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An Assessment of the Cyber Presence of Academic Libraries in Nigeria

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Abstract

This webometric study provides an assessment of the web presence of academic libraries in Nigeria. The research work considered all the 129 accredited universities in Nigeria on National University Commission (NUC) website. Links to libraries on the homepages of the universities were searched. Google search engine was used for counting the webpages and in-links to the available libraries' websites. Webometric Analyst software was used for generating the most targeted top level domains and link analysis of the websites. Findings showed that more than 50% of the academic libraries did not have websites. Also, academic libraries can be accessed from the homepages of 42% of the universities in Nigeria. There was an average of 20,203.47 webpages, 5.21 in links and 0.000258 web impact factors per academic library. Though most of the academic libraries that had websites are old and owned by the federal government, the private university libraries' websites had more webpages than others. Generally, the web impact factors of the academic websites were negligible, which suggests that the academic libraries did not have useful information and innovation on their websites. The most targeted top level domains were .com (58.7%), followed by .org (12.4%), and the link network diagram shows that the libraries did not exchange information online. It is recommended that academic libraries in Nigeria should form a consortium that will manage the development and standardisation of their websites of academic libraries.

Keywords: Academic library websites, Academic libraries, Nigerian universities, World wide web, Webometric analysis

Introduction

The study of the adoption, use and exploitation of information, information technologies and innovations is a major research interest in information science. The World Wide Web (www) or the web is one of the most profound information innovations and technologies that have attracted significant research interest in this regard. Webometrics is the sub-discipline which applies quantitative methods in studying the use, relationship, impact, evolution, presence and construction of information, information resources, structures and technologies on the web (Thewall, 2012). Webometric studies such as Jalal, Biswas, and Mukhopadhyay, (2010), Jeyshanka and Badu, (2009), Nwagwu and Agarin, (2008), Jeyashree, Ravichandran, and others, (2015) employed developed metrics for assessing the presence, quality, quantity, usefulness, impact, evolution of any piece of information and its relationship with other pieces of information disseminated on the web. Webometric research also studies the size of the web, parts or bits of the web and comparison of webpages or websites, based on predetermined underlying features such as visibility, accessibility, and technologies (Baka and Leyni, 2015). Information dissemination is made possible on the Internet through the webpages, which is the major basic unit of webometric analysis.

The web as the information superhighway and the largest library (though filled with information, misinformation and disinformation) is a public space where information, largely without censorship can be disseminated from anywhere by anyone. Libraries exploit and employ the technologies and features of the web for performing their duties, and it provides alternative means of reaching their patrons. With the digitisation of library print resources and production of born digital library resources, the web provides the infrastructure, technology and means for storing, dissemination, retrieval, archiving and preserving these electronic resources.

One of the information divides is the adoption and use of the web. For instance, while universities and academic libraries in some regions of the world are well represented on the web, studies such as Nwagwu and Agarin (2008), reported that some universities in Nigeria do not have websites. World webometric ranking of universities and institutional repositories also provides some insight into information divide, as universities from certain regions of the world are highly ranked while universities from other regions are poorly ranked. Academic libraries in Nigeria are characterised by poor funding, poorly trained staff, understaffing, poor structural and in conducive physical spaces, poor power supply to physical libraries and poor internet services (Nok, 2006; Abubakar, 2011; Ogunsola, 2004; Ibinnaiye, 2012; Jibia, Mubaraka; Jirgi, 2013; and Eze, Jacintha and Uzoigwe, 2013).This conclusion cannot be made of the presence and performance of the libraries on the Internet since studies about the webometric performance of academic libraries in Nigeria have not been populated. Two earlier studies which are on academic libraries in Nigeria have concentrated on the analysis of content and physical features. The first, (Mohammed, Garba, and Umar 2014) in which 10 universities were sampled, concentrated on e-resources and other physical features of the websites. The second study, (Gbaje and Kotso, 2014), also assessed the contents of the library websites of the federal universities in Nigeria.

