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An Appraisal of Open Access Utilization among Academic Librarians in Federal Universities in Northwestern States of Nigeria

By

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Abstract

With the proliferation of literature on Open access (OA), extensive literature can be found focusing on issues relating to OA publishing from the viewpoint of libraries and publisher, very little have been done on issues influencing authors' adoption and use of OA by academic librarians in Northern Nigeria. This study investigated the utilization of OA among academic librarians in Northwestern States of Nigeria. The findings from the study revealed that majority of the respondents indicated high level of awareness of OA publications concept but posses little Knowledge about OA initiatives. The study also discovered that librarians use OA resources and give priority to it when sourcing materials for their work. The study further revealed that inadequate funding for building and upgrading ICT infrastructure, unstable power supply and slow Internet connection (bandwidth) among others were the major factors militating against the use of OA resources. It is therefore, recommended that advocacy on OA initiatives have become imperative to encourage librarians publishing via OA models. Finally, adequate funding is seriously needed for building and upgrading ICT infrastructure in the academic institutions. This will go a long way in encouraging academic librarians to exploit fully the benefit of Open Access and also to contribute to the body of literature by publishing via Open Access models.

Key words: Academic Librarian, Research Productivity, Open Access, Northwestern States, Nigeria,

Introduction

Scholarly publishing is fast changing and characterized with the deployment of numerous milieu, forms, models, practices and movements in order to bring arrays of information resources to their immediate users at no cost. One of such movement is Open Access (OA) (Giarlo, 2013) explained that, OA is used to describe a model of scholarly communication in which users may freely view, download, copy, and print scholarly articles, books, conferences proceedings, squibs and so forth. This implies that users are able to freely access scholarly materials because the price of publication has been assumed by another party, usually the author, the author's institution or grant which funded the research. According to (Aliyu & Mohammed, 2014; Jain, 2012) the development of open access models was a result of what has been observed over the years to respond to risen costs of publishing as well as the increasing prices of scholarly journals published by commercial publishers.

University libraries being the heart and center of information provision for teaching, learning, research and leisure need to be fully supplied with various forms of information resources, however, the present economic turbulence in developed and developing countries has greatly hampered the services provided by the libraries due to budget cut. The scholarly information environment is now undergoing profound changes as a result of new technologies supporting new modes of research dissemination, changing research practices and needs, and increased focus on research performance (Co-operation, Economy, Houghton, & Vickery, 2005; John Houghton, Steele, & Henty, 2003; JW Houghton, 2004; Sompel, Payette, Erickson, Lagoze, & Warner, 2004). As a result, the traditional publishing system no longer serves well the needs of researchers for inhibited access to the research findings of others, or the needs of their funders for cost effective dissemination of findings in order to maximize the economic and social returns to their investment in Research and Development R&D (John Houghton & Sheehan, 2006). University libraries nevertheless need to fulfill its mission as information providers despites the financial challenges, what should be done has limitations because despite the potentiality of OA resources in academic productivity libraries are yet to fully explored and adapt.

At this juncture, "Open Access" (OA) resources have dawned as boom to both the academic users and the library managers (Joshi & Vatnal, 2012). The questions that need to be answered comprise; what are the levels of awareness of Open Access resources among academic librarians in federal universities in Northwestern States of Nigeria? Are Open Access resources effectively utilized by academic librarians in Northwestern States of Nigeria? What are the problems militating against the use of Open Access resources by academic librarians in Northwestern States of Nigeria and how can academic librarians promote open access in their institution?

Statement of the Problem

Open access (OA) is growing across the globe, Nigeria is not an exception. Although the global pattern and level of awareness, deployment and utilization may follow the paths of digital advantage, the movement has gained tremendous pace, probably due to increased global access to the Internet, the activities of OA promoters and the pertinence of the mission of the movement. (F. W. Dulle, Minish-Majanja, & Cloete, 2010), while analyzing the open access scholarly communication in public universities in Tanzania, stressed that like in many other developing countries, accessing and disseminating scholarly content is a major problem in public universities in Tanzania. Hurrell (2012), observed that a major issue for academic libraries has been the 'serials pricing crises' of the past two decades, whereby average costs of journal subscriptions have increased exponentially, partially due to the consolidation of journal publishers. Since library budgets have not increased at an equivalent rate to journal prices, the purchasing power of individual academic libraries has decreased, forcing them to cancel subscriptions, to reallocate budget items to maintain subscriptions, or to negotiate licensing agreements whereby access is granted to "bundles" of journals at a lower price per journal.

