ICA) Electronic Records Management Guidelines (Model)
- The National Archives of Australia Records Management Guidelines (AS ISO 15489 2002)
- The National Archives of Australia Digital Recordkeeping Guidelines 2004
- The National Archives and Records Service of South Africa Guidelines (Model)
- The National Archives (TNA) 2005 Model
- The Victorian Electronic Records Strategy Model (VERS)
- The University of Pittsburgh Electronic Records Management Model
- State Records Authority of New South Wales
- The Design and Implementation of Record Keeping Systems (DIRKS) Model.

In the discussion that follows, each of the above models is presented, including their key elements and relevance to graduate research in records management. According to Shepherd and Yeo (2003), since the 1950's, many variants of the records life-cycle concept have been modelled. Most models aim to show a progression of actions taken at different times in the life of a record: typically, its creation, capture, storage, use and disposal. Some writers show this as a linear progression, while others describe a loop or circle. Thus, the theoretical base of the models presented in the paper above is the records life-cycle concept/theory (Shepherd and Yeo 2003).

Records Life-cycle Concept/Theory

The development and application of the Records Life-cycle concept in records management is a subject of discussion (Penn, Pennix and Coulson, 1994; Mnjama, 1996; Millar, 1997; Yusof and Chell, 2000; Shepherd and Yeo, 2003; Ngulube and Tafor, 2006). The Records Life-cycle theory was developed in the USA after the First World War, by the then National Records and Archives Administration (Penn, Pennix and Coulson, 1994). Mnjama (1996) observed that under the records life-cycle, records passed through three stages, namely: creation, semi-active and non-active stages. Yusof and Chell (2000) stated that the development of the records life-cycle concept began in the USA in the 1930s and was invented by the National Archives of the USA, in response to the ever-increasing volume of records produced by organisations. The records life-cycle concept had been regarded as a theory which provided the framework for the operation of a records management programme.

According to Millar (1997), the records life-cycle concept was an analogy of the life of a biological organism, which was born, lived and died. In the same manner, a record was created, used as long as it had continuing value and was subsequently transferred to national archives or destroyed. The records life-cycle concept had four phases, namely: creation, distribution, maintenance and use, and appraisal and disposition. Shepherd and Yeo (2003) observed that since the 1950s, many variants of the records life-cycle concept have been modelled, and most models aimed to show a progression of actions taken at different times in the life of a record: typically, its creation, capture, storage, use and disposal. Some writers showed this as a linear progression, while others described it as a loop or circle.

Though the records life-cycle concept has influenced the development of records and archives management in many parts of the world, it has had its own critics. Atherton (1985) opined that the records life-cycle theory created a distinction between the roles of records managers and archivists during the records life-cycle. He proposed that the records life-cycle be changed into a more unified model consisting of four instead of eight stages, hence the records continuum model. Atherton (1985) argued that although the records life-cycle concept had been useful in promoting a sense of order in the overall management of records, strict adherence to its principles undermined any trend towards greater co-operation and co-ordination among archivists and records managers and hence ignored the many ways in which records and archives operations were interrelated.

The weaknesses of the records life-cycle concept, particularly, its application in managing electronic records, were noted by Yusof and Chell (2000). The authors pointed out that the records life-cycle concept would not be used in managing electronic records and needed to be replaced by a model which appropriately reflected the special characteristics of electronic records. In discussing

the weaknesses of the records life-cycle model in relation to management of electronic records, Yusof and Chell (2000) emphasised that as technology changed, the record was prone to transformation and conversion. The concept of the records continuum had thus been promoted in the records management world, as it addressed the management of paper and electronic records.

The perceived weaknesses of the records life-cycle concept led to the development of the records continuum model. Thus, the records life-cycle theory may be more applicable to those studies dealing with management of paper based records in organisations. The theory is not suitable for studies investigating management of electronic records.

Records Continuum Model

The records continuum model has gained acceptance worldwide as the best practice model for managing records and archives, including electronic records, as pointed out by An (2001). The author opined that the evolution of the concept of records continuum shows the processes of records management and archives management moving towards integration. The advantages of the records continuum model over the life-cycle model demonstrate that the mechanism behind the best practice is the integration of the management of documents, records and archives. Integrated approaches, integrated control and integrated framework can be components of a best practice framework. The records continuum model was more applicable in records and archives management studies, and therefore can be used as theoretical foundation of studies dealing with management of both paper and electronic records and archives.

The records continuum model is a subject of discussion by records and archives management scholars and institutions (Atherton, 1985; Millar, 1997; Sletten, 1999; Picot, 1999; Upward, 1998; McKemmish, 1998; An, 2001; Pemberton, 2003; Shepherd and Yeo, 2003; State Records New South Wales, 2004; Curtin University of Technology, 2005). The following discussion presents the model and its relevance to the study.

The records continuum model consolidated the eight stages of the record life-cycle concept into four stages, namely: creation, classification, scheduling and maintenance, and use of information (Atherton, 1985). Under the records continuum model, archivists and records managers would be involved in all the stages of managing records. The following would thus be realized: ensuring the creation of the right records containing the right information in the right formats; organizing the records to facilitate their use; systematically disposing of records no longer required, and protecting and preserving records.

The records continuum model originated from Canada, but was developed and adopted in Australia (Bantin, 2002). McKemmish (1998) recorded that the continuum model was developed by her Australian colleague, Frank Upward. The model provided a graphical tool for framing issues about the relationship between records managers and archivists, past, present and future, and for thinking strategically about working collaboratively and building partnerships with other stakeholders. Shepherd and Yeo (2003) stated that the records continuum concept was developed in the 1980s and 1990s, in response to criticism of the life-cycle models. In a continuum, there were no separate steps. Managing records was seen as a continuous process in which one element of the continuum passed seamlessly into another.

Concurring with Shepherd and Yeo (2003), Pemberton (2003) felt that the records continuum concept was a variation of the records life-cycle concept, and that it took a higher-order intellectual view of records, since it followed an integrated model rather than one made up of stages. The model stressed the need for records professionals to be involved in the earliest planning stage of information systems. The four actions of records care under the records continuum model were (Millar 1997):

- Identification and acquisition - Records management actions are the creation or acquisition of records, while archives management actions relate to the selection and acquisition of archives.
- Intellectual control - Records management actions include classification of records within a logical system, while archives management actions relate to the arrangement and description of archives.
- Access - Records management actions relate to the maintenance and use of records, while archives management actions relate to the

description of archives.

- Physical control - Records management actions are the disposal by destruction of records, or their transfer to the national archives, while archives management actions relate to the preservation of archives.

The structural principles of the records continuum model, as presented by Upward (1998), relate to the concept of "records" which was inclusive of records of continuing value and which stressed their uses for transactional, evidential and memory purposes, and which unified approaches to archiving/ recordkeeping. Other structural principles focus on records as logical rather than physical entities, regardless of whether they are in paper or electronic form. Institutionalization of the recordkeeping profession's role requires a particular need to integrate recordkeeping into business and societal processes and purposes.

According to the State Records New South Wales Recordkeeping Manual (2004), the records continuum model offers an integrated approach to managing records, particularly electronic records. The model recognized that records passed through identifiable stages, but the stages acted as a point of reference rather than as functions of records management. The model allows records managers and archivists to operate at the appropriate stages of the records continuum to meet their sometimes different but harmonious objectives.

Citing the Australian Records Management Standard, AS 4390, Sletten (1997) defined the records continuum model as a consistent and coherent regime of management processes, from the time of records creation to their preservation and use as archives. Under the model, records do not pass through distinct stages, the records continuum model stages, as implied in the records life-cycle model. These stages were interrelated in the records continuum model, forming a continuum on which both records managers and archivists are involved to varying degrees in the management of recorded information.

Discussing the benefits of the records continuum model, McKemmish (1998) explained that the model provided a way of conceptualizing recordkeeping in organisations. It had the following features:

- identified key evidential, recordkeeping and contextual features of the continuum and placed them in relationship to each other.
- represented the multidimensional nature of the recordkeeping function.
- mapped the evidential, recordkeeping and contextual features of the continuum against the dimensions of the recordkeeping function.
- was itself placed in a broader socio-legal and technological environment.

According to Curtin University of Technology (2005), the records continuum model helped clarify the nature and scope of recordkeeping in organisations and society. The model presented an overview of a seamless and dynamic recordkeeping regime that transcended time and space to capture and manage records for as long as they were required to satisfy business, regulatory, social and cultural requirements.

Although the records continuum model has been, and continues to be, of benefit to recordkeeping professionals, the model has generated certain concerns and fears amongst them. For example, Picot (1999) observed that the model and notions of its theory generated a certain reaction of fear and loathing in many people in the records and archives industry. The fear was that records managers and archivists shared both territory and professional competencies and thus, the continuum model posed a threat to their autonomy. She cautioned that, though the model would be invoked to justify restructuring, job cuts or changes in workplace practices, these would not invalidate its usefulness.

ICA Electronic Records Management Model

The ICA model (2005) was developed by the ICA committee on electronic records, and was designed to help archival institutions reposition themselves to address the management of archival electronic records. The model discussed the technological, organisational and legal trends that impact on the ability of organisations, including archives to keep and manage records that are in electronic form. The key issues addressed by the model are: records in a database environment; records and archives in the electronic age; strategies for managing electronic archives; preservation of electronic archives, access and legal and policy implications for electronic archives.

Whereas the theoretical base of the ICA

electronic records model is provided by the records life-cycle and records continuum approaches (Shepherd and Yeo 2003), it is noted that there is a point of divergence between the ICA electronic records model and the records life-cycle theory. Whereas the records life-cycle concept/theory described the stages that a record passed through, namely: creation, distribution, maintenance, use, and disposition, and is not applicable in managing records in electronic formats (Yusuf and Chell 2000), the ICA electronic records model provides guidelines for managing and preserving electronic records. The model further points out the technological, policy and legal environment that may impact on the management, preservation and access of electronic records and archives.

The ICA (2005) model may be suitable to studies that deal with preservation, management, and access to electronic records and archives within archival institutions. The ICA is the professional organisation for the world archival community dedicated to the preservation, development and use of the world's archival heritage, and brings together national archival institutions, professional associations of archivists, regional and local archives, as well as individual archivists (ICA 1997). Since electronic records do not necessarily pass through a life-cycle, the ICA electronic records model borrows from the records continuum model. The records continuum model stresses the need for archivists and records managers to be involved in the management of records in paper or electronic formats, an aspect that the ICA electronic records model captures. The major strength of the ICA electronic records model is that, besides addressing the strategies for managing records in electronic formats, it addresses the policy, technological and legal framework for managing electronic records.

National Archives of Australia Records Management Model

The National Archives of Australia Records Management Model is based on the Australian Standard AS ISO 15489 2002. The Australian Records Management standard borrowed from the International Records Management AS ISO 15489-1 Records Management Standard (2001). The first records management standard AS4390 was developed in Australia (Swan, Cunningham and Robertson 2002). The State Records of South Australia (2004) further noted that, Australia became the first country in the world to approve a standard on records management –AS 4390. Thus, AS ISO 15489 2002 replaces the old standard AS 4390 developed in 1996.

The State Records of South Australia (2004) notes that AS ISO 15489 2002 provides guidance on managing records in both public and private organisations to ensure that an organisation's systems create, capture and maintain records. The standard applies to the management of records in all formats or media, created or received in the conduct of an organisation's activities, and provides instruction on the design and implementation of a records system. The State Records of South Australia (2004) notes that some of the key elements of the National Archives of Australia AS ISO 15489 2002 are:

- Records-creation to archive;
- Planned management of official records;
- Designing and implementing a records system;
- Recordkeeping metadata;
- Creating, capturing, classifying, storing, finding and managing access to official records;
- Appraisal, and disposal of records;
- Records management policies, procedures and practices;
- Records management training; and
- Disaster management.

The National Archives of Australia Records Management Model is suitable for those studies investigating how records are managed in organisations during their active life. Thus, the theoretical base of the model is the records life-cycle and records continuum approaches. The National Archives of Australia Records Management Model is suitable for graduate research, since it is based on International Standard ISO 15489-1 (2001)-Information and Documentation-Records Management which has universal applicability. ISO 15489-1 (2001) applies to management of records in all formats; provides guidance on determining the responsibilities of organisations for records and records policies, procedures, systems and processes; provides guidance on records management in support of a quality process framework to comply with ISO 9001 and ISO 14001; and provides guidance on the design and implementation of a records system.

Although the AS ISO 15489 2002 model addresses the question of disaster management, it does not exhaustively discuss how archival records are managed and lays emphasis on managing records during their active phase. Thus, the model may not be suitable to graduate research in records and archives management investigating the management of archives in paper and electronic formats. This tends to contradict the records continuum principle, which perceives records and archives management as one unified discipline (Shepherd and Yeo (2003).

National Archives of Australia Digital Recordkeeping Guidelines 2004

The National Archives of Australia (2004) has also developed digital recordkeeping guidelines which address the creation, management and preservation of digital records. The guidelines cover the following areas namely: importance of digital records, digital recordkeeping framework, creating digital records, creating information about digital records, determining how long to keep digital records, storing and securing digital records. Other areas covered include business continuity planning for digital records, preservation, access and disposal of digital records. The guidelines further provide information on managing some common types of digital records such as electronic messages, web-based digital records, and records subject to online security processes and records in business information systems. Students undertaking graduate research regarding management and preservation of electronic records may consider using these guidelines as the theoretical foundation of their research.

The major strength of the National Archives of Australia Digital Recordkeeping Guidelines (2004) is that they provide a comprehensive help to assist organisations manage their electronic records. The guidelines also address the key challenges associated with management of electronic records such as creation and capture of electronic records, storage security, appraisal, disposal and business continuity planning for electronic records. Furthermore, the guidelines provide help relating to managing web-based digital records.

National Archives and Records Service of South Africa Records Management Model

The mission of the National Archives of South Africa is to foster a national identity and the protection of rights by preserving a national archival heritage for use by the government and people of South Africa, and promote efficient, accountable and transparent government through the proper management and care of government records (National Archives of South Africa 2005). The mission stems from the recognition that the racialised fragmentation of a South African identity and the violation of rights, which had characterised the Apartheid political system, needed to be redressed, in order for a post-apartheid democratic social order to become entrenched.

According to the National Archives of South Africa Records Management Model (2005), the responsibility for records management should be shared among record creating organisations, record users, and the National Archives and Records Service. According to the model, the elements of a sound records management programme for both paper and electronic records include the presence of a records management policy endorsed by the heads of government bodies and their top management teams, as well as by the national archives and records service; records management procedures to back the records management policy and such procedures should be designed by the national archives and records service and taking into account the unique functions, structures and resources of each government body.

Other elements of a sound records programme include presence of records classification systems which should include a file plan, schedules for records other than correspondence, paper-based records other than correspondence systems, microfilm records, electronic records system, and audio-visual records. Other elements include the presence of records disposal programme, which should be implemented by applying the national archives and records service general disposal authorities for records that are common to most offices and ensuring that disposal authorities are carried out on a regular basis. The issue of records managers attending

training courses designed by the national archives and records service is also covered.

The South African Records Management model may be applicable to graduate research in records management that seeks to investigate the role of national archival institutions in managing public sector records and the partnership between a national archives and government agencies in developing a records management infrastructure. Thus, this may involve investigating aspects such as the involvement of a national archives in developing current systems and procedures used for managing records, presence or absence of records management policy, and record classification schemes used, and procedures for the control of records, records appraisal and disposal and provision of records management education and training to registry staff. It is noted that although one of the core mandate of a national archives is to acquire, preserve and ensure access to archival materials, the South African Model may not be applicable to graduate research investigating role of a national archives in preserving and managing its documentary heritage. Furthermore, the model attempts to address the management of records following the various stages of a records life-cycle, thus the theoretical foundation of the model is the records life-cycle concept/theory.

In addition, the National archives and records service of South Africa has developed electronic records guidelines, which require government bodies to implement and maintain integrated document and records management systems. The guidelines were borrowed from US DoD 5015.2 Design criteria Standard for Electronic Records Management Systems and the UK Public Records Offices Functional Requirements for Electronic Records Management Systems (National Archives and Records Service of South Africa, 2005).

These guidelines provide, as a minimum, the following electronic records management functionality, namely: managing the following: a corporate file plan according to which records are filed; e-mail and web-sites as records, disposal processes, constructing and managing audit trails, record version control, managing the integrity and reliability of records, and managing records in all formats an integrated manner. The strength of the South African electronic records guidelines is that although they borrowed from the US DoD 5015.2 Design Criteria Standard for Electronic Records Management Systems and the UK Public Records Offices Functional Requirements for Electronic Records Management Systems, the guidelines are domesticated to suit the African environment. Furthermore, they also address the management of e-mails and web-sites records.

National Archives (TNA) Records Management Model

According to Blake (2005), the TNA 2005 model is based on the British Records Management Code. The Freedom of Information (FOI) Act was implemented fully in the United Kingdom in 2005. The Act creates a right of access to official information and places a duty on public authorities to publish information in accordance with publication schemes and maintain their records in accordance with the provisions of a Code of Practice issued by the Lord Chancellor under section 46 of the Act giving guidance on the practice which, in his opinion, it would be desirable for them to follow in connection with the keeping, management and destruction of records (British Records Management Code).

Blake (2005) further observed that TNA developed the code to assist public authorities in assessing conformance of their records management systems to the Records Management Code (The Records Management Code is available at: http://www.dca.gov.uk/foi/codesprac.htm) to comply with the FOI Act. The Code is divided into two parts: Part 1 sets out practices which relevant authorities should follow in relation to the creation, keeping, management and destruction of their records, while Part 2 describes the arrangements which public record bodies should follow in reviewing public records and transferring them to the Public Records Office (now known as The National Archives).

The TNA 2005 model focuses on areas listed in the Records Management Code for action, and the Model elements include the following:

- Records management function, needed to establish records management as a strategic corporate function and close links between records management and Freedom of Information Legislation, data protection, and other information management functions;

- Records management policy statement, supported and mandated by senior management across the organisation;
- Roles and responsibilities clearly defined and provision of training awareness to records staff;
- Active records management, records creation and recordkeeping;
- Records maintenance through adequate storage facilities, tracking systems, access controls and business recovery plans;
- Records disposal through use of retention and disposal schedules;
- Establishing an appropriate records access regime to manage requests for information under the FOI Act 2000;
- Performance measurement to relate records activities to needs, to assess the efficiency or effectiveness of records activities, and to demonstrate value and accountability;
- Risk evaluation and development of records mitigation strategies: risk reference, risk type, description of risk, indicators, related programme objectives, countermeasures, contingency, senior officer responsible; Sector specific guidance and regulations of records management: central government (departments, agencies, and non-departmental public bodies), Northern Ireland, Scotland, local government, health sector, education and police.

Although the TNA (2005) model was specifically developed to make public agencies restructure their records management practices to meet the requirements of the FOI law which came into force in the United Kingdom in January 2005, the model may be relevant to graduate research in records management that seeks to investigate aspects relating to the role of a national archives in providing records management advice to public agencies in line with the requirements of FOI in other countries where FOI law has been enacted. Thus, the model is applicable in those studies dealing with records management and implementation of FOI laws.

Victorian Electronic Records Strategy (VERS) Model

The VERS Model (2004) developed in Australia is a framework of standards, guidance and implementation projects, which were centred on the goal of reliably and authentically archiving electronic records created or managed by the Victorian government. The model has the following functions:

- Specifies a single, minimal framework for the management of electronic records.
- Specifies long-term format for the capture of electronic records, which need to be preserved for an extended period.
- It is generic but extensible, so that it will work in conjunction with agency's existing recordkeeping and business practices.
- Ensures that all records are stored in a long-term format to facilitate viewing of records in the distant future, regardless of the system that created them.
- Specifies methods to automate the capture of records from desktop and agency business systems.
- Ways and forms in which to capture information about records, and encapsulate this with the records to ensure that records in the future will be understood in context.
- Details methods for securing electronic records, so that unauthorised changes are detectable.

The model may be applicable to graduate research investigating electronic record-keeping in organisations, and in particular, issues such as creation, capture, preservation and security of electronic records. The VERS model has an implementation toolkit - a step-by-step guide to VERS implementation, information for vendors, and answers to frequently asked questions.

University of Pittsburgh Electronic Records Management Model

The University of Pittsburgh Electronic Records Management Model (2004) was developed as a result of a research project undertaken by the School of Library and Information Sciences at the University of Pittsburgh, United States of America (USA). The model integrated and built upon three existing branches of knowledge: business process improvement, information systems development and electronic records management and archival requirements. The model aimed at integrating records and archives management requirements and systems

development methodologies in an electronic records management environment. The model is more suitable to records management studies dealing with the design and implementation of electronic records management systems.

Design and Implementation of Record Keeping Systems (DIRKS) Model

The DIRKS model was produced by the National Archives of Australia in conjunction with the State Records Authority of New South Wales (The State Records New South Wales 2005). The model sets out a methodology which can be used for reviewing existing recordkeeping systems or building new ones. Tough and Moss (2006) note that DIRKS is an eight-stage methodology for the managed strategic improvement of recordkeeping systems. Some of the stages can be undertaken concurrently. The most up-to-date manual and other supporting materials are available from the National Archives of Australia Website (http://www.naa.gov.au). The stages of the DIRKS methodology are:

- Preliminary investigation of the organisation's boundaries, mission, decision-making processes, mandate and corporate culture;
- Analysis of business activity including the identification of core functions and the processes by means of which they are delivered;
- Identification of evidential needs and record-keeping requirements;
- Assessment of the organisations existing systems;
- Identification of strategies for recordkeeping;
- Design of a recordkeeping system;
- Implementation;
- Review and monitoring.

It is further noted by Tough and Moss (2006) that the DIRKS project approach is resource intensive and may involve the services of project managers, record-keeping professionals, information managers, information technology specialists, corporate governance and risk management specialists (including auditors and lawyers), business area experts, and staff representatives. The DIRKS model may be applicable to studies investigating the design and implementation of records management systems in organisations.

Additional Sources of Records Management Models

The models presented in this paper are by no means exhaustive. Postgraduate students and researchers are encouraged to consider using other records management models not highlighted in the paper, such as:

- Indiana University Electronic Records Project designed to implement and test the Functional Requirements for Evidence in Recordkeeping model developed by David Bearman, Richard Cox;
- New York State Archives, Models for Action: Developing Practical Approaches to Electronic Records;
- International Research on Permanent Authentic Records in Electronic Systems (InterPARES) Project based at the School of Library, Archival and Information Studies at the University of British Columbia;
- MoREq1 and MoREq2: Model Requirements Specifications for the Management of Electronic Records developed by the European Union. The model defines generic requirements for an electronic records management system (ERMS); and
- The International Records management Trust (2004) E-Readiness Tool aims to enable governments conduct high-level assessment of key areas of e-records readiness in relation to other aspects of e-government and to determine whether the records and information management infrastructure is capable of supporting e-government initiatives.

Summary and Recommendation

The paper has presented various theories/models that may underpin the theoretical framework for students undertaking graduate research in records management research. It defined the term records management and attempted to discuss the benefits and characteristics of a good literature review. The paper defined models and theories, and highlighted the link between theories and models in research. Various records management models and their suitability in records management graduate research were indicated. The paper has also provided

suggestions for further research. The discussion of the models presented in this paper should be of interest to students and researchers undertaking master's and doctoral programmes in records and archives management schools within and outside Africa. Students and researchers should also evaluate different model(s) themselves in terms of their adaptability and relevance to the African setting, and adapt them to fit their research objectives and contexts.

