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Chimezie Patrick Uzuegbu

University of Agriculture Umudike, Nigeria

Faustinus U. McAlbert

University of Agriculture Umudike, Nigeria

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Digital Librarians and the Challenges of Open Access to Knowledge: The Michael Okpara University of Agriculture (MOUAAU) Library Experience

Chimezie Patrick Uzuegbu

Faustinus U. McAlbert

Digital Librarians
Michael Okpara University of Agriculture
Umudike, Nigeria

Introduction

The development of Internet technology has provided academic and research institutions with a very high level of visibility on the web. As a result, teaching, learning and research is widely improved in the global society today. The intellectual call for knowledge and information dissemination by countless organizations and educational meetings has given birth to a terminology called *open access*. This initiative is aimed at bringing the knowledge society to a state of free access to all kinds of information and learning material using the Internet and ICT tools. The library plays an important role in sustaining the open access initiative (Das, 2008). Librarians who ensure the organization and dissemination of full-text content of knowledge materials to online communities are the *digital librarians*.

This paper therefore examines the state of open access in MOUAAU, discussing the challenges confronting the managers (digital librarians).

Literature Review

Digital Library and Open Access to Knowledge

According to Shiri (2003), the Digital Library Federation defines digital library as:

"Organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily available for use by a defined community or set of communities".

Digital libraries are an emerging concept in Nigeria, even though today's libraries in the developed countries are routinely providing information and services in digital form. Borgman (1999) agrees

with the view of Digital Library Federation (1998) which states that digital libraries have unique characteristics that differ from traditional libraries and their approaches to information provision. From a traditional librarian's point of view, digital libraries present a transformative model of a large-scale, user-centric organization that is moving towards an integrated form with various components. However, the main purpose of digital libraries remains consistent with that of traditional libraries in that the purpose of digital libraries is to organize, distribute, and preserve information resources just as it is for traditional libraries.

Lynch (1994) says that, "digital Libraries provide users with coherent success to a very large, organized repository of information and knowledge." According to Trivedi (2010), the purpose of a digital library includes:

- To expedite the systematic development of procedures to collect, store, and organize information in digital form.
- To promote efficient delivery of information economically to all users.
- To encourage co-operative efforts in research resource, computing, and communication networks.
- To strengthen communication and collaboration between and among educational institutions.
- To take leadership role in the generation and dissemination of knowledge

Digital libraries promise new societal benefits. One is elimination of the time and space constraints of traditional "bricks-and-mortar libraries". Unlike libraries that occupy buildings accessible only to those who walk through their doors, digital libraries reside on inter-networked data storage and computing systems that can be accessed by people located anywhere in the world. When the full potential of a digital library is realized for a particular community, people shall be able to access all human knowledge hosted in that digital database from any location. Digital libraries that are accessible over the Internet provide opportunities to advance knowledge and to dramatically improve the quality of life.

On the other hand, open access to knowledge is a key contributor in providing universal access to information and knowledge. The issue of open access is recently gathering global encouragement and support. The National Knowledge Commission of India commissioned in 2005 is demonstrating encouragement for open access. The commission's success in India today is driven by her belief that "Open access material stimulates research and helps students, teachers and researchers across the world".

Zuccala, et al. (2008), say that the term open access has been given a variety of definitions while its meaning is still evolving. However, following the Budapest Open Access Initiative meeting, a definition was produced as quoted in Bailey (2006):

First, open access works are freely available. Second, they are 'online', which would typically mean that they are digital documents available on the Internet. Third, they are scholarly works... Fourth, the authors of these works are not paid for their efforts. Fifth, as most but not all authors of peer-reviewed journal articles are not paid and such works are scholarly, these articles are identified as the primary type of open access material. Sixth, there are an extraordinary number of permitted uses for open access materials; users can copy and distribute open access works without constraint. Seventh, there are two key open access strategies: self-archiving and open access journals. (Bailey 2006:15)

According to Pinfield (2005), open access to knowledge is free, immediate, and unrestricted availability of content. Prosser (2003) defines open access as "free and unrestricted access on the Internet to literature that scholars provide without expectation of direct payment". He stated that the reasons for open access are to accelerate research, enrich education, and share learning across rich and poor nations. To further elaborate the acknowledgement of open access in the global society, Bhaf (2010) records that, presently, there are about 1,451 of open access repositories registered in Open DOAR (<http://www.opendoar.org/>), a directory of open access repositories.

