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Article *in* New Review of Information Networking · November 2012

DOI: 10.1080/13614576.2012.724282

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New Review of Information Networking, 17:69–92, 2012

ISSN: 1361-4576 print/1740-7869 online
DOI: 10.1080/13614576.2012.724282

Routledge
Taylor & Francis Group

Assessment of Nigerian University Library Web Sites/Web Pages

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Academic libraries, the world over, have designed and developed Web sites to advertise their resources and services to the outside world. In line with this, many universities in Nigeria have provided their library with a Web site while more are developing Web sites for their library to meet the new information superhighway's challenges. However, in-depth studies on the assessment of these Web sites have not been undertaken and the studies have been especially neglected or ignored by the Nigeria researcher. The available existing study only focused on the rating of the Web sites on the basis of the number of hits. In view of this, there is a necessity to research the aspects of in-depth assessment of selected academic library Web sites in Nigeria, especially in view of the accelerating rate of university establishment in the country. This study is an attempt to fill this currently identified gap. Hence, the study assessed the university library Web sites in selected university libraries in Nigeria. The study uses content analysis as the research design. A total of 30 Nigerian university library Web sites were selected from the three categories to represent 110 universities in Nigeria using a purposely stratified sampling technique with a checklist as the research instrument. The criteria for the checklist were drawn on an assessment of library Web sites for Web 2.0 tools, access to electronic materials, and links to the National University Commission (NUC) virtual library. Four research questions were developed and answered and the result revealed low level of the integration of Web 2.0 in most of the universities' Web sites. The study concluded that the use of the current web development technologies for deploying mainstream web information services is not widespread as web information services are yet to take off widely in academic libraries

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as regards to web 2.0, electronic resources and links to NUC virtual library. The majority of university libraries are found to be working in the conventional library settings and the diffusion rate of web information services is relatively low. Based on the conclusions, the study recommends that Web 2.0 tools should be used as part of the accreditation criterion for university libraries and that the NUC should embark on a national university virtual campaign. Additionally, librarians need to adapt to the revolutionary changes in technology that lead to changes in scholarly communication. Further studies can be conducted as to the choice of libraries in integrating Web 2.0 tools.

KEYWORDS library Web sites, university libraries, Web pages, Web 2.0 tools, electronic resources, virtual library, Nigeria

INTRODUCTION

Developments in ICT have brought revolutionary changes in the modes and methods of information storage, retrieval, and transmission. During ancient days, the functions of the libraries were simply the collection and preservation of documents, but in the twenty-first century, libraries are not only meant to preserve but also to disseminate information. Nowadays, the majority of the functions carried out by the libraries have been modernized with the latest technology. The national policy on education in Nigeria has also emphasized the need for a better library services in the near future. In this regard, libraries play a vital role in the promotion of education and research. With the initiation of the Internet and the advancement in ICT, access to various information sources and databases available in various parts of the globe are now made possible. The Internet has emerged as an important source for different types of information users. The Internet has become more popular for dissemination of information for its variety of features such as e-mail, telnet, ftp, www, and so forth. Some of the valuable resources freely available on the Internet have become indispensable tools for the dissemination of information.

Academic library Web sites/Web pages are libraries virtual presentation to the world (Liu 2008). These virtual spaces have evolved rapidly over the years and the dynamic or interactive Web sites, which encourage user participation, have replaced the early static library Web sites. Hence, the academic libraries, particularly the University Libraries in Nigeria today, are improving their service base especially with the application of Information Technology for access and delivery of e-content to their clients. In this process they are also adapting to the change and altering their image, by executing new functions and providing varieties of services in an evolving continuum. The rapid developments in information technologies have already laid a solid

foundation for a new innovative evolution of university in the ongoing digital era. Impacted by new advances in emerging and cutting-edge technologies, however, "academic libraries have already transformed their specific functions in today's changing world as, information center, learning center, training center, publication center," and so forth (Li 2009, 20).

The emergence of Internet has changed the role of libraries. It reduces the task of the library in retrieving and disseminating the information. It is now a substitute that provides a large number of reference tools such as books, journals, encyclopedias, dictionaries, directories, yearbooks, and so forth. The Internet provides a variety of services to different types of users such that the total collections of a library can be located through the Web site/Web pages. The World Wide Web (WWW), the invention of Tim Barnes Lee, has also created tremendous influence in the transformation of libraries as knowledge resource centers, rather than storehouses of print media. The impact of this change is all-pervasive and affects all the aspects of library operations, information resources and services, staff skill requirements, and users' expectations. The accelerating pace of technological developments has tremendously increased the ability to access, store, process, communicate, and deliver information services to the desk-tops of the libraries' clients.

The vast majority of library services is now Web-enabled and so attention is being focused on designing user-friendly and easily managed and maintained library Web sites.

> A library Web site can play different roles; it can serve as a workstation where a user finds databases, electronic texts, and the online catalog. It is a way to make library-made products available, it is used as a window to the WWW by making Internet resources available on a selective basis, and it is a communication tool where information about services, people and facilities and collections can be found. (Diaz 1998, 58)

All publicly accessible Web sites collectively constitute the WWW. Web sites are written in, or dynamically converted to, HTML and are accessed using a software interface classified as a user agent. Web pages can be viewed or otherwise accessed from a range of computer-based and Internet-enabled devices of various sizes, including desktop computers, laptops, PDAs, and cell phones. Furthermore, University library Web sites are hosted on at least one Web server, accessible via a network such as the Internet or a private local area network through an Internet address known as a URL, whereas some are an interfaces on the Web sites of the parent body. Today, libraries can treat their Web sites as a significant point of user contact and as a way of compensating for decreases in traditional measures of library use, such as gate counts and circulation. Web sites offer more than just a gateway to journals; librarians also can consider instructional or explanatory Web pages as a type of public service interaction. Web sites are one of the most accessible tools available for academic use; therefore, libraries have taken

advantage of the innovation by moving from the traditional library where users had to enter the library in order to use its services: the collections, reading-rooms, equipment, or lending and help services.