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* Dr. Henry N. Kemoni is Senior Lecturer at the School of Information Sciences, Moi University, Kenya. He holds PhD (Information Studies) from the University of KwaZulu-Natal, South Africa; Master of Philosophy, Moi University, Kenya; Post Graduate Diploma in Archival Studies from the School of Archival Studies, New Delhi, India; and Bachelor of Arts (Hons), University of Nairobi, Kenya.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 119 - 129

Information Technology and Web Use Characteristics of Nigerian Private Universities

Samuel C. Avemaria Utulu

Redeemer's University Library,
Redeemer's University, Redemption City, Mowe, Nigeria
yavehmaria@yahoo.com

Abstract

The different uses of the Internet by a university to provide and access appropriate web content define the university's Web characteristics. Studies of the Information Technology (IT) and Web characteristics of Nigerian universities so far have focused mostly on public universities. This study, therefore, evaluated the information technology (IT) and Internet availability, and the inclinations of academics to use Internet based outlets to access and disseminate research, in three purposively-selected Nigerian private universities. Observation, website analysis and questionnaire survey were used to collect data, with. 112 (37.3%) of the academic staff participating in the questionnaire survey. The study examined two web impact factors (WIF) - size and content of, and links received by, the universities' websites. The study found that IT and the Internet were readily available to academics in the universities. With regards to the WIF, however, only Babcock University had the right form of domain, although it had no in-links. Bells University of Technology had only one in-link, while Covenant University had five. The websites featured mostly non-academic contents, and none of them was linked by websites of other Nigerian universities. The academic staff used more web resources than they produced, as over 90% of them had downloaded research resources from the web, but less than 8 % of them had published their research on the web. The universities need to understand conventional global requirements for the development and deployment of websites and web resources in order to develop the web content and use characteristics that would improve their web presence and visibility.

Keywords

Information technology, web impact factors, private universities, Nigeria

Introduction

Africa's information use crises could be said to be in three eras, two of which predate the web presence measurement era. The first phase covered the colonial period and some years after colonial rule, when administrative data required for making informed socio-political and economic decisions were difficult to obtain. Sturges (1991) elaborates this extensively. The second era was characterized by the demand for scientific and technical information to serve the fast growing number of African academics and researchers engaged in different types of development research (Olanlokun and Issah, 1987; Altbach, 1998; Ikem and Ajala, 2000; Ochai, 2001; Edoka, 2002; Olanlokun and Adekanye, 2005). During this era, much of the research carried out in Africa were done without computerized systems, and therefore were not very accurate, and neither were they accessible, even to African researchers, policy makers and development agents residing in Africa. Technology and technical know-how required to share and use African contents were not available

and affordable (Aiyepeku, 1988; Wilson, 1989; Adedigba, et al., 1995; Alemna, et al., 2000; Adeyemi, 2002). Nwagha (1980) and Bii and Otike (2003) have highlighted the problems Africans faced during this epoch. The third era of information use crises is that of the digital age, wherein shortage of Internet content from Africa has resulted in the abysmally low web presence of African organisations, tertiary and research institutions, and countries.

Considering the opportunities and challenges of the digital era, there is high hope that the evolution of the Internet would, through its web resources and virtual libraries, help solve the information dissemination, access and use problems of academics and researchers in African universities. Internet use researchers are, however, still very much worried about the short supply of Africa-oriented research information on the Internet (Teferra, 1998; Chisenga, 1999; Aiyepeku, 2000; Oladele, 2001). Various reasons, like digital divide, inadequate awareness of the benefits of the Internet, cost of Internet technology and access, inadequate training and skills, lack of resources, poor writing culture, culture of secrecy in African societies, quality and relevance of African works, etc., have been advanced as the causes of the problem (Economic Commission for Africa, 1999; Keats, 2003; Adeogun, 2003; Roycroft, and Anantho, 2003; Ehikhamenor, 2003; Oyelaran-Oyeyinka and Adeya, 2004; Kawooya, 2006). Consequently, Chisenga (1999) wrote that "African universities and many other research-oriented institutions should encourage their academics and research staff to publish their works on the Internet."

African universities are keenly aware of the strategic importance of web visibility measurement indicators and rankings to their respective missions to contribute their research findings to support local, national and global development. Accordingly, African universities, including those in Nigeria, have intensified their effort to increase the availability of their content on the Internet. Journals, textbooks, newsletters, short research communication, pre-prints and post prints are among the resources African universities are now putting on the Internet. The Open Access Initiative sponsored by organisations in Europe and America has also increased the possibility of having more academic resources from African in the Internet.

The digital era is now being defined by such emerging issues like web content, web presence, digital divide, as well as the use of cybermetric and webometric tools to measure and evaluate the web characteristics of countries, organisations, and universities. The increasing use of the Internet for reporting research and other academic activities across the globe, as well as need to highlight and probably bridge disparities in the amount of web content from different regions of the world, has now led to the evolution of web presence and visibility measurements and ranking of institutions, countries, regions, which is meant to show the commitment of institutions to web publication (Cybermetric Research Group, 2006; Brown, et al., 2007). Webometric attempts to measure and characterize the extent of web usage for research. Bjorneborn (2004) opined that webometric is the "study of the quantitative aspects of the construction and use of information resources, structures and technologies on the web drawing on bibliometric and informetric approaches." NUC (2006a) defined webometric as web "measured on the basis of web characteristics or presence on the Internet" which is a reflection of: volume of published materials of institutions/individual on the web, the visibility and impact of the web pages measured by 'sitation' (site citations) or links they receive, and the measurement of these links.

Universities that own websites that have high external links are perceived to have inculcated globalization initiative and are in agreement with the information-for-all initiative, as promoted by the open access movement. These increase their perceived impact, improve their visibility, and make stakeholders' perception about them positive. They also, as a matter of fact, increase web content of their region. Smith (2004) gave a vivid picture of the benefits and motives for web links, which are adoptable to universities that have developed web resources in a manner that encourages high extent links to their sites. NUC (2006b), on its part, has outlined two major setbacks Nigerian universities are likely to face because of the poor performance in webometric ranking: lowering of esteem of the university in the eyes of stakeholders, especially potential students and funding agencies. Academic exchange with reputable universities from other parts of the world for teaching and research may also suffer. The NUC (2006a), however, listed the following as factors responsible for Nigerian universities' poor performance: scant attention paid

to presenting research findings in web-searchable forms – this results from publishing in low impact local journals without Internet links; non-publishing in electronic journals; absence of Nigerian universities on the Internet; website addresses not in a form that can be picked by the radar of Cybermetric Research Group; and lack of up-to-date and scanty content of the websites of Nigerian universities.

In the recent past, there has been a growing body of literature on the challenges African universities face in their bid to meaningfully use the web in a manner that will increase their web presence. These studies lay strong emphasis on technology divide without adequate consideration of issues relating to publishing culture, appropriateness of website addresses, content and designs, and general management of universities' websites. Chisenga (1995), highlights that lack of diversity, slow development in computer technology application, and inability to exploit information technology are some of the challenges Zambian libraries face in their quest to use computerized systems. Ehikhamenor (2003) attributed the non-use of the Internet in Nigerian universities to accessibility, ease of use, and cost factors. Oyelaran-Oyeyinka and Adeya (2004) laid emphasis on the effect of inadequate IT and Internet facilities on the use of Internet in Africa universities. The scholarly publishing and Academic Resources Coalition (2002) collated resources and experience from around the globe and noted that academic culture prevalent in universities affects to a large extent the use of Internet based outlets, especially open access outlets. This is also similar to the issue of information behaviour raised by Tenopir (2003), which noted that academics with science backgrounds were found to be early adopters of electronic journals than those in social sciences and humanities. Scholars like Kidd (2007), Hiller (2002), and Dillion and Hahn (2002) have similar positions on the effect of subject area on information behaviour and eventually on the willingness to adopt electronic resources, not only as readers, but also as authors.

Aside from social and technology divide factors, web use research has also covered personal websites ownership and web content measurement. Petric (2005) studied factors that motivate people who own personal websites and reported that those who wish to make contacts, correspond with associates, present knowledge and ideas, disseminate information, etc. are the most likely to own personal websites. Smith (2004) carried out an investigation to see if web links are synonymous with citation, but found out that only 20 % of the web links surveyed could be regarded as research links analogous to citations. Onyancha and Ocholla (2007) investigated web links of universities in Kenya and South Africa. The study revealed that although Kenyan universities have embraced the use of the Internet, their websites are at the initial stage of construction. However, universities in South Africa have reached advanced stage of website usage, which was defined by their websites' academic and research contents and sizes.

Objectives of the Study

For a university to be ranked as one meaningfully using the web for academic purposes by organisations conducting webometric ranking, it must generate appropriate academic and research contents in its website. The development and provision of such content is essentially a function of IT and Internet availability in the university, and the extent of web utilization among its staff. The dearth of studies in the Nigerian context, comparable to those in other African countries that were reviewed above, motivated this study. This study, therefore, sought to investigate issues surrounding the IT and Internet availability, the willingness of academics to use Internet-based outlets for disseminating research, as well as the web impact factors (specifically, website sizes and links) of some private universities in Nigeria. This is because of the need to know if these newly emerging universities have started to exploit the opportunities provided by the Internet to build infrastructure and behaviours to support the development of the web presence required for future global webometric ranking purposes.

Methodology

Three methods of data collection were used in the study - questionnaire, website examination, and web presence analysis. The three methods were used to complement each other because of the interrelationships among the entities and variables (web and Internet availability, web utilization and web presence) assessed. The study examined the relationship between web presence and IT and Internet availability and extent of web utilization for

academic activities by academic staff. As a result, a questionnaire was used to elicit data from academics on Web and Internet availability and their use of the Internet and Web for their statutory functions. Website examination and web presence analysis were used to collect data on the nature of content of the websites, as well as analyze and evaluate such web presence factors like number of pages and in-links and out-links.

Population and Sample of the Surveyed Academic Staff

The academic staff employed by all private universities in Nigeria established between 1999 and 2007 constituted the population of the study. For the purpose of stratified sampling, the private universities in Nigeria were divided into those established during 1999, 2002-2003, 2005, and 2006-2007. However, only the private universities established during the first three periods were considered because those established between 2006 and 2007 would be too young to be involved in significant research activity and output, which is a major aspect of web content analysis carried out in the study. One university was thereafter purposively chosen from each of the three included periods - Babcock University established in 1999; Covenant University, established in 2002; and Bells University of Technology, established in 2005.

The sampling technique is justified by the fact that the study is intended to be a pioneering and exploratory one aiming to obtain baseline information on the prospects and challenges of Nigerian private universities featuring in web presence evaluation. The sample population comprised those academic staff that had spent at least six months in the employment of the sampled private universities. Consequently, about 300 out of the about 350 academic staff of the three universities were eligible to be surveyed, out of which 112 eventually participated as respondents. This translates to 37.3 % of the eligible academic staff.

Tables 1 and 2 report the distribution of the respondents by affiliation and academic level in their universities. Table 1 shows almost equal sampling from the three universities. As expected in new universities and in a country already plagued with shortage of academic staff (NUC, 2006), majority of the respondents were in the lower academic cadres (Table 2):

Table 1: Respondents' Institutional Affiliation

Universities	Number	%
Babcock University (BU)	37	33.0
Covenant University (CU)	42	37.5
Bells University of Technology (Bellstech)	33	29.5
Total	112	100.0

Table 2: Respondents' Academic Status Level

Academic Status	Number	%
Graduate Assistant	2	1.8
Assistant Lecturer	38	33.9
Lecturer II	31	27.7
Lecturer I	16	14.3
Senior Lecturer	11	9.8
Associate Professor	7	6.3
Professor	4	3.6
No Response	3	2.7
Total	112	100.0

Academic staff in the Assistant Lecturer and Lecturer II positions accounted for 61.6 % of the respondents, while Senior Lecturers, Associate Professors and Professors accounted for 19.7 %. The distribution of this study's sample in Table 2 appears roughly representative of the distribution of academics in most Nigerian universities as reported by the Nigerian Universities Commission (NUC, 2006a) during its 2005 accreditation exercise for Nigerian universities, which found that 60% of academic staff in the universities comprised junior academics. In addition, 65.5% of the respondents had had only between one to five years work experience. Interestingly, as much as 101 (90.2 %) of the respondents were permanent academic staff of their respective universities, while only 9.8% were on sabbatical, visiting scholar, part-time or other appointments. This finding punctures speculations that the academic staff of most Nigerian private universities comprised of academics on sabbatical leave from the public universities.

The respondents were also categorized into two groups - Sciences and Humanities - by categorizing those from the natural science, technology and engineering fields as "Sciences" and those from the Management Sciences, Arts, Social Sciences

(including Library and Information Science) as "Humanities". Based on this, 47 (42.0 %) of the respondents were from the Humanities, while 65 (58.0 %) were from the Sciences.

Website and Web Presence Analysis

Web presence analyses were carried out, using the Google Search Engine. Despite the fact that general search engines like Google have not been found perfectly accurate for this kind of study (Bar-Ilan, 2005 and Baiza-Yates, Castillo and Lopez, 2006), it was assumed that Google would be able to provide adequate search results to enable this study to obtain an adequate glimpse of the universities' web presence. The likelihood of the appropriateness of this assumption is underscored by the fact that some studies (e.g. Onyancha and Ocholla, 2007; Aina, 2005) have used Google and Alta Vista search engines for obtaining web-based information on quality research. In the first analysis, in-link counts; that is, the number of other sites 'siting' the websites under study was carried out. This was done by using the search expression "link:*university domain names*" where the parameter in italics is different for each of the three private universities (e.g. *link:wwwbabcockuni.edu.ng)*. Website page count analysis was also carried out by using the search expression "site: *university domain name* (e.g. *www.covenantuniversity.com)*.

Findings

The findings, as shown below, were based on the responses drawn from 112 respondents who were academic staff of the three Nigerian private universities:

Ownership of IT Facilities

It was presumed that, if respondents personally owned IT facilities like PCs, laptops, printers, scanners, etc., the possibility of using the web for research would be increased. Xioaming and Kay (2004) and Ezeani (2005) had earlier opined that technological infrastructure available to a country and/ or individual remained one of the major drawbacks of electronic resources use.

Majority of the academic owned PCs and printers. Although, only 20 (17.9 %) owned digital cameras, three (2.7 %) owned pagers, while 46 (41.1 %) owned laptops. PCs were popular among the respondents, because their universities provided them in their offices. Therefore, 59 (52. 7 %) of the respondents indicated that their IT facilities were located in their offices, 68 (60.7 %) indicated that their IT facilities were located in their homes, while 25 (22.3 %) revealed that they moved their moveable IT facilities anywhere they needed them.

Table 3: Ownership of IT Facilities

ICT facilities	Number	%
PC	85	75.9
Laptop	46	41.1
Printer	50	44.6
Digital Camera	20	17.9
Pager	3	2.7
Others	3	2.7
N = 112		

Internet and Web Use

A significant percentage (68.8 %) of the respondents used the Internet everyday. Those who used the Internet, at least five times a week or three times a week, also constituted 29.5 % of the respondents. This gave a cumulative total of 98.2 % respondents that used the Internet at least three times a week. This can be easily translated to be high frequency of use, especially when it was considered that just two of the respondents (1.8 %) used the Internet once a week which also meant that all the respondents use the Internet. This was a departure from the finding of Ehikhamenor (2003), where as many as 49.6 % non-Internet users were found among academics.

Only 23 (20.5 %) of the respondents indicated that Internet access available to them was not too reliable, while 89 (79.5 %) agreed that the access was very reliable. Also, only 13 (11.6 %) of the respondents accessed the Internet in their homes, but 58 (51.8 %) accessed it in cybercafés and 91 (81.3 %) in their offices. This also marked a departure from the studies carried out on public universities, where access to Internet through cybercafé outranked access through offices

(Ehikhamenor, 2003; Oyelaran-Oyeyinka and Adeya, 2004). This meant that Internet access in private universities was more readily available and reliable than in public universities.

The limited and insignificant percentage of Internet access in homes also meant that majority of those who had PCs and Laptops at home do not use them to access Internet resources. This finding justified data presented by Internet Stat on Internet penetration in Nigeria, and the fact that only 4.9 % of Nigerians have access to, and use the Internet. This, however, is a significant leap from 0.1 % in 2000 and 3.1 % in 2006 (Internet Stat, 2007). One can, therefore, assume that most of the web resources used by the academics studied were accessed from their offices and cybercafés.

Table 4: Rate of Internet use by respondents

Rate of Use	Number	%
Everyday	77	68.8
5 Times a Week	14	12.5
3 Times a Week	19	17.0
Once a Week	2	1.8
Total	112	100.0

Table 5 shows the types of academic activities that respondents used the Internet for in the course of carrying out their statutory responsibilities.

Table 5: Academic activities for which the Internet is Used

Internet Uses	Number	%
Research	110	98.2
Emails	108	96.4
Access Electronic Journals	94	83.9
Getting Facts/Data	88	78.6
Conferences/Seminar Information	77	68.8
News/General Information	69	61.6
Academic/Professional Group Communication	67	59.8
Access Calls for Papers	63	56.3
Leisure	32	28.6

The data in Table 5 support claims about the continuous shift from using traditional to web-based sources of research information. Papin-Rancharam and Dave (2005) have opined that awareness is among the major factors that determine academic use of open access initiatives and the web for research, and the data above suggests a growing web resources awareness among academics in Nigeria.

Ownership and Use of Websites for Publishing Research Papers

Antleman (2004) observed that majority of academics who disseminate their research do so in web-based journals and through their personal websites. This study, however, revealed that the culture of using personal websites for disseminating research findings is yet to be developed in Nigeria. Only seven (6.3 %) of the respondents indicated that they have personal websites, while only two of the seven respondents used their website to disseminate their research findings. However, 52 (46.4 %) of the respondents claimed they belonged to academic associations that have websites. Of the 52 respondents, 36 (32.1 % of the overall sample of 112) used these websites to disseminate their research findings. Most respondents, therefore, used websites other than their own and those of associations or institutions they were affiliated with.

Only 58 (51.8 %) respondents have posted their academic papers on the web. The numbers of papers posted on the web are distributed thus: 19 (17.0 %) had posted just one paper; 17 (15.2 %) had posted two papers; 11 (9.8 %) had posted three papers; eight (7.1 %) had posted four papers; two (1.8 %) had posted five papers; and one (1.4 %) had posted six papers. In all, only 134 papers were posted by the 112 respondents. This gave an average of 1.2 web-based papers per respondent. However, 12 (10.7 %) of the respondents had published one paper on the web; 13 (11.6 %) had published two papers; three (2.7 %) had published three papers; five (4.5 %) had published four papers; while 6 (5.4 %) indicated that their papers were still under review for publication. In all, about 67 papers have been published on the web, which resulted in an average of 0.6 publications per respondent.

Despite the evident low web publication rate, only two (1.8 %) of the respondents never downloaded and used web-based research papers. As much as 77 (68.8 %) of them often downloaded and used web-based papers, while 27 (24.1 %) occasionally downloaded and used web-based papers. This gave a cumulative 104 (92.9%) of the respondents who had downloaded and used web-based papers. These findings confirm that the academics in the surveyed universities, as elsewhere in most other Nigerian and African universities, primarily consume Internet scholarly content and disseminate very little such content.

Finally, it was considered necessary to evaluate the factors that respondents consider before choosing outlets (print or Internet) through which to publish, as the findings above suggest that the respondents seem not attracted by the publication outlet opportunities that Internet-based journals provide. The major factor considered by respondents, as shown in Table 6, is quality of journal, i.e. if journal is local or international. Factors like visibility, author charges, Internet presence and chances of acceptance by the journal, etc, that one would expect to be important concerns in the choice of outlets were not considered primary by respondents. In other words, even if a journal was not visible to those their local or institutional communities, or if they have to pay to publish, respondents would prefer to publish in any journal once they are sure the journal is an international journal. Visibility of published content to other local or African users is thus not considered a critical reason by respondents in selecting outlets to publish their scholarly research output.

Table 6: Factors determining choice of publishing outlet

Factors	Frequency	%
International Journal	74	66.1
Correlation of Paper with Journal Objectives	52	46.4
Prestige and Visibility of Journal	42	37.5
Possibility of Acceptance Rate	40	35.7
Internet Presence	34	30.4
Non-payment of Author's Fee	21	18.8

Website Contents and Links

Considering the site addresses indicated above, only Babcock (www.babcockuni.edu.ng) had the right form of domain name. CU (www.covenant university.com) and Bellstech (www.belluniversity.org) adopted dot com and dot org respectively, which is primarily meant for commercial entities and non-educational organisations. These domain names were not in conformity with Ferrel's (2004) and Darlington's (2005) position that the most appropriate domain name for universities is "edu". Wathen and Burkett (2002) and Melun (2005) have pointed out that such misuse of domain name can lead to wrong evaluation of site content and credibility, as dot com sites contents have greater tendencies to be influenced by the owners' personal sentiments.

Nevertheless, using Google Search Engine to search on the expressions: *link:www.babcock uni.edu.ng, link:www. bellsuniversity.org and link:www.covenantuniversity.com,* the total number of pages linking to the three universities was analyzed. The results revealed that external links from the sites were low, and that none of the links recorded was from any Nigerian university, public or private. In other words, Nigeria universities have not found one another's sites attractive and valuable enough to link. The search results are presented in Table 7.

Table 7: Website links

University	Self links	External links	Total Links
Babcock	0	0	0
Bellstech	0	1	1
Covenant	29	5	34
Search was carried out on January 8, 2008.			

The total number of pages in each website was also analyzed using the Google search expressions: *site:www.babcockuni.edu.ng, site:www.bells university.org and Site:www.covenantuniversity.com.* The results were: Covenant University – 763 pages; Babcock University – 68 pages; and Bellstech – 73 pages. These numbers are rather too small for university websites that hope to have the kind of impact and links that will enable them have meaningful presence in the web. The website of a South African university was reported by Onyancha and Ocholla (2007) as having as many as 119,454 pages. This kind of number will definitely translate into the

inclusion of rich text files and other attributes that matter to organisations that conduct university web ranking.

However, it is not uncommon to determine an institution or an individual web content using its name or his/her name as search term. In order to presume the nature of the universities' web presence, their addresses were also used as search terms on the Google Search Engine. The hits were classified into the four broad subjects in Table 8, with the "Others" category combining hits on web blogs, friendship sites, social news, wikis, instant messaging groups, etc.

Data in Table 8 further confirmed both the insignificant presence of the three private universities in the web and the kind of content they generate. Only seven of 61 hits recorded were academic-oriented contents, while just three were on conferences. One can begin to understand why Nigerian universities rank so low in webometric ranking, and why African content remain so small on the web.