A preliminary investigation revealed that federal university libraries in Northwestern States of Nigeria are facing serious financial constraints where most of the libraries could not afford subscription to scholarly journals due to budget cuts. For example, most of the e-journals in Kashim Ibrahim Library, Ahmadu Bello University, Zaria, apart from *Science Direct* that is fully subscribed by the university management under consortium, the remaining are either partially subscribed or supported by international donor agencies. Even the *Science Direct* the university management could not subscribe to all the needed e-journals in the core areas. This has created barriers to information access, fostering a dependence on external funding. Open access present an opportunity for African scholars not only to learn from scholars in various parts of the world but also to share their scientific information, while at the same time addressing the challenges and bridging the information gaps with scholars in developed and developing countries. Despite the potentiality of OA resources in academic productivity this is not yet fully exploited. This could be affirmed by a survey conducted by Gbaje (2010) in Ahmadu Bello University who found that only 9.5 percent of those surveyed provide access to open access resources. It is on the basis of the above that the study intends to find out the extent to which academic librarians in federal universities in Northwestern States of Nigeria utilize open access resources for their academic productivity.

Research Question

The following research questions were set for the study:

1- What is the level of awareness of Open Access by academic in federal universities in Northwestern States of Nigeria?

2- What is the level of usage of Open Access resources for research productivity by academic librarians in federal universities in Northwestern States of Nigeria?

3- What factors militate against the use of Open Access resources by academic librarians in federal universities in Northwestern States of Nigeria?

4- How can academic librarians in federal universities in Northwestern States of Nigeria promote open access in their institutions?

Hypotheses: $H0_1$ There is no significant relationship between awareness and use of open access resources for research productivity among academic librarians in federal universities in Northwestern States of Nigeria?

Review of Related Literature

Suber (2007) defined OA as "Open access literature as digital, online, free of charge, and free of most copyright and licensing restrictions." Although open access is a concept that is most often applied to online publication, it is nonetheless compatible with print for those journals that also have printed versions. Open access is free of charge for readers of the online version, but does not exclude priced access to print versions of the same work (Guerrero & Piqueras, 2004). According to Harnad et al. (2004) OA means free online access to peer-reviewed research journal articles. Scholars in Africa and other developing regions should no longer mourn the unavailability to research outcomes from the developed world. This is because, on a daily basis, both older and newer in-lab and out-of-lab information materials–books, serials, gray materials and others– are uploaded onto the Internet, and downloaded by other scholars and researchers (Nwagwu, 2013).

In highlighting the level of awareness of open access resources (Ogbomo & Ivwighreghweta, 2010) reported that several studies indicated that open access is an unknown concept to many researchers. These studies include those conducted by (Christian, 2009; Kim, 2007; Nwagwu, 2013; Swan & Brown, 2004) found very low level of awareness prevailing in higher educational institutions and research institutes, organizations and governments agencies. According to Dinev, Hu, and Goo (2005), awareness is a pre-requisite to subsequent usage of open access publications unless an individual uses it unknowingly. According to Obuh and Bozimo (2012) "Awareness raises consciousness and knowledge about a certain technology and its personal and social benefits." This view was supported by the study conducted by (Dinev et al., 2005), which established awareness as the central determinant of user attitude and behavior towards technology. In the open access environment, awareness has also been acknowledged as an important factor in determining usage of this mode of scholarly communication. In a study conducted by Gbaje (2010) in Ahmadu Bello University, the findings revealed that sixteen representing 76% of the respondents who were editors–in-chief of the journals published in the university indicated that they were not aware of Open access initiatives. In Another related study conducted in Nigeria by Christian (2009) the findings reveals that while only 3% of 66 respondents at the University of Lagos were aware of the concept of open access journals, 22.7% knew very little about it and majority (i.e. 74%) of the respondents were completely unaware of it. A similar study conducted among academics librarians in southern Nigeria indicated 67% of academic librarians in private higher learning institutions were not aware of Open Access concept and only 33% of the respondents were aware of this concept (Ikponmwosa, Schorlastica, & Ngozi, 2013).

In addition, similar study conducted by Obuh and Bozimo (2012), showed that most of the respondents, who were LIS lecturer in southern Nigerian indicated some level of familiarity with of open access publications. Even though the result shows fairly high level of awareness on open access publications by lecturers of LIS in southern Nigeria, it is clear that, their awareness hinged mainly on the nature and types of open access and not on open access initiatives. Vlieghe et al. (2006) in their study of the awareness and usage of online resources found that the respondents or user groups

differed in their usage methods of access and in their frequency of use of online resources and that lack of awareness of the library home page could have prevented some users from using the resources (Aina, 2002). In a similar study, Sánchez-Tarragó and Carlos Fernández-Molina (2010) found variances in the knowledge of open access related initiatives among scholars from a group of health researchers in Cuba. In another similar situation, (F. W. Dulle et al., 2010) found that the most commonly known terms or initiatives by researchers were open access journals and open access repositories. Very few respondents knew about specific open access initiatives such as Budapest open access initiative, Open access movement and the OAIster. Likewise, a study by Papin-Ramcharan and Dawe (2006) also reported a low level of awareness of OA initiatives by the Social Sciences sector at Brescia University in Italy. Another study involving 27 Universities in Canada revealed that among the 32 survey respondents, 66% had some kind of familiarity with the term open access (Greyson, Vézina, Morrison, Taylor, & Black, 2010). Paradoxically, the usage of open access is highly dependent on scholars being aware of this mode of scholarly communication (F. W. Dulle et al., 2010). However, in certain situations users benefit from open access initiatives without their knowledge of this form of scholarly communication (Fullard, 2007; Papin-Ramcharan & Dawe, 2006). Studies conducted by (Fullard, 2007; Li Liew, Foo, & Chennupati, 2000; Swan & Brown, 2004) all found that many researchers are aware of OAJ and they give preference for and use it against printed articles which confirms the idea that patrons may limit their research to easily available electronic journals simply because of their convenience and regardless of whether other sources would better suit their information needs.