As libraries aspire to remain relevant as suppliers of information that attract and engage their patrons, embracing Web sites has become almost synonymous with their overall success. Libraries have started to offer a new virtual entrance to their services. The library Web site allows students, lecturers, and researchers to visit the library through the library Uniform Resource Locator (URL) and access the library collections and facilities. Libraries also provide links for other online resources connecting millions of library users in the academic community. They are also providing a two-way communication with the aid of an update to the Web site called Web 2.0, which consists of tools such as multimedia sharing, RSS feeds, wikis, blog, social bookmarking, Mashups, facebook, twitter, MySpace, FAQ, among others.

In recent years and with the ever-increasing usage among students and staff, University library Web sites are now changing their content and structure, with the introduction of social networking sites (SNS). This development has made libraries around the world keen to integrate some Web 2.0 tools into their university library Web sites. Web 2.0 is a term first coined by Tim O'Reilly in a conference brainstorming session between O'Reilly and MediaLive International (O'Reilly 2005). Since then, it has been growing into one of the most popular words in our current network environment, undoubtedly extending its influence to the library community. New tools and services utilizing Web 2.0 are changing the way people use the Internet, making it easier to collaborate, communicate, and share information. Under such influence, pioneering libraries in the United States and United Kingdom have steadily increased efforts to equip their traditional library Web sites with more 2.0 elements, a process being called Library 2.0. As libraries aspire to remain relevant as suppliers of information that attract and engage their patrons, embracing Library 2.0 has become almost synonymous with their overall success. The new wave of applications of Web 2.0-related technologies in libraries has gained increasing popularity globally. But this growth does not come without some concern. The 2007 Association of College and Research Libraries (ACRL) Environmental Scan urges librarians to facilitate new approaches to library services by continually assessing the impact that the proliferation of Web 2.0 has on users' perceptions of the library, including the use of social networking sites, wikis, blogs, RSS feeds, and recommendation systems (Association of College and Research Libraries 2007).

Breeding (2007) also endorses this stance, warning that the goal of implementing Web 2.0 technology is not enough; libraries must focus on methods of engaging users and emphasizing content while integrating its various Web 2.0 components. Web 2.0 is "a space that allows anyone to create and share information online—a space for collaboration, conversation, and interaction; a space that is highly dynamic, flexible, and adaptable (Coombs

2007). A key feature of Web 2.0 technologies is ". . . philosophy of mutually maximizing collective intelligence and added value for each participant by formalized and dynamic information sharing and creation" (Meckel et al. 2006). Web 2.0 includes the second generation Web based services such as collaborative publishing sites (Facebook, Bebo, MySpace, Friendster, etc.), wikis, blogs, social bookmarking sites (del.icio.us, furl, dig, etc.), and photo sharing sites (Flickr, photobucket, etc.). It appears that the Web 2.0 phenomenon is not going to stop here but will grow in popularity at a faster pace. Its impact can be felt in all frontiers of knowledge and profession; the library profession is no exception to this.

The history of university library development in Nigeria dates back to pre-independence time when the University of Ibadan and its library were established in 1948. As pointed out by Aguolu (1996), since independence in 1960, there has been an unrelenting upsurge in the establishment of educational institutions at all levels, especially university education. And, the World Wide Web (WWW) became available in Nigeria in 1996, while full Internet services became available in 1998, and the number of NCC (Nigerian Communications Commission) licensed Internet service Providers rose to over 150 by 2001 (Adomi 2005). The library Web site continues to evolve as a gateway for providing Web-based library services to the students and university staffs. In the transition, it has added the facilities of the Internet, providing remote access to information easier and more viable, as it is also becoming more economical to keep up-to-date. There is an increasing demand for the Web-enabled services to be provided by libraries. Hence, most of the academic libraries in Nigeria and elsewhere have designed and developed Web sites to present their resources and services. Traditional evaluation criteria endorsed and applied by Librarians over the years are not sufficient for the assessment of today's Web site environment. Nowadays, many universities in Nigeria have provided their library with a Web site as they are the parent body, while more are developing Web sites for their library to meet the new information superhighway's challenges. However, in-depth studies relating to an assessment of these Web sites have not been undertaken except a rating of the Web sites on the basis of the number of hits only. In view of this, there is a necessity to develop an in-depth assessment of selected academic library Web sites in Nigeria. This study is an attempt to fill this currently identified gap. Hence, this study assessed university library Web sites in selected Nigerian university libraries.

OBJECTIVES OF THE STUDY

The main objective of this study is to assess and analyze various university library Web sites in Nigeria, which include ten (10) federal university library Web sites, ten (10) state university library Web sites, and ten (10) private university library Web sites. The specific objectives of this study are:

1. To identify some university Web sites in Nigeria with their URL;
2. To determine the common Web 2.0 tools available on the Nigerian university library Web sites/Web pages;
3. To determine the common e-resources displayed on university library Web sites/Web pages in Nigeria; and
4. To find out the number of university library Web sites/Web pages in Nigeria that provide a link to the National University Commission (NUC) virtual library Web site.

RESEARCH QUESTIONS

The following are research questions developed for this study:

1. What are the identified university Web sites in Nigeria with their URL?
2. What are the common Web 2.0 tools available on the selected Nigerian university library Web sites/Web pages?
3. What are the common e-resources displayed on the Nigerian university library Web sites/Web pages?
4. How many Nigerian university library Web sites/Web pages provide a link to the NUC virtual library Web site?