Table 8: Hits Counts of Participating Universities

University	Scholarly	Conference	News	Acadmeic Associations/ Groups	Others	Total Hits
Covenant	5	3	1	1	28	38
Babcock	1			1	11	13
Bellstech	1		1		8	10
Search was carried out on the 20th December, 2007						

Discussion

Various factors could be adduced to explain Internet technology and web presence characteristic of the private universities covered by this study. Some of these factors pertain to the nature of the universities and the academics employed there. IT facilities availability can only be determined by the institution's desire and ability to provide the necessary investment resources. Hence, the fact that the study revealed that there is an encouraging level of IT provision and reliable Internet connectivity in the private universities could mean that the private universities consider investments on IT facilities and Internet access as critical to their mission, as most of them have promised in their statements of vision and mission. A related possible reason could be the efforts of the Nigerian Universities Commission (NUC, 2006a) to educate universities on how to effectively develop and deploy their website to attain required standards. Private universities might have been pressured to invest in IT and Internet facilities, in order to meet NUC's accreditation annual requirements.

Another factor that is very important to this study is the reward and promotion requirements in universities. For instance, Davis and Connolly (2007) evaluated the effect of academic reward system on the use of open access initiatives in Cornell University. In the Nigerian context, such studies are absent, and there is also inadequate recognition of electronic journals as adequately international, prestigious and of high impact. Although studies have shown that visibility of a journal is one of the important determinants of journal quality, it is still very difficult to link visibility to international standard, prestige and impact. This has affected the acceptance of publications in electronic journal for rewards and promotion in Nigeria. Since Vice-Chancellors, Professors and most Heads of Department in Nigerian private universities were employed from public universities, the culture of non-acceptance of electronic journals for rewards and promotion has been transferred to private universities. This has a profound effect on the use of electronic journals in Nigerian universities, and may have resulted in the low web publication rates found in this study.

Again, it is important to note that the salaries paid to academic staff constitute a very important determinant of ownership and access to IT and Internet facilities by the academics. Although this study found high proportions of academics personally owning IT facilities, the stringent salaries and financial resources available to the academics may have affected the quality of IT facilities they are able to have. Apart from this, the non-existence of Internet connectivity in homes is most likely going to be a function of the salaries and other financial resources available to maintain or pay for Internet connections. Internet connectivity in Nigeria is still very expensive, and is still very much reserved for organisations that can afford it.

This study also found a high rate of personal ownership of IT facilities among the academics, as

well as improving connectivity to the Internet from within the universities than through commercial cybercafés. These are positive trends. However, these trends have neither translated into improvements in the universities' web impact indicators as measured by sizes of, and links to or from the websites of the universities nor into improved publication of content by the academics in web-based outlets.

Conclusion and Recommendation

The findings of this study have confirmed the growing quest among the academic staff of Nigerian private universities and their academic staff to embrace IT and the Internet. Such developments as the Open Access Initiative and digital libraries are also providing opportunities for Nigerian scholars to access quality web resources, and possibly also provide quality web content. Nigerian scholars can count on improving visibility of, and access to, their own research work once they begin to publish in electronic journals and other web-based outlets. Nigerian scholars would be encouraged to exploit these opportunities once reward systems for academic staff in Nigerian universities begin to accept quality electronic journals as equal with quality print journals. This will enable Nigerian universities to produce and disseminate adequate highly visible web-based content required to enable them to feature prominently in global rankings of universities based on web presence and visibility variables. The NUC and Nigerian universities should therefore initiate and/or support programmes within the universities for identifying, rating and recommending local and international electronic journals with adequate quality and visibility that Nigerian academics can use to disseminate information about their research globally.

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Mr. Samuel C. Avemaria Utulu is currently the Systems Librarian at the Redeemer's University, Redemption City, Nigeria. He holds BLIS from the Department of Library, Archival and Information Studies, University of Ibadan, and M.Inf.Sc from the Africa Regional Centre for Information Science (ARCIS) of the same university.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 131 - 146

Individual Characteristics as Correlates of Attitudes to Information Technology among Nigerian University Lecturers

Rosemary O. Agbonlahor

Africa Regional Centre for Information Science, University of Ibadan, Nigeria
ro.agbonlahor@mail.ui.edu.ng

Abstract

Positive attitudes to information technology (IT) among relevant stakeholders are an important precursor to the effective IT use at different levels of education. This paper presents the findings of a study that investigated the relationships between the individual characteristics of Nigerian university lecturers and their attitudes towards the use of information technology (IT) for teaching, research and related purposes. The study used a self-administered questionnaire to collect data from 718 lecturers sampled randomly from 10 of the 40 federal and state universities in Nigeria at the time of the study in 2003. Findings from the study showed that Nigerian university lecturers generally have positive attitudes towards IT and its use in education. Attitudes were independent of age, academic rank and, to some extent, academic discipline, but were not independent of gender and experience of using IT. Previous negative experience with using IT had a significant influence on attitudes towards IT. The study concluded that programmes aimed towards facilitating the use of IT for teaching, research and related processes by lecturers in Nigerian universities are more likely to succeed if they are both gender - and discipline-targeted, and also provide effective support for everyday use of IT by the lecturers.

Keywords

Information technology, attitudes, higher education, Nigeria, technology adoption

Introduction

For developing countries, Information Technology (IT) affords university academics and researchers a unique opportunity to bridge the knowledge gap between them and their counterparts in developed nations. In fact, IT is seen as crucial to the continued survival of universities and research institutes in developing countries (UNISIST Newsletter, 1999). This point is supported by Paterson (1995), who identified three areas in which IT can make significant contributions to the economic and social development of developing countries, namely: as an instrument to make existing productivity sectors more efficient, as an area of economic activities in its own right, and as a tool in education. This observation was also buttressed by the World Bank's 1998/99 World Development Report, which observed that radical changes (for example, the infusion of IT) are called for in post-secondary education if Africa is to equip its labour force with the skills needed to survive in the new technological age.

In line with this realisation, a number of international and national initiatives have been undertaken to improve access to, and use of, IT in universities in developing countries. For example, the African Virtual University (AVU), based in Nairobi, Kenya, was initiated by the World Bank in 1999 in an attempt to bridge the north-south digital divide by linking sites or learning centres in African countries with learning institutions in the US, Canada, and Europe via voice-conferencing and other Internet technologies (Phombeah, 2000). Mangesi (2007) remarked that ICT use in education is now at a

particularly dynamic stage in Africa with new developments and announcements happening on a daily basis somewhere on the continent.

In Nigeria, the Federal Government, in 1989, launched a National Policy on Computer Education, aimed at making Nigeria a computer literate society by the middle of the 1990s. The objectives of the policy included the introduction of computer education into the curriculum at all levels of education from primary to university and other tertiary schools (Alabi, 1994). At the university level, the National Universities Commission (NUC), which is charged with the responsibility of setting minimum standards and accreditation of all academic programmes run in Nigerian universities, has been a key player in efforts to integrate computer skills training into the programmes of Nigerian universities. Toward this end, the NUC prepared a series of documents titled "Minimum Academic Standards for Nigerian Universities" which have formed the basis for the accreditation of academic programmes in Nigerian universities since 1990. The Approved Minimum Academic Standards (AMAS) provide guidelines on minimum hardware and software requirements for programmes run in Nigerian universities. AMAS also specifies that computer studies be offered as a unit course in all undergraduate programmes run in Nigerian universities (www.nuc.edu.ng). Other NUC initiatives have led to the introduction and development of university databases through the Nigerian universities management information system (NUMIS) and electronic connectivity of universities through the Nigerian universities network (NUNet). They also led to the automation of university library operations using the TINLIB software and the computerization of university accounting processes using the Computerised Accounting System (CAS) for bursary departments of Nigerian universities (Abdulkadir, 1995).

Problem Statement

In Nigeria, many universities are acquiring computers and other IT equipment for use by academic and administrative staff and students. However, as Adeya (2001) has observed, awareness of IT does not necessarily lead to immediate application. Hopkins (1996) pointed out that in acquiring IT, universities very often exhibit a blind faith in technology; a sort of technological determinism, seeming to suggest that merely installing a machine will lead to its efficient and rational use. This attitude of technological determinism also seems to prevail in the process of acquiring and providing access to IT in Nigerian universities. There have been reports of departments and faculties that acquire computers before deciding what to do with them, IT equipment that are purchased but never used, and of Internet access that have never been personally utilised by academic staff for a variety of reasons (Missen, 1999; Idowu, Adagunodo & Popoola, 2003).

Gilmore (1998) and Young (1998) have observed that although there are more computers and other information technologies in universities nowadays, the use of these technologies have, in a large number of cases, not enhanced either individual or institutional level productivity. The reasons advanced for this include inadequate training of lecturers in new skills, and/or unwillingness by lecturers themselves to learn new skills (Gilmore, 1998; Holt & Crocker, 2000). Holt and Crocker (2000) observed that successful use of IT depends not only on the technology itself, but also on the levels of skills and expertise of the individuals using the technology. They, however, noted that though the skills of an individual can be improved by proper training, the attitudes of a user towards the technology will affect his/her willingness to learn about the technology, the decision to use the technology, and the actual uses to which the technology is put.

Stefl-Mabry (1999) declared that an understanding of how and why users either accept or reject new technologies is paramount to the issue of effective integration of a technology into organizational functions. Studies by Goldenfarb (1995) and Moxley (2000) in universities have identified academic staff as a core group whose attitudes can play a major role in determining the extent of IT adoption by a university. Attitudes of lecturers may in fact shape university policy regarding IT (Young, 1998), and university IT policy may also affect levels of adoption and utilisation of IT by academic staff (Grineski, 1999). This study was therefore carried out to examine, amongst other things, attitudes of lecturers (academic staff) in Nigerian universities towards IT and how the individual characteristics of the lecturers affect their

use of IT. The study also aimed to generate information that will help define the current status of IT adoption and use in Nigerian universities, as well as help to guide programmes and projects aimed at facilitating the effective use of computers and other IT equipment by university lecturers.

This paper presents the findings of those aspects of the study that investigated the relationships between the individual characteristics of Nigerian university lecturers and their attitudes towards the use of information technology (IT) for teaching, research and related purposes.

Research Questions

Accordingly, the study investigated the following six research questions:

Is there a significant relationship between the gender of lecturers and their attitudes towards IT?

Is there a significant relationship between age and attitudes towards IT by Nigerian university lecturers?

Are there significant differences in attitudes towards IT among lecturers from different academic disciplines?

1. Are there significant differences in the IT related attitudes of lecturers in different academic ranks?
2. Is there a significant relationship between the lecturers' experience with using IT and their attitudes towards IT?

What is the influence of prior negative experience on current attitudes towards computers?

Literature Review

Several information systems studies have identified attitude as one of the strongest factors influencing successful IT use in any organisation (Christensen, 1997; Agarwal & Prasad, 1998; Gilmore, 1998). Furthermore, researchers have found that although technological and financial barriers are quite significant in the processes of integrating IT into education, educators' attitudes, beliefs or perceptions are even more so (Gilmore, 1998). Attitudes have been found to affect perceptions, and hence, rates of adoption and extent of utilisation of IT (Agarwal & Prasad, 1998; Pajo, 2000). In line with this, Green (1996) and Christensen (1997) observed that educators are resistant to change, so changing attitudes is a key factor in fostering IT adoption in education. In this regard, studies of the potential influence of attitude have used such constructs as enthusiasm, anxiety, avoidance, enjoyment, obsession, phobia, perceived usefulness, perceived ease of use, and so on, to measure attitudes towards information technology (e.g. Knezek & Christensen, 2000; Agarwal & Prasad, 1998; Karahanna, Straub & Chervany, 1999; Venkatesh, Morris, Davis, & Davis, 2003). Most of the studies have also concluded that the personal and job characteristics of the individuals adopting a technology, such as, gender, age, experience, rank, and work/discipline/profession can significantly influence attitudes towards the technology and can help predict information technology acceptance and usage behaviour (Zmud, 1979; Rogers, 1995; Spotts, Bowman and Mertz, 1997; Mitra et al., 1999). Some of the findings and conclusions of studies of the influence of these individual variables are reviewed next.

Gender: Hafkin and Taggart (2001) stressed that it is imperative for women in developing countries to understand and use IT, in order to avoid being marginalized from the mainstream of their societies; and that gender issues should be considered early in the process of introducing IT in developing countries, so that gender concerns can be incorporated from the beginning and not as a corrective afterthought. Already, there are growing concerns about the low participation of women in information technology related careers (Green, 1996; Idowu, Adagunodo & Popoola, 2003). Factors that have been cited as affecting female enrolment in IT courses and their use of computers include socialization and cultural practices, importance of role models, access to computers, experience with computers, and attitude towards computers (Idowu, Adagunodo & Popoola, 2003; Olorunda & Oyelude, 2003). Studies have repeatedly found gender differences in attitudes towards IT. For instance, Venkatesh and Morris (2000) and Drup (2004) found that males had more positive attitudes towards the use of computers than females. Others such as Ray, Sormunen and Harris (1999) found the reverse to be the case. However, in contrast to both sides, researchers such as Busch

(1995), Idowu (1997), Asan (2000), and Tiamiyu, Ajayi and Olatokun (2002) found no significant relationship between gender and attitudes towards IT.

Age: Powell (1996) found a significant difference among faculty attitudes toward computers relative to age. Kjerulff et al. (1992) studied nurses in a medical school and found that older nurses tended to be more technology anxious than younger nurses. Igbaria and Parasuraman (1991) also reported an inverse relationship between computer attitudes and age. On the other hand, Tiamiyu, Ajayi and Olatokun (2002) found that age did not significantly associate with information anxiety.

Academic Discipline: Faseyitan and Hirschbuhl (1992) examined the effects of personal attributes, as well as organizational and attitudinal factors, on the adoption of computers for instruction by university faculty. The results from their study indicated that discipline, computer self-efficacy, computer utility beliefs, and attitude toward computers were predictors of adoption. Similarly, Larose et al. (1999), in a survey of faculty members at a major Quebec university, found significant differences in "anxiety about computer environments" according to the faculty of origin of respondents. An anonymous survey conducted by JSTOR among faculty members at higher education institutions in the United States also showed disciplinary differences in faculty perceptions and attitudes towards electronic resources (Heterick, 2002). However, Mitra et al. (1999), in a study of use and non-use of email by faculty members in a US university, found that even though users and non-users tended to differ in their attitudes towards computers, these differences were not significant by discipline.

Academic Rank: Zayim, Yildirim and Saka (2006), in a study of technology adoption among medical faculty in a Turkish university, found that faculty members whose ranks were lower than professor had higher self-efficacy beliefs and were more likely to be early adopters of technology. A related observation was made by Adeya and Oyelaran-Oyeyinka (2002) in their comparative study of Internet use by faculty members in Nigerian and Kenyan universities. In contrast, Larose et al. (1999) found that associate professors reported a significantly higher level of anxiety about computer environments than full professors.

Experience with Computers: Studies have shown that people who have used IT for some time exhibit more positive attitudes towards IT (Christensen, 1997; Gilmore, 1998). Powell (1996) found that faculty who integrated computer technology into non-computer courses perceived computers to be more useful, had more confidence, more liking and less anxiety toward computers than their cohorts who did not integrate. Igbaria and Chakrabarti (1990) also found that computer experience significantly affected attitudes toward computers. Similarly, Ajayi, Olatokun and Tiamiyu (2001) reported an inverse correlation of computing experience with information anxiety, computer phobia, and obsessive computing. Christensen (1997) observed that with familiarity, anxieties and fears tend to decrease and confidence increases, and that people with prior positive experience tend to be more willing to adopt a technology than those who have had either a prior negative experience or no experience at all. In line with this observation, Wilberly and Jones (1994), in a longitudinal study of the IT adoption behaviour of eleven humanist scholars over a five-year period, concluded that while lack of money may be only a minor factor in the slow adoption of IT, frustrating experience with computers and negative reports of such experiences played a greater role in hindering the adoption of IT by the scholars. Agbonlahor (2006) showed that frequency of IT use and number of computer applications used by Nigerian university academics was significantly influenced by perceptions of ease of use.

Theoretical Framework

Agarwal (2000) noted that the term *individual differences* can generally be interpreted to connote dissimilarities among people, including differences in perceptions and behaviours, traits and personality characteristics, and in variables that connote differences attributable to circumstances such as education and experience. She identified a variety of research streams, including information systems, production, and marketing, that have found that individual differences can play a crucial role in the implementation of any technological innovation, and pointed out that most of the major theories in technology acceptance recognize the importance of individual differences in influencing technology acceptance and usage behaviour.

One of such theories was developed by Zmud (1979), based on a review and synthesis of the research literature on IT implementation and use. He developed a conceptual model to explicate two causal pathways through which individual differences influence IT implementation success, namely: cognitive and attitudinal. He further noted that individual differences can be categorized into three classes: (1) cognitive style, (2) personality, and (3) demographic/situational variables. Cognitive style represents the mode of functioning shown by an individual in his or her perceptual and thinking behaviour. Personality refers to the cognitive and affective structures (such as locus of control, need for achievement, extroversion/introversion, risk-taking propensity, etc) maintained by individuals to facilitate adjustments to events, people, and situations encountered. Lastly, demographic/situational variables refer to personal characteristics such as intellectual abilities, domain-specific knowledge, sex, age, experience, education, professional orientation, and organizational level (Zmud, 1979). This study focused on the relationships between demographic/ situational attributes of lecturers and their attitudes towards information technology.

Much of the research that have studied the relationships between individual characteristics and IT adoption have focused on commercial environments in developed countries (e.g. Agarwal and Prasad, 1999; Venkatesh & Davis, 1996), and there is a dearth of studies that are situated in developing countries or in educational environments. This study therefore sought to extend knowledge by examining the relationships between the individual characteristics and technology-related attitudes of adopters in a higher educational setting in a developing country context.

This study utilises Zmud's (1979) model in investigating the relationship between individual differences and attitudes towards IT by lecturers in Nigerian universities. The study posits that attitudes of lecturers towards IT will be influenced by the following personality/situational variables: gender, age, academic rank, academic discipline, and lecturers' experience with using IT.

Methodology

The study population comprised lecturers in all federal and state universities in Nigeria. Statistics from Nigeria's National Universities Commission (NUC) for the year 2000, which was the most comprehensive statistics available at the time of this study in 2003, gave the total number of academic staff in federal and state universities in Nigeria as 21,809, comprising 15,649 males and 6,160 females. The NUC statistics also gave the total number of federal and state universities in Nigeria as 40; made up of 25 federal and 15 state universities.

A survey design was used for data collection, with the study targeting a sample size of 1000 lecturers (about five per cent of the NUC figure) from the universities. A proportional sampling procedure was used to select lecturers from each university and, within university, the number of lecturers from each discipline. A self-administered questionnaire was used in data collection. The questionnaire sought, amongst other things, information about the demographic attributes of respondents, frequency of computer use, length of time using computers, and previous experiences with using computers. It also measured respondents' attitudes towards IT and the use of IT in education using five constructed and validated scales that respectively sought to measure respondents' level of *enjoyment, enthusiasm, anxiety* and *avoidance* relative to use of IT, and *attitude towards use of IT in education*. The attitudinal variables were defined and measured as follows:

- E*njoyment:* Amount of pleasure or feeling of satisfaction derived from (the prospect of) using IT.
- *Enthusiasm:* Level of excitement about IT use.
- *Anxiety:* Extent to which an academic feels uneasy or apprehensive about using IT.
- *Avoidance*: Extent to which a lecturer shies away from using IT.
- *Attitude towards using computers in education*: A lecturer's perception of the value of the use of computers for his/her own

productivity, as well as for the benefit of his/her students.

The constructed scales all had 5-point Likert-type items and were adapted from the Faculty Attitudes Toward Information Technology questionnaire, version 1.1 (FAIT v1.1), an instrument developed by Knezek, Christensen, Miyashita & Ropp (2000) for assessing the attitudes of university lecturers' towards new information technologies. The FAIT instrument has been validated in several studies (e.g. Gilmore, 1998; Knezek et al., 1999; Soloway, Norris, Knezek, Becker, Riel and Means, 1999). The internal consistency tests of the scales constructed for this study yielded Cronbach alpha values ranging between 0.63 and 0.73.

A total of 718 (out of the 1000 targeted) completed and usable copies of the questionnaire were retrieved from the sampled lecturers and used in the data analyses, giving a response rate of 71.8% (Table 1).

Five hundred and twenty-nine of the respondents (73.7%) were males, and 170 (23.7%) were females. Most of the sampled lecturers were between 30 to 49 years old. The lecturers were from seven major faculty groups (Table 2) and occupied academic positions that ranged from Graduate Assistant to Professor (Table 3).

Results

Attitudes Towards IT

Item scores on a scale were added up to generate a respondent's attitude score on that scale. Scale items that were negatively worded were reverse coded. Thus, on the Enjoyment, Enthusiasm, and Avoidance scales that had three items each, respondents could score a maximum of 15 points on each scale, while respondents could score a maximum of 20 points each on the Anxiety and Use of computers in Education scales that had four items each. The results show that attitudes of the lecturers towards information technology were generally positive, as their average score on each scale were closer to the scale maximum than the scale minimum (Table 4).

Table 1: Questionnaire Distribution and Response Rates

University	Questionnaire Copies Distributed	Questionnaire Copies Returned and Usable	Response Rate (%)
Ahmadu Bello University, Zaria	120	107	89.2
Obafemi Awolowo University, Ile-Ife	155	135	87.1
University of Nigeria, Nsukka	150	122	81.3
University of Jos	90	34	37.8
University of Port Harcourt	68	44	64.7
University of Agriculture, Abeokuta	48	48	100
University of Lagos	105	58	52.3
University of Ilorin	70	49	70.0
University of Ibadan	155	96	61.9
Delta State University, Abraka	39	25	64.1
Total	**1000**	**718**	**71.8**

Table 2: Faculty Groups of Respondents

Faculty Groups	Frequency	%
Arts	166	23.1
Social Sciences/Law	88	12.3
Medical Sciences/ Veterinary Medicine	79	11
Science	130	18.1
Education	126	17.5
Engineering/Technology	61	8.5
Agriculture	68	9.5
Total	**718**	100

Table 3: Academic Ranks of Respondents

Academic Ranks	Frequency	%
Graduate Assistant	47	6.5
Assistant Lecturer	90	12.5
Lecturer II	150	20.9
Lecturer I	210	29.2
Senior Lecturer	132	18.4
Reader/ Associate Professor	47	6.5
Professor	28	3.9
No Response	14	1.9
Total	**718**	**100.0**

Regularity of Use of IT

In this study, use of IT was characterised and measured by use of computers, in line with other studies which have found use of computers to be a good indicator of general IT use (e.g. Anadarajan, Igbaria & Anakwe, 2002). A total of six hundred and fifty-five respondents (91.2%) reported that they used computers and had been using computers for periods ranging from less than a year to over 30 years with a mean of 5.5 years and a median of 4.0 years. The respondents were categorized into regular, non-regular and non-users based on their reported frequency of computer use. Regular users were classified as those who used computers everyday or every two to three days; non-regular users were classified as those who used computers less often; and non-users were classified as those who did not use computers (Table 5).

