AWARENESS AND USE OF OPEN ACCESS INSTITUTIONAL REPOSITORIES BY ACADEMICS IN FEDERAL UNIVERSITIES IN NORTH CENTRAL STATES OF NIGERIA

BY

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DECLARATION

I, Hakeemat, Salahudeen Bello hereby declare that this dissertation was written by me and that it is a record of my own research work. I confirm that this dissertation is my original work and has not been presented in any other university/institution for certification. The dissertation has been complemented by referenced works duly acknowledged.

_____ _____

Hakeemat Salahudeen Bello, Date

CERTIFICATION

This dissertation titled “Awareness and Use of Open Access Institutional Repositories by Academics in Federal Universities in North Central States of Nigeria” by Hakeemat, Salahudeen Bello meets the regulation governing the award of the Master of Library and Information Science (MLIS) of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to my caring parents Dr. Suleiman Salahudeen and Hajiya Kudirat Salahudeen for their support. I also dedicate this work to my darling husband Mal. Suleiman Samaila and our children; Saratu Suleiman, Suleiman (Abba) Suleiman and Hafiz Suleiman for their great support, encouragement and putting up with my absence in the course of my studies.

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ABSTRACT

This research was carried out to investigate the Awareness and Use of Open Access Institutional Repositories by Academics in Federal Universities in North Central States of Nigeria. The research questions raised among others include; what is the level of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria? What are the sources of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria? To what extent do academics use Open Access IR in Federal Universities in North Central States of Nigeria? What challenges do the academics faced with in accessing Open Access IR in Federal Universities in North Central States of Nigeria? The hypotheses formulated and tested for this study are: There is no significant difference in the extent of satisfaction with the contents of Open Access IR among academics in Federal Universities in the North Central States of Nigeria. There is no significant difference in the frequency of use of Open Access IR among academics in the Federal Universities in North Central States of Nigeria. Survey research design was adopted for the study while structured and unstructured questionnaire was the instrument used for data collection. The population comprised academics in Federal universities in North central States of Nigeria. The findings from the study revealed that majority of the respondents indicated that they are aware of the existence of Open Access Institutional Repositories. The study also discovered that majority of academics in Federal Universities in North Central States of Nigeria indicated that the source of awareness of Open Access Institutional Repositories was through academics/colleagues etc. Concluding that awareness with the existence of Open Access Institutional Repositories by academics in the Federal Universities in North Central States of Nigeria is on the increase. They indicated that the Open Access Institutional Repositories is very important to the University community. This is because they accessed and disseminate scholarly works. It was recommended amongst others that 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 so as to contribute to the existing body of knowledge not mere consumers.

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LIST OF ABBREVIATIONS

BOAI	Budapest Open Access Initiative
DRM	Digital Right Management
DOAJs	Directory of Open Access Journals
ETDs	Electronic Theses & Dissertations
I CT	Information and Communication Technology
IDR	Institutional Digital Repository
IRs	Institutional Repositories
IT	Information Technology
NUC	National University Commission
OA	Open Access
OA-IRs	Open Access Institutional Repositories
OAJs	Open Access Journals
SPARC	Scholarly Publishing and Resources Coalition

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Advances in information and communication technology have brought extraordinary changes in many areas of our personal and workplace endeavors, some of which have challenged and even transformed established ways of thinking and communicating. The scholarly community has been far from immune to these changes, and in many respects has been at the forefront of accepting new technologies and their sometimes unpredictable consequences. The emergence of the Internet as the ubiquitous point of access to scholarly publishing has, in particular, hastened the inevitable rise of digital publishing that has simultaneously both entrenched and challenged the hegemony of commercial publishers in the scholarly publishing sphere. The Berlin Declaration (2003) defined Open Access (OA) as a new mode of scholarly communication through which the authors and right holders of scholarly work grants to all users a free, irrevocable, worldwide right of access to, and a permission to copy, use, distribute, transmit, and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship. According to this definition, a complete version of the work and all supplemental materials, including a copy of the permission to use should be deposited in at least one online repository using suitable technical standards to enable open access, unrestricted distribution, and long-term archiving of such works. The new form of scholarly communication is achieved through two main channels: Open Access Journals (OAJs) for electronic referred journals and Self-archiving Institutional Repository (Chan & Costa, 2005; Barley, 2006).

Open Access has since become the subject of common discussion among researchers, academics, librarians, university administrators, funding agencies, government officials, commercial publishers, and learned-society publishers. Prior to the advent of the Internet, publishers (especially commercial) and academic societies dominated scholarly communication and most researchers have to channel the publication of their research output mainly through authoritative publishers and academic societies. However, with the advent of ICTs, different models of information access and dissemination are being developed to provide access, manage costs, and manage an organization's scholarly output, especially in academic institutions such as colleges, polytechnics and universities. The current evolving information access model is referred to as Open Access.

Institutional Repositories have been the forerunner of the Open Access movement. Lynch (2003) points out that the "development of Institutional Repositories emerged as a new strategy that allows universities to apply serious, systematic leverage to accelerate changes taking place in scholarship and scholarly communication." A frequently cited definition of Institutional Digital Repository (IDR) is that offered by Lynch (2003) a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. Essentially, an Institutional Repository is about organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. The synergic relationship between publication of research output and universities influences the definition of Institutional Repositories. However, Institutional Repositories need not be confined to universities.

The aim of IR is to increase visibility, preservation and storage of all types of institutional output, including unpublished literature, support for learning and teaching, standardization of institutional records, ability to keep track of and analyze research performance, breaking down of publishers' cost and permission barriers, help universities to share their knowledge and expertise (Christian, 2008) . Essentially, IR collects and provides free access to the research output of a given institution. The main function of IR is to provide improved access to the full text of research articles and improve retrieval of relevant research (Christian, 2008). In Nigeria, the idea of Institutional Repositories (IRs) is a current theme in tertiary institutions that have seen it as a necessity for making available their institutional resources, thereby increasing their visibility and better performance in the ongoing web ranking of world universities in particular. In the last three years, Nigerian Universities have, more or less, competed among themselves to have higher ranking in the web metrics ranking of world universities. This has been a healthy competition because more and more of the institutions have been devising creative means of increasing their digital contents in the public domain, resulting in more Nigerian content on the Internet, and, particularly, more openness and share-ability of institutional resources (Akintunde & Anjo, 2012).

University libraries have an increasingly important role to play in supporting Open Access publishing and dissemination of research outputs. In particular, many libraries are playing a leading role in establishing and managing institutional repositories (IRs). Christian (2008) noted that for centuries, institutional libraries and scholarly publishing were the conventional model adopted in disseminating and preserving knowledge in academic and research institutions.

In the 21st Century, universities libraries in Nigeria have embarked on integration of technology in their operations. This serves as a mechanism for improvement and development, especially, in a situation where attention is drawn to the academic contents and ways of digitizing and preserving them for future use. Libraries have long played an essential role in containing, preserving, and sharing of information. Many information technologies have been created over the years; to cater for the entire library operations, particularly information storage and retrieval. University libraries are fully involved in this development as they are the heart of the University, being that they house the intellectual resources of the institutions. The effort to digitize the intellectual property of the institution is what is known as digitization (Eke, 2011).

Awareness is a pre-requisite to subsequent usage of open access publications unless an individual uses it unknowingly. According to Dinev (2005), "awareness raises consciousness and knowledge about a certain technology and its personal and social benefits". This view was supported by their study which established awareness as the central determinant of user attitude and behaviour towards technology. In the open access environment, awareness has also been acknowledged as an important factor determining usage of this mode of scholarly communication (Warlick, & Voughan, 2006; Fullard, 2007).

1.2 Statement of the Problem

Institutional Repository is a platform for knowledge sharing and development. Shearer (2003) stated that deposition of critical mass content could lead to significant usage of Institutional Repository. She further argue that the success of IR should be determine by it use, and one measures for the usefulness of Institutional Repositories was contribution of content by the researchers in the university community. It is now obvious to the academic and scholarly

community that the traditional model of scholarly communication via subscription-based journals serves to hinder rather than expand access to research output. In the light of emerging trends in digital scholarly communication, Institutional Repositories play an important role in the preservation and dissemination of institutional research outputs which in turn becomes a constituent part of a global research output (Ng'etich, 2004).

Nigeria has over 152 accredited Universities, Federal, State and Private NUC (2017). Nigeria has more universities than any country in Sub-Saharan Africa. These universities function as focal point for academic research in Nigeria. Egwunyenga (2008) has attributed this to the fact that research is made compulsory for both lecturers and students either by job description or by prescribed academic program of study. Academic institutions have been grappling with how to communicate to scholars the digital intellectual output they produce including journal articles, conference papers, reports, theses & dissertation, teaching materials, artwork, research notes, and research data. Thus after so much painstaking commitment of efforts and resources in undertaking researches, the outcome are not widely disseminated. The consequence of this is that these research findings die at the institutional level as those who need to apply the knowledge are unable to access them, there will be low citation because other people cannot build on their work and it prevent sharing of knowledge, idea and experiences. (Johnson, Helen, Omolara & Emilian 2017).

Open Access initiative has come to stay with its abundant benefits and opportunities to many stakeholders in the university community. Yet, lecturers that are supposed to be great users of the initiative medium and products are still unaware of the many benefits and opportunities that the medium and products are capable of offering them. Little is known about the extent to which Nigerian lecturers use the medium and its products to enhance their academic status and

visibility as well as web metric counts of their universities. Previous studies have persistently reported low submission of scholarly works by academic staff members who are the major authors of scholarly works (Ware, 2004); (Nicholas, Rowlands, Watkinson, Brown, & Jamali, 2012). Preliminary investigation reveals that academics in North Central part of Nigeria are reluctant in submitting their research publication in repository. It is against this backdrop that this study intends to examine level of awareness and extent of use of Open Access repository by academics in Federal Universities in North Central part of Nigeria from submitting their research publication in Open Access repository.