LITERATURE REVIEW

A Web site is the collection of Web pages, images, scripts, videos, and multimedia files hosted on one or multiple servers visible on the Internet. A Web site is space on a computer where anyone who subscribes can say "This is me, this is what I do, or what I am interested in, what I know, or what I can sell you." A Web site is an electronic brochure and source of information available to the whole world 24 hours a day. Within the Web site, each screenful of information is called a page. Pages may contain text, graphic images, or even photographs, sound, and video. There are many types of Web sites, ranging from a single page to multiple pages. Web sites may be provided by individuals (in which case they are usually called homepages), special interest groups (e.g., "The Association of Widget Collectors"), educational establishments (e.g., universities or science and research centers), Governments, voluntary organizations, individual retailers, banks and businesses, manufacturers and importers, news, media, financial organizations, and multinational corporations. Web sites are even provided by libraries, be it academic, research, or special. Although the size of the organizations may differ, each has the same opportunity and scope.

In the context of change brought by the Internet, libraries throughout the world have experienced revolutionary changes in the concept of

organization and institution, functioning and management of library, and information systems (Houghton 2000). The library's home page represents a new platform for the delivery of varieties of library services (Bao 2000) and gives academic libraries the leverage and ammunition they need to outperform competitor Web sites and regain the loyalty of students, teachers, and researchers alike (Detlor and Lewis 2006).

The academic library is a social institution with the primary aim to serve the academic environment, which includes the staff, students, and researchers whose educational and academic needs vary depending on their individual disciplines and field of studies. These academic libraries are usually attached to the universities or colleges they serve (known as the parent body) and aid in the adaptation to the new trend of web technology in rendering their services.

As libraries move away from a collections-based model toward access-based models, with online catalogues, digital book collections, online newspaper links, and online journal subscriptions, their Web sites take on greater importance. The point where a library has as great, if not more of, a presence with their Web site as with their physical building is quickly approaching. It is, therefore, imperative that a library's Web site is logical, helpful, and user friendly.

In the traditional academic libraries, students, staff, and other users had to enter the library in order to use its services: the collections, the reading-rooms, the equipment, or the lending and helping services. With the development of electronic collections and services libraries have started to offer a new virtual "entrance" to their services: the library Web site. Users can "visit" the library and use many of its services from remote places, for example, from their workplace or from home. Such visits, in analogy to the traditional physical visits, are called "virtual visits." The library Web site may be the library's own domain or it may be places within the institution's/community's Web site.

The convenience and availability of e-information sources from the web have dramatically altered the information landscape and the functioning of libraries (Kuchi 2006). Web sites serve as the primary tool in the delivery of services (Shropshire 2003) to market the library (Balas 1998)—a fact that requires the assessment of the quality of academic libraries on the web (Chao 2002). Liu (2008) described academic library Web sites as the libraries' virtual presentations to the world. Academic library Web sites provide access to online catalogues, electronic databases, subject resources, library instruction, tutorials, and digital collections. In alignment with each institution's mission, academic library Web sites are gateways to information that support faculty and students' research and educational needs.

Maintenance of the library Web site/Web page is an ongoing practice and tedious job for the Webmaster. One factor to be considered is the currency of all hyperlinks; some sites include a policy regarding the

updating process. Such a policy may include details of whether an individual or group is responsible for maintenance, their knowledge and expertise, and their motivation for doing so. If individuals or groups maintain a site voluntarily, they may be more likely to lose interest and therefore fail to maintain the site effectively in the long term. Contact information for site maintainers is also a useful feature and suggests a concern for site maintenance.

In fact, the most exciting and useful feature of the Web site is the implementation of Web forms. Forms provide a way for collecting detailed information from Web users. With the feedback from the forms, the librarian plays an active role in the library-patron relationship. The suggestions should be the integral part of the Web site development, especially in the initial stages as it helps in correcting the design and the suggestions are the views and reactions of the end-users. "Web-based forms, which are effective tools for library-user interaction and communication" (Ahmed 2002, 13). Speed of access is of particular concern and factors affecting speed include the location of sources, as well as the number and size of any images. In addition, "sites are faster to access if it is possible to view a text-only version of the information" (Ahmed 2002, 15). This ensures that pages are meaningful to any user irrespective of the fact whether the images are viewed or not.

The library's home page represents a new platform for the delivery of a variety of library services (Bao 2000) and gives academic libraries the leverage and ammunition they need to outperform competitor Web sites and regain the loyalty of students, teachers, and researchers alike (Detlor and Lewis 2006). The collaboration that is needed to occur between the libraries and the users are aided by the help of new technologies. Although Web 2.0 is not a technical specification, it does refer to the general trend of Web design becoming more creative, informative, and collaborative. Web-based communities, hosted services, social networking, video sharing, wikis, and blogs have become more important features and have reshaped the nature of modern Web site design.

Web 2.0 is a recent area of interest. Birdsall (2007) labels Web 2.0 as a "social movement." Libraries are also joining this bandwagon of social movement; consequently, Library 2.0 is an offshoot of Web 2.0 technology. Library 2.0 is essentially a mash-up of traditional library services and innovative Web 2.0 services. It has attracted the attention of libraries around the world as a means for promoting and extending their services. An attempt has been made to review the literature on the subject, although the review was not intended to be comprehensive or exhaustive. As it is now an accepted fact that Libraries have undergone a mini revolution in the way that they operate and provide information services to users. A vast amount of literature on various aspects of library Web sites is being generated and published in learned journals. A brief review of related literature is presented in this article to provide a succinct assessment process.