Table 5: Regularity of Computer Use

	Frequency	Percent
Regular	486	67.7
Irregular	169	23.5
Never	37	5.2
Total	692	96.4
No response	26	3.6
Total	718	100.0

Gender and Attitudes towards IT

Table 6 presents the gender distribution of the means and standard deviations of respondents' scores on

Table 4: Mean and Median of Respondents' Attitude Scores

	Enthusiasm	Enjoyment	Anxiety*	Avoidance*	Computers in Education
N	713	715	712	711	693
Mean	12.79	12.67	15.44	12.58	17.00
Std. Error of Mean	.098	.099	.133	.111	.103
Median	14.00	13.00	16.00	14.00	17.00
Minimum	1.00	1.00	1.00	1.00	6.00
Maximum	15.00	15.00	20.00	15.00	20.00
Alpha	0.71	0.69	0.64	0.73	0.63
* Due to reverse coding, higher scores indicate lower anxiety or avoidance.					

the attitude scales. From the data presented, males recorded higher mean scores on all five attitude scales than females. A t-test showed that with the exception of enjoyment, gender differences in attitudes were significant for all the other attitude scales.

Age and Attitudes towards IT

No significant differences in scores were observed on any of the attitude scales when compared among the different age groups ($p > 0.05$).

Table 6: Gender Differences in Attitudes towards IT

	Gender	N	Mean	Std. Deviation	T	Df	p	Remark
Enthusiasm	*Male*	526	12.91	2.592	2.300	692	0.022	Significant
	Female	168	12.38	2.662				
Enjoyment	*Male*	527	12.76	2.548	1.397	894	0.163	Not Significant
	Female	169	12.44	2.762				
Anxiety	*Male*	525	15.62	3.505	2.373	691	0.018	Significant
	Female	168	14.88	3.562				
Avoidance	*Male*	523	12.78	2.822	2.528	259.36	0.012	Significant
	Female	169	12.09	3.173				
Computers in Education	*Male*	510	17.10	2.649	1.979	673	0.048	Significant
	Female	165	16.62	2.921				

Academic Discipline and Attitudes towards IT

Table 7 presents the means and standard deviations of respondents' scores on the attitude scales distributed by faculty groups. From the data presented, lecturers in the Arts and Engineering groups appeared to be less enthusiastic about IT than lecturers in other faculty groups. Furthermore, on the enjoyment scale, the Medical Sciences/Veterinary Medicine and Agriculture groups scored higher than all others possibly indicating that they experienced higher levels of enjoyment with using IT. Lecturers in the Education and Agriculture groups seemed to be less technology anxious than lecturers in the other groups, while lecturers in the Agriculture faculty group reported the least level of technology avoidance amongst all faculty groups.

Table 7: Respondents' Attitude Scores by Faculty Groups

Attitude		Faculty						
		Arts	Social Sciences/ Law	Medical Sciences/ Veterinary Medicine	Science	Education	Engineering/ Technology	Agriculture
Enthusiasm	N	158	87	76	121	121	58	65
(F = 1.009, p = 0.418)	Mean	12.59	13.09	13.17	12.82	13.03	12.95	13
	Std. Dev.	2.58	2.02	2.08	2.53	2.72	2.13	2.69
Enjoyment	N	158	87	76	121	121	58	65
(F = 1.971, p = 0.068)	Mean	12.44	12.68	13.42	12.79	12.78	12.83	13.09
	Std. Dev.	2.77	2.55	1.88	2.28	2.54	1.99	2.40
Anxiety	N	158	87	76	121	121	58	65
(F = 2.006, p = 0.063)	Mean	15.34	15.55	16.3	15.27	15.91	15.26	15.95
	Std. Dev.	3.41	2.98	2.85	3.12	3.61	2.89	3.69
Avoidance	N	158	87	76	121	121	58	65
(F = 2.125, p = 0.049)	Mean	12.42	12.45	12.92	12.76	12.56	12.26	13.75
	Std. Dev.	2.77	3.05	2.82	2.80	3.03	3.30	2.02
Computers in Education	N	158	87	76	121	121	58	65
(F = 1.707, p = 0.117)	Mean	16.70	16.59	17.11	16.83	17.17	17.43	17.63
	Std. Dev.	2.85	3.02	2.58	2.58	2.89	2.41	2.18

ANOVA test results showed that the observed differences in attitudes were significant only for the avoidance scale (F= 2.125, p <0.05). A post hoc analysis (Duncan multiple ranges test) revealed that lecturers in the Agriculture and Medical Sciences/ Veterinary Medicine groups demonstrated significantly less technology avoidance than lecturers from other faculties.

Academic Rank and Attitudes towards IT

When compared across academic ranks, ANOVA test results showed no significant differences in the average scores of respondents on the five attitude scales (p > 0.05).

Experience with Using Computers and Attitudes towards IT

The length of lecturers' experience with using computers correlated significantly, though weakly, with their attitudes towards IT (Table 8). Attitudes towards IT were also compared for the three user groups (regular, irregular and non- users). Aside the attitude towards computers in education scale, significant differences were found among the three groups of respondents on all the other scales (Table 9). Regular users were the most enthusiastic, enjoyed IT more, and displayed the lowest level of computer anxiety. Computer avoidance did not however differ between regular and irregular users – a possible

indication that even though their use of computers was not regular, irregular users were not consciously avoiding them. They probably didn't have enough computer related tasks to justify regular use. Non-users, on the other hand, displayed the highest level of computer avoidance – possibly indicating that a number of them were consciously avoiding the use of IT.

assess the influence of previous negative experiences on the five attitude variables (Table 10). The results showed that negative experiences with using IT significantly influenced attitudes towards IT. The influence of negative experiences on respondents' scores on the attitude scales ranged from as low as 6.6% for attitudes towards computers in education (R^2 = 0.066) to as high as 17.9% for computer

Table 8: Correlation of Experience with Using Computers and Attitudes towards IT

		Computers in Education	*Enthusiasm*	*Enjoyment*	*Anxiety*	*Avoidance*
How long using computers (yrs)	Pearson Correlation	0.183(**)	0.110(**)	0.115(**)	0.145(**)	0.156(**)
	p (2-tailed)	0.000	0.007	0.005	0.000	0.000
	N	583	599	601	600	597
** Correlation was significant at the 0.01 level (2-tailed).						

Table 9: ANOVA Differences in Attitude among Respondents Grouped by Regularity of Computer Use

	F	p	Remark
Enthusiasm	11.576	0.000*	Non users least enthusiastic, regular users most enthusiastic
Enjoyment	31.422	0.000*	Regular users showed highest levels of enjoyment.
Anxiety	20.122	0.000*	Non users most anxious, regular user least anxious
Avoidance	11.230	0.000*	No sig. difference between regular and irregular users. Non users displayed highest levels of avoidance
Computers in Education	2.427	0.089	No sig. difference between the three groups of users
* Test was significant at the .05 level.			

Relationship between Current IT Use and Previous Negative Experience with Using IT

Previous negative experience with IT was measured using a scale composed of two items framed as 5-point semantic differential with values ranging from "not at all" to "a lot". Alpha coefficient for the scale was 0.73. Regression analyses were used to

avoidance (R^2 = 0.179). The fact that previous negative experience with using IT had the greatest influence on computer avoidance implies that respondents who were currently avoiding the use of IT probably had unpleasant experiences with using computers, and they were yet to overcome such experiences.

Table 10: Influence of Prior Negative Experience on Attitudes towards IT

Variable	R^2	Std. Error of the Estimate	Beta	P
Enthusiasm Score	0.075	2.528	-0.274	0.000*
Enjoyment	0.098	2.463	-0.313	0.000*
Anxiety	0.080	3.177	-0.282	0.000*
Avoidance	0.179	2.637	-0.423	0.000*
Computers in Education	0.066	2.618	-0.256	0.000*
Predictor: Previous negative experience with computers *: Test was significant at the 0.05 level.				

Discussion

The lecturers in this survey generally had positive attitudes towards IT and the use of IT in education; however, some variations associated with some of the individual characteristics were found. These findings are discussed next.

Gender: Significant gender differences were observed in respondents' scores on the Enthusiasm ($t = 2.30$, $p<0.05$), Anxiety ($t = 2.373$, $p <0.05$), and Avoidance ($t =2.528$, $p<0.05$) scales. On these three scales, female respondents scored significantly lower than male respondents. This implies that female lecturers were less enthusiastic, more anxious, and avoided using IT more than male lecturers. These are all factors that can significantly affect the type and intensity of interactions that female lecturers have with IT. Both genders did not differ significantly in their scores on the Enjoyment scale ($t = 1.397$, $p >0.05$); possibly indicating that male and female lecturers did not differ significantly in the (perceived) amount of enjoyment they derived from (the prospect of) using IT. This finding lends some support to Okebukola (1993) and Dorup (2004), who found that females were more negative in their attitudes to computers than males. It however contradicts Ajayi, Olatokun and Tiamiyu (2002), who found no significant association between gender and information anxiety. The results from this study also imply that activities and policies geared towards enhancing IT adoption by female academics should seek to help them develop positive attitudes and perceptions about IT very early in their academic careers. This should be a deliberate policy issue by universities in a developing country such as Nigeria. In addition, since males and females did not differ significantly in their perceived enjoyment of IT, training which aims to make the use of IT enjoyable could facilitate the development of positive attitudes by all academics – male and female alike.

Age: No significant differences were observed in scores on any of the attitude scales when compared among the different age groups. This result contrasts with Igbaria and Parasuraman (1991) and Kjerullf et al. (1992), who reported an inverse relationship between computer attitudes and age. On the other hand, it supports Tiamiyu, Ajayi and Olatokun (2002), who found no significant association between age and information anxiety, and Barnes (2003), who found that age did not significantly influence attitude towards technology integration by lecturers in a US university. This finding implies that older academics did not necessarily have more positive attitudes towards IT than younger ones (and vice-versa), thus implying that intervention programmes aimed at facilitating IT adoption in Nigerian universities do not necessarily have to be targeted at lecturers in specific age brackets.

Academic Discipline: Although differences in average attitude scores existed among lecturers from the seven faculty groups, these differences were only significant for computer avoidance ($F = 2.125$, $p <0.05$). Post hoc analysis showed that lecturers from Agriculture and Medical Sciences faculties demonstrated significantly less computer avoidance than lecturers from other faculty groups. This is in contrast to Larose et al. (1999), who found that respondents from the faculty of applied sciences exhibited a more positive attitude towards ICTs than respondents from faculty of education. They also

found that teachers from the faculty of administration displayed a significantly more favourable attitude towards the usefulness of ICTs for teaching than their colleagues in the faculties of law, theology, ethics and philosophy. Furthermore, they found that teachers in applied sciences had significantly lower level of anxiety about computer environments than their colleagues in the faculties of theology, ethics, philosophy and education. The findings from this study seem to imply that irrespective of discipline, Nigerian university lecturers are generally positive about the prospect of adopting and using IT. However, when it comes to actual adoption, there seems to be some measure of avoidance though this is less pronounced among lecturers from the faculties of Agriculture and Medical Sciences. One way to overcome this attitude is to promote the utility of IT in enhancing teaching, learning and research in different disciplines via demonstrations and hands-on trainings customized for each faculty. Mentoring by lecturers from the same discipline who have successfully adopted IT in their work might also be a good strategy toward this end.

Academic Rank: No significant differences were observed in the attitude scores of lecturers in different academic ranks. This contrasts the findings of Zayim, Yildirim and Saka (2006), Adeya and Oyelaran-Oyeyinka (2002) and Mitra et al. (1999), who found that faculty members in higher ranks tended to have less positive attitudes towards computers. It is also contrary to Larose et al (1999), who found that associate professors were more anxious about computer environments than full professors. Thus, academic rank is not a significant factor that influences the attitudes of Nigerian university lecturers towards IT. This might be due to the fact that computer use by Nigerian university lecturers was still a relatively recent phenomenon as at the time of the study (most of them had been using computers for an average of 5.5 years). Thus, there is a likelihood that lecturers who were older in the academic cadre (Senior Lecturers and above) and those who were younger in the academic cadre (Lecturer 1 and below) have had about the same kind of experiences with using computers and have probably developed the same kinds of attitudes towards computers.

Experience with Computers: Attitudes towards IT correlated positively with the number of years for which respondents had used computers. This supports Christensen's (1998) observation that more positive attitudes towards IT are exhibited by people who have used them for a longer period. The implication of this is that lecturers need to be introduced and equipped to integrate IT into their job functions early in their academic careers, so as to develop positive attitudes, as well as competence over the years. This view is buttressed by the fact that the strongest correlation was found between the numbers of years for which lecturers had used computers and their attitudes towards the use of computers in education. When compared among the three user groups (regular, non-regular and non users), regular users were more enthusiastic, enjoyed using IT more and were less anxious about the use of computers than lecturers in the other two categories. This supports the assertion of Christensen (1998) that familiarity with IT tends to decrease anxieties and fears while increasing confidence. The finding also supports that of Idowu (1997) who found that frequency of use of computers was significantly related to positive attitudes towards computers. Regular and irregular users did not however differ in their level of IT avoidance – it could be that irregular users did not have enough computer-based tasks to warrant regular use. It could also be that they lacked the skills and training to use computers for more than a modicum of tasks. This is an area that might require further investigation. Non-users displayed the highest level of computer avoidance and their non-use might be because they were deliberately avoiding the use of IT.

The attitudes of the lecturers towards IT were significantly influenced by their previous negative experience with using computers. In fact, previous negative experience accounted for between 6.6 to 17.9% of the variations in respondents' scores on the various attitude scales. It also had the most significant influence on Computer avoidance ($R^2 = 0.179$, $p < 0.001$). This implies that a significant reason for avoiding computers by lecturers was a negative previous experience. It might even be the underlying factor for non-use of computers by some lecturers. These results have implications for the kinds of training and support provided to lecturers in their use of IT. If universities have resource centres or persons within the university upon whom lecturers can call and receive prompt assistance whenever

they run into problems with using computers, then any frustrations encountered might not be sufficient to make them give up using computers altogether. The active support of colleagues and peers who have successfully adopted IT can also be of assistance in this aspect.

The results also indicate that one of the ways to get university academics to adopt and use IT regularly in their job functions is to help them form positive perceptions about IT. In summary, facilitating early adoption of computers, providing effective and efficient support services, as well as providing well-targeted training and mentoring programs have all been indicated in this study as factors that can aid in the development of positive attitudes by lecturers. These are issues that university administration and other bodies interested in integrating IT into university education need to consider in designing programmes and strategies.

Recommendations and Conclusion

A number of issues can also be highlighted from the results of this study:

1. Organizational facilitation for use of IT by lecturers needs to be improved in each university. Especially important is the need to provide functional support centres where lecturers who have problems with IT equipment or software can go and receive prompt attention whenever they run into problems with using IT.
2. Programmes and activities aimed at integrating IT into the university must take into consideration differences in the attitudes towards IT by academics in different faculties. Change agents might need to devise different strategies for different faculties – "one size fits all" strategies are not likely to work very well.
3. The significant differences observed in attitudes of male and female lecturers towards IT imply that there might be need to adopt different strategies in facilitating IT adoption for lecturers of different genders. Activities geared at increasing effective use of IT by female academics should aim at reducing anxiety about, and avoidance of computers by female lecturers. One strategy could be to introduce IT through informal classes rather than through formal lectures. Mentoring by female academics who have successfully adopted IT in their work can also help to create more positive attitudes about the use of IT.
4. It would appear that the best strategy might be to target lecturers in different disciplines, and within discipline, package different intervention programmes for lecturers of different sexes.

From the results of the study, it can be concluded that Nigerian university lecturers generally have positive attitudes towards IT and the use of IT in education. Furthermore, lecturers' attitudes towards IT appear to be influenced by their gender or experience with using IT. In fact, previous negative experience with using IT had the most significant influence on the lecturers' attitudes towards IT. Therefore, programmes geared towards facilitating the integration of IT into Nigerian universities are likely to meet with better success if they are gender- and discipline- targeted, as well as provide enough support for everyday use of IT by lecturers. Such programs should also, as a matter of policy, introduce lecturers to use of IT very early in their academic careers, so as to facilitate the formation of positive attitudes very early. Efficient and effective institutional support for lecturers' use of IT is clearly needed, as it will help alleviate the effect of negative experiences with using IT.

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*** Dr. Rosemary Agbonlahor** holds a B.Sc. degree in Physics, and Master's and Doctorate degrees in Information Science from the University of Ibadan, Nigeria. She is currently a lecturer at the Africa Regional Centre for Information Science, University of Ibadan.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 147 - 155

Computer Anxiety as Predictor of Librarians' Perceived Ease of Use of Automated Library Systems in Nigerian University Libraries

Stephen Osahon Uwaifo

Department of Library and Information Science, Delta State University, Abraka, Nigeria.
stephenosahon@yahoo.com

Abstract

The paper examines the predictive effect of computer anxiety on perceived ease of use of automated library systems by library staff in Nigerian universities. A survey research design was used to collect data on level of computer anxiety and perceptions of ease of use of automated library systems among the library staff. The study found that many of the university libraries in Nigeria are not yet fully automated,due to financial constraints, erratic power supply and inadequate information technology (IT) facilities. The study also found that the main library routine for which the computer is used to perform is cataloguing. The library staff exhibited a moderate level of computer use anxiety; yet,computer use anxiety was found to be a strong predictor of perceived ease of use of automated library systems by the library staff. The paper recommends adequate funding of university libraries to facilitate the financing of continuing IT use training programmes for library staff, which would, in turn, enhance optimal use of automated library systems in the university libraries.

Keywords

University libraries, library automation, computer anxiety, Nigeria.

Introduction

In this age of globalization, the importance of information technologies cannot be over-emphasized. The university library occupies a significant position in every university. This is so because a good university library is one that effectively helps in galvanizing the university's human intellectual capacity by providing adequate and timely information in support of the teaching, learning and research activities of the university. Several library routines, therefore, need to be performed by librarians, in order for the library to be an effective information centre. Rowley (1998) identified the basic functions that might be expected in any library management system as ordering and acquisition, cataloguing, circulation control, serials control, management information, inter-library loans, community information, and Internet access.

The needs of library clienteles in the digital age are such that they cannot be met adequately with the use of the manual systems. This is because of drawbacks associated with manual systems such as delays, errors, as well as the physical and mental efforts required of library staff and users by such systems. While supporting this view, Akinyokun (2000) stated that the manual system of carrying out library tasks involves a considerable amount of paper work, and does not promote the effective and efficient performance of the librarians. This underscores the importance of automation in modern libraries.

Smith (1997), however, stipulated that the success or failure of an information technology (IT) IT application, such as an online public access catalogue (OPAC) system, often depends upon acceptance by the user. The IBM Dictionary of Computing (1993) defined usability as "the ability of a system, programme or device that enables it to be easily understood and conveniently applied by the user." Hackbarth, Grovers and Yi (2002) argued that IT users are likely not going to adopt or use a system if they perceive it to be difficult to use. Perceived ease of use cannot be separated from the quality of an IT application. In other words, it serves as a measure of IT quality and usability. If an automated library system is perceived by library staff as difficult to use, there is the tendency for them to detest using it, and vice versa. IT quality and usability are, therefore, variables likely to influence library staff's perception about the ease of use of an automated library system. In this connection, Szajna (1996) recalls the Technology Acceptance Model's prediction that external variables will definitely influence technology adoption indirectly via perceived ease of use and perceived usefulness.

Statement of the Problem

Most university libraries in Nigeria are either automated or in the process of doing so. This reflects the recognition by the universities of the importance of automated universities to their missions. However, the actual effective operational use of automated library systems in the libraries is a variable that also needs to be continually investigated within individual university libraries. It is one thing for a library to be automated, and another for the automated library system to be put to optimal use. If an automated library system is complex to use, satisfaction may not be derived by library staff from its use. As a result, they may avoid using it, which means that the objectives of system would not be achieved. The study therefore was conceived and designed to investigate the predictive effect of computer anxiety on perceived ease of use of automated library systems by library staff in Nigerian universities.

Objectives of the Study

The main objective of the study was to investigate the relationship between computer anxiety as a potential determinant of library staff's perception of the ease of use of automated library systems in Nigerian universities. The specific objectives are:

(a) To identify the library operations/routines, which the library staff perform with computers.
(b) To ascertain the library staff's level of anxiety about computer use.
(c) To determine the predictive effect of computer anxiety on perceived ease of use of automated library systems by library staff.
(d) To find out if computer anxiety and perceived ease of use vary by the level of automation of the university libraries.

These objectives generated the following research questions and hypotheses for the study:

Research questions

(a) What are the library operations/routines, which the library staff perform with computers?
(b) What is the level of anxiety about computer use among library staff?

Research hypotheses

(1) There is no significant relationship between computer anxiety and perceived ease of use of automated library systems by library staff.
(2) Perceived ease of use of automated library systems by library staff does not depend significantly on the combination of library staff's level of computer anxiety and the level of university library automation.

Literature Review

Literature and empirical work relevant to this study pertains to the variable 'computer anxiety', including its alternative definitions, its causes, as well as the effects of computer anxiety on use of information systems generally. The term 'anxiety' has been defined differently by different writers. For instance, French (1997) defined it as a state of emotional and physical disturbance induced in a person by a real or imagined threat. Anxiety may arise in a specific situation that the person seeks to avoid. Such a state is called phobia. Andreasen (2000), on the other hand, believes that anxiety is a term used by mental health professionals to mean the same as fear or worry.

This writer illustrates the phenomenon thus: when people dread or avoid particular objects or activities, such as spiders, flying or being in high places, these special dreads are called phobias.

Bozionelos (2001) defined computer anxiety as the "negative emotions and cognitions evoked in actual or imaginary interaction with computer-based technology." In a similar vein, computer anxiety is regarded as a situation whereby a person fears computer when using it or is afraid of the possibility of using it (Chua, Chen & Wong 1999). This definition implies that computer anxiety has to do with a person's emotional reaction towards using computers. This is unlike a negative attitude toward computers, which entails beliefs and feelings about computers (Heinssen, Glass & Knight, 1987). Rosen and Weil (1987), quoted by Deloughry (1993), further differentiated among the following terms:

Anxious technophobe: Exhibits the classic signs of an anxiety reaction when using technology: sweaty palms, heart palpitations and headaches.

Cognitive technophobe: On the surface is calm and relaxed, but internally seethes with negative messages such as "everybody but me knows how to do this" or "I'll hit the wrong button and mess this machine up!"

Uncomfortable user: May be slightly anxious or use some negative statements, but generally not in need of one-on-one counselling.

Some reasons have been advanced by writers on the cause of computer anxiety. For instance, Ganzel (1998) was of the view that several computer users feel anxious when they deal with computer system, especially at the initial stage of interaction. However, the users' initial anxious feelings will be overcome, replaced with favourable perceptions as they familiarize themselves with the system interface and functionality. There is no doubt that the bottom line of Ganzel's view is experience. On the issue of experience, Necessary and Parish (1996) stated that students with little or no computer experience have more computer anxiety, compared with their counterparts who have computer experience. The likely implication of this is that reduced computer anxiety further increases computer usage, thus enhancing a user's positive attitude to computer use.

In a related development, Gos (1996) revealed that prior computer experience correlates with current computer anxiety. This may imply that the students with unpleasant prior computer experience tend to be computer phobes unlike their counterparts who do not, because they have pleasant prior computer experience. While the former shows negative attitude towards computer use, the latter shows positive attitude. Also, in a study conducted in the United States of America, Rosen and Weil (1995) reported that, out of the 488 teachers that were surveyed in elementary and secondary schools, between one-third and two-thirds of them were not using computers, due to their lack of confidence or felt frightened by computers. While corroborating this view, Russell and Brandley (1997) stated that "teachers' lack of confidence in their ability to use computers effectively in classrooms can be understood as a form of computer anxiety or cyber phobia."