1.3 Research Questions

The study sought to answer the following research questions:

1. What is the level of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria?
2. What are the sources of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria?
3. To what extent do academics use Open Access IR in Federal Universities in North Central States of Nigeria?
4. To what extent do academics satisfy with the contents of Open Access IR in Federal Universities in North Central States of Nigeria?
5. What challenges do the academics faced with in accessing Open Access IR in Federal Universities in North Central States of Nigeria?

1.4 Objectives of the Study

The following objectives were used:

1. To find out the level of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria.
2. To identify the sources of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria.
3. To determine the extent at which academics use Open Access IR in Federal Universities in North Central States of Nigeria.
4. To determine the extent of satisfaction with the contents of Open Access IR by academics in Federal Universities in North Central State of Nigeria.
5. To find out the challenges the academics face in accessing Open Access IR in Federal Universities in North Central States of Nigeria.

1.5 Hypotheses

The following hypotheses were tested:

$H_{01:}$ There is no significant difference in the extent of satisfaction with the contents of Open Access IR by academics in Federal Universities in the North Central States of Nigeria.

$H_{02:}$ There is no significant difference in the frequency of use of Open Access IR by academics in the Federal Universities in North Central States of Nigeria.

1.6 Significance of the Study

The academics would benefit from the findings, because they would be able to understand that through Open Access Institutional Repository their digital research outputs can be manage and archived for future use which would provide open access to it, promote scholarly communication and enhance professional visibility of their research work, citation counts and

extending the range of knowledge. It gives the academics more exposure that by having their research and publications openly available on the Web, not just in fee-based databases, scholarly journals, or books, their work is likely to be used and cited more. As a result, their reputation would be enhanced over the long term, due to the recognition they gain from this. Academics contribute to the adoption of Open Access IR by depositing and making use of research works deposited in Open Access IR by their colleagues. Having identified the challenges they face when adopting Open Access IR, they would address impediments of gaining access to IR.

The findings of this study would make them re-focus on strategies and policies based on the issues raised by the main users of IR. It would assist university libraries to elevate the problem of increasing journal subscription costs and permission crisis and by so doing provide what their readers need. This would in turn enable librarians to implement IR as one of their methods to disseminate and preserve digital information resources. The findings would also act as a guide for library management on areas to concentrate on when developing training programmes for academics as it would reveal areas in which they require additional training.

Universities worldwide are ranked based on their web presence. The findings would help universities in Nigeria in devising strategies in line with academics needs. Increased academics provision of research works would be useful in organization of the university's academic databases so that they would be comparable to other world universities through Open Access IRs. It opens up the outputs of the university to the world and maximizes the visibility and impact of these outputs. Repositories are significant for universities in helping to manage and capture intellectual assets as a part of their information strategy. It significant to universities because they form the infrastructure for a new scholarly publishing paradigm that wrests control

away from publishers and puts it back in the hands of the academy, increase visibility, prestige, and public value of contributors. It promotes sharing of knowledge throughout the country.

Finally, the outcome of the study also contributed to the existing body of literature in the area of librarianship in Nigerian and world in general**.**

1.7 Scope of the Study

This study covered all the academics in Federal Universities in the North Central States of Nigeria that are having their Open Access Institutional Repositories. These universities were: University of Ilorin, University of Jos, Federal University of Technology Minna and Federal University Lokoja. University of Agriculture Makurdi, and University of Abuja had been removed from the study because they did not have Open Access IR as at the time of conducting the research. Therefore, the researcher worked with only four Federal Universities in North Central States of Nigeria.

Federal Universities were chosen for this study because they were the largest government funded tertiary educational institutions in Nigeria so scholarly publications are more likely to be available at these universities. They account for a significant proportion of the scholarly researches conducted in Nigeria and close to 50% of the staff in Nigerian universities are teaching and conducting research in the Federal Universities (Christian, 2008). Also, North Central States Federal Universities in Nigeria were chosen for this study because they were lagging behind in the global information revolution such as Open Access and Institutional Repositories.

The study focused on academics. This is because academics were considered to be in a better position to conduct lifelong research.

1.8 Operational Definition of Terms

The following terms were defined as used in this study:

Academics: This refers to the teaching staff of Federal Universities in North Central States of Nigeria.

Awareness: The state of having knowledge and willingness of academics to deposit their research publications in Open Access IR.

Institutional Repository (IR): An online hub established for purposes of collecting, preserving, and disseminating the digital intellectual research output of Federal Universities in North Central States of Nigeria.

Open Access (OA): Unrestricted online access to research articles published in scholarly journals or Institutional Repositories.

Scholarly Content (SC): This refers to any work product created by the institution's students, faculty, non-faculty researchers and staff.

Use: The process of accessing the digital intellectual research output available in the OA IR.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of literature related to the study. It is arranged under the following sub-headings:

2.2 Concept and Significance of Open Access Initiative

2.3 Concept and Significance of Institutional Repository

2.4 Level of Awareness of Open Access IR by Academics

2.5 Sources of Awareness of Open Access IR

2.6 Use of Open Access and Dissemination of Research Outputs

2.7 Extent of Use of the Contents of Open Access IR

2.8 Extent of satisfaction with the contents of Open Access IR by Academics

2.9 Challenges the Academics Faced in Accessing of Open Access IR

2.10 Summary of the Review

2.2 Concept and Significance of Open Access Initiative

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. Furthermore, developments in information and communication technology especially the World Wide Web have made possible an unprecedented collaboration in the production, dissemination and

exchange of information by people world over irrespective of their geographical location. Open Access emerged in response to increasing legal and economic barriers by commercial scholarly publishers which made access to research output and information difficult especially to people in developing countries of the world. Thus the movement seeks to promote free and Open Access to research output devoid of any permission barriers and unnecessary legal restraints. Open Access therefore seeks to use the internet - a product of the 'networked information economy' to provide free access to research and scholarly output to people irrespective of their physical or geographical location, or their social and economic means.

Suber (2002) was of the view that open access to scientific articles means online access without charge to readers or libraries. This will imply dispensing with the financial, technical and legal barriers that are designed to limit access to scientific research articles to paying customers. One of the most frequently cited definitions of open access has been that proffered by the Budapest Open Access Initiative (BOAI, 2002) which defined the concept of Open Access in relation to journal literature as: "free availability on the public internet, permitting any user to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited."

The basic principle of Open Access is founded on the shared and equitable distribution of knowledge. Such knowledge is very essential for developing countries striving to improve the general welfare of their population. The relationship between knowledge and development

cannot be overemphasized. Hence even when a country has abundance of natural resources, it must transform the resources to things it needs. This transformation involves access to knowledge and information. Ghosh & Das (2007) noted the contrast between developed and developing countries institutions in terms of generating access to knowledge as well as the relevance of knowledge to development. They observed that the developed world consists of information rich countries, enterprises and organizations that exert powerful control over valuable information resources. On the other hand the developing world is at a critical juncture where the development of technologies, economies and humanity as a whole are largely dependent on access to relevant and adequate information resources. The academic and research institutions in the developing world cannot afford to subscribe to a wide array of primary literature due to lack of resources or limited budgetary provisions. In this situation, Ghosh & Das (2007) believe the Open Access gains worldwide support as an alternative and sustainable model of scholarly communication.

OA could be provided by either self-archiving on an IR for the institution or publishing in an open access journals. Self-archiving is where authors deposit their works on the institutional repository which may be a subject-based repository, or a combination of them. The same item may well appear in a traditional journal (which may be print, parallel published or electronic only). Self-archiving is also called “Green” Open Access (Budapest Open Access Initiative, 2002; Harnad, 2005). Open Access Journals on the other hand provide access to full-text contents of scholarly, peer reviewed journals which could be available either in electronic version or in both electronic and print versions. The latter is also known as “Gold” Open Access (Budapest Open Access Initiative, 2002; Harnad, 2005). Green OA is provided by authors publishing in any journal and then self-archiving their post prints in their institutional repository

or on some other OA websites. Green OA journal publishers endorse immediate OA self-archiving by their authors. Gold OA is provided by authors publishing in an Open Access Journal that provides immediate OA to all of its articles on the publisher's website.

2.3 Concept and Significance of Institutional Repository

The term “institutional repository” may have dissimilar meaning to different people (Allard et al. 2005). As the concept is rather new, there are diverse opinions on its meaning (Bailey 2005). Generally an institutional repository is an electronic system that captures, disseminates and preserves intellectual results of a group of universities or a single university. Lynch (2003) has defined a university institutional repository as a collection of services that a university proffers to its own members intended for the management, organization and diffusion of digital works produced by these members. Crow (2002) & Ware (2004) characterized an institutional repository as open, interoperable, cumulative, perpetual, contributes to the process of scholarly communication in collecting, storing and disseminating the scholarly content. The Scholarly Publishing and Academic Resources Coalition (SPARC) position paper declared that "Institutional repositories are digital collections capturing and preserving the intellectual output of a single or multiuniversity community, providing a critical component in reforming the system of scholarly communication a component that expands access to research, reasserts control over scholarship by the academy, increases competition and reduces the monopoly power of journals, and brings economic relief and heightened relevance to the institutions and libraries that support them" (Crow 2002).

Institutional Repository is an online archive of an institution's scholarly papers, deposited by their authors. Institutional Repositories may include a variety of research output of an organization such as datasets, administrative documents, course notes, learning objects, or

conference proceedings. Deposit of material in an Institutional Repository is sometimes mandated by that institution. An Institutional Repository is a means to ensure that the published work of scholars is available to the academic community even after increases in subscription fees or budget cuts within libraries (Bhardwaj, 2014 & Boufarss 2011). The majority of research scholars do not provide free access to their research output to their colleagues in an organization (Ahmed & Al-Baridi 2012). IRs provides scholars with a common platform so that everyone in the institution can contribute scholarly material to promote cross-campus interdisciplinary research. An Institutional Repository is an online archive for collecting, preserving, and disseminating digital copies of the intellectual output of an institution, particularly a research institution.