Proliferation of literature on usage of open access resources in disseminating and accessing scholarly information has attracted the attention of many scholars in recent years (Ogbomo & Ivwighreghweta, 2010). Many studies have been carried out on the use of open access journals. While extensive literature can be found focusing on issues relating to open access publishing from the point of view of libraries and publishers, very little have been done on issues influencing authors' adoption and use of open access (Obuh & Bozimo, 2012). A study conducted by Obuh and Bozimo (2012) in southern Nigeria on the level of usage of OA publications among lecturers in the department of library and Information science indicated high level of usage. i.e. both senior and junior lecturers exhibit a similar level usage in terms of high priority in sourcing OA materials for their work and also in their rate of retrieving OA contents. Renwick (2005) conducted a study on the knowledge and use of open access resources by academics in the medical sciences of the University of the West Indies found that there is a high level of usage of open access resources by faculty in their research and professional growth. However, Obuh and Bozimo (2012) observed that the high level of usage of open access publications by both senior and junior lecturers can only be accounted for in terms of sourcing and retrieving its content for their research work as the result show that both categories of lecturers rarely self-archived their work on the Internet. A study by F. W. Dulle et al. (2010) found that despite the fact the respondents claimed to have used open access publication media to access scholarly works, but actually fewer Tanzanian researchers disseminated their findings through open access channels than those who accessed.

Looking at the attitude of librarians toward open access an attitude-based survey by Palmer, Dill, and Christie (2009) indicated that there "discrepancy between librarian support of open access concepts and actions taken that reflect this stated support. The respondents believe their profession should be a part of at least some aspects of the open access movement, but few are currently taking any action toward this end. Noteworthy is the discrepancy between the levels of support respondents purport for library involvement in educating others about open access and actual education behaviors performed. While all concepts related to education were agreed to or strongly agreed to at a level of

70 percent or higher, only 20 percent (54) of respondents' institutions and 7 percent (20) of respondents were involved in education campaigns relating to open access". A study by Mercer (2011) revealed that 49 percent of academic librarian authors' articles were available open access. Although academic librarians authored fewer total articles, their OA choices compare favorably to the other authors in LIS journals. Still, fewer articles were available open access than were eligible for self-archiving in some type of repository based on publisher policies for both author types. In a study conducted among Tanzanian health science librarians by Lwoga and Questier (2015) reveals that 75% of the librarians strongly support promoting OA issues on campus. On the other hand the researcher highlighted that various Open Access-related tasks did not translate in to actual action.

Looking at the attitude of academic librarian in supporting and promoting open access Gedye (2004), claimed that in an open access era, "a new role for librarians needs to be discussed, defined, and promoted" in order to better apply their research and instruction expertise to facilitate and instruct their users in accessing and evaluating the quality of open access articles. Open access also requires policy and procedure changes, in order to accommodate the additional collections of institutional repositories and open access journals. Subject specialists, bibliographers, and cataloguing librarians need to establish guidelines to perform quality control and regular catalogue maintenance on these titles (Joshi & Vatnal, 2012).

With the entire benefit offer by open access, yet, open access is being bedeviled with numerous problems across regions and localities across the globe, each region and locality with its unique problem and in some instance concord. Looking at the factors militating against the use of Open Access in developing countries, studies conducted in India by Joshi and Vatnal (2012) reported that challenges in developing countries like India are erupt in the form of lack of adequate funding for building and upgrading ICT infrastructure. All the institutions of higher learning are not equally enthusiastic about establishing and maintaining institutional repositories. Though publicity is being given to OA resources, still many pockets lack total awareness regarding exploiting maximum benefit from them. Smith (2007) looked at South Africa, and found that insufficient bandwidth was a major problem, and the range of open access journals in the respondents' field of interest was fairly limited. studied by Manda (2005) on the use of electronic resources in Tanzania by academics revealed that the use was low, due to inadequate end-user training, slow connectivity, and limited access to PCs, poor search skills, and budget cuts.

Looking in to Nigeria with regards to problems hindering effective usage of open access resources, Christian (2009), reported that inadequate funding also constitutes another problem, stressing that since most of the academic and research institutions in Nigeria are funded by the government, these institutions continue to grapple with percentage decline in budgetary allocation. Considering the fact that development of institutional repository in this part of the world is a capital intensive project, funding constitutes another major obstacle to the development of institutional repositories in the country's institutions. Adequate funding to build, upgrade and maintain ICT infrastructure is a problem in many developing countries. For example, because of the poor ICT infrastructure in academic and research institutions in developing countries like Nigeria it is difficult to sustain the development of institutional repositories. Upgrading ICT facilities requires enough financial support (Canada, 2009; Ikponmwosa et al., 2013).