Suber (2004) reminds that open access is free of most copyright and licensing restrictions. He reveals that the highest restriction observed in a fully open access portal is the demand of user name and password in accessing materials, which is like feedback information on statistics of usage and in the other hand serve as a check to miss-use of license rights. Consequently, this

paper defines open access as a host of digital literatures online, which is free of charge for every one with an Internet connection.

The Role of a Digital Librarian in Open Access to Knowledge

One may ask: who is a digital librarian? Gibbons (2004) reason that since the range of digital content can be vast, which includes text, audio, video, images, learning objects and datasets, born of digital or of a physical medium that has been digitized, such as scanned images, digital librarians could be defined as bridges between digital resources and users. This implies that he or she must be skilled in the use of information communication technology (ICT).

Igun (2010) cited Zhou (2005) who declares that the ICT/digital librarian must be able to:

- select, acquire, preserve, organize and manage ICT/digital collection;
- design the technical architecture of ICT/digital library;
- plan, implement, and support ICT/digital services such as information navigation, consultation and transmit services;
- establish friendly user interface over network;
- set up relative standards and policies for the ICT/digital library;
- design, maintain and transmit added-value information products;
- protect digital intellectual property in network environment; and
- ensure information security.

Nevertheless, the duties of digital librarians can also be viewed from different perspective. This may mean the same as roles expected of them in achieving open access to knowledge. For instance, Sreenivasulu, (2000) says that the digital librarian is a guardian of the information superhighway and acts as "a symbiotic human-machine guru". Breaks (2005) report that digital librarians will among other things believe in themselves, learn from each other to develop, find out what they can offer and never take their existence for granted. But Suber (2004) and Bailey (2007) agree that the role of a digital librarian in open access to knowledge is more than having ICT skills. Their works suggest that the role of a digital librarian in open access to knowledge can be accomplished through two complementary strategies. One is "self archiving" and the other is "open access journal".

"Self-archiving" refers to making "e-prints" available on the Web. An e-print is either a digital preprint or a post-print. The typical preprint is an article that has been (or is intended to be) submitted to a scholarly journal for peer review and editorial acceptance and editing. However, the term is also commonly used to refer to articles submitted to serials that do not conduct peer review and to articles that will never be submitted to any serial. A post-print is the final version of an article, which reflects changes made during the peer review and editorial process. It can either be the publishers' digital version or a preprint that the author has modified to mirror the publisher's changes. ..." (Sherpa Project, n.d).

So the digital librarian is inevitably expected to collect print materials at his reach and upload them to the Web. E-prints are typically made available in one of the primary four ways: (1) the author's personal Website; (2) a disciplinary archive that includes works by authors worldwide about one or more subjects; (3) an institutional e-print archive that includes e-prints by authors in a single academic unit, such as a department, or the entire institution; or (4) an institutional repository that includes diverse types of digital works (e.g., data sets, electronic theses and dissertations, presentations, and technical reports), including e-prints, by authors at a single institution. (Bailey, 2005).

The digital librarian shall manipulate one of the many open source software to establish open access to knowledge. Suber (2005) advocates that a copyright owner of the article, whether it is the author or the publisher, must permit open access to it, even though current copyright laws cannot be changed. Thus, the digital librarian should understand this policy and maneuver the barriers. Some of the policies that allows open access and is of advantage to digital librarian includes: the creative commons law, open access right, fair dealing, public domain, etc. (Covey, 2005).

On the other hand;

"Open access journals are e-journals that are freely available (some open access journals have supplementary fee-based print versions as well). They mirror the quality assurance practices of conventional journals, such as editorial oversight, peer review, and copy editing. ..." (Bailey, 2007)

That means that the digital librarian should be conversant with e-journals that are freely available on the web, register his institution and provide link to faculty members and students. In the situation where library membership fees are requested, the digital librarian notifies the management for fund, if approved, subscribes for access.

The State of Open Access to Knowledge in Nigeria

One major challenge to open access to scholarly publication in Nigeria is the fact that Intellectual property rights are required to facilitate the creation of content as well as access to digital information in our libraries. PITAC (2001) describes this observation as "the digital dilemma". This challenge includes such issues as, access to information subject to copyright. Digital librarians are expected to work with copyright experts, attorneys, legislators at all levels and other stakeholders in the information industry to address the issues involved here. Managing intellectual property rights therefore appears to be the most complex of the challenges facing digital librarians in the country today. This is so because of the huge legal and financial costs that may be involved. The legal liability of providing access to licensed digital materials can be far greater than that of similar information in printed format. What it therefore means is that digital librarians may require that users of information in their repository pay some fee for access to information they would have acquired free of charge.