According to Barton & Waters (2004) "Institutional Repositories is a database with a set of services to capture, store, index, preserve and redistribute a university's scholarly research in digital formats". For a university, this includes materials such as monographs, eprints of academic journal articles both before (preprints) and after (post prints) undergoing peer review as well as electronic theses and dissertations (ETDs).

As Raym Crow states, Institutional Repositories are, “digital collections capturing and preserving the intellectual output of a single or multi-university community” (Crow, 2002). Clifford Lynch’s definition of an Institutional Repository is that it “is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. Services as well as content form the basis of a repository” (Lynch 2003). IRs therefore are institutionally defined; the content may be purely scholarly but may comprise administrative, teaching and research

materials (both published and unpublished); cumulative and perpetual; open and interoperable and contributes to the process of scholarly communication (Johnson, 2002; Ware, 2004).

It is now obvious to the academic and scholarly community that the traditional model of scholarly communication via subscription-based journals serves to hinder rather than expand access to research output. In the light of emerging trends in digital scholarly communication, open access Institutional Repositories play an important role in the preservation and dissemination of institutional research outputs which in turn becomes a constituent part of a global research output. Although publication by faculty members in scholarly journals could add impact to the prestige of the institutions they are associated with, an Institutional Repository stands to generate greater impact by centralizing research outputs generated by the institution's researchers, and thus serving as a much better and simpler metrics for gauging the quality of the institution's academic scholarship, productivity and prestige. In the case of research and academic institutions in developing countries, development of Institutional Repository will not only boost the global visibility and utility of their research, but will also introduce a novel research culture focused on meeting international standard and values. Knowledge by a researcher that his research will be openly accessible by a global audience will have an impact on his focus and standard. Anbu was of the view that the current closed access publishing model fails to portray the quality and quantity of research done in African universities and by African scholars. Bailey et al (2006) defines IR as a means of collecting and providing access to diverse locally produced digital materials. Thus, IR serves as an indicator to an institutional intellectual wealth. Donovan & Watson (2008) affirmed that it is a means of the intellectual digital outputs of an organization for the purpose of making them accessible to the global research community.

2.4 Level of Awareness of Open Access IR by Academics

Awareness is considered a central determinant of user attitude and behaviour towards technology (Dinev, Hu & Goo, 2005). Awareness raises consciousness and knowledge about certain technology and its personal and social benefits (Obuh & Bozimo, 2012). One might be right to say that awareness could be acknowledged an important factor or element in determining actual use of a technology, and particularly open access literature as regards the subject of this study. In describing the level of importance of awareness of open access content to its actual use, few years back, several studies, such as those of Swan and Brown (2004), Kim (2007), Christian (2008) & Gbaje (2010) indicated that researchers were alien to the concept of open access. This was because these studies found very low level of awareness of open access in higher educational institutions. Ajuwa (2003) & Ureighe, Oroke & Ekruyota (2006 as cited in Ivwighreghweta & Onoriode, 2012) found that the use of Open Access was low due to lack of awareness and poor attitude to Open Access among researchers.

Mohammed & Garba (2013) conducted a survey on awareness of Open Access scholarly publication among postgraduates in the Faculty of Science, Ahmadu Bello University and revealed that majority of the students were not aware of Open Access scholarly publications, even though, they used them for research. Ryanand Bernal (2015) discovered lack of awareness of Open Access publications among faculties in the arts and humanities at the University of Western Australia. Gbaje (2010) in a study on open access among Editors-in-Chief of journals published in Ahmadu Bello University indicated that 76% of the population signified that they were not aware of open access initiatives.

Years later, the level of awareness increased as a result of improvement in the use of ICTs. Open Access thus become the subject of much debate and concern among academics, librarians, university administrators, government officials, commercial publishers and learned

society publishers because they have become important sources for scientific research and development. Ehikhamenor (2003) & Eqbal & Khan (2007) indicated that lecturers were more aware of Open Access content than their actual use. Further, several other research have documented the use of Open Access among local and foreign faculty, even though, digital divides existed. For instance, in the Directory of Open Access Journal (DOAJ), Nigeria has only 38 Open Access journals indexed out of 10, 547 indexed journals as of May 2015 (UNESCO, 2016). Similarly, researchers from Nigeria published only 465 articles with BioMed Central, a Science, Technology and Medicine international Open Access Publisher and also only 119 articles have been published in Public Library of Science (PLoS) Open Access journals (UNESCO, 2016). Obuh & Bozimo (2012) showed that majority of library and information science (LIS) lecturers in universities in southern part of Nigeria indicated some levels of familiarities with open access publications, even though, their level of awareness hinged mainly on the nature and types of open access rather than on open access initiatives.

It has been observed that in order for adoption of Open Access outlets to be realized, scholars must be aware of their existence, their advantages, their accessibility, and the advantages that OA outlets have to offer over traditional ones. The adoption of Open Access outlets depends on awareness of Open Access scholarly communication by scholars. However scholars have been able to benefit from Open Access initiatives without knowing this mode of scholarly communication. Studies on adoption of Open Access indicate that the general awareness of Open Access among the research community is gradually growing. A recent longitudinal study of research on OA journals since 1990s revealed that the rate of authors who were not aware about OA was as high as around 50% in the 1990s, but dropped to below 15% by 2007 (Xia, 2010).

According to Dinev & Goo (2005), “awareness raises consciousness and knowledge about a certain technology and its personal and social benefits”. This view was supported by their study which established awareness as the central determinant of user attitude and behaviour towards technology. In the open access environment, awareness has also been acknowledged as an important factor determining usage of this mode of scholarly communication Warlick & Voughan (2006). Christian (2008) posited that there is empirical evidence that the knowledge of open access institutional digital repository is very low among the major stakeholders including lecturers, researchers, librarians and students in Nigeria.

Awareness is a pre-requisite to subsequent usage of IRs unless an individual uses it unknowingly. Much of the literature and previous research makes it clear that researchhers' decision to participate in contributing content to the IR can be affected in many ways. Similarly, to participate in any work or activities, awareness about the environment, how things are done and should be done is very crucial. Alemayehu (2010) observed that the level of awareness of researchers to the IR at the University of Oslo is very low. These studies have shown that there is generally a low level of awareness of IR. Researchers generally have a very confused understanding of the ‘IR’ concept, its purpose and the means to achieve it. However, researchers have not yet fully engaged with IR or self-archiving. A 2004 survey of authors’ attitudes towards IR showed that 82% knew ‘nothing at all’ or ‘a little’ about IR (Rowlands, Nicholas & Huntington, 2004). The study also indicated that scholars showed a positive perception of IR despite having some reservations about quality and preservation in such a model.

Given the vision and the potential, it is surprising and disappointing that IR collections have generally grown more slowly than proponents had anticipated. The phenomenon is worldwide. Also typically communicated through these activities are the benefits of depositing in

an IR for faculty members. They further indicated that "as you begin to build a service; it is critical to communicate how the service benefits the university community in other words, to do some marketing to advertise the service on campus" (Barton, Mark & Shearer, 2004). These types of promotional activities are important because they raise awareness of the repository. In other words, the information professionals and the host institution in general should play a very vital role in attracting and creating awareness of researchers' attitude toward the potential IR for the research community to make it usable in addition to those authors who are accustomed with it. According to Pickton (2005) most institutions begin their content recruitment activities through a variety of promotional activities on campus. Most commonly, such activities include passing out brochures, conducting presentations to faculty committees, publishing articles in the library or campus newsletters/newspapers, and formally launching the repository. "Academics have to hear about your IR service many times, over a period of time, and from several sources (print, online, in person). A good rule of thumb is that someone needs to have been exposed to your service seven times before they are fully aware of your service. Barton, Mark & Shearer (2004) said that "be sure to outline explicitly the benefits of your service to academics".

Barton, Mark & Shearer further noted that even with a variety of creative ideas and promotional activities, lecturers' uptake has been reluctant where voluntary compliance is needed. Certainly implementers have found that 'recruiting content' is the biggest challenge and frustration. According to Mark & shearer (2006), literature has cited a number of reasons why lecturers' participation rates are so low. At the most basic level, faculty members [academics] lack awareness of the existence of IRs. Several surveys have found that many academic authors are not familiar with the concept of any IRs on campus (Swan & Brown, 2005; Swan & Brown, 2005). Christian (2008) noted that lack of knowledge or awareness of IR is not peculiar with

researchers. In fact, this is the situation in most developing country institutions. However, Dulle (2008) established that a majority of researchers had heard about open access. The most common terms or initiatives by researchers are IRs. It therefore means that the levels of awareness of IR issues are varied.

2.5 Sources of Awareness of Open Access IR

A study by Pelizzari (2003) indicates that colleagues, professional literature, and libraries have been the main sources of learning about open access to those who claimed to be aware of it. On the other hand, self-archiving by their peers, open access debate, institution or library and established subject-based archives promotions were established as being the main means through which researchers were exposed to open access (Swan & Brown, 2004). The most common ways in which open access related terms have been discovered include searching the Internet, participation in debates or via colleagues in their disciplines (Allan, 2005).

A similar study by Sanchez-Tarrago & Fernandez-Molina (2009) found that 40% of the respondents were informed about open access through colleagues and 37% for professional literature in their fields of research. In concurrence with the above findings, several other studies have acknowledged other ways through which respondents were exposed to open access. These include: university/library websites; contact from institutional repository staff member; publicity through campus newspapers; results of a web search engine/Internet; direct publicity from publishers; word of mouth from associates; and participation in an initial meeting of institutional repository (Kim, 2006; Moller, 2007). Usage of open access in both disseminating and accessing scholarly information has attracted the attention of many scholars in recent years. Varying levels of involvement of researchers in open access publishing were reported by Allan (2005), Swan & Brown (2005), Utulu & Bolarinwa (2009).