At this juncture, the issue of the likely effects of anxiety on IT use comes to mind. Anderson (1996) documented that computer anxiety has been shown to affect students approach to the use of computers while embarking on their studies. The implication of this may be a show of negative disposition to IT use. Supporting this notion, Doyle, Stamouli and Huggard (2005) opined that "individuals who suffer from computer anxiety usually display negative behaviour and physiological reactions to computer." Some instances of the negative behaviour have been pointed out by scholars thus: avoidance of use of computers (Anderson, 1996), minimizing the use of computers with extra care (Beckers & Schmidt 2001).

In the area of physiological reactions to computer use, Beckers and Schmidt (2001) identified issues like dizziness, sweaty palms and shortness of breath. It is obvious therefore that the identified negative behaviour and psychological reactions may lead to people's perception that the computer is difficult to use. For instance, Rosen and Weil's (1995) study showed that teachers in elementary and secondary schools in the United States of America actively avoided the use of computers whenever the gadgets were available. Furthermore, on the effect of computer anxiety on its use by people, it has been observed that when educators become computer anxious, it is seen as a stumbling block to integrating computers into educational programmes (Rezoich, 1996, Yang, 1996, Gunter, Gunter and Wiens, 1998).

To wrap up the effect of computer anxiety on computer use, Harrington, McElroy and Morrow (1990) discovered that a high level of computer anxiety has been found to be negatively related to learning computer skills, resistance to the use of computers (Torkzadeh and Angula, 1992; Weil & Rosen, 1995), and poorer task performance (Heinssen, et al., 1987).

Methodology

This study is a survey that employed a survey approach to data collection. The survey population comprised the 581 library staff in the 17 Nigerian federal and state government-owned university libraries that had automated or were automating their operations. The university libraries were categorized into three levels in terms of the level of computerization attained – initial, partial, and high. The *initial* level of computerization was defined as including the processes of planning for computerization, acquisition of hardware and software, and the use of the computer only for word processing and desktop publishing functions in the libraries. The *partial* level was defined to involve the use of the computer for performing a few library routines, but excluding the total retrospective conversion of manual catalogue records into a library catalogue. It is also characterized by the absence of Online Public Access Catalogue (OPAC). Finally, the *high* level was defined to involve the use of computer for virtually all library routines and services. This level is characterized by complete automated networking of the library.

Library staff surveyed in the study included all those that used computer in their jobs or functions in the library. They consisted of university librarians, other librarians, library officers as well as systems staff and secretaries. The population figures were obtained through personal contacts by the researcher during preliminary investigations. The university libraries were purposively sampled to ensure that one library was selected from the populations of libraries that had achieved initial, partial or high level of computerization at the time of the study. An initial pilot study of the university libraries provided information about the level of computerization in the population of university libraries and the total population of library staff as defined. Proportionate purposive sampling was used to select about two-thirds of the library staff in each library for the study, yielding a total sample of 386 respondents (Table 1). The table also shows how the 386 respondents were distributed in terms of the different staff categories in the university libraries. A breakdown of the sample shows that there were 17 university librarians, 194 other librarians, 113 library officers, and 62 systems staff and secretaries.

Table 1: Catergories of Library Staff Sampled from each University Library

S/N	University Libraries	Library Computerization Level	Total Library Staff	Categories of Staff Sampled				Total Sample	Sampling Rate %
				Univ. Librarians	Other Librarians	Library Officers	Systems Staff and Secretaries		
1.	Univ. of Ibadan Library, Ibadan	Partial	46	1	17	7	6	31	67.3
2.	Univ. of Nigeria Library, Nsukka	Partial	35	1	11	7	4	23	65.7
3.	Univ. of Lagos Library, Lagos	Partial	45	1	17	8	4	30	66.7
4.	Ahmadu Bello Univ. Library Zaria	Total	45	1	14	9	6	30	66.7
5.	Univ. of Benin Library, Benin City	Partial	40	1	15	6	4	26	65.0
6.	Obafemi Awolowo Univ. Library, Ife	Partial	34	1	13	6	3	23	67.6
7.	Abubakar Tafawa Belewa Univ. Library, Bauchi	Partial	33	1	11	7	3	22	66.7
8.	Univ. of Jos Library, Jos	Total	35	1	12	6	4	23	65.7
9.	Univ. of Calabar Library, Calabar	Initial	30	1	9	7	3	20	66.7
10.	Univ. of Maiduguri Library, Maiduguri	Partial	25	1	8	5	3	17	68.0
11.	Univ. of Ilorin Library, Ilorin	Partial	35	1	13	6	3	23	65.7
12.	Bayero Univ. Library, Kano	Partial	32	1	10	7	3	21	65.6
13.	Federal Univ. of Technology, Library Owerri	Partial	31	1	9	7	4	21	67.7
14.	Federal Univ. of Technology Library, Akure	Partial	30	1	11	5	3	20	66.7
15.	Univ. of Agriculture Library, Abeokuta	Partial	30	1	9	7	3	20	66.7
16.	Delta State Univ. Library, Abraka	Initial	35	1	11	8	3	23	65.7
17.	Michael Okpara Univ. Library, Umudike	Initial	20	1	4	5	3	13	65.0
	Total		**581**	**17**	**194**	**113**	**62**	**386**	**66.4%**

Key:
Initial level – Use of computer mainly for word – processing and desktop publishing in the library;
Partial level – Use of Computer to perform few library routines, but excluding OPAC;
High level – Use of computer to perform virtually all library routines/operations and networking.

Results and Findings

During the preliminary field survey of the selected universities, the study found that computer systems were being used to perform one or more of the following library operations or routines: acquisitions, cataloguing, circulation, serials, reference services, word processing, library statistics, inter-library loan, library management, Internet access, OPAC, Online searches, CD-ROM searches, etc. Table 2 summarizes the frequencies with which computer systems were being used to perform the different library operations/routines.

The majority of the respondents (194, representing 77.0%) used computers to perform cataloguing routines. This was followed by Internet access - 162 (64.3%) respondents, OPAC/Online searches 157 (62.3%), word processing 150 (59.5%).

The main routines indicated in the 'Others' category were e-mailing and e-classroom participation. The majority of the respondents who indicated Internet and online search routines were equally the ones who stated that they used computer for e-mailing and e-classroom participation.

The above results on the relative uses of computer for different library operations are different from the finding of Idowu (1997) that "word processing is the commonest usage to which the librarians applied that computers …" It is important to note, however, that although the majority of the university libraries used the computer to perform cataloguing routines, it does not mean that the routines are effectively performed over the years. This is because the libraries often face impediments to their use of computers to perform cataloguing routines. For instance, Ajibero (2001) lamented that, "one of the major problems in designing and implementing computerized cataloguing system is the issue of retrospective conversion." The researcher observed in the course of this study that the problem of retrospective conversion of existing library records to computerized format still lingers in many automated university library systems in Nigeria.

Table 2: Library Operations/Routines Performed with Computer Systems

Types of Library Operations/Routines	Frequency	%
Cataloguing routines	194	77.0
Internet access	162	64.3
Online public access catalogue (OPAC)	157	62.3
Online searches	157	62.3
Words processing	150	59.5
Acquisition routines	113	44.8
Serials routines	107	42.5
Circulation routines	105	41.7
Library statistics	103	40.9
Reference routines	93	36.9
CD-ROM searches	74	29.4
Library management routines	67	26.6
Inter-library loan routines	22	8.7
Others	16	6.4
Total respondents = 252		

Level of Anxiety about Computer Use

This issue was dealt with under the second research question. The results of the analysis are presented in Table 3.

Table 3: Respondents' Level of Anxiety about Computer Use

	Responses			Total
Library Staff category	**High**	**Moderate**	**Low**	
University Librarians	1	5	2	8
Dep. Univ. Librarians	1	6	2	9
Principal Librarians	3	14	5	22
Senior Librarians	4	15	7	26
Librarians I	5	20	8	33
Librarians II	2	10	3	15
Assistant Librarians	4	15	10	29
Library Officers	16	26	14	56
Systems Staff/ Secretaries	15	27	12	54
Total	**51**	**138**	**63**	**252**

The data in Table 3 indicate that the level of computer use anxiety varies with category of staff. However, the majority of the respondents, i.e. 138 (54.8%) indicated a moderate level of anxiety about computer use. This means that many library staff are still not completely free from the negative emotions and cognitive stress involved in their actual or envisioned interaction with the computer to perform library and other tasks. Such fear is also likely to affect negatively their perceptions about the ease of use of automated library systems and, hence, their job performance. Previous studies by Russell and Bradley (1997) and Harrington, McElroy and Morrow (1990) supported this finding.

Relationship between Computer Anxiety and Perceived Ease of Use of Automated Library Systems

This section reports the results of the tests of the two hypotheses of the study. The potential predictive effect of computer anxiety on perceived ease of use

of automated library systems is the purpose of research hypothesis 1, which states: "There is no significant relationship between computer anxiety and perceived ease of use of automated library systems by library staff." Toward performing analyses to validate this hypothesis, the computer anxiety level of the sampled university library staff was correlated with their corresponding perceived ease of use of automated library systems, using the Pearson correlation method. Table 5 reports the results.

Table 4 shows that the mean score of perceived ease of use of automated library systems by library staff in Nigerian universities is (x = 62.41, SD = 9.70) while the mean score of their computer anxiety is (x = 31.86. SD = 11.78). The results also show that there is a significant negative relationship between computer anxiety of the staff in Nigerian university library and their perceived ease of use of automated library systems (r = -0.346, p<.01). Therefore, the null hypothesis was rejected. In other words, the library staff who are computer anxious are more likely to perceive the use of automated library systems as difficult. This finding agrees with the observation by Doyle, Stamouli and Huggard (2005) that "people that suffer from computer anxiety are fond of displaying negative behaviour, as well as physiological reactions to computers. Other studies by Yang (1996), Gunter, Gunter and Wiens (1998), Torkzadeh and Angula (1992), Weil and Rosen (1995) and Rezoich (1996) attested to this relationship between computer anxiety and usage of information systems by people.

Table 4: Mean and Standard Deviation and Correlation of Computer

(a) Means and standard deviation			
Variables	*Mean*	*Std. Deviation*	*N*
Perceived ease of use of automated library systems	62.4048	9.70126	252
Computer anxiety	31.8611	11.77717	252

(b) Correlation coefficient	
	Level of Computer Anxiety
Perceived Ease of Use of Automated Library Systems	-346**
** Pearson correlation was significant at the .01 level (2-tailed). N=252.	

The second hypothesis states: "perceived ease of use of automated library systems does not vary significantly on the basis of library staff's level of computer anxiety and level of university library automation." In testing this hypothesis, two-way analysis of variance with more than one entry per cell was employed. The results are shown in Table 6.

Table 5 shows a significant relationship between perceived ease of use of automated library systems by library staff and their level of computer about computer use (categorized for the analysis as high, moderate and low). On the other hand, there was no significant relationship between perceived ease of use of automated library systems by the library staff and the level of automation achieved at the university libraries where they worked (categorized as high, partial and initial). Finally, there was no significant interaction effect of the level of computer anxiety and level of automation achieved on perceived ease of use of the automated library systems.

Table 5: ANOVA Results of the Effect of Computer Anxiety and Level of University Library Automation on Perceived Ease of Use of Automated Library Systems

Source of variation	**Sums of Squares**	**Df**	**Mean Square (MS)**	**F**	**Remark**
Library Automation Level	10.85	2	5.42	0.18	Not Significant
Computer Anxiety Level	55126.79	2	27563.40	898.29	Significant
Interaction (Automation x Anxiety)	47.09	4	11.77	0.38	Not Significant
Within Cells	7456.32	243	30.68		
Total	62641.05				

Conclusion and Recommendations

This study has established that the majority of the university libraries in Nigeria were yet to be adequately computerized, not to talk of being fully automated. The study found that the major library routine to which the computer was being applied in Nigerian university libraries at the time of the study is cataloguing. This represents some evolutionary growth from the status about a decade earlier, when Idowu (1997) reported that computers in Nigerian university libraries were being used mostly for word processing applications.

This study found a moderate level of computer anxiety among the library staff, and that the moderate level of computer anxiety nevertheless still correlated inversely significantly with perceptions by the library staff of the ease of use of the computerized library systems. What this means is that the library staff are likely to consider their automated systems difficult to use, partly because they exhibit some anxiety about the use of computers and, by extension, the automated library systems in their libraries.

Arising from both the findings of this study, as well as the factors identified by earlier researchers to be responsible for the slow pace of automation in Nigerian university libraries, this study proffers the following recommendation to improve the situation in Nigerian university libraries:

- Training programmes like seminars, workshops, etc, on IT use should be organized periodically by university libraries for their staff. This will enable library staff to update their knowledge about emerging new information technologies being introduced in the libraries, thereby reducing their level of computer anxiety.
- University libraries should strategize to improve their access to funds from government, their parent universities and other sources towards meeting the financial and technical demands of effective and efficient library automation, such a reliable electricity supply, networking, Internet connectivity and staff training.

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*** Dr. Stephen O. Uwaifo** is a Senior Lecturer in the Department of Library and Information Science, Delta State University, Abraka, Nigeria. He holds BLS and MLS from the Bayero University, Kano, Nigeria, and PhD from the Department of Library, Archival and Information Studies, University of Ibadan. His research interests are in library automation and networking, and ergonomics of IT.

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 157 - 168

Information Literacy Delivery in Tanzanian Universities: An Examination of its Effectiveness

Mugyabuso J. F. Lwehabura

Sokoine University of Agriculture
Sokoine National Agricultural Library
P.O. Box 3036, Morogoro, Tanzaniaj
ulwe@yahoo.com; lwehabura@suanet.ac.tz

Abstract

This paper presents the findings regarding information literacy (IL) delivery) in four Tanzanian universities in terms of IL content and delivery methods and their effectiveness. Based on a questionnaire survey of librarians and undergraduate students, the study found that the main IL teaching methods used include lectures, web pages and seminars, while content covered in IL sessions include information search skills, use of library facilities, information evaluation, and use of information sources. However, it is concluded that because of a number of factors, including lack of clear IL policy, inadequate time, the teaching of IL as stand-alone programme on voluntary basis, and non-involvement of teaching staff, the current IL delivery approach is not effective for imparting adequate IL skills. A new IL delivery approach that addresses the identified weaknesses is therefore recommended.

Keywords

Information literacy, teaching methods, evaluation, universities, Tanzania

Introduction

Since the 19th century, librarians have been engaged in teaching people how to use the library and its resources using, various rubrics such as library orientation, bibliographic instruction, information research skills, user education, etc. (Kaufman 1992). In the early years, librarians' emphasis was given to bibliographic instruction, later to user education, and more recently to problem-based learning, which has information literacy (IL) as its core (Hepworth, 2000). Through information professionals, the consciousness of librarians and other educators about IL significance has spread around the world mainly as a result of the technological development of the 21st century that has propagated information proliferation, both in terms of quality and quantity (Bruce and Candy, 2000). This situation has created a challenge in terms of the knowledge and skills that people should possess, in order to handle and use information effectively.

In response to this challenge, professionals in library and information science reconfigured the library skills instruction of the 1960s into a research framework they called information literacy (IL). Today, IL has thus grown, gained strength and recognition world wide both in educational institutions and workplaces, and is considered as an important tool needed by all information users, in order to empower themselves with skills needed for life-long learning and to make them competitive in a global information age. The importance attached to IL has led many education institutions including universities, colleges and schools to introduce IL programmes that would equip students with adequate knowledge and skills for being effective information users. Since most of IL activities involve the information domain of which librarians are experts, most of IL programmes and initiatives in many institutions have been initiated or introduced under the influence of librarians.

This article reports the state of IL delivery in four Tanzanian universities and discusses its

effectiveness in imparting IL knowledge and skills among students. Measures that can lead to further improvements of the IL programmes are also suggested.

Research Problem and Objectives

In Tanzania, as in other developing countries, it is commonly observed by librarians and other information professionals that most information users, especially students, have information skills deficiencies. Students attend universities and other higher learning institutions knowing very little or nothing about the basic library use and information search skills, computer-related skills and other information resources use skills in general. Consequently, students lack the information knowledge and skills necessary to effectively comprehend what they require in order to meet the information needs of their day-to-day academic pursuits. The main reason behind this situation is the poor base of library systems, including school libraries in most developing countries, both in rural and urban centres. A number of studies concerning school libraries in Africa, including those by Dike and Amucheazi (2003) and Obajemu (2002), report poor library resources generally, as well as non-existent or poor school library facilities and services in Nigeria and many other African countries.

The problem of inadequate information and knowledge skills is exacerbated by the fact that many African universities lack meaningful programmes geared to improve the level of information skills education (Mgobozi and Ocholla, 2002). This situation has a detrimental effect on the development of independent learning skills essential for successful educational development among students. In order to remedy this problem, universities and other learning institutions are conducting various programmes to help students and other information users, to become competent and effective information users.

As no comprehensive study had previously been undertaken to assess the nature and forms of library instructions/information literacy programmes in Tanzanian universities, this study was conducted in order to fill this gap. This article emanates from a broader study that was under taken to critically investigate the status and practices of IL as a means for imparting and acquiring skills for effective teaching and learning in Tanzanian universities. The study was undertaken with the main objective of coming up with best strategies that can be adopted by higher learning institutions in Tanzania to improve or develop effective IL programmes to assist students to gain the knowledge and skills necessary for life-long learning in the contemporary information environment. A more specific objective of the study was to identify and evaluate the types and forms of library instruction (as an aspect of IL) being practised in the universities under study.

Literature Review

The concept of IL has been used primarily in higher education, although it has started to diffuse in other places such as workplaces. Since the 1990s, some IL scholars have come with studies and theories that underpin IL. In the past, the approach to IL has frequently been narrowly skills- and sources-based in a way that focused on equipping and aiding students to acquire skills in using a particular library and its specific sources or tools (Mutch, 2000; Eisenberg and Brown, 1992; Kuhlthau, 1987). This approach has been criticised by a number of authors including Bruce (1997) and Kuhlthau (1987). For example, Kuhlthau (1987) points out that this approach had disadvantages in the difficulty of transfer to other situations of information seeking.

Kuhlthau (1987) asserts that the theoretical base for library instruction is the one that combines learning theory, information seeking behaviour and a broader view of library skills. Essentially, Kuhlthau's IL theory is a combination of cognitive science and constructivist learning theory drawn from views of other scholars like Dewey (1933), Kelly (1963) and Bruner (1973; 1986). In principle, approaches to IL teaching are now influenced by both learning theories developed by education psychologists and research in information seeking behaviour. According to Kuhlthau (1987, 2001), new methods for teaching IL are based on cognitive and affective attributes and applied to teaching methodologies that are concerned with problem solving and seeking meaning. For example, the developmental psychology theories, developed by the Swiss biologist, Jean Piaget, contend that children's cognitive abilities develop in a sequence of stages from sensor-motor, preoperational, concrete operations to formal operations. These stages as

conceived by Piaget can be applied in IL programmes.

Kuhlthau (1987) contends that other theories from other psychologists like Kelly, Bruner and Neisser that are also based on sequential learning can be applied in IL programmes. Based on those theories, Kuhlthau (2001) advocates a constructivist approach to learning as being suitable for teaching and learning IL as opposed to the transmission approach or skills approach. Constructivism is a philosophy of learning, based on the premise that learning takes place through reflecting on one's own experience and constructing understanding of the world we live in. Under constructivist teaching, strategies are tailored to encourage students to analyse, interpret and predict information, and to apply hands-on approaches to learning and problem solving.

A constructivist approach is very pertinent in developing IL skills, especially regarding the aspect of independent and lifelong learning. Constructivism involves linking and classifying information in new ways, as well as helping to build personal meaning. Kuhlthau (1989) observes that the information research process is a holistic learning process encompassing the affective experience of students, as well as their intellect. She thus emphasises that IL should be imparted by means of genuine assignments rather than source-based instruction. Information literacy is also influenced by research in information seeking behaviour. Accordingly, research in information retrieval has expanded from studies on text or source representations and search techniques to studies on users.

Modes of Delivery for Information Literacy Programmes

There are different approaches or modes of providing IL programmes that include the following:

Course Integrated Instruction: Course integrated instruction, according to Young and Harmony (1999), is instruction that meets at least the following requirements:

- Members outside the library are involved in the design, execution and evaluation of programme.
- The instruction of the programme is curriculum-based in the sense that it is directly related to students' course work or assignment.
- Students are required to participate.
- Student's work is graded or credit is received for participation.

Because of its effectiveness in imparting IL knowledge and skills, this approach is most preferred by many authors and IL practitioners.

Non-Integrated Instruction: Unlike course integrated instruction, a non-integrated course is not an essential component of any specific course and/ or research assignment. Although some members of academic staff may be involved in deciding the content or linking it to particular assignments, this type of a programme, according to Young and Harmony (1999) lacks two aspects:

- Members of academic staff do not actively collaborate with librarians in designing and providing the content.
- Librarians have very little involvement in the design and evaluation of research assignments.

According to Young and Harmony (1999), non-integrated instruction programme can be delivered as either stand-alone presentations or a one-time lecture. *Stand-alone programmes* are scheduled and presented by librarians independent of academic course schedules and assignments. What is taught in these programmes depends on the assessment by librarians of what may be needed by students, such as an introduction to the on-line catalogue, databases and specific resources or specialised topics. Attendance by students is also voluntary, as they do not receive assignments, grades or credit. *The one-time-lecture method* mainly consists of a lecture delivered in class by a librarian invited by a lecturer to come and speak on specific resources or on an information search topic that may be considered important and needed for accomplishing a particular piece of work or an assignment. This type of programme, according to Young and Harmony (1999), is considered to be inadequate for delivering IL skills, because it provides limited chances to include aspects of evaluation and problem solving that are very important in IL programmes.

Web–Based Tutorials: Web-based tutorials are instruction offered through Web interfaces. These tutorials can be used to give assignments or self-paced IL learning modules. The web is an integrated teaching tool that allows students to use the actual resource itself to learn, as well as to conduct their research (Young and Harmony 1999). Web tutorials

range from the simple to the complex, and focus on issues such as online-searching, evaluating web sites, citing sources, information ethics, and broader information literacy topics (Eisenberg, Lowe and Spitzer 2004).

Workbooks: A workbook is a book that provides assignments and activities that users can write in and practise lessons on skills or concepts. Workbooks can be in paper form or electronic (Young and Harmony1999).

Other Methods: Other useful methods that can be used to complement the above approaches and methods include signage, tours, exhibits, slides, tapes and videotapes. Signage, usually paper-based and posted in conspicuous areas, can be used for different purposes, including providing information, instruction and procedures for using equipment like computers, databases and printers. Signage can also be used to provide warning and directions. On the other hand, maps can be used for self-help in locating materials, service points and other important locations in a single building or in multi buildings within larger areas such as a campus (Grassian and Kaplowitz 2001).