Many worthwhile studies have been conducted in the field of Web 2.0 applications since 2004, although some might disagree with the true meaning of the term Web 2.0. Han and Liu (2010) in their quest to know the Web 2.0 technologies that are utilized in Chinese top-ranking university libraries, examine the services that integrate Web 2.0 and describe the main characteristics of these applications. They found out that most of the Web 2.0 applications in the examined 38 university libraries are still in their basic developmental stage and most of the libraries only use one or two applications in their services. They further stated that the general status of Web 2.0 application in Chinese university libraries is still extremely underdeveloped even for those most prestigious university libraries. Under most circumstances, these Web 2.0 applications are not integrated into whole new platforms to create user-friendly environments. Only two libraries in their sample have tried to integrate Web 2.0 tools into a platform as an on-campus SNS focusing on resource locating, experience sharing, and subject information reference; these libraries could be good examples for other libraries emulate. Han and Liu (2010) concluded that Web 2.0 applications in Chinese university libraries still have a long way to go; the journey has certainly begun and hopefully will continue to evolve. Their findings determined that more than two-thirds of the 38 top Chinese university libraries apply one or more kinds of Web 2.0 tools through the basic functions of their Web sites. Among six types of tools, Catalog 2.0 and RSS are the most common, while IM, Blog, SNS, and Wiki are less frequent.

Harinarayana and Raju (2010), in their discussion and conclusion on the recent trends in the application of web 2.0 and library 2.0 features on top 100 university library Web sites around the world, found out that 57 of the top 100 libraries have used at least one of the Web 2.0 features listed in Table 1. It is a surprising finding that 43% of the top university libraries have yet to integrate Web 2.0 in their Web sites. RSS and IM are the most widely used Web 2.0 applications in university library Web sites and are found in 37 (64.91%) university libraries. RSS, as revealed by the study, is widely used to provide alerts about current events (35 out of 37, 94.59%) and new acquisitions (12 out of 37, 32.43%). RSS has been found to be the most popular Web 2.0 tool in other earlier studies (Shoniwa and Hall 2007; Nguyen 2008). But on the other hand, IM, the other most popular Web 2.0 tool as per the present study, is used to provide online reference service. Shoniwa and Hall's result is found to be contrary to the findings of Nguyen (2008). The next highly deployed Web 2.0 feature, as per the present study, in university libraries is the blog (15 out of 57, 26.32%). Blogs are used for providing subject guides, publishing library newsletters, publishing current events, and so on. Wiki is the least applied Web 2.0 feature in university libraries (1 out of 57, 1.75%). The possible reason for this trend is that the wiki is perceived more as an internal communication channel (Nguyen 2008). University libraries do use other Web 2.0 tools. While three

TABLE 1 Nigerian University Websites and their URL

S/N	Name of the University	URL
1	Ahmadu Bello University, Zaria	htpp://www.abu.edu.ng
2	Federal University of Technology, Akure	htpp://www.futa.edu.ng
3	University of Nigeria	htpp://www.unn.edu.ng
4	University of Port-Harcourt	htpp://www.uniport.edu.ng
5	University of Ibadan	htpp://www.ui.edu.ng
6	University of Ilorin	htpp://www.unilorin.edu.ng
7	University of Lagos	htpp://www.unilag.edu.ng
8	University of Agriculture, Abeokuta	htpp://www.unaab.edu.ng
9	University of Benin	htpp://www.uniben.edu.ng
10	University of Agriculture Makurdi	htpp://www.uam.edu.ng
11	Adekunle Ajasin University	htpp://www.ajasin.edu.ng
12	Ekiti State University	htpp://www.unad.edu.ng
13	Osun State University	htpp://www.uniosun.edu.ng
14	Delta State University	htpp://www.deltastate.edu.ng
15	Kaduna State University	htpp://www.kasuportal.net
16	Nasarawa State University	htpp://www.nsukonline.net
17	Enugu State University of Science and Technology	htpp://www.esut.edu.ng
18	Gombe State University	htpp://www.gomsu.org
19	Lagos State University	htpp://www.lasunigeria.org
20	Ladoke Akintola University of Technology	htpp://www.lautech.edu.ng
21	Salem University	htpp://www.salemuniversity.org
22	Redeemers University (RUN)	htpp://www.run.edu.ng
23	Joseph Ayodele Babalola University	htpp://www.jabu.edu.ng
24	Lucky Igbinedion University	htpp://www.iuokada.edu.ng
25	Babcock University	htpp://www.babcockuni.edu.ng
26	American University of Nigeria	htpp://www.aun.edu.ng
27	Novena University	htpp://www.novenauniversity.org
28	Wesley University of Science and Technology, Okene	htpp://www.wusto.edu.ng
29	Madonna University	htpp://www.madonnauonline.com
30	Afe Babalola University	htpp://www.abuad.edu.ng

Note. Serial numbers (S/N) 1–10: federal universities; S/N 11–20: state universities; S/N 21–20: private universities.

(out of 57, 5.26%) university libraries use Podcasts; Vidcast is used by six (out of 57, 10.52%). Some university libraries (five out of 57, 8.77%) have been using social networking sites to make photos of library events available, or make available their search interface through Facebook (e.g., University of Michigan, University of Adelaide, and University of Texas at Austin). None of the university libraries, however, is using MySpace (myspace.com), which has been reported in literature to be the most highly visited SNS on the internet (Urista, Dong, and Day 2007). Social bookmarking has also been found only in a few university library Web sites (five out of 57, 8.77%). For example, the University of Pennsylvania library (PennTag) allows users to tag the items they found in library the Online Public Access Catalog (OPAC).