This finding corroborates Dulle (2008) who indicated that most researchers claimed that they got IR awareness from their colleagues, internet debate, publishers' promotion and workshops. "Academics have to hear about your IR service many times, over a period of time, and from several sources (print, online, in person). Barton, Mark & Shearer (2004) noted that even with a variety of creative ideas and promotional activities, lecturers' uptake has been reluctant where voluntary compliance is needed. These types of promotional activities are important because they raise awareness of the repository.

2.6 Use of Open Access and Dissemination of Research Outputs

Research has documented that Open Access contents have been put to various uses. OECD (2002) expressed that Open Access contents as products of research output have been put to various uses, such as to establish and confirm facts, reaffirm the results of previous work, solve new or existing problems and to support theorems or develop new theories, amongst others. As a result of these, academics used Open Access in searching for suitable and relevant information for scholarly works and dissemination of research findings. This has serious implications on its adoption by academics. Fullard (2007) indicated that researchers that were aware of Open Access used them against printed articles because of the convenience of location and regardless of whether other sources better suited their information needs. Also Dulle, Minish-Majanja & Cloete (2010) indicated that usage is highly dependent on scholars being aware of this model. Dulle & Minish-Majanja (2009) revealed that researchers used open access for sourcing scholarly articles for their research more than using it to disseminate research findings. Togia & korobili (2014) regarded the level of utilization of Open Access among faculties as being positive.

Jose (2014) findings indicated that scholars from the Social Science were the most users of Open Access followed by scholars from the Sciences. The low use of this medium of publication was adduced to lack of knowledge about the existence of Open Access journals. Utulu & Bolarinwa (2009) revealed that Nigerian academics had access to ICT and as a result make significant use of Open Access publications. Ivwighreweta & Onoriode (2012) carried out a study which revealed low use of Open Access journals by LIS students. Obuh & Bozimo (2012) in a study of Open Access publication usage among lecturers in the Department of Library and Information Science in Southern Nigeria revealed high and similar levels of usage among senior and junior cadre lecturers in terms of high priority in sourcing Open Access materials for research and also in rate of retrieving Open Access contents. Results also indicated that both categories of lecturers rarely self-archived their work on the Internet.

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 & 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 & 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 Dulle, Minish-Majanja & Cloete (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.

Almost all authors writing about repository archiving report problems in encouraging author participation and use. Davis & Connolly's evaluation (2007) found the Cornell University repository to be under-populated and under-used by academic staff. Key reasons for non-use included preference for existing alternatives to repositories, a perception that repositories were redundant, technical difficulties, concern that their work may be plagiarized, and concern regarding quality and status of the repository, and confusion over copyright. Foster & Gibbons's (2005) research into understanding faculty in order to improve repository content recruitment found the majority of researchers did not perceive the repository to be relevant to their needs, nor perceive any potential benefit from using the repository. Apprehension towards repository deposit (and Open Access publishing in general) seems to centre around three key issues: lack of motivation to self-archive; concerns surrounding intellectual property, copyright and plagiarism; and negative attitudes toward open access publication and archiving as legitimate modes of academic communication.

Mandatory deposit policies have been adopted by many institutions to boost repository content and create a sustainable, accessible collection of research outputs (Sale, 2006). These

policies may apply to specific types of research output, to academic staff outputs, or to postgraduate theses. While mandates take time to be embedded in staff work processes (Sale, 2006), they have been shown to be an effective way to achieve growth and guarantee the sustainability of repository collections. However, other repository developers propose that mandates damage goodwill toward the repository as an integral service and that staff buy-in is more important to sustainability than any guarantee of regular submissions of content (Palmer, Teffeau & Newton 2008).

2.7 Extent of Use of the Contents of Open Access IR

Depending on the goals established by each institution, an institutional repository could contain any work product generated by the institution's students, faculty, non-faculty researchers, and staff. This material might include student electronic portfolios, classroom teaching materials, the institution's annual reports, video recordings, computer programs, data sets, photographs, and art works virtually any digital material that the institution wishes to preserve. However, given SPARC's focus on scholarly communication and on changing the structure of the scholarly publishing model, we will define institutional repositories here whatever else they might contain- as collecting, preserving, and disseminating scholarly content. This content may include pre-prints and other works-in-progress, peer-reviewed articles, monographs, enduring teaching materials, data sets and other ancillary research material, conference papers, electronic theses and dissertations, and gray literature (Crow, 2002).

To control and manage the accession of this content requires appropriate policies and mechanisms, including content management and document version control systems. The repository policy framework and technical infrastructure must provide institutional managers the flexibility to control who can contribute, approve, access, and update the digital content coming

from a variety of institutional communities and interest groups (including academic departments, libraries, research centers and labs, and individual authors). Several of the institutional repository infrastructure systems currently being developed have the technical capacity to embargo or sequester access to submissions until the content has been approved by a designated reviewer. The nature and extent of this review will reflect the policies and needs of each individual institution, possibly of each participating institutional community. As noted above, sometimes this review will simply validate the author's institutional affiliation and/or authorization to post materials in the repository (Crow, 2002).

Compared with traditional print publishing, the IR offers the ability to store and provide access to a much wider variety of material. Researchers produce articles and reports, but also "original art, grant proposals, maps, radio/TV interviews, motion pictures, music scores, photographs, consulting (technical) reports, technical drawings, and poster session displays" (Cervone, 2004). All of these, once converted to digital format, might be deposited in the IR. Moreover, supplementary material such as supporting evidence and data, interim reports and draft versions of papers may also be stored.

Repositories adhere to an internationally agreed set of technical standards that means that they expose the metadata (the bibliographic details such as author names, institutional affiliation, and date, titles of the article, abstract and so forth) of each item in their contents on the Web in the same basic way. In other words, they are 'interoperable'. This common protocol to which they all adhere is called the open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). The contents of all repositories are then indexed by Web search engines such as Google and Google Scholar, creating online IR databases of freely-available global research. As the level of self-archiving (the process by which authors deposit their work in repositories) grows, the IR

corpus will represent an increasingly large proportion of the scholarly literature (Swan in Pickton, 2005). IRs contains the following:

Peer-Reviewed Journal Articles and Conference Proceedings

The primary type of content in repositories is peer-reviewed journal literature. A collection of the journal articles published from an institution, provided in Institutional repository through the repository, gives the institution's research programme worldwide visibility and increases its impact. Individual authors also enjoy the same increased visibility for their work and concomitant impact.

Research Data

Now that research data are increasingly created in digital form, repositories are also places where authors can deposit the data that underpin their final articles. More and more research funders are requiring their grant-holders to make their data Open Access, once they have themselves analyzed and published their findings from the data. This is in order that other researchers can use the data to verify results, to compare with their own data or to re-use in some way to generate new data and knowledge. Datasets may be of many types – spreadsheets, photographs, audio files, video files, and representations of artwork, diagrams, and charts and so on. They may even be 'complex objects', that is, combinations of several types of data, such as a numerical dataset recording weather patterns with accompanying satellite images (Treloar, Groenewegen & Harboe-Ree, 2007).

Monographs and Books

Most IRs also contains books or book chapters. Books are often written for monetary gain (royalties on sales) and in such cases authors may be reluctant to deposit them for free in a repository. In these cases it is still important for the book to be deposited, with the metadata

(title, author, synopsis, publisher details, etc) on display, but the text may be 'hidden' from viewers. Having the metadata visible means that the book is counted in the institution's assessment procedures, it existence is known to would-be readers and it can be located by Web search engines. The evidence is accumulating, however, to show that when the entire content of a book is visible in a repository, sales of the book frequently rise. This is because the visibility in the repository is raising awareness of the book and promoting it to an audience which is then likely to buy the book if it seems relevant to their work. It is analogous to what Amazon offers with its 'Look inside' facility.

Other Content Types

As well as the types of content described above, IRs frequently contains theses, dissertations and other research-related outputs such as presentations. In similar vein, Veldsman (n.d.) noted the following as what an IR can be filled with. They are pre-prints of articles or research reports submitted for publication, the text of journal articles accepted for publication, revised texts of published work with comments from academic readers, conference papers, teaching materials, student projects, doctoral theses and dissertations, datasets resulting from research projects, committee papers, computer software, works of art and photographs and video recordings.

2.8 Extent of Satisfaction with the Contents of Open Access IR by Academics

The development of institutional repositories in Africa is seen as a way of making institutional research outputs available to a community with less than optimal access to resources (Musoke, 2008). Akintunde & Anjo (2012) observed that in Nigeria Digitization holds the advantage of providing a platform for sharability and duplicity of data, and networking because of the digital form of content. It also enhances the life-span of records as well as securing data and records that would have been obliterated due to their age.

However, Cullen & Chawner (2008) postulated that reasons for setting up repositories vary, and a range of projected benefits has been suggested in many literatures. These include benefits to the researcher, to the institution, and to individual disciplines. Academic libraries also benefit from being involved in Institutional Repository initiatives, and there are implications for scholarly communication overall. The primary reasons used to persuade academics of the benefits of placing their output in an Institutional Repository is exposure that by having their research and publications openly available on the Web, not just in fee-based databases, scholarly journals, or books, their work is likely to be used and cited more. As a result, their reputation will be enhanced over the long term, due to the recognition they gain from this (Pinfield, Gardner & MacColl, 2002). Other benefits to researchers include stewardship and preservation of their publications in digital form, which frees them from the need to maintain this content on a personal computer or website (Lynch, 2003).

According to Suber (2002), "Open Access articles are cited significantly more than non OA articles, even when other variables are taken into account. The growing numbers of institutions and research funding organizations are starting to put in place requirements regarding open access". Lawrence (2001) further stated that "with appropriate indexing and search mechanisms in place, Open Access online articles enjoy appreciably higher citation rates than the traditionally published articles". Promotion of institutional research output and Prestige Institutional Repositories provide access to wealth of knowledge in the form of scientific and technological information which are very essential for development. According to Chisenga (2006), several of the research output from Africa exists in the form of unpublished information and knowledge resources such as research reports, theses and dissertations,

seminar and conference papers. Very little research outputs find their way into the world's well-established international scientific journals.