Another related challenge to the above is that of privacy and security. This relates to the ability of digital librarians to deal effectively with and protect digital content in their library collections from unauthorized access, uncontrolled use, storage, copying and printing.

Furthermore, notwithstanding the growth in Internet usage in Nigeria, the speed and reliability of the Internet connections still poses a great deal of challenge to most of the institutions that have digital libraries in them. Low Internet bandwidth availability in the sub-Saharan African region poses an obstacle to easy access to free online journals. Papin (2006) notes that institutional repositories require reliable and fast Internet connection, since the common mode of access to digital content in libraries are in the form of PDF files. Christian (2008) relates the high cost of Internet bandwidth in developing countries like Nigeria to the difficulties academic institutions in the region face in affording adequate bandwidth to host digital content. He observes that bandwidth allocation in Africa is so expensive that most universities in Nigeria, on their own, cannot afford more than 1.5 Mbps, which is less than what many home broadband users in regions like North America have at their disposal. African universities pay more for same or even less Internet bandwidth than it will cost a consumer in Europe and America a month. The problem was well described by Jensen (2006) who was of the opinion that:

Bandwidth is the life-blood of the world's knowledge economy, but it is scarcest where it is most needed – in the developing nations of Africa which require low cost communications to accelerate their socio-economic development. Few libraries, universities and research centres on the continent have any Internet access. For those that can afford it, their costs are usually higher than for their counterparts in the developed world, and even Africa's most well-endowed centers of excellence have less bandwidth than a home broadband user in North America or Europe, and it must be shared amongst hundreds or even thousands of users.

Alhasan and Adepoju, (2007) and O'Leary, *et al.* (2005) agree that a bandwidth is the amount of data that a computer network can transfer in a certain amount of time. It is the capacity of a particular Internet or intranet connection. It is measured in kilobits per second (Kbps) or megabits per second (Mbps). A kilobit is one thousand bits; a megabit is one million bits and a gigabit is more than one million bits.

Echezona and Ugwuanyi (2010) narrate that the poor nature of Internet speed infringe on the

usefulness of the connections and is a real barrier to using e-resources. Their work further reveals the survey of ATICS in 2006, which compared the bandwidth kbps (kilobits per second) of African academic institutions and accounts that the University of Jos and Bayero University are the only academic institutions in Nigeria listed among the first ten countries in Africa. The former has a total of 6,000 kbps uplink and downlink, while the later has only a capacity of 4,500 kbps.

In 2003, the International Network for the Availability of Scientific Publications (INASP) observed that an average African university has an Internet connection of between 512 Kbps and 1Mbps as at May 2003, while the British University (Bristol) by contrast has a 2.5 Gbps link , with 16,000 computers shared by 22,000 users representing an average of 1.3 person per computer (Vente, 2003).

Another major situation of open access to knowledge in Nigeria is on the issue of infrastructure. The problem of electricity power supply is a major infrastructural problem associated with open access to scholarly journals in Nigerian academic institutions. An institutional repository of research, information and knowledge should be openly accessible 24 hours a day.

Fatunde (2008) has observed that poor electricity supply is a major impediment to the operation and growth of information and communication technology in Nigerian universities. According to him:

*"Only a trickle of daily electricity production dribbles erratically into the country's 93 institutions, rendering ICT systems dysfunctional. Universities resort to diesel-propelled generators, but they are expensive and environmentally unfriendly".
Fatunde (2008).*

The implication here is that there should be a sustained and regular electricity supply to power ICT facilities. Irregular and un-sustained electricity supply is a major problem in developing countries like Nigeria.

Open Access at MOUAW: E-Journals and Databases for Academic Research

Michael Okpara University of Agriculture Umudike (MOUAW) came into existence following decree no 48 of 1992 that established the university along with the University of Agriculture Abeokuta and University of Agriculture, Makurdi, running its operations as a single division in a shared apartment with the then library of the College of Agriculture, Umudike, which was later relocated to Ishiagu, Ebonyi State in 1995.

The MOUAW Library is today seen in a three department operation with seven units running under them, inheriting the initially shared building and expecting to relocate to its permanent site upon its completion. The library reading halls has a total seating capacity of over 188 readers. Mrs. Ibegwam Ahiaoma is the present University Librarian, supported with a total staff figure of forty eight (48), comprising of eight librarians, seven library officers, eleven library assistants, ten library attendants, one bindery officer, seven clerical officers, two porters and one casual hand. (Source: internal survey).