This study aims at finding out the following:

(i) number of academic libraries in Nigeria that have websites;

(ii) availability of library links in university homepages;

(iii) visibility of academic libraries on the Internet;

(iv) web impact factor of academic libraries on the Internet; and

(v) relationship that exists among the libraries on the Internet.

Library and the Web

The web provides an alternative platform for academic libraries to provide services to their patrons. The web is the largest library and it attracts the largest access. In this digital age, the web and computing technologies are library infrastructure for library activities. The web provides global access to library content. Considering this feature, universities make learning and library resources available online for distance learning students that could have otherwise found the library accessible because of distance. Overdrive is one of the online libraries that is exploiting the features of the internet effectively. It had traffic of over 1.6 billion visits to its website by 2011; and in 2012 alone, it attracted 6.26 million visits with 134 million checkouts of digital materials (Ewing, 2015). There are other features of the web and other information technologies that libraries exploit. For instance, Blummer (2008) claimed that libraries use e-books as an alternative for reducing cost of acquisition, maintenance and dissemination while the goal of easy information retrieval and access and collection development is achieved. The websites and the social platforms of libraries are used as marketing tools (Nooshinfard and Ziaei, 2011; Kaur, 2009; Ikonne, Onuoha, and Madukoma, 2013; Agha, 2004; Alkindi and Al-Suqri, 2013; Chan, 2012; (Schmidt, 2004; Siddike, Munshi, and Mahamud, 2013) as library products, services and resources are marketed to patrons and prospective patrons.

Studies have indicated that most library patrons prefer the online platforms for accessing library services (Omeluzor, Bamidele, Onuoha, and Alarape, 2013) while others either prefer electronic resources (Salleh and Alwi, 2014; Cumaoglu, Sacici, and Torun, 2013; Sharma, 2009) or they consider the electronic resources good alternatives to the print version (Woody, Daniel, and Baker, 2010; Idiegbeyan-Ose, Ilo, Ohaegbulam, 2015; Tosun, 2014). With the

increasing preference for electronic resources by library users, the academic library websites have provided a gateway to the libraries, their electronic catalogues and resources on the internet and sometimes the Intranet.

Most libraries have Internet centres for attracting a section of their patrons because Internet services are now regarded as a special and important library service to many patrons. Zickuhr, Rainie, and Purcell (2013) revealed that 77% of American library users above age 15 consider free Internet access is an important library service. Also, public libraries in the US that provide Internet access services, serve as bridges between the citizens and the e-government services, as well as means of communicating with the government during emergency (Bertot, Jaeger, Langa, and McClure, 2006).

Library Websites

Library websites have attracted a lot of interest in the research arena. Even basic activities such as development of academic libraries are not left out as studies such as Lwoga (2014) and Hilyer(2009) have carried out studies on user-centered library website designs. Other research such as Konnur, Rajani and Madhusudhan(2010), Gbaje and Kotso(2014), Mohammed et al., (2014), Chua and Goh, (2010) and Hazidah, Awang and Abidin, (2013) have focused on the content, resources, architecture and technologies on library websites. There are studies which have considered use and adoption of library websites by users such as Augustine and Greene (2002), Kim (2011a) and Kim(2011b). Other studies such as Nooshinfard and Ziaei (2011) have concentrated on the use of websites by libraries for marketing of information resources and services.

Onyancha (2007) carried out a webometric analysis of academic library websites in Eastern and Southern African countries. The study aimed at investigating the accessibility to the library websites from the university websites, the availability of some popular electronic services, the size of the websites, the number of in links, the web impact of the websites, and the online interaction of the websites.

Methodology

A sample survey design was adopted to study websites of academic libraries in Nigerian universities. Sampling frame which contained a list of all approved federal, state and private universities was collected from the website of National Universities Commission (NUC) on the 4th of March, 2015. There were 40 federal, 50 private and 39 state universities, making a total of 129 universities in Nigeria. All the universities were considered for this research work.