The immediate benefit of IR is that, all the research outputs which are collected and stored in its repository are unconditionally made available to its faculty and to all other members who are associated with it. Apart from easy and open access to scholarly information, for universities, repositories are good marketing tools. This is because it communicates the capability and quality of the institution by showcasing the faculty and student research and other intellectual activities. According to the cybermetrics laboratory which organizes the Ranking Web of World Universities, the objectives is to promote web publications to support OA initiatives, electronic access to scientific publications and to other academic materials. In addition to this, publishing here is cheaper. OA-IR also helps the institutions to see how much impact they are having on the scholarly map as a result of traffic inflow to the IR platform. The volume of uploads from the platform gives an indication of how relevant research undertaken in the institution is valued. The web ranking gives 15% weight to Rich files of Research, 20% to the size, 15% to statistics of visits from Google Analytics and 50% to link visibility. Thus the OA-IR also puts the institution in a good position in terms of ranking.

This sub-section presents the benefits of Open Access, particularly to scholars. Studies have revealed that benefits abound from the use of Open Access medium and products. The main benefit of Open Access products is that the entire content is made readily available and accessible to users regardless of affiliation with subscribing libraries (Ivwighreghweta & Onoriode, 2012) or wherever users are located. Authors' citations of articles in hybrid open access journals proved much greater or higher than non open access articles (Antelman, 2004). With Open Access, articles can be accessed online free of charge (Suber, 2012; 2013). Open

access publications usually appear more regularly thus, allowing scientists disseminate research findings more quickly, timely, widely and establishing priority of researchers investigating same problems (Albert, 2006). These benefits of open access have encouraged increased accessibility to resources and better serve users' needs (Mammo & Ngulube, 2015). This view was supported by Kenneway (2011) and Gross & Ryan (2015) when they expressed that open access journals contents have been made accessible to global audience. Similarly, Qayyum, Riaz, Rehman, Ahmed, Tahir & Kazi (2013) stressed that widespread dissemination of scientific knowledge was a major benefit derived from Open Access publishing medium.

Open Access initiatives have helped solved the challenges of inaccessibility to information bedevilling the developing countries (Canada, 2009; Nwagwu & Ahmed, 2009; Jain, 2012; Mammo & Ngulube, 2015). The initiative has ensured that publications and research contents are available, searchable and retrievable thus allowing, data or statistics, information and knowledge within an article to be recycled and re-used. It incorporates local research into all interoperable network of global knowledge; increases impact of local research providing new contacts and research partnerships for authors; removes professional isolation and strengthens economies through development of strong and independent national science base (Antelman, 2004; Canada, 2009; Willinsky, 2010; Suber, 2012; Jain, 2012; Mammo & Ngulube, 2015). It has equally allowed institutions to deposit published and unpublished materials into institutionalised subject-based repositories (Jain, 2012). Kenneway (2011) admitted that Open Access increased readership of published materials thereby increasing citations. Increased citation is an evidence of good visibility for publications because such works would be available to users worldwide and at no cost. Ivwighreghweta & Onoriode (2012) regarded restricted access as great barrier to the growth of science and the wellbeing of publishing which Open Access has

solved. This was buttressed by Suber (2012; 2013) who considered restrictions as limiting research audience and harmful to research development. Utulu & Bolarinwa (2009) also considered Open Access as being more economical than print publications. According to Georgia State University (2015), Open Access have increased opportunities for collaboration and innovation, brought about better returns on investment for research sponsors, faster than the traditional publishing model and have contributed immensely to education's mission of advancing knowledge.

2.9 Challenges the Academics Faced in Accessing of Open Access IR

In spite of the benefits accruable from Open Access publishing, there are many challenges bedevilling it as a form of publishing. The issue of quality of publications emanating from this model constituted a vital challenge that seemed to be a discouraging factor. Dulle & Minishi-Majanja (2009) adduced low quality of open access to lack of peer review. This is usually perpetrated by unscrupulous publishers who capitalise on huge turnover to search the Internet for publishable research/articles and thus publish contents that were either poorly peer reviewed or not peer-reviewed at all by them. The publication and dissemination of either poor or non peer reviewed articles may results into rejection or non recognition of such articles and journals by promotions committees of universities. This situation could make research efforts of academics and researchers fruitless for attaining promotion. It could also discourage academics, researchers and others from publishing their research or creative works in such publishing outlets. This probably might be the reason why Open Access contents have not been broadly accepted by some academics and researchers (Dulle & Minishi-Majanja, 2009). Kenneway (2011) however dispelled the fear about quality when he expressed that not all publications

emanating from open access are not peer-reviewed, some were, though this might have been lightly done.

Increased visibility, citation advantage and high journal impacts are some of the benefits of publishing in Open Access (Kenneway, 2011; Suber, 2008; 2012; 2013). These are highly regarded in academic circles. Majority of authors that have published in high impact journals have not been enjoying the much expected visibility and citations advantage as a result of licensing fees and other restrictions placed on subscription and access. Suber (2012; 2013) gave modest strategies and policies of overcoming these restrictions. Furthermore, lack of skills in the use of the Internet for self-archiving has been found to be a major hindrance to Open Access adoption by faculty (Okoye & Ejikeme, 2011; Musa, 2016). The fact that faculty needed this form of publishing model to make their research findings more visible to other researchers and academics as well as access timely and relevant information for research necessitated the need to investigate lecturers' level of awareness, perceived benefits and challenges encountered in the use of Open Access.

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academics as well as access timely and relevant information for research necessitated the need to investigate lecturers' level of awareness, perceived benefits and challenges encountered in the use of Open Access.

In terms of actual use of Open Access contents, challenges have been identified country wise. These elements of challenges vary from one country to another. For instance, in India, lack of fund for building and upgrading ICT infrastructure, lack of institutional repositories and lack of awareness on benefits of Open Access have been identified by Joshi, Vatnal & Manjunath (2012). In South Africa, Smith (2007) identified insufficient bandwidth and insufficient range of Open Access journals in fields of interest as challenges to Open Access use. In Nigeria, several factors or elements have been identified as challenges to effective use of Open Access contents or publications. Christian (2008) reported inadequate funding as a result of budgetary allocation decline; poor ICT infrastructures and lack of repositories. Okoye & Ejikeme (2011) identified inadequate skills to navigate the Internet; unstable power supply; unavailability of Internet facilities; unstable financial supports and lack of knowledge of existence of Open Access journals as constraints to use of Open Access among researchers. Ivwighreghweta & Onoriode (2012) identified lack of knowledge of the existence of Open Access journals; improper archiving; power outage; limited computer terminals; lack of Internet search skills and download delay amongst others as constraints to effective use of Open Access. Musa (2016) revealed poor ICT infrastructures; inadequate funding for building and upgrading ICT infrastructures; low level of awareness; unstable power supply; technological barriers; unavailability and slow Internet connectivity; lack of sensitization to adopt Open Access; lack of ICT skills and inadequate advocacy for Open Access in academic and research institutes as major constraint to Open Access.

Below are some other specific challenges of open access institutional repository:

Awareness of Open Access IR

Ignorance or lack of knowledge of open access Institutional Repository seems to be one major issue to the development of open access Institutional Repository in developing countries. This lack of knowledge or awareness of open access Institutional Repository is not peculiar to Nigeria alone but the whole of the continent of Africa except South Africa. Open Access software and other issues related to the establishment of Institutional Repository such as copyright, metadata, policies, populating and marketing of Institutional Repositories, etc. still persist. It is only when this ignorance is tackled that any meaningful progress can be made.

Inadequate ICT Connectivity and Infrastructure

OA-IR requires a reasonably fast and reliable internet connection for maximum benefit. Unfortunately, this is not the case in Nigeria. The bandwidth in most academic and research institutions is inadequate notwithstanding the growth in internet usage in Nigeria. Low internet bandwidth availability poses an obstacle to the deployment of Institutional Repository. The high cost of internet bandwidth in developing countries makes it much difficult for academic institutions in the region to afford adequate bandwidth to host digital repositories. IRs ideally requires dedicated internet connection and the cost of such dedicated services are beyond many institutions.

According to Jensen (2010), "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 schools and public libraries on the continent have internet access." Whereas not much is needed by way of infrastructure to set up a repository, much more is required to access the full benefit. Accessibility requirements include a network coverage of the entire institution, provision

of access points, network equipment and other accessories which are too high for some institutions to deploy even as an internal service (intranet).

The availability of an efficient telecommunication service is the most important prerequisite for electronic networking which affects the open access institutional repository. The telecommunications infrastructures in most countries in the Sub-Saharan Africa still remain underdeveloped.

Unreliable Power Supply

Another challenge associated with internet connectivity in academic and research institution is the problem of electrical power supply. An IR should be openly accessible to every user at all times (i.e.24 hours a day within the week). This will therefore require a sustained and regular electricity supply to power the ICT facilities. Electricity supply is a major problem in Nigeria as in other African countries. The North Central States of Nigeria University for example, is bedeviled with frequent power outages which affects the daily operations of the library. This problem will make the development of major projects like an Institutional Repository in Nigeria a difficult and expensive venture as backup generators have to be enlisted and additional funds required to fuel them.

Inadequate Funding

Inadequate funding is another major problem academic and research institutions in developing countries are likely to face in their effort to establish digital repositories. The state of ICT infrastructure in academic and research institutions in developing countries like Nigeria is low and requires complete overhaul in order to sustain the development of IRs. The development of IR in developing countries is more capital intensive project than in developed countries. This is because academic and research institutions in developed countries already have in place a well-established state-of-the-art ICT infrastructure to build on. However, in developing countries

such as Nigeria, this infrastructure is not yet in place. This requires huge financial resources to put them in place.