Tours can be guided by librarians or be self-guided. Self-guided tours can be provided on paper, electronically by audiotape, CD-ROM or can be Web-based. In most cases, librarians combine the physical tour with a brief introduction to the set up of the library and instruction in the use of various resources that are available (Grassian and Kaplowitz 2001).

Signs that are hand-lettered or computer printed, glossy photos, printed posters, enlarged sample websites and sample research papers constitute an exhibit or display that can become very useful for information users. Slides, tapes and short video instructional programmes with live dialogue and voiceovers are also effective means of instruction to information users. A combination of images and voices are effective tools for capturing an audience's interest (Grassian and Kaplowitz 2001).

It is important to note in conclusion that contemporary teaching and learning practices are now characterised by student-centred, problem-based or inquiry-based approaches. All these approaches have their philosophies drawn from various learning and teaching theories. What needs to be emphasised is that in order to achieve the maximum IL outcomes, the whole process of IL teaching should be considered as part of contemporary learning theories because, as pointed out by Moore and Page (2002), IL exists in pedagogical terms at the confluence of resource-based learning practice, constructivist and meta-cognitive theories, and derives from the practice of developing thinking skills through modelling and scaffolding. It is therefore important for educators engaged in IL (librarians inclusive) to be knowledgeable about various learning theories. This stance is clearly affirmed by Grassian and Kaplowitz (2001) that:

> *The most effective information literacy instructors are those who are familiar with a variety of learning theories and the teaching techniques that are based on those theories. Effective instructors remain flexible and are willing to mix and match various techniques as needed.*

Methodology

The study involved four Tanzanian universities: University of Dar-es-Salaam (UDSM), Sokoine University of Agriculture (SUA), Iringa University College (IUCO), and St. Augustine University of Tanzania (SAUT). Tanzania currently has a total of nineteen universities of which eight are state owned while eleven are privately owned. By the time of the study in 2006, however, Tanzania had a total of 10 universities out of which five were state owned while the other five were privately owned. The four universities involved in the study were deliberately selected using purposive sampling method. Purposeful sampling was considered appropriate because some of the universities were relatively too new and small to provide adequate information in relation to IL. The selection of the four universities was considered ideal for allowing a balanced representation from two sectors offering university education (state and private), as well as capturing data from two bigger universities in terms of the number of students and staff from each sector.

A survey method of data collection using a self-administered questionnaire was used to collect data from librarians and undergraduate students in the four

universities. A total of 25 librarians who constituted the entire population of librarians with a minimum qualification of a first degree participated in the study. Of the librarians, two (8%) were associate professors, nine (36%) were senior librarians, five (20%) were librarians, and nine (36%) were assistant librarians. In terms of their academic qualifications, seven (28%) had PhDs, 15 (60%) had master's degrees, two (8%) had first degrees, and one (4%) had a post-graduate diploma. In terms of work experience, ten of them (40%) had worked for over 16 years, three (12%) had worked for between 11-15 years, two (8%) had worked for between 6-10 years, while 10 (40%) had worked for between 1-5 years.

The students' sample was obtained using probability sampling techniques. A list of all undergraduate students in each university was obtained, and the names were stratified according to students' faculties and years of study. In each stratified group, a sample was picked systematically by making the selection at a regular interval from a sampling frame.

Using a formula by Krejcie and Morgan (1970) for determining the population sample size, a total of 1123 copies of a questionnaire were administered to the students, while the 25 librarians has their own separate questionnaire. The return rate was 25 (100%) for librarians and 664 (59.1%) for students.

Findings and Discussion

IL Delivery Methods Used

From the responses given by 23 (92%) librarians, the study confirmed that librarians in all four libraries provided IL training to their users. The methods used for IL teaching include lectures (28%), orientation and hands-on practices (21%) each, Web pages (15%), seminars 7(13%), and leaflets by 1(2%). The study established from responses given by 14 (63.6%) librarians that, IL was taught as stand-alone programmes. In addition, the study confirmed by 82.6% of the respondents that delivery of IL was being undertaken by both *academic* and *non-academic librarians*. In Tanzanian university libraries, academic librarians are those who are employed in the academic staff category. Their terms of employment and their promotion criteria are the same as for teaching staff, while non-academic librarians are employed in the administrative staff category.

The application of a combination of different methods as found in the study is a positive trend leading librarians and information professionals in Tanzanian universities towards imparting IL skills in a more effective manner. As pointed out by Thompson (2003), there is no one solution to solve the problem of how to help students improve their research skills, library skills or information literacy skills, rather a combination of approaches need to be applied. However, what is important is to critically look and make an assessment on how and to what extent those methods are applied, in order to create and bring the desired impact to learners in terms of acquiring the necessary IL knowledge and skills. Therefore, in order to nurture and promote IL knowledge and skills among students, it is important to ensure that different teaching methods are used in ways that would bring positive and effective results.

IL Aspects Taught

From responses given by librarians, the study ascertained that there was a relatively good combination of IL aspects that were being covered. Among the list of IL aspects taught, information search skills had more weight by 34%, followed by use of library facilities with 26%. Information evaluation ranked third with 17.3%, while use of sources of information was fourth with 15.4%. Citation and references ranked fifth and lowest with 5.8%.

Although it cannot be stated categorically that one particular IL aspect is more important than the others, it is important to provide balanced training that would enable students to acquire skills in all aspects, so that they can link one particular skill to another because skills are interrelated and interdependent. For instance, for students, the benefits of being information literate will be limited if they are able to search for information from the Internet, but are not able to critically evaluate the information they access. What needs to be stressed here is that in order to provide students with adequate IL knowledge and skills, the coverage for IL teaching should be as wide and in depth as possible.

Assessment and Evaluation

Assessment and evaluation of any teaching and learning programme is very important. Like any other teaching/learning activity, IL needs to be evaluated as a means of determining its success and facilitating continuous effectiveness. The reasons for doing evaluations of various IL activities, according to Cameron (2004), include:

- To establish a base line of students' skills around which IL might be built.
- To assess the effectiveness of particular library instruction sessions or approaches to instruction.
- To determine the impact of library instruction programmes on student IL skills and academic success.
- To generate data with which to communicate with faculty.

Despite evaluation being stressed frequently both in education and library and information science literature, a number of authors, including Young and Harmony (1999) and De Jager and Nassimbeni (2003), have registered their dissatisfaction concerning IL evaluation. Librarians were therefore asked to confirm the presence of system for assessing or evaluating IL activities in their libraries. The study found and confirmed that assessment and evaluation of IL in the universities under study was weak. Out of 25 respondents who were required to respond regarding the presence of IL assessment and evaluation systems, 17 (68%) of the respondents indicated that there was no assessment/evaluation system, compared to eight (32%) who said the opposite (Table 1). However, from eight respondents who confirmed the availability of evaluation system, the study was able to establish the main areas and stages where assessment and evaluation exercise takes place. The summary is as shown in Table 1.

As it can be noted from Table 1, assessment/ evaluation of the teaching methods was not done at all. Evaluation and assessment of teaching methods is crucial, because it potentially leads to improvement of IL delivery.

Table 1: Methods, Aspects and Stages for IL Assessment/Evaluation (N = 8)

Method		**IL Aspect**		**Stage**	
Examination	3 (37.5%)	Students' skills gained during the programme	7 (87.5%)	During the programme	4 (50%)
Assignments	2 (25.5%)	Students' prior IL skills	1 (12.5%)	At the end of the programme	2 (25%)
Feedback evaluation forms	3 (37.5%)	Teaching methods	0 (0%)	At the beginning of the programme	1 (12.5%)
				Any time	1 (12.5%)

Awareness about IL Programme and its Effectiveness

Students were required to answer some of the questions, in order to verify some of the responses given by librarians. Students were asked to confirm their awareness regarding the availability of IL training in the use of library resources conducted by their libraries. The results indicated that 328 (49%) of students agreed being aware of the training, while 336 (51%) said they were not aware of the training. The 328 students who confirmed of being aware of

the training were asked to give their views regarding the effectiveness of the training. Out of 328 respondents, only 312 responded to the question, and the results showed that 148 (47%) were of the view that the training was effective, while 164 (53%) were of the view that the training was not effective. The reason indicated by students for effectiveness or ineffectiveness are shown in Table 2.

Table 2: Evaluation of and Reasons for the Effectiveness of Training in the Use of Library Resources (N = 312)

Effective		**Not Effective**	
Reasons	***Frequency***	***Reasons***	***Frequency***
Provides exposure to library users	89 (28%)	Time spend not adequate	133 (43%)
Provides adequate skills	59 (19%)	Programme not comprehensive	12 (4%)
		Lack of proper programme	7 (2.2%)
		Lack of practice	7 (2.2%)
		Unqualified instructors	5 (1.6%)

Assessment of the Effectiveness of IL Delivery Methods

Lectures: Lecture method is a common and widely teaching method used in different teaching settings. Lecture method is effective for teaching large groups and it becomes more effective when sufficient time is allocated. Some African universities, such as the University of Botswana, combine lectures with other methods to teach IL skills to students in stand alone general education courses.

The condition under which lecture discrepancy occurs is when IL is not taught as stand alone courses or allocated formal time slots in the main university academic timetable, with the result that IL lecture sessions take place outside the timetable on voluntary basis. Such condition means that there would be no assurance of students' regular attendance of the lecture sessions. Consequently, the acquisition of skills by many students is most likely to be inconsistent and incomplete. In order to make lecture method effective for IL delivery, the academic timetable should allocate adequate time periods for IL lecture sessions. Preferably also, IL should be taught as an integrated compulsory programme instead of being taught as stand alone and optional.

Orientation and Hands-on practice: Orientation undertaken during the first week of the new academic year is common in almost all university libraries. However, because of a number of limitations, orientation is not recommended for use to impart serious IL skills. The main purpose of orientation should therefore remain to orientate and familiarise new students with the general library services offered. On the other hand, hands-on methods are considered to be more meaningful, because they provide practical skills for using various resources such as CD-ROM and getting actual experience in using various information tools and computer applications.

However, the study found that this method is hindered by time constraints because IL is not allocated official time in the timetable. Instead, hands-on practice is acquired by students when individual students go to the library to search for some information or during voluntary sessions. Such a system does not ensure that all students acquire the adequate skills. Sufficient time for hands-on practice therefore needs to be allocated in the academic timetable.

Web page Tutorials: Web pages, especially interactive ones, are very useful for imparting IL skills. Students can use them to answer questions and follow some instructions that guide them to do some assignments. In the study, web page method ranked third among various methods used for IL delivery. However, among the four universities during the time of the study, only one university web site had a link to the library web page with IL information. Nevertheless, the information provided under that link was very limited; and therefore, it was unlikely that the information could make effective impact on students' IL skills.

In order to make this method more effective, libraries should provide comprehensive IL information on their web pages. In addition, efforts should be made to make those pages interactive. Such a system can enable IL instructors to monitor and get feedback from users who access the pages.

Seminars and Leaflets: Seminars could be effective if lecturers are compelled, as part of the university academic policy, to allow their students to attend IL seminar sessions when they are organised. However, this was not the case in the universities. As for leaflets, the study did not find any evidence to

indicate that they were being used purposely for transmitting IL skills.

In general, it can be concluded from the study's findings that the current IL programmes being offered in Tanzanian universities need to be more improved. New approaches are required in order to make them more effective for imparting the required IL knowledge and skills.

Toward Improving and Strengthening the IL Programmes

Current Awareness: Current awareness among information users is very important, in order to allow them become aware of various services that are available for them. The study found that 51% of the 664 students were not aware of IL training that was being offered. This was a clear indication of inadequate awareness by students, which also means that a considerable number of students are not benefiting from the available IL training. Lack of current awareness not only affects programmes such as IL, but also may affect other aspects, including utilization of various information resources licensed or subscribed to by the institution's libraries (Buschman and Warner, 2005; Kiondo, 2004).

Although the study found that libraries had a number of posters placed in different areas within the library, most of the posters were not directly intended to provide instructional directives to IL, as they were mainly intended to advertise, publicize, and make library users become aware of various academic, social and political issues such as HIV-AIDS, study and scholarship programmes vacancies, gender, and business issues, etc.

Current awareness for various library programmes such as IL can be harnessed by effective use of posters and leaflets placed on notice boards and at important points such as issue desks, main library entrances, and specific sections.

IL Teaching Scope: IL has borrowed from traditional practices in library instruction, bibliographic instruction and user education. However, unlike bibliographic instruction and other forms of instruction, IL embraces a combination of knowledge, skills and concepts that are learned over time, both in and outside the library (Galvin 2005). IL also underlies education as a whole and everything we do in libraries and outside libraries to facilitate access to information (Bridgland and Whitehead 2004).

Thus, in order to make IL more meaningful in a way that extends its scope beyond former programmes (user education, library instruction and other forms of instruction), IL programmes should combine skills and competencies such as retrieving, assessing and evaluating, assimilating and creating new knowledge out of the synthesis of information from a variety of information sources. In this respect, skills in the evaluation of information need to be given as much weight as information searching

Involvement of Teaching Staff: Tendencies to confine IL activities within the library, as well as being entirely practised by librarians in isolation without involving teaching staff, are factors that lead to IL not being effective, and consequently, not receiving wide university recognition.

It was established in this study that the involvement of teaching staff in IL activities was very minimal, as only 8.7% of the librarians indicated that teaching staff were involved in teaching or designing content for IL programmes, as compared to 82.6% of the respondents who indicated that IL was undertaken by library staff. Further to this, 72% of librarians were in favour of IL being taught by librarians, the main reason being the IL expertise possessed by librarians. On the other hand, the librarians mostly regarded teaching staff as lacking IL skills.

However, the involvement of teaching staff in IL activities has been cited and emphasized by many authors as a factor that brings success in conducting and delivering IL programmes. According to Asher (2003), collaboration between teaching staff and librarians is essential for effective IL development, planning and delivery of training. This sort of collaboration also serves other purposes, including fostering the sharing of ideas and expertise. Collaboration provides opportunities for exposure to different pedagogies, new teaching and learning techniques, and enables colleagues to become familiar with each other's fields. Also, collaboration allows the two professional groups to contribute their expertise and specialised knowledge to the university curriculum (Hunt and Birks 2004). According to Carlson and Miller (1984), as cited by Hardesty

(1995), "no matter how hard librarians work, without the cooperation and support of teaching staff, IL programmes will be unsuccessful or severely limited." Collaboration, alliances and co-operation between librarians and other educators are the keys to the integration of IL within the total education process (Doskatsch 2003). In other words, IL should have a university wide outlook and acceptance. This situation requires the inclusion and collaboration with teaching staff in all activities pertaining to IL.

Successful IL programmes involving librarians and teaching staff have been reported in other African universities like the University of Botswana and the University of South Africa (UNISA). See for example Yeboah (1999), and Machet and Behrens (2000). It is therefore important for librarians in Tanzania to collaborate with teaching staff, in order to avoid certain negative consequences that may arise from lack of collaboration. For example, it is likely that most of the teaching staff would be reluctant and skeptical to support IL as a university wide education activity if they are not involved in any form. Librarians should therefore avoid envisaging IL as a library preserve that is only fit to be practised by librarians alone. Instead, efforts should be taken to craft IL programmes that are recognized as part of the educational strategy for the entire university, and practiced in collaboration with teaching staff.

Librarians should recognise that although they are experts in IL and other information issues they should be ready to invite the teaching staff to participate in IL activities as long as they are available and are willing to do so. It is in this way that IL can acquire a university wide recognition.

Hands-on Practice: Although the study found that hands-on practice was one of the methods used for imparting IL skills, the lack of opportunity for hands-on practice was among the inadequacies in programme delivery cited by student respondents. This problem results from two conditions: inadequate time allocation, and inadequate number of PCs for hands-on practice. Practical skills can be gained through using various facilities such as CD-ROMs and Internet-connected PCs to practice searching for information from various information sources. In order to achieve the most effective learning environment for IL, according to Blakeslee, Owens and Dixon (2001), the practical context is important in order to reinforce theory. Librarians therefore need to address the importance of allocating adequate time for hands-on practice, in order to create more room for effective acquisition of IL knowledge and skills among students.

IL Assessment/Evaluation: Hunt and Birks (2004) contend that assessment of student outcomes in IL is most effective when multiple measures are applied. Hunt and Birks (2004) point out further that, as opposed to the old model of teach then test, IL is best assessed for both process and product. Such an assessment helps to give evidence in terms of the library's contribution regarding students' learning that result from gaining IL skills (Rockman 2002). Without producing evidence of what is taking place in IL activities, it will be difficult to justify the importance of IL; hence, the prospects of IL being integrated into the mainstream curriculum and/or requests for funds to run IL activities are most likely to meet stiff opposition from university administration and their structures.

Conclusion and Recommendations

The study established that librarians in the four universities provide some form of information literacy instruction, using a combination of methods including orientation, lectures, hands-on practice and web-page. However, this instruction is not effective enough in fostering the required information literacy knowledge and skills among students, because it is affected by a number of factors including inadequate time, inadequate resources, and lack of clear IL policy. Because there is no official time allocated for IL within the university timetable, IL sessions are undertaken out of librarian's concern, and are attended by students voluntarily. IL problems in the universities under study emanate mainly from lack of IL policy to guide its activities. It is for this reason that IL is treated as a voluntary activity. According to Ojedokun and Lumande (2005), the consequence of IL not being integrated into regular courses and not being timetabled compromises the effectiveness of IL, both in terms of theory and hands-on practice because, IL is not accorded its due importance. As far as this study is concerned, it can be concluded that IL is not yet adequately recognized in the universities as an important learning activity.

In order to improve IL programmes and make them more effective, the more aggressive proactive approach is needed, especially from librarians. Librarians need to promote widespread and deeper recognition of IL in the universities by raising awareness among students, teaching staff, and other institution stakeholders on the importance of information literacy in facilitating teaching, students' formal education, and life-long learning. Sensitization seminars, leaflets, posters and comprehensive IL information published through the university or library website can be used to serve this aspect.

In addition, the following should also be considered:

- Librarians should make efforts to ensure that they involve teaching staff in IL activities, including teaching and designing or proposing IL programme content.
- More current awareness on the existing IL programmes should be strengthened, so as to increase the number of students who can attend them on voluntary basis as they do now.
- IL should be allocated with adequate time and resources, in order to create adequate opportunity to balance cognitive/theoretical sessions and practical skills during hands-on practice. This is taking into consideration that effective IL learning environment is not only influenced by the context of a discipline, but is also influenced by a practical context that reinforces theory. Adequate practice time also reinforces active learning processes among students.
- Evaluation and assessment of IL should be improved, in order to ensure that there is a proper mechanism for evaluating and assessing each teaching method being used.

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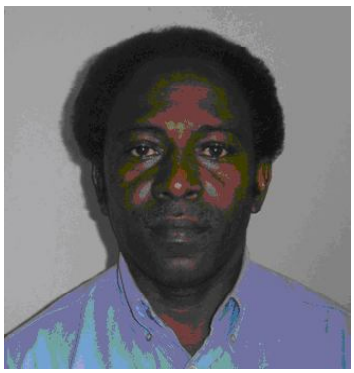
* **Dr. Mugyabuso J. F. Lwehabura** is a Senior Librarian and Deputy Director, Sokoine National Agricultural Library, Sokoine University of Agriculture, Tanzania. He attended the University of Dar-Es-Salaam, University of Sheffield and University of KwaZulu -Natal. He holds Bachelor of Arts (Education), MA (Librarianship) and PhD (Information Studies).



Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 169 - 180

Development of a Web-based Virtual Classroom System at the Federal University of Technology, Akure, Nigeria

B.A. Ojokoh and V.F. Balogun

Department of Computer Science, Federal University of Technology,
P.M.B. 704, Akure, Nigeria.
bolanleojokoh@yahoo.com

Abstract

The Internet is about the biggest technological advancement since the industrial revolution, and has fundamentally changed virtually every sphere of life, including educational paradigms and practice. This research work harnessed the joint and several advantages of the Web and its tools to design and write programs that run in the browser to implement a cost effective collaborative virtual classroom system. In the research, Apache served as the web server; HTML was used to edit the web pages; Javascript for data validation; MySQL for creating the database tables; and PHP for writing CGI scripts. This paper focuses on the student module of the collaborative virtual classroom system, which was designed and implemented in the Computer Science department of the Federal University of Technology, Akure (FUTA), Nigeria. The system provides such facilities as University news and calendar, results checking, course registration, online admission, and teaching support tools. The system also facilitates easy updates and maintenance.

Keywords

Collaborative learning, Virtual classroom, Nigeria, Tertiary education, online learning

Introduction

We now live in a fast changing world where improvement over existing operations appears to be the driving force for better life. This is largely due to the information revolution through which the computer and communication technologies have permeated virtually all human activities, including education. The fast changing world poses a challenge to educational and computer professionals, particularly website designers to design new technologies for delivering education at all levels.

Schools and educators have the responsibility to prepare young students to be future leaders within their environment. Schools and teachers need to know how to utilize technological advancement to promote education, and students need to be inspired to entertain new ideas, new technologies and adapt them to life. Nigerian universities need to join their counterparts in developed countries to utilize up-to-date technologies like Collaborative Virtual Classroom (CVC) to enhance the education of their students and help them overcome the time and cost constraints they face.

Collaborative learning is a process that emphasizes group or cooperative efforts among faculty and students, active participation and interaction on the part of both students and instructors, and new knowledge that emerges from an active

dialogue among those who are sharing ideas and information (Smith and MacGregor, 1992). This new conception of learning shifts away the focus from the teacher-student interaction to the role of peer relationships in educational success (Johnson, 1981). Collaborative Virtual Classroom helps to empower, enable and connect students around the world using Internet technology. It aims to provide students the opportunity of developing three skills that are essential in the 21st century - Cross-cultural communication, Collaboration and Computer skills. Collaborative virtual classroom applications give "virtual classroom" applications, with an emphasis on learner-participation. In this case, the Internet is used for communication; teacher / facilitator-to-learner communication, as well as learner-learner communication. Study materials are available on the World Wide Web (WWW), but the WWW as a medium for imparting knowledge is not the major focus. The prime emphasis is on simulating and improving on the level of class interaction and participation. Collaborative projects are carried out where learners depend on one another for input to tasks and activities, yet remain individually as well as jointly accountable (Bouton and Garth, 1983; Whipple, 1987; Gokhale, 2002; Spurlock-Johnson et al., 2004).

Collaborative Virtual Classroom also serves as Internet–managed instruction. In this case, course management, as well as the management of an entire institution, is done via the Internet. Actual teaching, instruction, lesson presentation and tutorials are done on the web, hence reducing the stress that students may face when required to take part in face-to-face learning sessions. Moreover, all course-related communication involving teachers and students can be conducted online via-e-mail and discussion forums. CVC technologies emphasize asynchronous communication, which means that there is no need to attend classes scheduled for certain days or specific hours; the study guides which include course materials, assignment and assessments are developed as Web-pages.

Considering the wave of technological advancement, it is necessary to provide a conceptual framework that will facilitate online education, which can serve as a substitute for or complement to traditional classroom education. In the traditional classroom method of learning (Chubb, 2006):

(i) the delivering of training is slow; there is no access to training for students when and where they need it;
(ii) the cost of learning (including fees, acquisition textbooks and other materials) is high;
(iii) there is specific timeframe according to instructions schedule, which make each delivery not consistent;
(iv) learners cannot learn in their preferred styles;
(v) there are less opportunities for learners to communicate; and
(vi) the physical environment in terms of lighting, comfort, group size, trainer competence and learner competence most times are not conducive for learning.