Summarily, Academic librarians are presumably expected to use open access resources as authors and readers and as well promoter and supporter, therefore, their supportive measure in promoting open access initiative is quite important Mercer (2011), observed that with the expanded roles of libraries as publisher and increased expectations for subject librarians, one could assume academic librarians are well versed in scholarly communications topics, well prepared to share this

knowledge with the rest of the academic community, Mercer further reiterated that Academic librarians have responsibility for maintaining awareness and promoting services such as institutional repositories (IRs), as well as alternative publication avenues such as open access journals, Palmer et al. (2009) concluded that librarians are generally quite supportive of scholarly communications programs including opening access to scholarship, but are nonetheless ambivalent or unsure how to discuss these topics with faculty at their institutions.

Research Methodology

Survey research method was adopted in this study using questionnaire as instrument for data collection. The Likert scale of measurement ranging from strongly agree, agree, disagree, and strongly disagree was used for the respondents to choose from. The instrument was subjected to face and content validation where it was subjected to experts for checking and making necessary observations, corrections and amendments in order to improve the instrument. As (Kerlinger, 1973) observed that validation by others (experts in the field) is an effective method of validation of a research instrument. The instrument was tested using split-half method, the instrument's reliability coefficient was 0.8, which indicates that the instrument is reliable as postulated by (Education, 2010) a reliability coefficient of 0.8 and higher is generally considered to be good. The population for the study consisted of academic librarians (who have acquired skills and training in librarianship and possessed at least a first degree with a grade not less than second class lower but work in university based library, their condition of service is the same with the teaching staff in the Faculty). A total of 200 academic librarians in seven (7) Federal Universities in Northwestern state of Nigerian formed the populations for the study. This comprises Ahmadu Bello University Zaria, Bayero University Kano, Usmanu Danfodiyo University Sokoto, Federal University Dutse, Federal University Dutsinma, Federal University Birnin Kebbi and Federal University, Gusau. Out of 200 copies of the questionnaire distributed to the respondents, 174 (87%) were duly completed and found usable for the study. The entire population was considered as sample for the study due to the fact that it was reasonable and can be manage by the researcher. As supported by (Newman & Feldman, 2011), a researcher's decision about the best sample size depends on three issues: the degree of accuracy required; the degree of variability or diversity in the population; and the number of different variables examined simultaneously. In an ideal situation (manageable population, adequate time and financial resources), the researcher is supposed to study the whole population (F. W. Dulle et al., 2010). The data collected for the study were presented and analyzed using descriptive and inferential statistics (PPMC). The descriptive statistics was used for the research questions and the findings were presented in tables, showing frequencies of responses and their corresponding percentages, while PPMC was used to test the hypothesis formulated for the study. The analysis was done using the Statistical Package for Social Sciences (SPSS) version 16. The choice of this software was based on its high descriptive and multivariate statistical power for quantitative data analysis (F. W. Dulle et al., 2010).

Result and Discussion

A total of 200 copies of questionnaire were distributed to the respondents, 174 (87%) were duly completed and returned.

Table 1: Demographic Characteristics of the Respondents

Demographic characteristics of the respondents were among the variables selected for evaluation, along the opinions of the academic librarians for the utilization of open access resources in table 1

Demographic Characteristics of the Respondents			
Variables	**Variable classification**	**Frequency**	**Percentage**
Name of Institution	Ahmadu Bello University, Zaria	108	62.06
	Bayero University Kano	24	13.79
	Usmanu Danfodio University Sokoto	25	14.36
	Federal University Dutse	10	5.74
	Federal University Dutsinma	7	4.02
	Federal University Birnin KB	0	0
	Federal University Gusau	0	0
	Total =	**174**	**99.97**
Gender	Male	114	65.51
	Female	60	34.48
	Total =	**174**	**99.99**
Age	23-30 yrs	6	34.4
	31-38 yrs	110	63.21
	39-46 yrs	48	27.58
	47 yrs and above	12	5.74
	Total=	**174**	**99.97**
Highest Educational Qualification	BLS	92	52.87
	MLS	53	30.45
	Phd	3	1.72
	M.phil	4	2.29
	Others	22	12.64
	Total=	**174**	**99.97**
Working Experience	1-5	120	69.96
	6-10	34	19.54
	16-20	2	1.14
	21-25	9	5.17
	26-30	7	4.02
	31yrs and above	2	1.14
	Total=	**174**	**99.97**