Inadequate Advocacy

Advocacy is one of the best ways to promote the development of OA-IR in a developing country like Nigeria. All stakeholders of Institutional Repository such as lecturers, researchers, librarians as well as students must be involved in order for such advocacy to be effective. Advocacy attracts contributors as well as stakeholders. Regrettably, a high percentage of stakeholders in Nigeria have little or no knowledge of what OA-IR is about to be able to act as advocates. This has created apathy in the scientific/research community. Hence very few understand the concept and are willing to donate content.

Copyright and Technical Barriers

Another challenge that will affect the development of Institutional Repository is copyright and technical challenges. Legal barriers arise from copyright law and licensing agreements that determine how a person can deal with a published work such as a journal article or a research paper or whether the work shall be available in a closed or Open Access format. Faculty copyright retention is a necessary precondition for libraries to help disseminate their institutions' scholarly output. Also, some copyright laws ask authors to transfer their copyright to them before their papers are published. In such a case, the publisher's consent would have to be sought before such research works could be posted into the Institutional Repository. Also, in the view of Ghosh (2007), other technological barriers like the software issues would have to be sorted with the digital rights management (DRM) a software professional in order not to block access by authorized users.

Institutional Culture and Politics

The most significant challenge facing academic libraries undertaking these Institutional Repository projects is not technical but rather cultural. According to the computer library centre

(OCLC, 2003), "the technical issues involved in creating Institutional Repositories are not necessarily difficult, but the developers of a repository will more likely face challenges related to the politics and culture of an institution from the stakeholders, namely the faculty, library staff, IT staff and instructional designers". In the view of OCLC (2003), there is no common view of what an institutional repository is, what it contains and what its governance structure should be.

Any single institutional failure can cause more damage to the viability of the Institutional Repository. An Institutional Repository can fail over time for many reasons: policy (for example, if the institution chooses to stop funding it), management failure or incompetence, or technical problems. Any of these failures can result in the disruption of access, or worse, total and permanent loss of material stored in the Institutional Repository.

Reward Systems in some Institutions

The non use of articles submitted to OA-IR in assessing and promoting authors makes them reluctant in freely contributing to OA-IR platform. This will consequently affect the content of materials that would be posted to the Institutional Repositories.

2.10 Summary of the Review

The literature reviewed had shown that awareness is the general determinant of the actual use of Open Access IR by the academics. It was found that the use of Open Access IR was low due to lack of awareness and attitude of academics. Also, researchers used Open Access IR for sourcing scholarly articles for their research more than using it to disseminate research finding. It is imperative to note that majority of the studies reviewed were conducted in the developed countries. There have been few empirical studies on awareness of and attitudes of academics towards the use of IR.

From the literature review, it can be concluded that open access IRs has immense benefits to institutions, academics, university library and by extension the whole country. It is evident that various benefits such as visibility of academic research, preservation of intellectual output and avenue for sharing research therefore makes marketing and sensitization strategic too for ensuring IR awareness. Open access (OA) is now going on everywhere across geographical locations in the world, including Africa. Although the global pattern and level of awareness and use 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. Although low level of awareness is recognized as problem which in most cases inhibits access by researchers, other inhibiting factors include lack of navigation skills, poor support from Government, poor ICT infrastructure and epileptic power supply among others.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology used in carrying out the research. It is sub - divided under the following topics:

3.2 Research Design

3.3 Population of the Study

3.4 Sample size and Sample Technique

3.5 Instrument for Data Collection

3.6 Validity and Reliability

3.7 Procedure for Data Collection

3.8 Procedure for Data Analysis

3.2 Research Design

A survey research design was adopted for this study. Ali (2006) stated that survey is a type of descriptive research which uses sample data to describe and explain what is existent or non-existent on the present status of a phenomenon being investigated. Statistics Canada (2003) stated that survey is any activity that collects information in an organized and methodical manner about characteristics of interest from some or all units of a population using well defined concepts, methods and procedures, and compiles such information into a useful summary form.

Both quantitative and qualitative data was collected. Quantitative data was obtained from closed ended questions while qualitative data was obtained from open ended questions which led to descriptive explanations through appropriate presentations. Osuala (1987) agreed that survey

research uses both large and small populations by selecting and studying the relative incidence, distributions and interactions of social and psychological variables.

The reason for the adoption of this method was that survey method enabled the researcher to collect data quantitatively in order to measure naturally the level of awareness of Open Access Repository outlets by the academics within the time frame covered by the study. Also, this method would helped the researcher in determining the relationship between "awareness and use of institutional repository for disseminating research outputs" by academics in Federal Universities in the North Central States of Nigeria so that generalization and inferences could be drawn.

3.3 Population of the Study

The population for this study consisted of all academics in Federal Universities in North Central States of Nigeria that are having Open Access IR. There were 3,547 academics in the Federal Universities in the North Central States excluding University of Agriculture Makurdi, and University of Abuja. (See Table 3.1 for Federal Universities and academics in North Central States of Nigeria).

Academics in Federal Universities in North Central States of Nigeria was used because they account for a significant proportion of the scholarly research conducted in Nigeria and close to 50% of the staff in Nigerian universities are teaching and conducting research in the Federal Universities (Christian, 2008).

Table 3.1: Population of the Study

S/N	NAMES OF UNIVERSITIES	ACADEMICS
1.	University of Ilorin	1422
2.	University of Jos	1125

3.	Federal University of Technology, Minna	826
4.	Federal University, Lokoja	174
Total		3,547

Source: University of Ilorin 2017 Annual Report, Uni. Jos Establishment Office (2017), F. U. T. Minna Establishment Office (2017), and F. U. Lokoja Media and Information Service (2017).

3.4 Sample Size and Sampling Techniques

Several techniques were used to obtain the required sample. Purposive sampling was used to select 4 universities that have Open Access IR out of a total of 6 at the time of the study. This is because they have the repositories and they are functional other two federal universities do not have. Proportionate sampling was use to select 10% of the academics of the 4 universities. The reason for using 10% of this population is based on the submission of Suleiman (2012) who suggested that in most cases, a minimum of 10% sample is enough for controlling of sampling error in social sciences research especially if the population runs in to thousands. To select the academics, simple random sampling technique was used. This is in order to give every academic regardless of the faculty, department, and gender e.t.c. a chance of being selecting in order to remove bias. (Table 3.2 presented the sample of the study).

A sample of 355 respondents (Academics) was selected for the study. The figure represents approximately 10% of the target population of academics in the Federal Universities in North Central States of Nigeria.

Table 3.2: Sample of the Study

S/N	Name of Universities	Sample of the Academics
1.	University of Ilorin	142
2.	University of Jos	113

3.	Federal University of Technology, Minna	83
4.	Federal University, Lokoja	17
Total		355

3.5 Instrument for Data Collection

The research instrument that was used to collect data for this study was questionnaire. The questionnaire was developed by the researcher because the researcher could not find the one that could be adopted to match the research questions of this study. Malhotra (2004) posited that the questionnaire is a formalized set of questions for obtaining information from respondents. The overriding objective is to translate the researcher's information needs into a set of specific questions that respondents are willing and able to answer. He added that a questionnaire is the main means of collecting quantitative primary data. A questionnaire enables quantitative data to be collected in a standardized way so that the data are internally consistent and coherent for analysis.

The questionnaire was preferred to other data collection techniques because of its cost effectiveness for such a study that involved a large sample size and large geographical areas. Besides, the questionnaire was preferred because there was high literacy rate among the selected respondents. Finally, the questionnaires help in reducing bias thus ensuring that the researcher's opinion did not influence the respondents to answer questions in a certain manner.

The Questionnaire for this study is divided into two (2) sections. The first section covered demographic data of the respondents while the second section asked questions pertaining to the research questions and the hypotheses rose for the study. The questions employed the Likert Scale of Measurement, asking respondents to choose between a number of categories that gave

an indication of how closely they agreed or disagreed with a set of statements. Numerical values were allotted to the different categories so that the respondent's attitude or opinion could be measured by the total of these numerical values. While the remaining questions were provided with options for the respondent to tick appropriate option that best described their opinions.

3.6 Validity and Reliability of the Instrument

Validity is often described as the degree to which a research instrument measures what it intends to measure. Onukwo (2000) asserted that validity of an instrument means the degree to which the instrument measures the qualities, abilities, skills, traits, and information it is designed to measure. Face and content validity were used where the supervisors, experts in the area of library and information science and statiscians who made corrections on the instrument looked at the instrument and made sure the contents of the instrument aligned with the research questions, objectives, title of the work among others.

On the part of the reliability of the instrument, a pilot study was conducted at Ahmadu Bello University, Zaria Kaduna State using academics of the university where 10 copies of questionnaires were used. All the copies of questionnaire distributed for the pilot study were personally retrieved by the researcher. The data collected from the pilot study was statistically analyzed for the purpose of reliability co-efficient. The Split-half reliability using Guttmann and Spearman-Brown formula were used. The reliability co-efficient of 0.82 was obtained. This is considered adequate for the internal consistency of the instruments as supported by (Razak & Ajayi, 2000).

3.7 Procedure for Data Collection

An introductory letter was collected from the Department of Library and Information Science, Ahmadu Bello University, Zaria to facilitate the distribution and retrieval of the

questionnaire from the various institutions for the study. The administration and collection of data was carried out personally by the researcher with the aid of three-trained research assistants. The research assistants were trained on the mode of administration and collection of the questionnaire as well as how to give relevant information about the content of the questionnaire where necessary. They were instructed to administer the questionnaire to the academics irrespective of the faculties, departments, schools, gender etc. Finally, the researcher makes multiple follow-up contacts to the three-trained research assistants by telephone calls and email to encourage high responses from the academics. The administration and collection of data lasted for the period three month.