The first level of data collection with the aim of assessing the access points to the websites of the libraries on the university websites involved all the universities in the sampling frame that have functional websites. The websites of the universities were searched and checked for library links between the 1st and 13th of March, 2015. Two steps were taken to obtain the website addresses of universities. First, the links provided on the NUC website provided access to the functional websites of some of the universities. Non-functional links to universities' websites on the NUC website were noted. Some links were non-functional because the web addresses were probably wrongly spelt, offline or never existed. The second step taken to obtain the website addresses of all the universities was that for all the universities whose links on NUC website were not functional, their names were searched on the www, using the Google search engine. The search for websites of universities whose weblinks on NUC website were non-functional was conducted within a week. Universities whose domain had expired, or whose webpages were non-functional because they were under construction were not considered for the second level of analysis.

The second level of analysis involved the assessment of the links to academic library websites on the university websites. The menu and the other hyperlinks on the homepage of the university websites were checked for links to the library website. If links indicating "library", "university library" or "library services" were not found, links indicating OPAC, e-library, library management system, e-resources and e-books were also considered as library links. There were two types of results in this category: first,

university websites with functional library links and second, university websites without functional library links or websites. An academic library is considered not to have a functional library website or webpages if the:

i. university websites do not have a library link,
ii. library links opens pages that are under construction,
iii. library links opens pages that are empty,
iv. library link is not working,
v. link opens the home page of the university website,
vi. library home page is not accessible to the public because it requires login details and,
vii. library link does not provide information about the library.

Google search engine was further used to search for academic libraries that have links on the websites of their universities, this was done to collect data about libraries that maintain more than one website. Also, on the host institutional website, if a library had no link or a non-functional link ,the Internet was searched for such library using Google search engine. This was done to make sure that libraries that created websites independently of or without links from their host institution's websites are not erroneously recorded as not to possessing a website.

For this research, a library was considered to have a website if its website is a sub-domain under the university domain. For instance ,www.ui.edu.ng is the University of Ibadan website address or domain name whereas http://library.ui.edu.ng/ which is one of its subdomains is the website address of the University of Ibadan library. A library is also considered to have a website, even if the domain name is different from the university's domain name. For instance, www.nou.edu.ng is the domain name or website address of the National Open University of Nigeria (NOUN), while www.nounlibrary.com.ng is the domain name or website address of the National Open University of Nigeria Library.

The third level of analysis was performed with the use of Google search engine's features for collecting data about number of web pages and the in-links. "info:name of website" query was entered into the Google search engine. This search was conducted in March, 2015.

The fourth level of data collection was done using the Webometric Analyst 2.0 for link impact report and link analysis between the websites. Data collection was also done in March 2015. Information about web impact factor (WIF) was obtained by dividing the number of in-links by total number of web pages that were indexed by Google. WIF is a quantitative metric for ranking websites or top-level domains (Noruzi, 2006). In-links can be likened to citations to a document; a document is cited by another document when information from such the cited document is used;, also a webpage or website receives an in-link from another website or webpage when information on the in-linked website or webpage is used. In another word, number of in-links can be likened to the citation count while WIF can be likened to journal impact factor (JIF). Therefore, WIF is a measure of the usefulness of a website or webpage. The formula for calculating WIF is given below:

$$WIF = \frac{Total\ number\ of\ in-links\ into\ a\ given\ website}{Total\ number\ of\ web\ pages\ of\ a\ website\ indexed\ by\ Google}$$

Results

Libraries Websites' Links from Host Universities' Homepages

The analysis of the presence of the libraries brought about the categorisation of the web presence of the academic libraries as presented in Figure 1. This study revealed different levels of presence of academic libraries on the Internet. First, parent universities of 8% of the academic libraries do not have websites at all, and academic libraries in this category do not host separate websites as confirmed by Google search engine. Less than a third (29%) of the universities in Nigeria did not have links to a library or other related websites such as library system, library catalogue, library management system, OPAC, e-books or e-library. Some have links to a library website (21%), but the links are either not working or they opened expired pages, pages under construction or empty pages. Academic libraries can be accessed from the homepages of 42% (54) of the universities in Nigeria.