Based on the classification of the respondents by institution, Kashim Ibrahim Library, Ahmadu Bello University, Zaria has the largest number of academic librarians with 108 (54%) responses. It is not surprising to find out that the Ahmadu Bello University, Zaria has the largest respondents because it is among the first generation university and one of the largest in the country. Looking at Bayero University library Kano and Usmanu Danfodiyo University, Sokoto have almost the same number of academic librarians. Out of all the respondents, 114 (65.51%) of them were

males and 60 (34.48%) were female. This unequal representation of the gender in the study signified that male constitutes the majority of academic librarians in the area covered by the study. The age range of 31-38years constituted the highest respondent with 110 (63.21%) responses followed by 39 – 46 years category with 48 (27.58%), the age range of 23 -30 and 47 and above were ostensibly few. The implication of this finding is that there is high number of young academic librarians that are within range of 31 to 46 years. Furthermore, analysis from the distribution indicated that, majority of the respondents with 92 (52.87%) responses were Bachelors Degree in Library Science (BLS), followed by Masters in Library and Information Science (MLS) with 53 (30.45%) responses. The findings revealed that academic librarians with Phd and M.phil were ostensibly few with 3 (1.72%) and 4 (2.29%) responses, respectively. With regards to working experience, first and second categories that is 1-5 with 120 (68.96%) and 6-10 with 34 (19.54%) have the highest responses respectively. This implies that academic librarians with less than 10 years working experience constitute the majority.

Table 2: Type of Open Access Available Resources and Pattern of Usage

Types of OA Available Resources	**Pattern of Usage**				
	Ratings (number & percentage)				
	Never	Yearly	Monthly	Weekly	Daily
Open Access Journal/Databases	16 (9.2)	16 (9.2)	11(6.3)	33 (19.0)	82 **(47.1)**
Institutional Repositories	12(6.9)	17 (9.8)	22(12.6)	16 (9.2)	68 (**39.1)**
Subject / Discipline repositories	20 (11.5)	7 (4.0)	13 (7.5)	42 (24.1)	47 **(27.0)**
Directory of Open Access Repositories (OpenDoar)	24 (13.8)	11 (6.3)	14 (8.0)	40 **(23.0)**	35 (20.1)
Directory of Open Access Journals (DOAJ)	20 (11.5)	8 (4.6)	27 (15.5)	17 (9.8)	55 **(31.6)**

The results from Table 2 indicate that Open Access Journal/Databases as the primary most preferred content usually used on daily basis with 82 (47.1%). Institutional repositories ranked second with 68 (39.1), Subject/discipline repositories ranked third with 47 (27.0%) responses. Directory of Open Access Repositories and Directory of Open Access Journals were the least ranked with 40 (23.0%) and 55 (31.6%) responses respectively.

It is evident that the finding rising from the study indicated variations in terms of the types of available open access resources and their frequency of usage by the respondents. This study is in line with that of Mallik and Roy (2007) who observed variations in pattern of usage of online resources where they found that the respondents or user groups differed in their usage methods of access and in their frequency of use of online resources.

Table 3: The Level of Awareness of Open Access by Academic Librarians

Level of awareness of open access was investigated to find out the extent to which academic librarians are aware of this mode of scholarly communication In Table 3.

Level of Awareness of Open Access	Ratings (Number & Percentage)			
	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
Aware that OAPs implies free access	87**(50%)**	79 **(45.4%)**	2 **(1.1%)**	6 **(3.4%)**
Familiar with disciplinary archives	31 **(17.8%)**	95 **(54.6%)**	35**(20.1%)**	13 **(7.5%)**
Aware OAPs are in Online/ Electronic format	103 **(59.2%)**	58 **(33.3%)**	4 **(2.3%)**	9 **(5.2%)**
OA are copyright free at the point of use	48**(27.6%)**	89 **(51.1%)**	31 **(17.8%)**	6 **(3.4%)**
Usually peruse contents from OA journals, repositories	24 **(13.8%)**	113**(64.9%)**	29 **(16.7%)**	8 **(4.6%)**
Familiar with initiative Open Access Initiative Metadata Harvesting Protocol (OAI-PMH)	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with OAI	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with BioMed Central Charter on Open access	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with Berlin Declaration on Open Access to Knowledge,	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with Budapest Open Access Initiative (BOAI)	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with Scholarly Publishing and Resource Coalition (SPARC)	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with OAISter	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**
Familiar with Public Library of Science (PloS)	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**

The Result from Table 3 shows that in most of the items listed against the level of awareness of OA publications are ranked high. The respondents 87 (50%) indicated high level of awareness (Strongly agree) about Open Access Publication (OAP) while 79 (45.4%) indicated awareness (agree). The respondents agreed or strongly agreed that they are aware that Open Access publications are in online format and copyright free at the point of use with 161 (92.5%) responses. 137 respondents representing (78.7%) indicated that they usually peruse contents from OA journals and repositories. Even though, the respondents show some level of awareness and familiarity with OA resources. However, it could be noticed that their level of awareness hinged mainly on the nature and types of open access and not on open access initiatives as the entire item listed against open access initiatives indicated low level of awareness by the respondents.

Analysis from the research findings indicated high level of awareness on OA resources. This research finding agreed with those conducted by (Dinev et al., 2005; W. F. Dulle, 2010; Obuh & Bozimo, 2012) who reported some level of awareness and familiarity with OA resources by their respondents.