An empirical survey of the application of Web 2.0 in Australasian university libraries has been reported by Nguyen (2008). Content analysis method

was adopted for the home pages of 37 libraries. The survey reports that among Web 2.0 technologies utilized by Australasian university libraries, RSS was the most widely applied technology and instant messaging was the least used technology. Furthermore, Xu (2007) surveyed 82 academic libraries of New York State and Long Island in the United States. Her study found that blogs, IMs, and RSS were the main Web 2.0 applications that have been used extensively compared to social bookmarking, social networking sites, and podcast.

However, a few libraries have implemented only one of the applications. Some earlier studies have discussed the application of single Web 2.0 tool (Clyde 2004; Draper and Turnage 2008). Boeninger (2006) and Fichter (2006) have demonstrated the use of wikis as a knowledge base for libraries. Fichter (2006), in particular, discusses the various applications of wikis in libraries. Ceelikbas (2004) study provides an overview of RSS technology. Among the few research articles available, Linh (2008) investigates the application of Web 2.0 in Australasian university libraries and concludes that at least two-thirds of Australasian university libraries deployed one or more Web 2.0 technologies, but the average of these indexes was still low. The mean application index was only 12 points while the highest was 37 points. Secker (2008) provides a comprehensive literature review regarding Web 2.0 applications in libraries, which explores the different presence of the concept in different libraries. She concludes that social software and Web 2.0 technologies offer enormous potential for the library community, and the role of the librarian as the facilitator of collaboration and communication could become crucial in the Web 2.0 world. At the same time, she points out that librarians should address the issue of whether there is a specific social function that could be replicated for those unable to visit the building.

In order to fill the gap in the literature and advance the professional understanding of Web 2.0 technologies' application in Chinese university libraries, this study tries to present the findings of content analysis that systematically examines various Web 2.0 applications in a group of 38 Chinese top-ranking university libraries and attempts to describe the extent of their applications of Web 2.0 tools. According to the American Bar Association's (2009) Technology Survey Report, 12% of respondents' firms have social network pages (an increase from 4% in 2008), and 43% indicated that they personally have used one of these sites (an increase from 15% in the previous year). Habib (2006), in his master's degree paper, elaborated on the ongoing discussion on Web 2.0 and Library 2.0. The study proposed a methodological framework for employing Web 2.0 tools in academic libraries. The authors who wrote most extensively on Library 2.0 include Miller (2006a, 2006b), Casey and Savastinuk (2006, 2007), Chad and Miller (2005), and Crawford (2006).

Harinarayana et al. (2007) studied the application of RSS in 30 libraries. Abram (2006) listed the potential areas of application of podcast in libraries.

Jowitt (2007) conducted a study on the use of library instructional podcast by the staff and students at the Universal College of Learning (UCOL). The study identifies the pitfalls and advantages of having podcasts. Foley (2002) conducted a case study of potential usage of instant messaging as a digital reference service in academic libraries. Barsky and Purdon (2006) discussed the usage of social networking sites in libraries with exemplary notes on a few libraries utilizing SNS.

METHODOLOGY

Research Design

This study used content analysis of library Web sites as the research method to collect data on the variables of focus including Web 2.0, electronic resources, and link to the virtual library. Content analysis is a research tool that focuses on the actual content and internal features of media. It is used to determine the presence of certain words, concepts, themes, phrases, characters, or sentences within texts or sets of texts and to quantify this presence in an objective manner. In the past, content analysis merely consisted of procedures for defining, measuring, and analyzing both the substance and meaning of texts, messages, or documents. Today, Web pages are growing into one of the main types of materials studied with the use of content analysis. This useful method for library researchers is nonreactive, unobtrusive, and not limited by geography (Beck and Manuel 2008). Content analysis is considered suitable in this study based on the fact that it looks directly at communication via texts or transcripts, and hence focuses on the central aspects of social interaction: (1) It can allow for both quantitative and qualitative operations; (2) It allows a closeness to text which can alternate between specific categories and relationships and also statistically analyzes the coded form of the text; (3) It is an unobtrusive means of analyzing interactions; and (4) When done well, it is considered a relatively "exact" research method (based on hard facts, as opposed to Discourse Analysis).

Population of the Study

The population comprised the universities established in the post-independence development in Nigeria, except the University of Ibadan which was established in 1948. At the time of this research, there were 36 federal universities, 24 state universities, and 50 private universities, making a total of 110 universities approved/accredited by the National University Commission (NUC). A total of 10 federal universities library Web sites, 10 state universities library Web sites, and 10 private universities library Web sites represent the sample for this study. See the Appendix for the full list of accredited universities in Nigeria from which the sample of university library Web sites for this study were drawn.

Sampling Methods

Stratified sampling technique was adopted to select the sample for this study. All the universities in Nigeria were divided into three strata, that is, Federal universities, State universities, and Private universities. From each stratum, a total of 10 universities were purposely selected. This was to ensure equal representation from each stratum. The selected 30 developed university library Web sites were assessed to determine the features of Web 2.0 available on the university library Web sites, to determine various e-resources displayed on the university library Web sites, and to determine which of the universities library Web sites are linked with NUC virtual library.

Data Collection Instruments

A checklist was used as the main research instrument. It was developed according to the focus of identification for this study, that is, the Web 2.0 tools, e-resources, and link with the virtual library. The checklist consists of questions with yes or no answers and the list of the university libraries, which indicate their status of application in which pass mark is used to represent yes, while a blank is used to represent no. The questions in the checklist were developed from the information obtained from previous studies (Linh 2008) with some adjustment for practical purposes.