The forces that have driven a rapidly increasing number of universities worldwide to adopt and incorporate information and communications technology (ICT) in teaching and learning include (Richardson and Turner, 2001; O'Donoghue et al., 2004; Kavanagh et al., 2004):

(i) Greater information access;
(ii) Greater communication facilities;
(iii) Quality of teaching;
(iv) ICT skills acquisition;
(v) Asynchronous learning;
(vi) Pedagogical improvement and staff renewal;
(vii) Cost effectiveness.

The evolution of Collaborative Virtual Classroom technologies provides valuable opportunities for university-level education in Nigeria. The acceptance and availability of CVC in Nigerian universities will provide an integrated information infrastructure to support and enhance web-based learning and educational administration services. These services will cover such educational administration tasks as student enrolment, online access to and provision of student and subject information and provision of subject content modules or lecture notes from the most renowned expertise of professionals in the field of teaching to students.

The significance of Collaborative Virtual Classroom technologies to Nigerian university communities and their students, teachers and administrators, as well as the society at large cannot be over emphasized. They will increase the efficiency and productivity of the academic staff and

adult learners with shared base of knowledge, skills and values, improve the universities, image and enhance the whole learning environment.

This preceding discussion highlights the urgent need for Nigerian universities to develop and use Collaborative Virtual Classroom technologies that take into account both the universal good practices in such technologies, as well as local conditions.

This paper discusses the learning aspect of a research work carried out to design a Collaborative Virtual Classroom. A prototype of the system was implemented in the Department of Computer Science of Federal University of Technology, Akure, Nigeria.

Related Work

Fundamental to computer-mediated communication systems is the concept of being able to utilize the capabilities of a computer to tailor human communication process to the nature of the application and the group undertaking this application (Hiltz and Turoff, 1993; Turoff, 1991).

A number of researches have been conducted so far on Virtual and particularly Collaborative Classrooms. Hiltz (1998) confirmed that Collaborative learning designs are more effective for online learning than pedagogical approaches that emphasize individuals working alone with materials posted online. He stated that software structures can be constructed which will support group collaboration, although they can only facilitate the desired behaviour, not produce it. From his study, he discovered that for the group to adapt a structure of interaction that is collaborative in nature, the instructor must mould, model, and encourage the desired behaviour, and the students must be able and willing to participate regularly. He further recommended that the question of how to build and sustain online learning communities is a prime area where researchers on Asynchronous Learning Networks ought to be focusing their efforts.

Turoff (1995) reviewed the software functionality that has evolved over the past two decades of research in Computer Mediated Communications at New Jersey Institute of Technology, Newark NJ, USA to create a Virtual Classroom to support distance education. The multimedia Virtual Classroom courseware allowed the author who publishes the on-line classroom courseware and the user who browses the available information and contributes to the authoring as a participant. Based upon many years of evaluating the effectiveness of this approach to remote education, he summarized his views about the software functionality needed for further improvement of the approach to distance education. He emphasized the need for integration into a single interface that is easy to learn for the sake of usability and user acceptance of the software. In addition, he recommended the use of the technology to facilitate multiple instructors, multiple courses, material used across different course sequences, training on the job, and numerous other requirements that in themselves can add to the requirements for software functionality.

Gibson and Rutherford (1998) developed a method implemented in the "OTEN Information Technology Virtual Classrooms". This method, incorporating a listserv, newsgroup and Web pages, allows questions, answers and additional comments to be embedded in all the learning materials in the most relevant places, hence allowing some interactions to take place. It allows the usual class exchanges to occur and also saves them in context for the next student to use. They reported that "Apart from helping to create a feeling of belonging to a class, this also improves the quality of the teaching resources because after a time the teacher can review and edit these annotations and make use of them to improve the content of the next edition."

System Design and Implementation

Design Objectives

The system aims at giving an effective, interactive and cost-effective channel for promoting online learning, for teaching and instruction, and for delivering and taking tutorial practices, on the web. It emulates and improves upon the nature of class interaction and participation, while providing a means of disseminating information to students both on and off campus.

Since the system involves online client-server activities, it is built on the WWW framework. This provides a cost effective way of publishing information, supporting collaboration and workflow and delivering scientific application to connected users all over the world.

Access to the Internet is essential for the design of the new system. Since all learning activities are done online, access to secured information is controlled through a registration process and user passwords.

Data Collection and Analysis

The research was conducted, firstly, by means of an extensive review of current related literature. A thorough study of the current methods of teaching and learning was also carried out, thereby understanding the teaching and learning requirements, constraints and inadequacies. Afterwards, relevant data collection was done through study of the departmental handbook, collection of sample lecture notes from the lecturers, and personal interview with some members of the school.

Design and Programming Tools

The design of the system was done using Hypertext Markup Language (HTML) to create plain text and image files; JavaScript, for client – side validation; PHP, which is a server side application program, to write CGI scripts; and MySQL for database management. Apache was used as the Web Server, and File Transfer Protocol was used for the file upload. The following languages were used for the reasons outlined:

1. ***HTML*** was used because it is the standard for authoring web pages and supported by a wide variety of browsers (both graphical and non-graphical).
2. ***Javascript*** was used for validating the entries made on the client side because it is supported by the two most popular browsers – Internet Explorer and Netscape Navigator.
3. ***MySQL*** is the database construct that enables PHP and APACHE to work together to access and display data in readable format to browser. It is a Structured Query Language designed for heavy loads and processing of complex queries. As a relational database system, MySQL allows many different tables to be joined together for maximum efficiency and speed.
4. ***PHP,*** abbreviation for Hypertext Preprocessor, was used to write CGI (Common Gateway Interface) scripts to support the database because it has tightly integrated database capabilities, and it is extensive in that it offers compatibility with several database servers.

System Architecture

The design of the system was decomposed into modules to provide a software structure that implements the functions elaborated in the system detailed design. The modular design of the system shown in Figure 1 focuses on the internal processing function, decomposing high level functions into sub functions, defining internal data stream and data stores and establishing relationships among functions, data stream, and data store. The activities of collaborative learning, which include course registration, posting of questions, posting of assignment, download of lecture note and video, were noted. Top-down, modular approach was employed for the decomposition of the proposed system, which tends to reduce complexities inherent in higher level modules. Figure 1 and 2 illustrates the system's modular structure, and the flow chart of activities and processes in the student's module of the system.

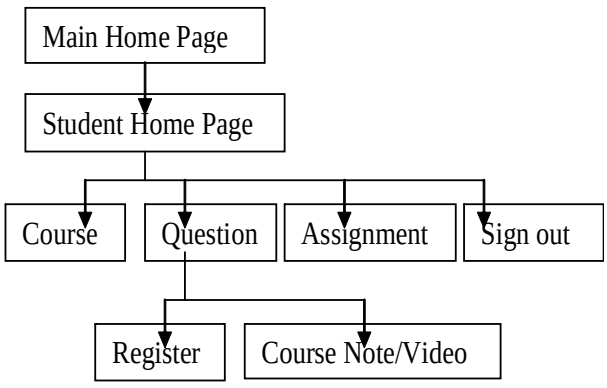


Fig. 1: System's Modular Structure

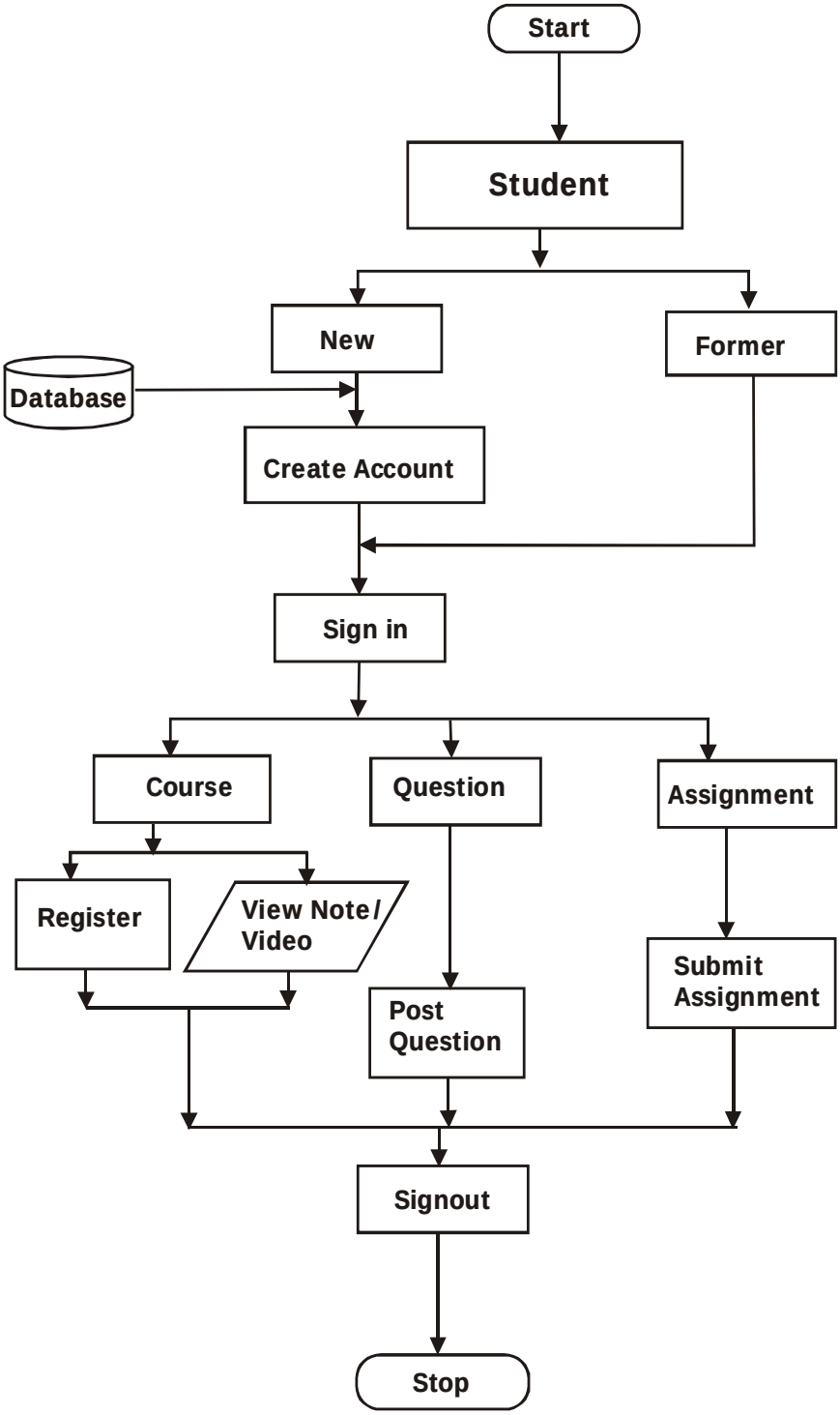


Fig. 2: Flow chart of activities and processes in the student module of the system.

Input Design

This consists of the forms that were used to enter data into the system. The input design forms include: student personal registration form, question form and students' assignment posting form. Samples of the student personal registration form and question form are displayed in Figures 3 and 4.

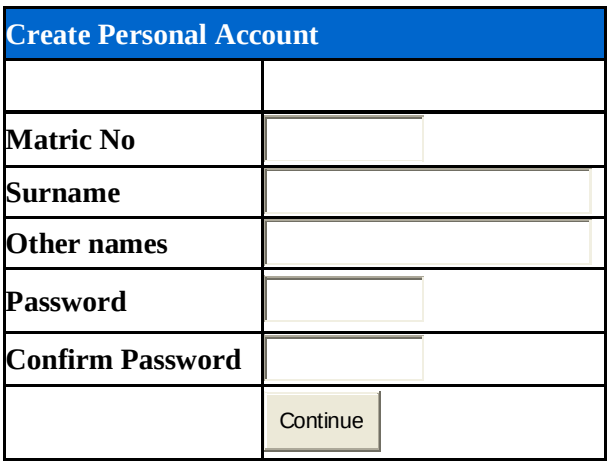


Fig. 3: Student's Personal Registration Form

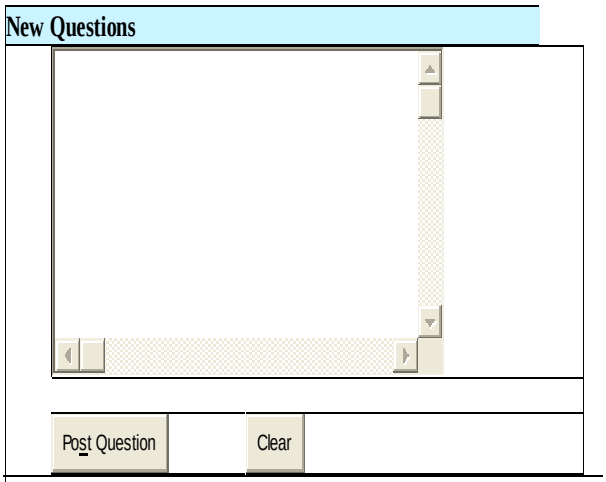


Fig. 4: Question Form

Output Design

The proposed system has the facilities to generate output in formats that can be printed. The output include: list of courses and lecturers assigned and list of submitted assignment.

Database Design

The system uses MySQL to build the database which consists of several tables for data storage. Tables I to VII are the database tables used by the system.

Table 1: Assignment

Field	Type	Description
Id	varchar(15)	Primary key
code	varchar(8)	Course code e.g. CSC203
question	text	Questions asked
datesubmit	date	Date of Submission

Field	Type	Description
code	varchar(8)	Primary key
title	varchar(70)	Course title
unit	char(3)	No of units

Table 3: Course

Field	Type	Description
Id	Int(11)	Primary key
code	varchar(8)	Course code
title	varchar(70)	Course title
unit	char(3)	No of units
lecturers	varchar(50)	Name of lecturer
coursenote	text	Course material
video	varchar(120)	Lecture clips

Table 4: Question

Field	Type	Description
Id	varchar(15)	Primary key
question	Text	Questions
matno	varchar(11)	Matric number
datequest	Date	Date questions were asked
datereply	Date	Submission date
teacher	varchar(30)	Name of lecturer
reply	Text	Submitted solution

Table 5: Register

Field	Type	Description
Id	Varchar(15)	Primary key
matno	Varchar(11)	Matric number
code	Varchar(8)	Course code

Table 6: Studaccount

Field	Type	Description
Id	Int(11)	Primary key
matno	varchar(11)	Matric number
surname	varchar(30)	Student's surname
othername	varchar(30)	Student's firstname
password	varchar(20)	Password

Table 7: Submit_Assignment

Field	Type	Description
Id	varchar(15)	Primary key
code	varchar(8)	Course code
matno	varchar(11)	Matric number
assignment	text	Question
datesubmit	date	Submission date
attach	text	Submitted solution

Web Interface

General Home Page

This is the general login page. It gives the description of how the student can log in through the student login box where user name and password can be entered. It also creates a current account where student can register newly (Figure 5).

Student Home Page

This page contains Home, Courses, Question, Assessment, and Log out menu. This page has links to all the other modules on the site (Figure 6).

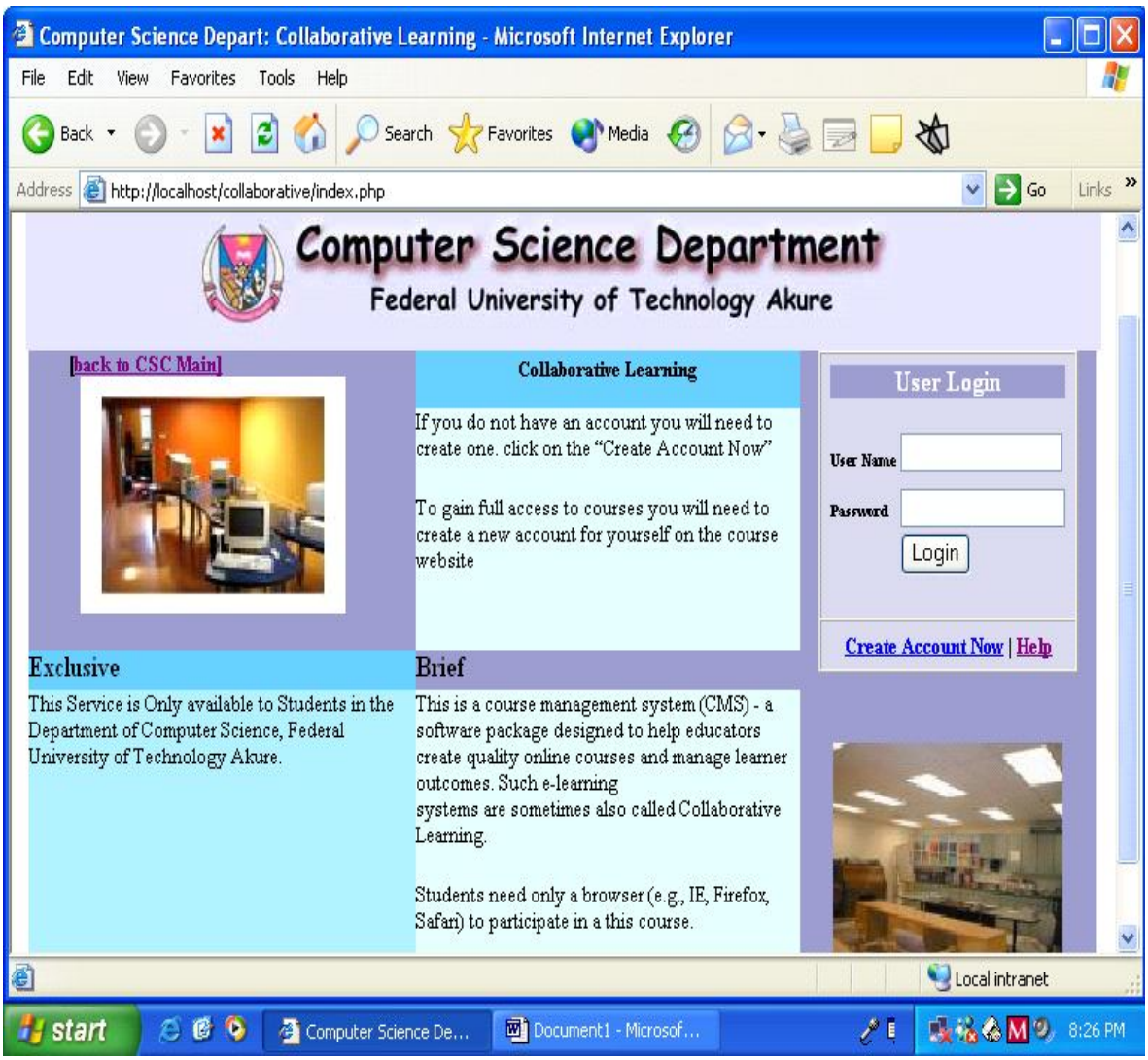


Fig. 5: General Home Page

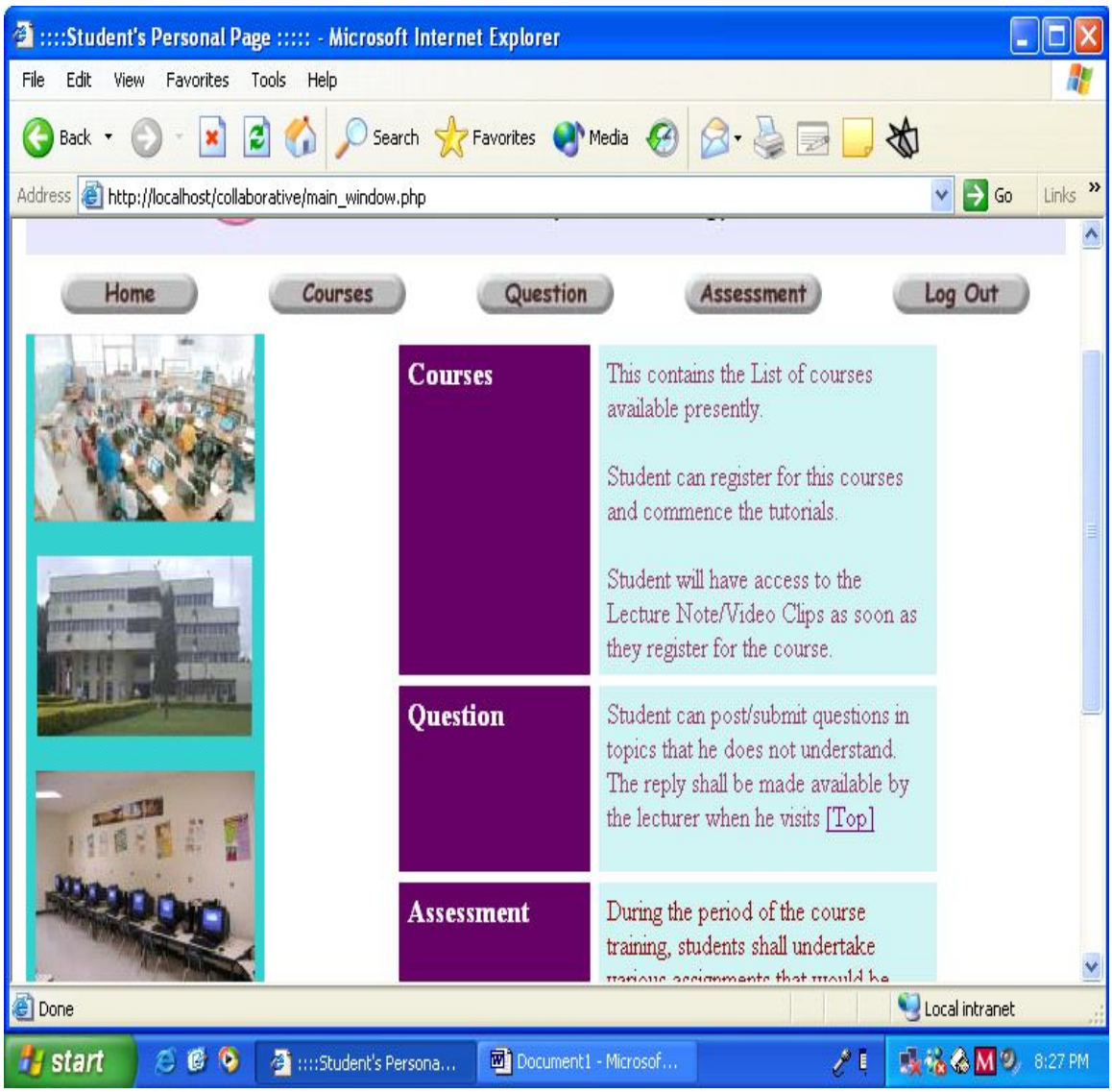


Fig. 6: Student Home Page

Course Registration Page

On clicking "Course Registration" under "Courses", figure 7 is displayed. This page shows the number of courses that have been registered for, the course code, course title, and number of units. It also displays an additional registration form where students can register newly.