The Level of Usage of Open Access Resources by Academic Librarians

Open access usage was investigated to find out the extent to which academic librarians utilized scholarly contents through this mode of scholarly communication in table 4.

Table 4: The Level of Usage of Open Access Resources by Academic Librarians

Level of Usage of Open Access Resources	**Ratings (number & percentage)**			
	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
I often use OA publications in my research	51**(29.3%)**	114 **(65.5%)**	5 **(2.9%)**	4 **(2.3%)**
I usually retrieve scholarly content from OA	62**(35.6%)**	92 **(52.9%)**	12 **(6.9%)**	8 **(4.6%)**
I have submitted many papers to open access journals	32 **(18.4%)**	37 **(21.3%)**	79 **(45.4%)**	26 **(14.9%)**
I usually self-archive my works on the internet	25**(14.4%)**	14 **(8.0%)**	58 **(33.3%)**	77 **(44.3%)**
I only cite and not publish in OA publications	31 **(17.8%)**	95 **(54.6%)**	35 **(20.1%)**	13 **(7.5%)**
OA is usually my first priority when sourcing for materials for my work	36 **(20.6%)**	100 **(57.5%)**	29 **(16.7%)**	9 **(5.2%)**
OA is usually my first priority when deciding on where to publish my work	22**(12.6%)**	81 **(46.5%)**	61 **(35.1%)**	10 **(5.7%)**
I have some publications in open access outlets	11 **(6.3%)**	41 **(23.6%)**	74 **(42.5%)**	48 **(27.6%)**

. It can be noted that the results from Table 4 show in most of the items listed against the level of usage of OA publications. 165 (94.8) of the respondents agree or strongly agree that they use OA publications in their research activities. In addition to the usage 136 (78.1) considered Open access outlets as first priority in sourcing materials for their work with responses. Similarly, the respondents stated that they usually retrieve scholarly content from OA with 154 (88.5%) responses. Even though the respondents highly retrieved content from OA majority do not make their works through open access mode of scholarly communication. For instance, when asked whether they self-archive their works, majority 135 (77.6%) indicated that they do not self-archive their works. Similarly, the respondents stated that they only cited and not published in OA publications with 126 (72.4%) responses. Lastly only 52 (29.9%) agreed or strongly agreed that they have some publications in open access outlets. Majority 122 (70.1) have no publications in open access outlets. The finding revealed that academic librarians in federal universities North Western States of Nigeria accessed and utilized open access resources but they do not publish via same route.

Analysis from the research findings in (see Table 3 & 4) indicated some level of awareness and usage of Open Access resources but, their level of awareness hinged mainly on the nature and types of open access and not on open access initiatives. This research finding supported those conducted by Dinev et al. (2005), F. W. Dulle et al. (2010), and Obuh and Bozimo (2012) which established awareness as the central determinant of user attitude and behavior towards use of technology.

Factors Militating Against the Use of Open Access Resources by Academic Librarians

The respondents were required to state factors militating against the use of open access resources. In order to achieve this, respondents were asked about their reasons for not accessing open access content.

Table 5: Factors Militating Against the Use of Open Access Resources by Academic Librarians

Factors Militating Against the Use of Open Access Resources by Academic Librarians	**Problem Ratings (number & percentage)**			
	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
Low level of awareness	79 **(45.4%)**	74 **(42.5%)**	9 **(5.2%)**	11 **(6.3%)**
Lack of adequate funding for building and upgrading ICT infrastructure	79 **(45.4%)**	82 **(47.1%)**	11 **(6.3%)**	2 **(1.1%)**
Poor ICT infrastructure in academic and research institutions	67**(38.5%)**	78 **(44.8%)**	22 **(12.6%)**	7 **(4.0%)**
Unstable power supply	71 **(46.5%)**	68 **(39.1%)**	19 **(10.9%)**	6 **(3.4%)**
Unavailability Internet connection	55 **(31.5%)**	85 **(48.9%)**	28 **(16.1%)**	6 **(3.4%)**
Slow Internet connection	55 **(31.5%)**	85 **(48.9%)**	28 **(16.1%)**	6 **(3.4%)**
Technological barriers from digital rights	51 **(29.3%)**	96 **(55.2%)**	25 **(14.4%)**	2 **(1.1%)**
Lack of sensitization to adopt open access	53 **(30.4%)**	86 **(49.4%)**	33 **(19.0%)**	2 **(1.1%)**
Inadequate advocacy for open access in Nigeria	62 **(20.7%)**	88 **(50.6%)**	19 **(10.9%)**	5 **(2.9%)**
Intellectual freedom issues such as privacy, copyright, censorship,	70 **(40.2%)**	77 **(44.3%)**	20 **(11.5%)**	7 **(4.0%)**
Lack of Skill on how to use ICTs facilities	38 **(32.1%)**	71 **(40.8%)**	32 **(18.4%)**	15 **(8.6%)**

Data in Table 5 shows that almost all factors militating against the use of OA publication were considered as hindrance by about three quarters of all the respondents, where they agreed or strongly agreed that lack of adequate funding for building and upgrading ICT infrastructure with 161 (92.6%) responses, poor ICT infrastructure in academic and research institutions with 145 (83.3%), followed by low level of awareness with 153 (87.9%) responses, next to it is unstable power supply with 139 (85.6%) responses, Technological barriers from digital rights has 147 (84.5%) responses, while unavailability of Internet connection and slow Internet connection have the same responses with 140 (80.4%) each., lack of sensitization to adopt open 139 (79.8%), and lack of skill on how to use ICTs facilities with 109 (72.9%) and lastly, inadequate advocacy for open access in Nigeria 150 (64.5%) responses.