Data Collection Procedure

The purpose of data collection was to obtain information to keep on record, to make decisions about important issues, and to pass the information on to others. Primarily, data was collected to provide information regarding a specific topic. As a result, this research decided on the surfing of each page of the libraries' Web sites with a thorough search for the presence of tools that reflect the principles of Web 2.0. Examples of these tools include RSS feeds, blogs, wikis, instant messenger, social networking services (SNS), and also that of e-resources which include the presence of e-journal links, encyclopedia, dictionaries, newspapers, e-book links, OPAC, almanac and maps, manuscript, and bibliographies and all were thoroughly examined. In addition, the presence of an NUC virtual library link was carefully examined on each university library Web sites. Furthermore, in order to obtain the most accurate data possible, the identification of the existence of Web 2.0 tools, e-resources, and the NUC virtual library link, the following steps were implemented: the researcher logged onto the NUC Web site through which the list of accredited/approved universities in Nigeria were found with their various Web sites and that provided easy access for logging in; and, after logging into these Web sites, a thorough search of each of the integrated services of the 30 university library's Web sites was conducted. Through this method

the aforementioned Web 2.0 tools were found; also the aforementioned e-resource link was found; finally, the NUC link was located easily either on the main page or subpages of the Web sites. Downloading and saving of the Web page were done where necessary.

Data Analysis

Data analysis is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information suggesting conclusions and supporting decision making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains. The data collected in the study were analyzed using a frequency table and a bar chart.

UNIVERSITY WEB SITES IN NIGERIA WITH THEIR URL

Table 1 shows the name of the universities selected for the study with their URL. The universities consisted of ten (10) Federal universities utilizing the serial numbers 1–10, followed by ten (10) State universities utilizing the serial numbers 11–20, while the private universities utilized the serial number 21–30. The serial numbers represent each university as the analysis continues.

IDENTIFICATION OF COMMON WEB 2.0 TOOLS AVAILABLE ON THE SELECTED NIGERIAN UNIVERSITY LIBRARY WEB SITES/WEB PAGES

Table 2 and Figure 1 shows the frequency distribution and bar chart representation of various Web 2.0 tools common to the 30 university library Web sites assessed. A total number of 43 Web 2.0 tools are being used by the 30 universities. The Table 2 and Figure 1 revealed that Facebook and Twitter have the highest frequency. A total of 10 the university library Web sites integrate these tools on their Web sites. Additionally, YouTube, blog, and RSS are the second set of popular Web 2.0 tools integrated on the university library Web site in Nigeria. A total of 6 university library Web sites integrated these into their Web sites. Next in the order are LinkedIn and Meebo which were integrated by 2 university libraries to their Web sites. Lastly, delicious and podcast were integrated by only 1 university library to their Web sites.

The pie chart representation (Figure 2) shows that out of a total of 43 Web 2.0 tools integrated by the universities assessed in this study, Federal universities have the highest with 39% while the State universities have 33% and private universities 28%. This indicates that Federal university's libraries

TABLE 2 Common Web 2.0 Tools Available on the Selected Nigerian University Library Websites/Web Pages

	Blog	Delicious	Facebook	Linkedin	Meebo	Podcast	RSS	Twitter	Youtube
1									
2			✓					✓	✓
3							✓		
4							✓		
5	✓		✓			✓		✓	
6			✓	✓	✓			✓	
7	✓		✓					✓	
8	✓								
9									
10									
11									
12			✓					✓	✓
13		✓	✓		✓		✓	✓	
14									
15									
16									
17	✓		✓	✓			✓	✓	✓
18									
19									
20									
21									
22	✓		✓					✓	✓
23									
24			✓				✓	✓	✓
25									
26									
27									
28									
29									
30			✓				✓	✓	✓
Total	5	1	10	2	2	1	6	10	6

in Nigeria are making the best use of Web 2.0 tools, better than State and the privately owned universities in Nigeria.

Table 3 and Figure 3 show the frequency distribution and bar chart representation of e-resources displayed on the Web sites of the 30 university library Web sites. A total number of 45 electronic resources are displayed on these university Web sites. The table also revealed that e- Journal has the highest number of frequency with 15 universities having it on their library Web sites. Furthermore, out of the 30 assessed university library Web sites, a total of 9 display e-book on their Web sites. Newspapers and OPAC are displayed by 6 university library Web sites; 3 university library Web sites displayed dictionary on their Web sites, while 2 university library Web sites displayed encyclopedia, almanac, and yearbook on their Web sites. Finally, only one university displayed bibliography and manuscript on its library Web sites.

The pie chart (Figure 4) representation shows that out of a total of 45 electronic resources integrated by the universities libraries assessed,

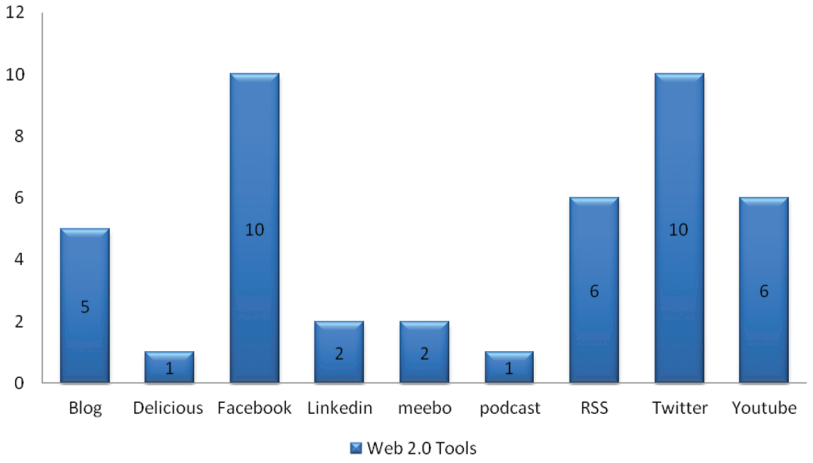

FIGURE 1 Common Web 2.0 Tools Available on the Selected Nigerian University Library Websites/Web Pages (color figure available online).