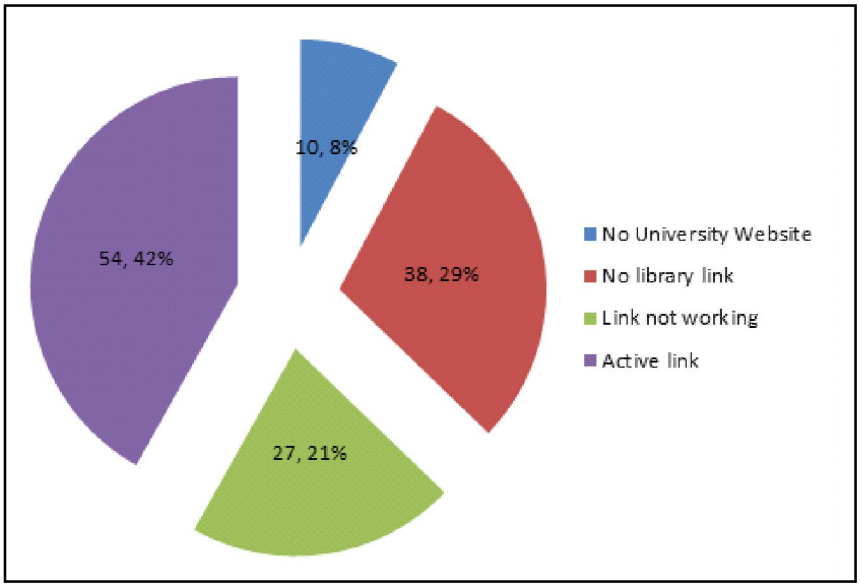

Figure 1: Categories of the Presence of Academic Libraries on the Web

Academic Libraries with Websites

There were 19 academic libraries that had websites based on the operational definition of a website in this research work. Out of the 19 academic libraries that had websites, 15 used sub-domain under the host institution domain name. There were thirteen federal, two state and four private universities that had at least a library website.

Size of the Websites of the Academic Libraries, In-Links and WIF

While the number of web pages provides information about quantity only, the in-links provides information about impact and online quality of information provided on the website. Since library websites are not expected to provide access to knowledge only, they are also expected to contain knowledge, in-links which provide information on 'online quality of information' contained in the website on the web were considered for analysis in this research. According to Table 1, eleven academic libraries' websites did not have in-links and WIF. There was an average of 20,203.47 webpages, 5.21 in links and 0.000258 WIF per academic library. Most of the libraries that had websites are older and federal government owned. However, the private universities had larger websites. A little over half of the (52.63%) of the libraries had less than a hundred web pages. Only 21.05 % had more than a thousand web pages. The WIF of the libraries were very small. The University of Lagos had the highest WIF, followed by American University of Nigeria.

Table 1: Academic Libraries, their web addresses, Number of Web pages, In-links and WIF