On print collection of MOUAW library, records of the acquisition department reveals that the library has over 23,000 volumes of materials covering all aspects of agricultural sciences and allied fields; 5000 volumes of reference materials, including dictionaries, encyclopedia, directories and research reports of students.

Electronically, the MOUAW library has an ICT unit and a digital library. The digital library is not located in the library building because of no facilities to support it. So the MOUAW digital library is located at, and supported by the University ICT/AfriHub partnered centre. This digital library, housed in the AfriHub building, has forty four (44) computers linked to a cable modem connected to the Internet. AfriHub is a private Company that is in partnership with NUC/Federal Universities in Nigeria. The library also employs the wireless access of the MOUAW ICT centre to make available to both staff and students the digital content of the library via Wi-Fi Hotspot Antennae which are mounted at various locations on campus. The state of the Internet access however is bad. The bandwidth speed at AfriHub, which provides Internet access to the company's business classes and to the digital library, is very low. That of the ICT department of the university is also nothing to

write home about. Thus, Internet access most times, especially when too many users are online, can be very frustrating, especially when student spend time or fail to download the e-journals contents.

The university subscribed for her library e-journals and databases that publish articles freely and allow MOUUAU students, lectures and other categories of researchers to access, read, download and print any part of the publication published in the e-journals. Access to the e-journals is through the Internet. These e-journals and databases, together with their scope, are presented as follows:

- AGORA
- OARE
- HINARI
- TEEAL

AGORA: The full meaning of this database is Access to Global Online Research in Agriculture. It is a program set up by the Food and Agriculture Organization of the UN (FAO) together with major publishers, enables developing countries to gain access to an outstanding digital library collection in the fields of food, agriculture, environmental science and related social sciences. AGORA provides a collection of 1900 journals to institutions in 107 countries. AGORA is designed to enhance the scholarship of the many thousands of students, faculty and researchers in agriculture and life sciences in the developing world. This database can be found at: www.aglInternetwork.org

OARE: The full meaning of this database is Online Access to Research in Environment. It is a global consortium of over 340 scholarly scientific publishers and societies offering one of the world's largest collections of environment research literature online. It provides access to about 1.5 billion scientific papers, representing about 75% of the world's most influential peer-reviewed publications. It is coordinated by UNEP (United Nations Environment Programme) and Yale University in association with international association of scientific technical and medical publishers, among other sponsors. This database is available at: www.oaresciences.org

HINARI: The full meaning of this is Health Inter Network Access to Research Initiative. This Programme is set up by WHO (World Health Organization) together with major publishers, enables developing countries to gain access to one of the world's largest collections of biomedical and health literature, containing about 7,000 journal titles. This database is accessible at: www.who.int/hinari

TEEAL: This is "The Essential Electronic Agricultural Library". This is a collection of 130 major agricultural journals, contained in 426 CD-ROMs. TEEAL is independent of Internet availability or network. The reason for this is that all information is available on CD (2005 version). The library has also acquired the LAN 2.0 version of TEEAL containing 141 titles. The ICT office of the library, located in library building, has this equipment and two computers that enable researchers to read and copy the content of the CDs. The website page for this database is: www.teeal.org

Therefore, at MOUUAU, students and faculty members have online access to more than twelve thousand (12,000) scholarly journal titles covering agricultural related subject areas. How does it operate? The ICT department of the university made it compulsory for all students (both undergraduates and post graduates) to pay a sum of five thousand naira in exchange for a sixty hours time code valid for a single academic session. With the time code, students can go to the ICT computer laboratory, the AfriHub café' or to the digital library, type in their code (username and password) and access Internet. That is to say that all computers are set on "time-pro". Passwords to access the e-journals are freely given to "bonafide" students and faculty members by the digital librarians. Staff members on the other hand obtain a wireless access code for same amount, deductible from their salary, upon request. Thus, both staff and students who are duly registered and have their pre-paid Internet access account from the University ICT Directorate have access to these e-journals.

Staff of the Digital library have submitted a proposal to the University on digital repository project starting with the students' final projects and thesis and dissertations, and later to publications and other information materials. Proposals and application for external funding from donor agencies have been submitted for consideration and approval to ensure the realization of the digitization project. Recently, through contacts made by staff (librarians) in the digital library with the University

of Iowa, arrangements for collaboration to digitize local content emanating from MOUUAU as well as training of staff to manage the project is yet to be feasible.