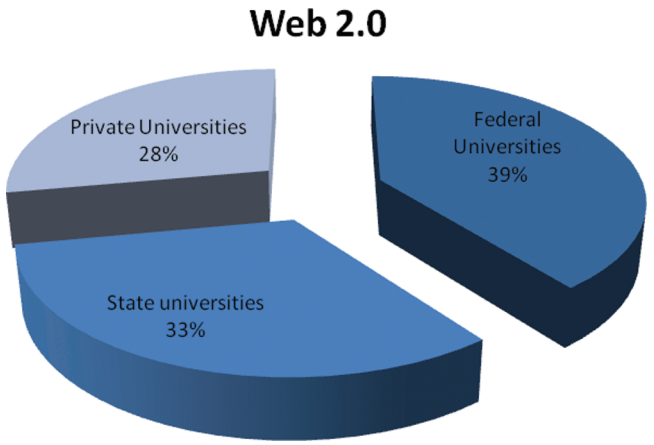

FIGURE 2 Percentage Presentation of Common Web 2.0 Tools Available on the Categories of Nigerian University Library Websites/Web Pages (color figure available online).

Federal universities libraries have the highest with 62% while private universities have 22% and State universities 16%. This shows that Federal universities libraries in Nigeria are making the most use of e-resources in terms of integrating them on their Web sites for the advantage of their users

NUC VIRTUAL LIBRARY WEB SITE

Table 4 shows that out of the 30 university library Web sites assessed 10 integrate a virtual library link into their Web sites.

TABLE 3 Common e-Resources Displayed on the Nigerian University Library Websites/Web Pages

	Al&Map	Biblo	Dict	E-B	E-J	Encyclopedia	Manuscript	News	OPAC
1				✓	✓				✓
2									
3					✓				
4									
5	✓	✓	✓	✓	✓		✓	✓	✓
6				✓	✓	✓			✓
7				✓	✓				
8					✓				✓
9	✓		✓		✓	✓		✓	
10				✓	✓			✓	
11									
12					✓				✓
13					✓				
14				✓	✓				
15									
16									
17				✓	✓				
18									
19									
20									
21				✓	✓				
22									
23								✓	
24									
25					✓				
26			✓		✓			✓	✓
27								✓	
28									
29				✓					
30									
Total	2	1	3	9	15	2	1	6	6

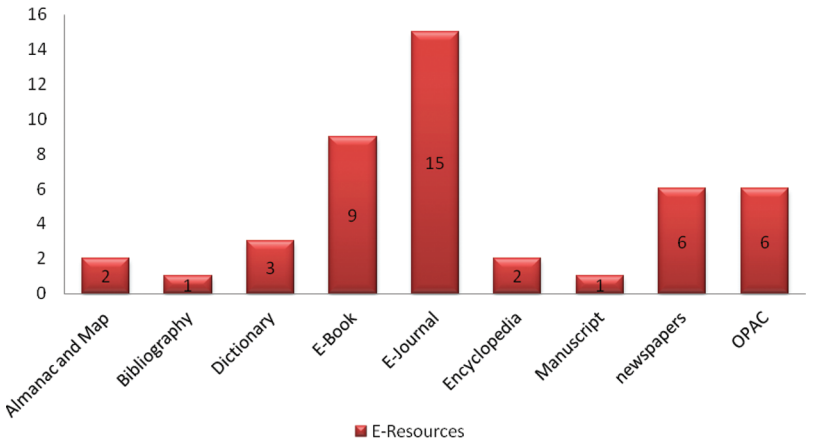

FIGURE 3 Common e-Resources Displayed on the Nigerian University Library Websites/Web Pages (color figure available online).

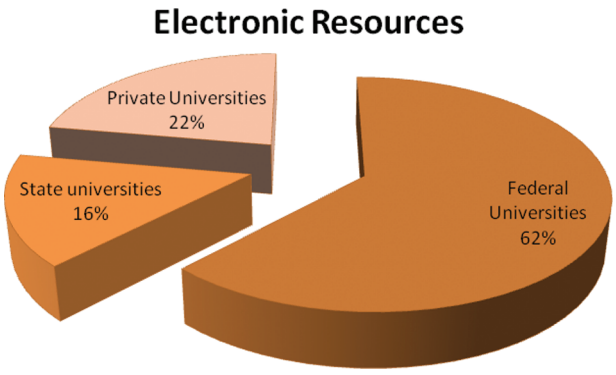

FIGURE 4 Percentage Presentation of Common Electronic Resources Available on the Categories of Nigerian University Library Websites/Web Pages (color figure available online).

TABLE 4 NUC Virtual Library Website

Universities	Virtual Library
1	
2	
3	
4	
5	
6	✓
7	
8	✓
9	✓
10	✓
11	✓
12	✓
13	✓
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	✓
24	
25	
26	✓
27	
28	
29	
30	✓
Total	10

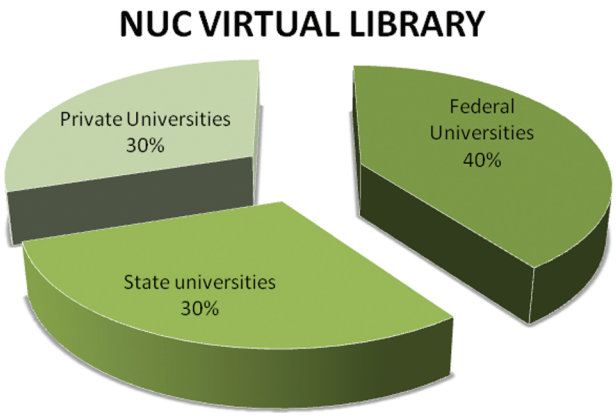

FIGURE 5 NUC Virtual Library Website (color figure available online).