	Name of University	Web address	Web pages	In-links	WIF
1	Federal University of Technology, Akure	http://lib.futa.edu.ng/	861	13	0.015
2	Obafemi Awolowo University	http://library.oauife.edu.ng/	27	0	0
3	University of Abuja	http://www.uniabujalibrary.net/	16	0	0
4	University of Abeokuta	http://library.unaab.edu.ng/	81	1	0.012
5	University of Calabar	http://library.unical.edu.ng/	17	0	0
6	University of Ibadan	http://library.ui.edu.ng/	19,900	34	0.0017
7	University of Ilorin	http://www.library.unilorin.edu.ng	150	3	0.02
8	University of Lagos	http://library.unilag.edu.ng/	85	16	0.18
9	University of Port Harcourt	http://library.uniport.edu.ng/	209	7	0.033
10	Lagos State University	Lasulibrary.org	61	0	0
11	Ondo State University of Science and Technology	library.osustech.edu.ng	57	0	0
12	American University of Nigeria	http://library.aun.edu.ng/	89	12	0.13
13	University of Osun	library.uniosun.edu.ng	152	8	0.052
14	Babcock University	library.babcock.edu.ng/	259,000	0	0
15*	Elizade University, Ilara-mokin	http://library.elizadeuniversity.edu.ng	96,000	5	0
16	National Open University	www.nounlibrary.com.ng/	263	0	0
17	Adeleke University, Ede	koha.adelekeuniversity.edu.ng/	6,850	0	0
18	OOU, Ago-Iwoye	library.oouagoiwoye.edu.ng/	27	0	0
19	Michael Okpara University	http://www.mouaulibrary.com/	21	0	0
	Total		383866	99	

Most Commonly Targeted Top Level Domains (TLD)

The types of websites that are referenced or linked by websites are categorised by type of top level domain (TLD). TLD refers to the highest hierarchy domain in the Domain Name System (DNS) on the internet. For instance, the TLD for www.ui.edu.ng is .ng while the TLD for www.nounlibrary.com is .com. Targeted TLDs by the libraries refer to the TLDs that are out-linked by the library websites. Three academic libraries had no out links. Out-links refer to links on a given website to other websites. Majority of the targeted TLDs were .com domains (58.7%), followed by .org TLD (12.4%) as shown on Table 2 below.

Table 2: Most Targeted TLDs by the Academic Library Websites

Domain	Federal	State	Private	Total (%)
com	54	59	15	128 (58.7%)
org	20	0	9	29 (12.4%)
net	13	3	1	17 (7.5%)
edu	4	0	4	8 (2.5%)
de	6	1	1	8 (3%)
info	7	2	2	11 (3.5%)
co	2	1	1	4 (2%)
do	4	0	0	4 (2%)
se	1	1	1	3 (1.5%)
others	14	0	3	17 (8.4%)
	118	65	18	201

Link Network Diagram

Link analysis diagram in Figure 2 shows that there was no interaction between the academic libraries online. This was generated with webometric analyst 2.0 that was designed by Mike (2012).

Discussion of Findings

The first finding of this study which showed that more than 50% of academic libraries in Nigeria did not have presence on the Internet suggests that librarianship in Nigeria is far from maturity, gauche, and presents less innovation in information technological adoption and use. The web is a veritable tool for academic libraries in the digital age. Any academic library that does not have a presence on the Internet is left behind and not present on the world map of the information society; it therefore shows that academic raries in Nigeria must keep pace with the world. Secondly, it shows that the university libraries were not exploiting in its fullest the features of the web. Thirdly, web savvy and technologically inclined researchers in these communities will be excluded in service provision by the academic libraries that did not have websites. Lastly, access to global research outputs in form of electronic journal articles and other resources is limited or not possible without functional academic library website.

One of the implications of making a library own webpages under the parent university's website as opposed to allowing it to operate and maintain a sub-domain under the university's domain name or operate and maintain an independent domain is that when the university website is hacked or crashed, the library website is hacked or crashed as well. Moreover, libraries cannot take certain decisions on the type of platform to host their websites or the type of securities they want to put in place for the digital intellectual properties of the libraries when they only own webpages on their universities' websites. Also, libraries cannot add pages, services, innovation or information to their websites without the bottlenecks of the university IT unit. Whereas, with an independent domain or sub-domain, a library can independently "run" in the digital world.

Out of the academic libraries that have websites, four libraries had websites that were not sub-domains or part of the universities' domain name. Academic libraries are expected to host websites that form part of the university's domain. There are advantages of doing this. First, it will contribute to the web impact of the university and second, locating such library websites will be easier.