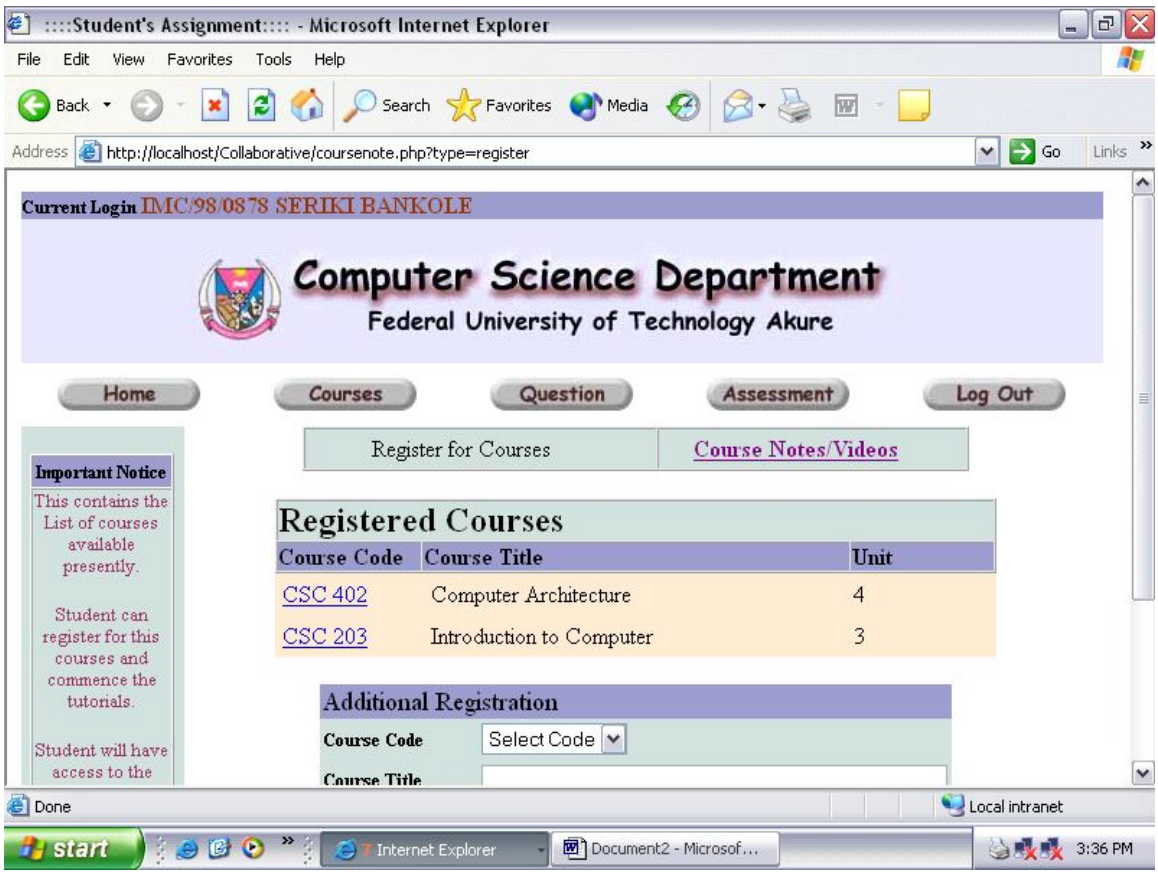


Fig. 7: Course Registration Page

Question Page

On clicking "Question", figure 8 is displayed. This page shows the previous questions that have been asked by the student and the reply to the question by the teacher or lecturer. Also a folder where new questions can be asked is displayed. There is another page that lists courses, their titles, units, the names of the lecturers teaching each of them, and the course note/video. On clicking on note, the notes for the course will be displayed, while clicking on video displays the clip of the lectures.

Assignment Posting Page

On clicking "Assignment", figure 9 is displayed. This displays a folder where new assignment questions are posted. It also shows the list of submitted assignments.

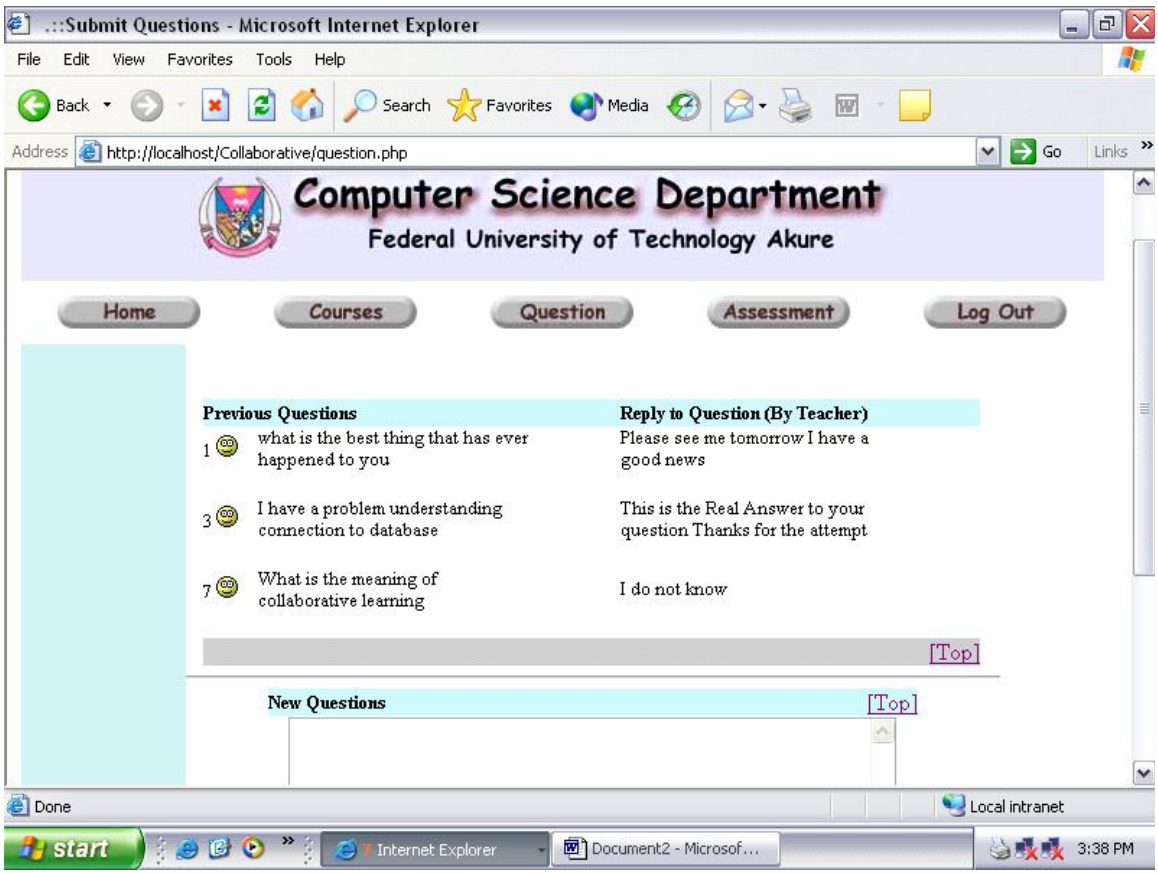


Fig. 8: Question Page

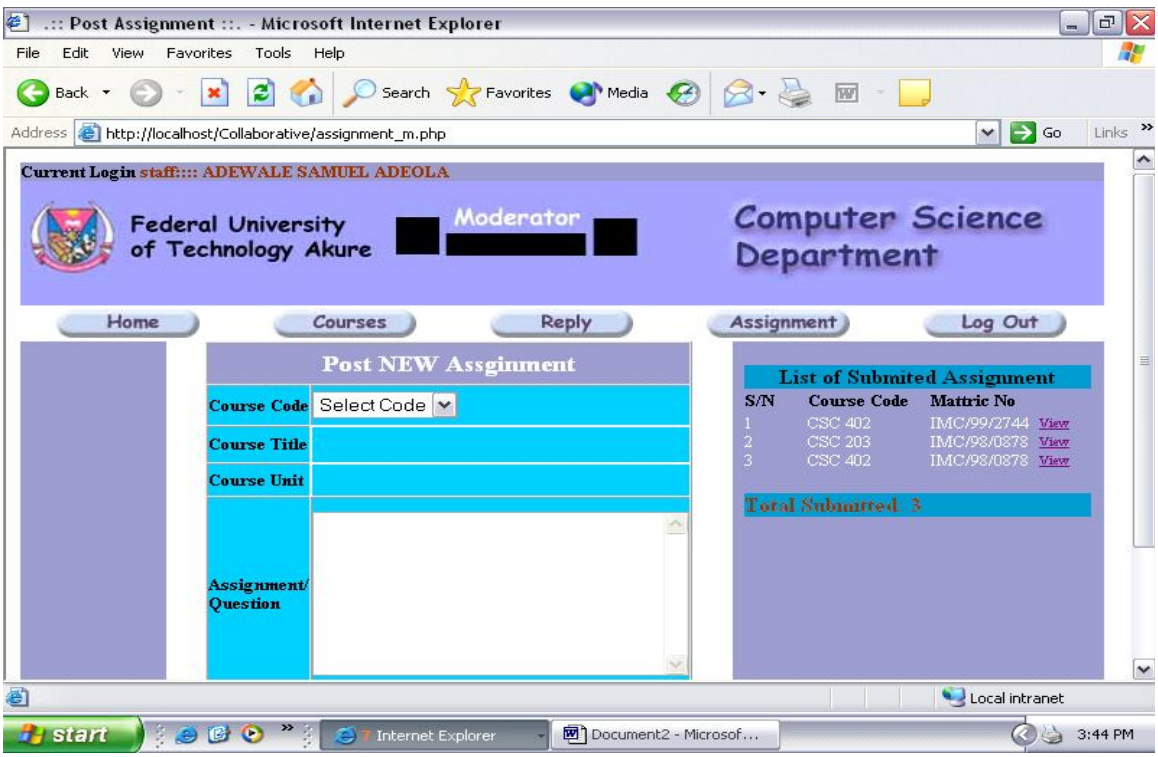


Fig. 9: Assignment Posting Page

Hardware and Software Requirements

Hardware Requirements

For the system to be fully operational, a full multimedia and Internet-connected computer system with a minimum of the following requirements are needed at the server end: P-III processor; 10.2 GB hard disk space; 64 MB RAM; Super VGA colour monitor; peripheral auxiliary hardware, such as, stabilizer and UPS. Low cost complete computer systems are sufficient to operate at the client side.

Software Requirements

The software requirements of the system include:

- A Network Operating System (Linux or Windows NT) at the server end.
- Windows Operating system (Windows '95, Windows '98, Windows 2000, Windows ME or XP) at the client sides.
- Web Server (Apache)
- MySQL Server
- Web Browser (Internet explorer or Netscape Navigator) and Firewall software for security enhancement.

Conclusion and Future Work

The prototype of a Collaborative Virtual Classroom System was designed, implemented and tested at the Federal University of Technology, Akure (FUTA), Nigeria. The design of the system took into consideration the characteristics of a traditional Nigerian university classroom and how these could be implemented in a virtual learning environment, incorporating students' collaboration. With the system, teaching, learning, posting of assignment, tests and tutorial and others could be done without students having to use a physical classroom.

The prototype was tested with some students of the Computer Science Department of the university, in order to validate its functionality and usability. Lecture notes and assignments were posted to students through the system, and the students submitted their assignment reports and interactive questions also through the system. The students noted the relative efficiency of the system, compared with performing the same activities in the traditional classroom and emphasized the system's advantages of convenience, effective utilization of time and accessibility to students.

However, they also noted that the system would require some more enhancements for it to fully replace the traditional means of learning. The students also recommended that further tests with more students in different departments of the university be carried out to ascertain the acceptability of such a system by students.

Finally, the students observed that uninterrupted power supply and full Internet facilities are required for using the systems, and that students would need some training, in order to be able to use the system effectively.

Issues of security and adequate monitoring of students' activities during sessions on the system were some challenges faced in the course of the system design. Some of the problems were solved to some extent, but for maximum security, there is the need to put in place good firewall software when the system is fully implemented for operational use in the future.

In line with the above considerations, future research direction on the work will include a more elaborate implementation and evaluation of the system in a more formal way, hence helping to improve on its applicability, especially to the entire University and any Nigerian university.

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***Mrs. Bolanle Adefowoke Ojokoh** is a Lecturer II in the Department of Computer Science, Federal University of Technology, Akure, Nigeria. She holds B.Sc (Hons) and M.Tech. degrees in Computer Science.

***Mr. Victor F. Balogun** is a Lecturer I in the Department of Computer Science, Federal University of Technology, Akure, Nigeria. He holds B.Tech. (Hons) and M.Sc. degrees in Computer Science.

Mrs. Bolanle Ojokoh

Afr. J. Lib, Arch. & Inf. Sc. Vol. 18, No. 2 (2008) 181 - 185

Short Communication

Opportunities and Challenges for Nigerian Libraries in National Environmental Protection Initiatives

Kingsley Nnamdi Egbukole

University Library, Federal University Of Technology, Owerri
kingsabikane@yahoo.com

Abstract

Nigeria's environment is today being degraded with refuse and other pollutants at an alarming rate. Efforts by successive governments to combat this menace have proved abortive. This paper thus discusses the role that Nigerian libraries can play in environmental protection efforts, just as it is being done by libraries in other countries of the world. The paper concludes that for environmental problems to be successfully managed in Nigeria, the support of libraries is very crucial.

Keywords

Libraries, environmental protection, information dissemination, Nigeria

Introduction

"Environmental management is a complex system of concepts, values, processes, rules, and formal and informal organizations and behaviours that translate public preferences and goals into actions in order to influence environmental quality." (Lovei and Weiss, 1998). As environmental protection is attracting increasing political attention and public support, many developing countries are designing and putting into practice environmental policies and institutions.

The performance of environmental management is influenced by the importance attached to environmental protection in political decision making, and the commitment of the government to address environmental problems. These are influenced, in turn, by (i) the public's concern about environmental problems and its access to meaningful information on environmental issues; and (ii) the existence of mechanisms for public pressure on environmental decisions. (Lovei and Weiss, 1998)

Causes and Management of Environmental Problems

Some environmental problems are natural, while others are man-made. The man-made environmental problems are more common and varied. Ayoade (1997) stated that any process natural or man-made that modifies the physical characteristics of the earth's surface and the chemistry of its atmosphere has the potential to influence the pattern of global atmospheric circulation and the resultant pattern of global weather and climate. However, some authors are of the view that not all changes in the physical environment are environmental problems.

Sloep and Van Dam-Mieras (1995) opined that natural disasters and other changes not caused by humans should not be regarded as environmental problems, because including them would cloud the issue of human responsibilities and liabilities. They thus defined environmental problems as any change of state in the physical environment, which is brought

about by human interference with the physical environment, and has effects which society deems unacceptable in the light of its shared norms. This thus excludes natural disasters like flood, fire, volcanic eruption, etc. In consonance with the above, Uchegbu (1998) listed pollution (air, water and noise), global warming, ozone layer depletion, land degradation, loss of biodiversity, deforestation, desertification, and atmospheric contamination as environmental problems. These man-made environmental problems are more common and varied than the natural disaters, and often also heighten the negative human impact of the natural disasters. Most of the environmental problems are directly related to the population of a particular region or city and the level of development associated with the region or city.

The various activities of man on the environment over the years are the root causes of the environmental problems. Ayoade (1997) stated that the climate exerts influence on man and his socio-economic activities in many and diverse ways. Man, in turn, influences climate through his various activities. Thus, environmental problems such as deforestation, desertification, noise pollution, air pollution, water pollution and solid waste generation tend to increase as the human population increases. In this respect, Dr. Jidbhong Jayavasu, Deputy Governor of Bangkok Metropolitan Administration, in a keynote speech in a UNESCO organized workshop on promoting awareness on environmental problems, emphasized that environmental problems are interrelated and that the roots of the problems are human in nature (Jayavasu, 1991). Accordingly, in order to understand environmental problems, one needs to begin with the human factor.

Current Environmental Situation in Nigeria

The UN Millennium Development Goals (MDGs) and the Rio declaration (Earth Summit) of June 1992 both emphasize that, in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. However, the Nigerian environment today is in a sorry state of decay, neglect, degradation and overwhelming pollution environmental waste, neglected or destroyed landscapes, which make the society prone to increased probability of epidemics.

Furthermore, markets and motor parks established at unauthorised places lead to noise pollution and blockage of major roads which compounds traffic and crime control problems. The situation is partly confirmed by the National Planning Commission, Nigeria (2004), which reported that "development has proceeded with no regard for waste management or pollution control. Cities have inadequate systems for safe disposal and treatment of waste." The National Planning Commission, Nigeria (2004) also reported that the problem of waste production and disposal worsens, as rural emigration to urban areas grows.

In Nigeria, many environmental sanitation committees and programmes have been set up across the country to tackle some of these environmental pollution problems. However, the tendency has been to pitch the authorities against the people, where the authorities rely completely on their coercive powers to enforce compliance by citizens. Most environmental sanitation committees are set up without broad-based representation from the citizenry aimed at making its programmes people-directed. Hence, citizens are not afforded the opportunity to internalise the programmes as something they own and which they should voluntarily and wholeheartedly support and participate in to ensure success and sustainability. The government tries to clean the environment without cleaning the minds of the inhabitants; hence, environmental sanitation programmes have always failed. A people-oriented environmental sanitation programme assisted by modern technologies for refuse collection, treatment and disposal will help to reclaim the country from filth and dirt and improve its environmental conditions sufficiently to turn the country into a destination for international tourists.

Public awareness is one of the key means for preventing and solving environmental problems. Lovei and Weiss (1998) emphasise this when they state that the key to sound environmental management is the degree of importance that the public and its representatives assign to environmental matters. The basic purpose of observing the World Environmental Day on 5th June every year is to bring to the forefront the environmental problems and issues to the enhancement of public awareness and concern for human environment. But, such an aim

cannot be accomplished, unless it is pursued honestly and continuously. All stakeholders should be adequately enlightened and sensitised, including citizens, governments at the federal, state and local levels, traditional rulers, town union leaders, village heads, societies, non-governmental organisations; landowners, teachers, students; professionals, etc. Therefore, mechanisms for interaction and consensus building among all stakeholders are imperative elements of environmental policy making and action.

There are many constraints on governments' environmental protection efforts in developing countries. These often include funding, rehabilitation of displaced people, political opposition, sustainability of programmes, authoritarian actions of environmental protection agencies, rehabilitation of displaced people, and citizens' resistance to change.

Potential Roles of Libraries in Environmental Protection Programmes

Libraries can play significant roles in the management of environmental problems. Kolb (1991) stated that as one of the institutions that serve as depositories of knowledge and information, libraries can play an important role in disseminating information and organising activities that create public awareness and understanding on important national concerns, such as that of the protection of the environment. To illustrate this correlation, UNESCO and the Bangkok Metropolitan Administration organised a sub-regional workshop on the role of public and school libraries in promoting awareness on environmental issues and problems (Kolb, 1991). The workshop was organised within the framework of the UNESCO Network of Associated Libraries (UNAL).

Libraries are well suited to play this role because they are considered as non-formal educational institutions, which provide books and information in various forms, as well as help the people to develop healthy and productive ways of thinking, living and participation in day-to-day activities. Library services are geared towards motivating creativity and innovations for improving the status, quality and productivity of people in society. Libraries are considered as institutions for promoting education, culture and information; for promoting life long learning; and, through their access to collections of knowledge sources, for offering accurate information to influence thinking on vital issues.

The role of libraries in helping the people to develop healthy ways of thinking and participation in public activities is a role which the federal, state and local governments in Nigeria should encourage and exploit by providing adequately for libraries to participate effectively in the efforts to improve the poor orientation of the populace to environmental protection. The success and sustainability of the environmental development and protection programmes of the federal and state governments will be enhanced, should the government at the different levels recognise the role of libraries in these programmes. Otherwise, the hindrance created by the widening gap between the government and the citizenry would continue to be the stumbling block that may derail the good intentions of government's environmental protection programmes.

Some library activities that can be used in promoting awareness of environmental issues are:

- Acquiring and providing books and information materials related to environment.
- Providing information dissemination services: journals/newspapers clippings, selective bibliographies, guides in finding information, current awareness services, selecting and packaging information materials, mobile libraries.
- Organising activities to create public awareness on environmental issues and problems: campaigns, workshops, meetings, forum lectures, exhibitions, film/video shows, rallies, radio/ television programmes.
- Mobilising pupils, students and the youth to take interest in protecting and preserving the environment: arranging programmes such as book talks, storytelling, plays, songs, and quiz contexts on environmental themes; encouraging school children to read and share what they read with friends and family members.
- Supporting the initiatives of environmental groups and organizations through various library activities.

Governments in developed and some developing countries, realizing the importance of libraries, have partnered with them for the beneficial purpose of providing the right information to both the government and the public. In the United Kingdom, public libraries secured government funding in the middle 1990s for computers in every library as part of the "People's

Network Project" (Krolak, 2005), a project that assures that no one needs to be excluded from the information revolution. Also the libraries in UK, Denmark, Finland, USA, and Singapore are modern examples of highly developed library systems that are an integral part of a national education and information strategy based on library laws and appropriate funding.

Scope and Challenges for Nigerian Libraries in Information Dissemination for Environmental Protection

In Nigeria, not much can be said on the support of the government to libraries and librarians to encourage and enable them take up their rightful role, even in the present day democratic Nigeria. The government and other relevant organs have failed to see the library as the true local gateway to knowledge, which provides a basic condition for life-long learning, independent decision-making and cultural development of the individual and social group. The government also seems ignorant of the fact that libraries in Nigeria are agents that can enhance the citizen's constructive participation in governance, and that the development of democracy depends on satisfactory education, as well as on free and unlimited access to knowledge, thought, culture and information, which libraries can provide, given the required recognition and support.

Librarians in Nigeria should therefore gear up to make the government and other agencies realise the very significant role of libraries in environmental protection programmes. This can be done by planning series of national seminars on the formulation of a national policy on the development of library and information services; promoting active participation of librarians in international and national campaign, conferences, radio/television programmes, as well as membership in voluntary and professional organizations (state, national or regional); sensitising government authorities, mass media, teachers, parents, community leaders and international non-governmental organizations on library programmes and services. Nigerian libraries can thus help to clean the minds of Nigerian inhabitants, a pre-requisite to making them appreciate, implement and sustain programmes to clean up Nigeria's environments, and ensure that it is protected from degradation in future.

Conclusion

Environmental problems will continue to occur and increase as the world's population increases and urbanization increases. The key issue then is effective management of such problems through effective environmental rehabilitation and protection policies and programmes. For the environmental programmes to be successfully managed in Nigeria, however, libraries and librarians must initiate and be supported to play their rightful role not only as depositors of knowledge and information, but also as key social institutions for providing information that will help the people to develop healthy ways of thinking and living necessary for ensuring adequate protection of Nigeria's different environments.

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* **Kingsley Nnamdi Egbukole** is a Librarian II and Head, User Services Unit of the University Library, Federal University of Technology, Owerri, Nigeria. He holds a Bachelor of Science degree in Microbiology from the University of Port-Harcourt, Port-Harcourt, Nigeria; a Master of Business Administration (Project Management) degree from the Federal University of Technology, Owerri, Nigeria; and a Master of Library Science degree from the Imo State.