The pie chart representation (Figure 5) shows that out of the total of 10 links to the NUC virtual library, Federal university libraries have the highest with 40% while private universities have 30% and State university libraries have 30%.

DISCUSSION

After careful assessment through investigation, most of the Web 2.0 applications in the assessed 30 university libraries are still in their basic developmental stage and most of the libraries only use one or two applications in their services and some use none. In this sense, the general status of Web 2.0 application in Nigeria university libraries is still extremely underdeveloped even for the most funded university libraries. Most of the universities have not integrated the Web 2.0 applications into library Web sites/platforms to create user-friendly environment. Only a few libraries in the sample have attempted to integrate Web 2.0 tools into a platform as an on-campus SNS focusing on resource locating, experience sharing, and subject information reference, which could be good examples for other libraries to follow. This research has draws an overall picture of the Web 2.0 applications in Nigerian university libraries and attempts to provide these libraries with helpful information to better understand how their foreign university counterparts apply Web 2.0 technologies.

Regarding the second objective, which was to determine the common e-resources displayed on university library Web sites/Web pages in Nigeria, the results reveal the use of electronic journal maintains its scholarly relevance in university library Web sites in Nigeria. Additionally, in terms of the provision of intellectual materials, the study demonstrates that electronic book still remain relevant in the library Web sites/Web pages for effective

service delivery. For information access in an online environment, the study demonstrated OPAC seems to be relevant in the university library Web sites, while provisions of online newspaper links are also evident in the results. Electronic resources were still in their infant stages in most of the libraries assessed. Finally, the integration of the Nigerian virtual library links is not an encouraging one when considering the varieties of services offered by these resources which was stated in the literature review.

To sum up, the revelation that Facebook, YouTube, and some other Web 2.0 tools are common in the Nigerian universities Web sites is not coincidence. This is because it is considered an attempt to keep pace with the trend of transformation in services being rendered by the academic services across the globe. These results are consistent with Han and Liu (2010) who examined the Web 2.0 technologies that are applied in Chinese top-ranking university libraries with the report that most of the Web 2.0 applications in the examined 38 university libraries are still in their basic developmental stage and that most of the libraries only use one or two applications in their services. Han et al.'s (2010) report that the general status of Web 2.0 application in Chinese university libraries is still extremely underdeveloped also lends good credence to the results of the present study.

CONCLUSION

The library ecosystem is changing, as do the patron worlds and expectations. The looming large Web technology and its applications for libraries are exploited worldwide; the open source world also offers a variety of solutions at almost no cost for developing Web-based information sources. However, to start strengthening library Web services requires strategic planning, training, and exposure to the latest technologies and constant learning for the long-term.

After careful investigation, most of the Web 2.0 applications in these 30 university libraries are still in their basic developmental stage and most of the libraries only use one or two applications in their services. In this sense, the general status of Web 2.0 tools in Nigeria university libraries is still extremely underdeveloped even for those most prestigious university libraries. Under most circumstances, these Web 2.0 applications are not integrated into whole new platforms to create user-friendly environment.

Web 2.0 is suitable for educational and lifelong learning purposes in our knowledge society, because our modern society is built, to a large degree, on digital environments of work and social communication and educational practices that foster a creative and collaborative engagement of learners with this digital environment in the learning process. However, the technology alone does not deliver educational success. It only becomes valuable in education if learners and teachers can do something useful with it, and the

librarians are the real promoters in maximizing the use of those tools in the learning process. E-resources have been widely and rapidly accepted in academic spheres and academics in universities have widely indicated that they can able use and access electronic resources. E-journals are the most used among the array of available electronic resources.

RECOMMENDATION

Asss this research is completely based on content analysis, there are some limitations especially for qualitative/subjective type questions, which may partially influence the understanding of the effects of these Nigeria university libraries' Web 2.0 tools, e-resources, and virtual link library. For libraries to be rated as the best service units, the library personnel should strive hard to engage with the learning community in a variety of roles and functions: e-learning, course content development, online subject gateways, information literacy, and orientation programs. Librarians need to cultivate the habit of interaction, leading the change in scholarly communication, designing information products, and developing information marketing programs.

Additionally, Maness (2006) discussed in his article the four conceptual underpinnings to Library 2.0, it is: (1) user-centered; (2) a multi-media experience; (3) socially rich; and (4) communally innovative. These encouraged many academic libraries to embrace the application of Web 2.0 technologies into library community and services. For example, Bradley (2007) and Farkas (2007) believe that librarians should begin experimenting and using these tools to enhance the services they offer. Maness (2006), in his most often cited article, addressed the issues related to how Web 2.0 technologies such as synchronous messaging and streaming media, blogs, wikis, social networks, tagging, RSS feeds, and mash-ups might intimate changes in how libraries provide access to their collections and user support for that access. Training should also be pursued by some academics to facilitate their use of electronic resources, while others should learn through trial and error. Most academics in universities have equally claimed they can operate computers.

SUGGESTION FOR FURTHER STUDY

Further research in the area of Web 2.0 tools, e-resources, and virtual library link in the university library community may be expanded into a benchmark analysis of the effects of newer Web 2.0-based services with a comparison to corresponding foreign libraries. After painting an overall picture of Web 2.0 tools, e-resources, and the virtual library in Nigeria university libraries, a prototype can be developed in different aspects, most especially Web 2.0 tools, in library communities worldwide. Further study related

to understanding the behavior of librarians in selecting Web 2.0 tools and how they use them may also be conducted. Surveys of librarians and personal interviews would provide valuable information about the reasons for libraries' choices, the full extent to which any tools have been promoted to users beyond mention on library Web sites, as well as evidence of success or failures in experimenting with these tools.

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