The finding also affirm the finding of (Christian, 2009), who reported unstable power supply, inadequate information and communication technology infrastructure, high cost of Internet bandwidth, slow Internet connection, inadequate funding were considered as problems faced by most academic institution in Nigeria, stressing that since most of the academic and research institutions in Nigeria are funded by the government, these institutions continue to grapple with percentage decline in budgetary allocation. The research is also in agreement with that of Suber (2007) and Goodman (2005) who connected open access with intellectual freedom issues such as privacy, copyright,

censorship. Goodman further stressed that managing intellectual property rights through alternative publishing agreements is another issue that developing countries are confronted with. For instance, in 2008, the International Institute of Tropical Agriculture (IITA) in Nigeria developed an institutional repository, but the repository could not go public due to some copyright issues. Copyright in research works conducted by the researchers at the Institute was signed away to the commercial journal publishers for the publication. Curiously, the Institute lost the right to make public research works it has funded and now had to negotiate the right from the journal publishers (Christian, 2009).

Roles of academics Librarians in Promoting Open Access in their Insttitutions

The respondents were required to state how academics librarians can promote open access in their various insttitutions in table 6.

Table 6: Roles of academics Librarians in Promoting Open Access in their Insttitutions

How can academics Librarians Promote Open Access in their Insttitutions	**Ratings (number & percentage)**			
	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
Academic librarians should encorage university administrators to develop selfarchiving policies to encorage self-arching practices	61 **(35.1%)**	106 (60.9)	16 **(9.2%)**	3 **(1.7%)**
Academic librarians should encorage university administrators to set out reward and penalty mechanics "Carrot and stick"	55 **(32.6%)**	108 (62.1)	3 **(1.7%)**	8 **(4.6%)**
Academic librarians should educate university administrators to finance open access related projects	89 (51.2)	66 **(37.9%)**	16 **(9.2%)**	3 **(1.7%)**
Academic librarians should encorage university administrators to upgrade facilities	100 (57.5)	53 **(30.5%)**	4 **(2.3%)**	4 **(2.3%)**
Academic librarians should educate academics about open access , copyright issues and publishers licensing clause	55 **(31.6%)**	111 (63.8)	4 **(2.3%)**	4 **(2.3%)**
Academic librarians should advocate, support and promote open access project and initiatives in their Institution	96 (55.2)	47 **(27.0%)**	6 **(3.4%)**	5 **(2.9%)**

It is very glaring from the analysis table 6 indicated that majority of the respondents strongly agree or agree that academic librarians should encorage university administrators to develop selfarchiving policies to encorage self-arching practices with 167 (96%). The study also revealed that the respondent are in agreement with a statement; "that academic librarians should educate other academics about open access, copyright issues and publishers licensing clause" with 166 (95.4%)

responses. Another interesting finding is that 163 (94.7%) of the respondent strongly agree or agree that "academic librarians should encorage university administrators to set out reward and penalty mechanics "Carrot and stick" in ensuring high deposition mandate among academics." Worthy to mentioned also is the fact that the respondent also suggested that cademic librarians should educate university administrators to finance open access related projects with 155 (89.1) responses. lastly, the finding highlighted that academic librarians should advocate, support and promote open access project and initiatives in their Institution with 141 (82.2) responses.

Base on the finding, it is interesting to see that all the items on strategies to promote open access were considered as supportive. This suggest that the involvement of academic librarian is very important and their action or in actions would definitely lead to success or failure. More importantly academic librarian can better effectively model the attitude of authors toward deposition mandates and on the other hand, university administrators guided toward implementation of appropriate strategies. This finding concords with that of Mallik and Roy (2007), Mercer (2011) who highlighted the relevant of librarian in promoting open access.

Hypotheses 1: H_0 There is no significant relationship between awareness and use of Open Access resources for research productivity among academic librarians in federal universities in Northwestern States of Nigeria.