3.8 Procedure for Data Analysis

The data collected was presented and analyzed using descriptive and inferential statistics in order to obtain relevant answers to the research questions formulated and also test the hypotheses respectively. Mean and standard deviation were used to analyse the data that relate to the research questions, using mean of 2.5 as a bench mark because the total of the Likert scale used is 10, as 4+3+2+1 = 10, 10 divide by 4 = 2.5. However, all the mean of 10 from the table were higher than the bench marks as a result of that, the researcher use the highest and lowest mean. The highest mean was use in getting the major findings in chapter five and lowest mean was used in getting the recommendations in chapter five. One-way ANOVA is being use to test the null hypotheses. The choice of ANOVA was based on the premise that four Universities were involved in the data collection. On the part of the demographic information, frequency and percentage was used because the highest and the lowest extremes are needed only to make discussion and interpretations of the findings.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presented the data that was collected, analyzed and discussed. The chapter was divided under the following sub-headings:

4.2 Response Rate

4.3.1 Descriptive Analysis

4.3.2 Level of Awareness of Open Access IR by Academics

4.3.3 Sources of Awareness of Open Access IR by Academics

4.3.4 Extent of Use of the Contents of Open Access IR

4.3.5 Academics Satisfaction with the Contents of Open Access IR

4.3.6 Challenges Academics Face in Accessing Open Access IR

4.4 Inferential Statistical Analysis

4.2 Response Rate

A total of three hundred and fifty five (355) copies of questionnaires were distributed to the academics in the Federal Universities in North Central States of Nigeria that have the Open Access Institutional Repository. Three hundred and forty six (346) copies were duly completed, returned and found worthy for the analysis. In University of Ilorin, 142 copies of questionnaire were distributed where 137 copies were returned with 38.6 response rate, in University of Jos, 113 copies of questionnaire were distributed where 110 copies were returned with 30.9 response rate, in Federal University of Technology, Minna, 83 copies of questionnaire were distributed where 82 copies were returned with 23.1 response rate, in Federal University, Lokoja, 17 copies of questionnaire were distributed where all the copies were returned with 4.8 response rate. This represents the response rate of 97.4 %. Table 4.1 presented the response rate of this study.

Table 4.1: Response Rate

S/N	Federal Universities in North Central States of Nigeria	No. of Questionnaire Distributed	No. of Questionnaire Returned	Percentage of Questionnaire Returned
1	University of Ilorin	142	137	38.6
2	University of Jos	113	110	30.9
3	Fed. Uni. of Tech., Minna	83	82	23.1
4	Fed. Uni. Lokoja	17	17	4.8
Total		**355**	**346**	**97.4**

From table 4.1, a 97.4 % response rate was realised. This was due to the fact that the researcher with the help of three research assistants administered and collected the instrument back. The researcher as well as the three research assistants used to follow up the distributed questionnaire. There was also a good relationship between the researcher, research assistants and the respondents. That led to the on the spot as well as quick completion of the copies of the questionnaire by most of the respondents.

4.3.1 Descriptive Analysis

This section presented the data collected and analysed using descriptive statistics. The data analysed in this section was collected using the five (5) research questions which guided this study. Mean and standard deviation were used in analyzing the data collected in this section. The following tables presented the results in this section in order of the research questions used.

4.3.2 To find out the awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria.

Table 4.2: Level of Awareness of Open Access IR by Academics

S/N	Level of Awareness of Open Access IR	Federal Universities				Total	Mean	S. D
		University of Ilorin	University of Jos	Fed. Uni. of Tech., Minna	Fed. Uni. Lokoja			
1	Aware	134	109	80	17	340	85.0	50.4
2	Not Aware	3	1	2	0	6	1.5	1.3

Table 4.2 presented the awareness on the existence of Open Access Institutional Repositories in Federal Universities in North Central States of Nigeria. From the table, it was discovered that academics in University of Ilorin were aware with the existence of Open Access Institutional Repositories with total counts of 134 only 3 of them were not aware with the existence of the Repositories. On the part of University of Jos, 109 academics were aware with the existence of Open Access Institutional Repositories while 1 academic was not aware with the existence of the repositories. On the part of Federal University of Technology, Minna, 80 academics were aware with the existence of Open Access Institutional Repositories, while 2 academics were not aware with the existence of the repositories. In Federal University Lokoja, all the 17 academics were aware with the existence of Open Access Institutional Repositories. In general, 340 academics from Federal Universities in North Central States of Nigeria were aware with the existence of Open Access Institutional Repositories while 6 of them were not aware with the existence of the repositories. From the mean and standard deviation angles, awareness on the existence of Open Access Institutional Repositories has the mean of 85.0 while not aware has that of 1.5. This finding related with that of Xia, Gilchrist, Smith, Kingery, Radecki, Wilhelm, & Mahn (2012) who discovered that academics are aware and used the local information repositories in self-archiving their publications for disseminating them to the local

users. This implies that many of the publications of the academics can be found in the Open Access Institutional Repositories because the academics were already aware with the repositories and they know that the repositories are important avenues of disseminating their knowledge to the local users.

4.3.3 To identify the sources of awareness of Open Access IR by academics in Federal Universities in North Central States of Nigeria.

Table 4.3: Sources of Awareness of Open Access Institutional Repositories

S/N	Sources of Awareness of Open Access Institutional Repositories	Federal Universities				Total	Mean	S. D
		University of Ilorin	University of Jos	Fed. Uni. of Tech., Minna	Fed. Uni. Lokoja			
1	From academics/colleagues	128	90	78	17	313	78.3	46.1
2	Institution bulletins	129	93	46	11	279	69.8	51.9
3	Through internet browsing	86	89	70	10	255	63.8	36.8
4	Through publishers' handbills/flyers in the internet	78	62	62	8	210	52.5	30.6
5	Through workshops	80	70	49	9	208	52.0	31.4
6	Through the library/librarian	100	60	69	8	237	59.3	38.2
7	Through this questionnaire	65	56	56	10	187	46.8	24.9

Table 4.3 presented the sources of awareness of Open Access Institutional Repositories in Federal Universities in North Central States of Nigeria. From the table, it was seen that majority of academics in the University of Ilorin with total counts of 129 indicated that the source of awareness of Open Access Institutional Repositories was through this Institutional bulletins, it was followed by from academics/colleagues with total counts of 128. While through workshops and through publishers' handbills/flyers in the internet with total counts of 65 and 78 respectively were the least sources the academics aware of. On the part of University of Jos, it was seen that majority of academics in the University of Jos with total counts of 93 indicated that

the source of awareness of Open Access Institutional Repositories was through this questionnaire, it was followed by from academics/colleagues with total counts of 90. Also, through workshops and through publishers' handbills/flyers in the internet with total counts of 56 and 62 respectively were the least sources the academics aware of. On the part of Federal University of Technology, Minna, majority of the academics with total counts of 78 indicated that the source of awareness of Open Access Institutional Repositories was from academics/colleagues, it was followed by through internet browsing with total counts of 70. While through workshops and through publishers' handbills/flyers in the internet with total counts of 56 and 62 respectively were the least sources the academics aware of. On the part of Federal University Lokoja, majority of the academics with total counts of 17 indicated that the source of awareness of Open Access Institutional Repositories was from academics/colleagues, it was followed by through internet browsing with total counts of 10. While through publishers' handbills/flyers in the internet and through library/librarian with total counts of 8 and 9 respectively were the least sources the academics aware of. From the mean angle, from academics/colleagues and through institution bulletins with total counts of 78.3 and 69.8 respectively have the highest means. However, through this questionnaire and through workshops with means of 46.8 and 52.5 respectively have the lowest means. This finding agreed with that of Utulu & Bolarinwa (2009) who discovered that academics and their peers are important sources through which scholars get aware about the existence of Open Access Institutional Repositories. This implies that academics social interaction is an important source of sharing information among them.

4.3.4 To find out the extent at which academics use Open Access IR for accessing and disseminating of research outputs in Federal Universities in North Central States of Nigeria.

Table 4.4: Extent of Use of the Contents of Open Access Institutional Repositories

S/N	Extent of Use of the Contents of Open Access Institutional Repositories	Federal Universities								Total	Mean	S. D
		University of Ilorin		University of Jos		Fed. Uni. of Tech., Minna,		Fed. Uni. Lokoja				
		U	NU	U	NU	U	NU	U	NU			
1	Journal articles	110	27	101	9	80	2	17	0	346	43.3	46.0
2	Theses and Dissertations	105	32	33	77	5	77	1	16	346	43.3	38.4
3	Inaugural lectures	67	70	59	51	65	17	12	5	346	43.3	27.2
4	Conference papers	104	33	82	28	67	15	4	13	346	43.3	36.5
5	Seminar papers	91	46	81	29	67	15	17	0	346	43.3	33.5
6	Course materials	104	33	89	21	59	23	12	5	346	43.3	36.8
7	Lecture notes	91	46	0	110	81	1	13	4	346	43.3	45.2
8	Students projects	85	52	56	54	10	72	2	15	346	43.3	30.5
9	Committee papers	88	49	43	67	11	71	4	13	346	43.3	31.3
10	Computer software	69	68	60	50	75	7	10	7	346	43.3	30.1
11	Works of art	51	86	32	78	49	33	11	6	346	43.3	28.8
12	Photographs	50	87	46	64	20	62	7	10	346	43.3	28.6
13	Video recordings	49	88	53	57	56	26	9	8	346	43.3	27.2

Key: U=Utilise, representing highly Utilise and Utilise. NU=Not Utilise, representing rarely Utilise and Not Utilise

Table 4.4 presented the extent of use of Open Access Institutional Repositories in Federal Universities in North Central States of Nigeria. From the table, it was seen that in the University of Ilorin, the academics with total counts of 110 indicated that they highly utilize Journal articles of the Open Access Institutional Repositories; it was followed by Theses and Dissertations with total counts of 105. Theses and Dissertations and Course materials with total counts of 32 and 33 respectively were the least responses that use Open Access Institutional Repositories. On the part

of University of Jos, the academics with total counts of 101 indicated that they highly utilize Open Access Institutional Repositories for Journal articles; it was followed by for Course materials with total counts of 89. Journal articles and Course materials with total counts of 9 and 21 respectively were the least responses that use Open Access Institutional Repositories. On the part of Federal University of Technology, Minna, the academics with total counts of 81 indicated that they used Open Access Institutional Repositories for Lecture notes; it was followed by for Journal articles with total counts of 80. Lecture notes and Journal articles with total counts of 1 and 2 respectively were the least responses of use. On the part of Federal University Lokoja, the academics with total counts of 17 indicated that they used Open Access Institutional Repositories for Seminar papers; it was followed by Journal articles with total counts of 17. Seminar papers and Journal articles with total counts of 0 and 0 respectively were the least responses of use. From the standard deviation angle, Journal articles and Lecture notes with standard deviations of 46.0 and 45.2 respectively were the extent at which the academics use the Open Access Institutional Repositories. This finding agreed with that of Ogbomo & Ivwighreghweta (2010) who revealed that the Open Access Institutional Repositories were used by scholars for Journal articles and Lecture notes. This implies that the Open Access Institutional Repositories can be used conveniently by the academics to access and disseminate research works.