Apart from this, websites of four academic libraries were not accessible from the university homepage. Library websites are expected to be located at the homepage of the university website and at conspicuous locations, at least as a main menu item. One of the responsibilities of a university is knowledge creation, and the library manages the materials for knowledge production. Often, the wealth of resources in an academic library is a direct reflection of the intellectual state of its host institution. Moreover, in this digital age, the library is the custodian of knowledge produced by the university because the library manages university's institution repository which contains all forms of knowledge produced by the university and members of the university community. Since the library is central to knowledge production and it is very important to the university, it is expected that it should be centrally placed on the university website.

The WIF of the library websites which were negligible suggests that the library websites were not informative and innovative with ideas. WIF measures the usefulness of an information source on the Internet. This supports earlier studies such as (Gbaje and Kotso, 2014) and (Mohammed et al., 2014) which reported that librarianship in Nigeria is at infancy and that websites of academic libraries in Nigeria are presented as ordinary organisational website with very little inclination towards intricacies of academic library websites requirements. It further suggests that there is need to carry out content analysis of the academic library websites in Nigeria to investigate the quality of information literacy instructions on the websites; as this can provide information concerning the quality of information services provided on these websites.

The targeted domains by the library websites explains the type of information that are referenced by the libraries. It was revealed that the library websites did not target educational or academic (.edu, .ac) and government (.gov) domains, rather they targeted commercial domains (.com). This finding suggests that the information that are referenced on the websites are largely non-academic. This is a further reflection of the present practice in which academic libraries in Nigeria operate in isolation.

Conclusion and Recommendations

In conclusion, this study revealed that most academic

libraries in Nigeria did not have websites. Only few academic libraries owned websites, which contain few webpages, very few in-links and out-links and negligible web impact factors or low quality information. Among the academic libraries, linked network analysis diagram revealed that there were no interactions.

It is therefore recommended that library websites should be hosted as sub-domain of the university web domain to encourage innovation, technological inclination and autonomy of the library. The address of a website speaks volume about its authority and purpose. Academic library websites that form part of the university's domain are more authoritative, and the purpose is conspicuous from its address. It is recommended that academic libraries in Nigeria should consider populating their websites with quality information literacy instructions, e-resources, marketing and links to the university's institutional repository and library services. An academic library website becomes more useful and used when it provides services such as library registration, interlibrary loans, research data management and booking for reading rooms through its websites. Videos instructions that can educate patrons on subjects like effective searching, academic misconducts, tour of the library, e-resources in the library, reference management and other library services are strongly recommended for library websites. Apart from quality content, institutional repositories, data repositories and research data repositories are services that could be provided by libraries on their website that can drive traffic, increase usefulness (in-links and WIF), enhance global visibility and webometric ranking of the universities. Academic libraries in Nigeria therefore have a major part to play in enhancing global visibility of Nigerian universities on the web, thereby improving their webometric rankings in the world.

It is also recommended that academic libraries in Nigeria should form a consortium that will manage the development and standardisation. The consortium will be advised by special interest groups of professional information scientists in the country. Also, the location of a link to library website on the homepage of the university website is recommended in accordance with Onyancha (2007) which submitted that "a library whose website is hidden is as good as a library that does not have a website".

Academic libraries in Nigeria should strongly consider training librarians and information technology technical staff on academic library websites requirements and intricacies. Well trained librarians should be involved in the design, development and management of academic library websites for libraries than depend on the web managers of the university. As it was earlier noted that the academic libraries did not interact online, it is recommended that the consortium of academic libraries in Nigeria, if formed, should consider developing a modality for resource sharing and interlibrary loans of library materials among the academic libraries and patrons. This consortium can take cues from the South African's SABINET (Southern African Bibliographic Network) through which South African libraries have formed a consortium for interlibrary loan and resources sharing among other things.

One of the limitations of the study is that the most targeted websites by the websites of the academic libraries were not considered as a part of the research work. It is suggested that a consortium of libraries in Nigeria should be formed, which will specify and implement certain standards for library websites' development and design modalities for online resource sharing and interlibrary loans services among academic libraries.

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