Correlations were run on a number of questions the hypotheses set for the study, The correlations have the null hypothesis as starting point, which says that there is no relationship between variables i.e. $r = 0$. A 5% significance level ($p < 0.05$) as guideline for determining significant correlations

Table 7: Pearson Product Moment Correlation (PPMC) Statistics to Test the Relationship between Awareness and Use of Open Access Resources for Research Productivity

Pearson Product Moment Correlation (PPMC) Statistics to Test the Relationship Between Awareness and Use of Open Access Resources for Research Productivity			
Level of Awareness	**N**	**P-Value**	**Calculated Value**
Aware that OAPs implies free access	172	.000	1
Aware of author personal websites	161	.000	.301**
Familiar with disciplinary archives	151	.001	-.262**
Aware that OAPs are in Online/electronic format	149	.003	.243**
Aware that OA are copyright free at the point of use	166	.000	.474
Usually peruse contents from OA journals, repositories	161	.000	.301**
Familiar with Open Access Initiative Metadata Harvesting Protocol (OAI-PMH)	142	.004	-.239**
Familiar with OAI	142	.004	-.239**
BioMed Central Charter on Open access	142	.004	-.239**
Familiar with Berlin Declaration on Open Access to Knowledge (BDOAK)	142	.004	-.239**
Familiar with Budapest Open Access Initiative (BOAI)	142	.004	-.239**
Familiar with Scholarly Publishing and Resource Coalition (SPARC)	142	.004	-.239**
Familiar with OAISter	142	.004	-.239**
Familiar with Public Library of Science (PloS)	142	.004	-.239**

Level of Use			
I often use OA publications in my research	151	.001	-.262**
I usually retrieve scholarly content from OA	165	.798	.020
I have submitted many papers to open access journals	151	.428	-.065
I usually self-archive my works on the internet	160	.579	.044
I only cite and not publish in OA publications	159	.195	.103
OA is usually my first priority when sourcing for materials for my work	169	.080	-.135
OA is usually my first priority when deciding on where to publish my work	165	.097	-.130
I have some publications in open access outlets	152	.224	.099

The result from Table 7 revealed that significant relationship was established between awareness and use of Open Access resources for research productivity among academic librarians in federal universities in Northwestern States of Nigeria. This position was confirmed from the details of the (see Table 4) which the calculated significance of 0.000 is less than 0.05 level of tolerance, where in all the items the p-value is less than the significance level, confirming the presence of a significant relationship. Hence the null hypothesis which stated that there is no significant relationship between awareness and use of open access resources for research productivity among academic librarians in federal universities in North Western States of Nigeria is rejected.

Conclusion

Open access is a very new and dynamic medium of access to scholarly information. The main force behind the emergence of open access is to ensure free access as against restriction to information through copyright and licensing as practiced by the commercial mode of scholarly publishing. Although, there is clear evidence that open access have a lot of benefit within the university set up. Unfortunately, majority of the respondent lacked extensive awareness of specific open access initiatives such as Open Archive Initiative (OAI), Open Archives Metadata Harvesting Protocol (OAI-MHP), The Public Library of Science (PLoS), BioMed Central, Berlin Declaration on Open Access to Knowledge etc., which to large extent greatly affect the level of usage of open access resources. Even though, some of the respondents claimed to have used open access resources but, majority acknowledged that they do not make their scholarly output via same route. In spite the fact that open access offers a lot of benefit to academic librarians in federal universities in Nigeria, however, there are a lot of factors militating against effective utilization of open access resources which among others are; inadequate funding for building and upgrading ICT infrastructure, poor ICT infrastructure in academic and research institutions, unstable power supply, slow Internet connection, technological barriers arising from digital rights, lack of sensitization to adopt open, Intellectual freedom issues such as privacy, copyright, censorship, and lack of skill on how to use ICTs facilities. In view of the above challenges, the attractive benefits of open access cannot be achieved without considerable wrestling and reconfigurations. Advocacy on open access initiatives, supportive policies, good facilities and enabling environment have to be put into place. This would go a long way in encouraging academic librarians in federal universities in Northwestern States of Nigeria to effectively utilized open access resources and disseminate their research output via open access outlets so as to share with the international community their local content. This is only one way to make Nigeria's declining scholarly publication rate, more robust.

Recommendations

Based on the findings of this study, the following recommendations were made.

1- Efforts should be geared towards organized campaigns, advocacy on other forms of open access initiatives by inculcating understanding and awareness of the initiatives, techniques, technologies and benefits both at national and institutional level within the study area which can be easily achieve by organizing workshops, seminars etc.

2 -Academic librarians who use open access resources should make efforts to sensitize others to adopt the habit through workshops, seminars etc. The university management should provide necessary facilities and formulate policies that would encourage mandatory deposit and use of scholarly works in open access institutional repositories and other open access outlets to raised the level of usage and also to contribute to the existing body of knowledge not mere consuming.

3- Adequate funding is seriously needed for building and upgrading poor ICT infrastructure, standby generator and inverters, Connectivity and high Internet bandwidth are equally important. Likewise, advocacy and sensitization to adopt open access is very important. Issues of Intellectual freedom such as piracy, copyright, censorship need to be addressed. Adequate training on skill on how to use ICTs facilities is equally needed.

4- Academic librarians need to encourage university management to formulate policies that would encourage academic to self-archive their work in the Institutional Repositories through application of appropriate mechanism for reward and punishment "carrot and stick". There is also the need for sensitization campaign on publisher licensing clauses, copyright issues. Lastly, Academic librarians should also encourage university management to finance, support and promote open access project and initiatives in the institution covered by the study.

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