Digital Librarians Challenges at MOUUAU

The librarians' challenges in open access to knowledge in MOUUAU are discussed in the following;

1. Professional Skills: The MOUUAU library at present has only two digital librarians. They have the abilities prescribed in Zhou's (2005) work. Two other librarians are pursuing ICT certification courses in the AfriHub centre in the university at their own expense. The professional skill needed to achieve open access is as vital as open access itself. Reitz (n.d.) states that ICT is an indispensable tool in achieving open access. A community that has no ICT or the one that has but cannot operate it would definitely not achieve open access. So, in MOUUAU, the level of ICT proficiency is low, staff development efforts in this direction is lacking and has affected the advocacy of digitalization and open access to knowledge.

2. The Library's Cold Attention in the Past: Advocacy has been a major tool in the development of open access initiatives. The low level of advocacy for open access here has been attributed mainly to lack of knowledge of what the philosophy of open access is all about. The library has suffered from what may look like ignorance of open access. The library management never showed or convinced the university management on the need to digitalize the library and seek open access to knowledge materials. However, the present management is working towards digitalization by advocating the digital projects the library needs to execute, encouraging all staff to obtain a computer and become conversant with it.

3. Poor Knowledge of Open Access by the university community: Lack of Knowledge of the existence of open access journals in the various fields or discipline is another major challenge to the development of this valuable resource. Most academic staff and members of some disciplines are not aware of the existence of a greater number of free online journals available to them in their various fields or disciplines. At Umudike, NUC reported that the institution has a very low level of access and usage of the free online journals available to the institution. Several efforts aimed at organizing campaigns to enlighten the university community on the existence of opportunities in the area of open access have not yielded any positive results. This is not peculiar only to the University of Agriculture Umudike. This is the situation in most developing country institutions. A research earlier carried out by Papin-Ramcharan and Dawe (2006) at the University of West Indies in Trinidad and Tobago shows that just 8% (6/79) of the academic staff members of the Institution's faculty of engineering are aware of digital repositories. Another study at the University of Lagos, Chan, *et. al.* (2005) points to this very fact.

4. Low Commitment at the Decision Making Level of the University Community: The university community management has not understood the need for the library to be digitalized let alone encouraging the library to establish open access to knowledge. Thanks to the Vice Chancellor, Professor Ikenna Oyido, who engineered the subscription of the university library to the present online journals the library can boast of today.

5. Internet Access in the University Library: The MOUUAU library as a building has no Internet connection at the present. This is a big challenge for the library. As stated earlier, the unit where the librarians are managing the digital resources (e-journals and other databases directory discovered daily by the digital librarians) is the ICT/ AfriHub partnered facility. Besides, the bandwidth and Internet effectiveness of this "borrowed" apartment is not yet achieved, and therefore constitute a challenge to open access in MOUUAU.

6. Space: This is another major problem for the library. The library is occupying a temporary building since the inception of the university. This building, located east of the university community, is not ideal to house ICT facilities neither has it been a good environment for reading and research. However, this problem is being addressed by the present administration. It is hoped that the permanent site of the University library will be ready soon.

Conclusion and Recommendations

Open access to knowledge is an innovative mode of scholarly communication within the digital environment. It is aimed at achieving universal access to information and knowledge. While open access helps digital inclusion of citizens in developing countries by bringing within easy reach full-text contents of scholarly works, documentary heritage collections and development-related literature, the digital library remains a knowledge repository of such citizens, indigenous people, communities and institutions.

But regrettably, academic and research institutions in Nigeria, including the librarians, are yet to take advantage of the benefits emanating from open access initiative, giving reasons ranging from: low uptake and lack of knowledge or awareness of open access, poor and inadequate funding, poor state of ICT facilities on campus, lack of advocacy, Inadequate manpower and skilled personnel, space problems among others.

It is the recommendation of this paper that librarians should be courageous to seek ICT skills and ceaselessly inform the university management on the need to introduce and work with information communication technologies. Echezona and Ugwuanyi's (2010) view that bandwidth management should be incorporated into the institutional objectives of African universities should be adopted. This paper also forwards the recommendations of JISC (Joint Information Systems Committee) for universities. This committee says that for a university, as an academic institution, to realize the advantages of open access, such a university should note that:

- a university-wide policy on open access will ensure a high level of participation from a university's researchers
- if no institutional repository already exists, the small investment in setting one up and maintaining it will yield benefits in managing a university's research outputs and making them widely available
- setting up a dedicated fund to manage income and expenditure flows for open access publication charges will assist researchers in publishing in open access journals
- internal publicity about Open Access policies and procedures will provide researchers with clear guidance on the opportunities available to them.

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