4.3.5 To determine the extent of satisfaction with the contents of Open Access IR by academics in Federal Universities in North Central State of Nigeria.

Table 4.5: Extent at which Academics Satisfy with the Contents of Open Access Institutional Repositories

S/N	Extent at which Academics Satisfy with the Contents of Open Access Institutional Repositories	Federal Universities								Total	Mean	S. D
		University of Ilorin		University of Jos		Fed. Uni. of Tech., Minna,		Fed. Uni. Lokoja				
		S	NS	S	NS	S	NS	S	NS			
1	Journal articles	131	6	96	14	79	3	17	0	346	43.3	50.9
2	Theses and Dissertations	130	7	99	11	80	2	16	1	346	43.3	51.5
3	Inaugural lectures	120	17	70	40	42	40	17	0	346	43.3	37.6
4	Conference papers	110	27	95	15	52	30	15	2	346	43.3	39.5
5	Seminar papers	103	34	69	41	78	4	14	3	346	43.3	36.9
6	Course materials	108	29	87	23	70	12	17	0	346	43.3	39.6
7	Lecture notes	85	52	93	17	46	36	15	2	346	43.3	32.8
8	Students projects	104	33	82	28	67	15	4	13	346	43.3	36.5
9	Committee papers	104	33	89	21	59	23	12	5	346	43.3	36.8
10	Computer software	91	46	81	29	67	15	17	0	346	43.3	33.5
11	Works of art	88	49	43	67	11	71	4	13	346	43.3	31.3
12	Photographs	105	32	33	77	5	77	1	16	346	43.3	38.4
13	Video recordings	85	52	56	54	10	72	2	15	346	43.3	30.5

Key: S=Satisfy, representing Highly Satisfy and Satisfy. NS=Not Satisfy, representing Rarely Satisfy and Not Satisfy

Table 4.5 presented the extent at which academics satisfy with the contents of Open Access Institutional Repositories in Federal Universities in North Central States of Nigeria. From the table, it was seen that in the University of Ilorin, the academics indicated that they were highly satisfied with journal articles with total counts of 131; it was followed by theses and dissertations with total counts of 130. Lecture notes and video recordings with total counts of 85 for both were contents of the Open Access Institutional Repositories least satisfied with. On the part of University of Jos, theses and dissertations and journal articles with total counts of 99 and

96 respectively were the contents of the Open Access Institutional Repositories highly satisfied by the academics. Photographs and works of art with total counts of 33 and 43 respectively were the contents of Open Access Institutional Repositories the academics least satisfied with. On the part of Federal University of Technology, Minna, theses and dissertations and journal articles with total counts of 80 and 79 respectively were the contents of the Open Access Institutional Repositories highly satisfied by the academics. Photographs and video recordings with total counts of 5 and 10 respectively were the contents of Open Access Institutional Repositories the academics least satisfied with. On the part of Federal University Lokoja, journal articles, theses and dissertations as well as inaugural lectures with total counts of 17, 16 and 17 respectively were the contents of the Open Access Institutional Repositories highly satisfied by the academics. Photographs and video recordings with total counts of 1 and 2 respectively were the contents of Open Access Institutional Repositories the academics least satisfied with. From the standard deviation angle, theses and dissertations and journal articles with standard deviations of 51.5 and 50.9 respectively were the contents of the Open Access Institutional Repositories highly satisfied by the academics. This finding agreed with that of Ogbomo & Ivwighreghweta (2010) who revealed that the local contents of the Open Access Institutional Repositories were mostly theses and dissertations, journal articles among others and the members of the local contents environment benefits a lot from these documents. This implies that the universities research output can be detected from the contents of the Open Access Institutional Repositories. Also, scholarly publications and commitments of the Universities under study can be accessed through their Open Access Institutional Repositories.

4.3.6 To find out the challenges academics face in accessing Open Access IR in Federal Universities in North Central States of Nigeria.

Table 4.6.5: Challenges the Academics Faced in Accessing Open Access Institutional Repositories

S/N	Challenges the Academics Faced in Accessing Open Access Institutional Repositories	Federal Universities				Total	Mean	S. D
		University of Ilorin	University of Jos	Fed. Uni. of Tech., Minna	Fed. Uni. Lokoja			
1	Awareness of Open Access IR	63	70	10	2	145	36.3	35.2
2	ICT connectivity inadequate and infrastructure	135	110	79	16	340	85.0	51.4
3	Unreliable Power Supply	132	108	80	12	332	83.0	51.9
4	Inadequate Funding	131	101	71	9	312	78.0	52.1
5	Inadequate advocacy	126	109	75	7	317	79.3	52.6
6	Copyright and Technical Barriers	107	86	60	8	261	65.3	42.7
7	Institutional culture and policy	85	60	10	6	161	40.3	38.6
8	Reward system in my institution	129	91	64	11	295	73.8	49.6

Table 4.6 presented the challenges academics faced in accessing Open Access Institutional Repositories in Federal Universities in North Central States of Nigeria. From the table, it was seen that majority of academics in the University of Ilorin with total counts of 135 indicated that the challenges faced in accessing Open Access Institutional Repositories was ICT connectivity inadequate and infrastructure; it was followed by Awareness of Open Access IR with total counts of 132. Reward system in my institution and Institutional culture and policy with total counts of 63 and 85 respectively were the least challenges the academics faced. On the part of University of Jos, it was seen that all the academics with total counts of 110 indicated that

the challenges faced in accessing Open Access Institutional Repositories was ICT connectivity inadequate and infrastructure, it was followed by inadequate advocacy with total counts of 109. Institutional culture and policy and reward system in my institution with total counts of 60 and 70 respectively were the least challenges the academics faced. On the part of Federal University of Technology, Minna, majority of the academics with total counts of 80 indicated that the challenges faced in accessing Open Access Institutional Repositories was awareness of Open Access IR; it was followed by ICT connectivity inadequate and infrastructure with total counts of 79. Reward system in my institution and Institutional culture and policy with total counts of 10 for both were the least challenges the academics faced. On the part of Federal University Lokoja, majority of the academics with total counts of 16 indicated that the challenges faced in accessing Open Access Institutional Repositories was ICT connectivity inadequate and infrastructure; it was followed by Awareness of Open Access IR with total counts of 12. Reward system in my institution and Institutional culture and policy with total counts of 2 and 6 respectively were the least challenges the academics faced. From the mean and standard deviation angles, ICT connectivity inadequate and infrastructure has the highest mean of 85.0 followed by Unreliable Power Supply with mean of 83.0. However, Awareness of Open Access IR and Institutional culture and policy with means of 36. 3 and 40.3 respectively have the lowest means. This finding corresponded with that of Utulu & Bolarinwa (2009) who discovered that Open Access Institutional Repositories cannot be accessed if the challenges of ICT connectivity and infrastructure are encountered. This implies that academics experience a kind of delay when looking for information from their Open Access Institutional Repositories during their academic activities which can in turn lead to their academic productivity negatively. This is because in this century, without constant access to the internet in the learning environment, the teaching,

learning and research which are the major activities in academic environment will be affected negatively.

4.4 Inferential Statistical Analysis

This section dealt with the inferential statistical analysis employed to test the two (2) null hypotheses formulated and tasted in this study. All the hypotheses were tested using one way ANOVA. This is because the research has four (4) groups. The alpha, $\alpha = 0.05$ was used. This is because the researcher conducted this study within the context of social sciences.

$HO_{1:}$ *There is no significant difference in the frequency of use of Open Access Institutional Repositories among academics in Federal Universities in North Central States of Nigeria*

Table 4.7: Analysis of Difference by Academics in the Federal Universities in North Central States of Nigeria on the Frequency of Use of Open Access Institutional Repositories among Academics in Federal Universities in North Central States of Nigeria

Responses	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	10.479	3	3.493	.260	.854
Within Groups	4596.619	342	13.440		
Total	4607.098	345			

Table 4.7 Showed that the F – calculated value is 0.260 and the P value is 0.854 which is greater than $\alpha = 0.05$. Thus the null hypothesis one is retained. This shows that there is no significant difference in the frequency of use of Open Access Institutional Repositories among academics in Federal Universities in North Central States of Nigeria. This implies that there are similarities in the frequency of use of Open Access Institutional Repositories by academics in Federal Universities in North Central States of Nigeria.

$HO_{2:}$ *There is no significant difference in the extent of satisfaction with the contents of Open Access Institutional Repositories among academics in Federal Universities in North Central States of Nigeria*

Table 4.8: Analysis of Difference by Academics in the Federal Universities in North Central States of Nigeria in the Extent of Satisfaction with the Contents of Open Access Institutional Repositories among academics in Federal Universities in North Central States of Nigeria

Responses	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	140.661	3	46.887	.706	.549
Within Groups	22725.250	342	66.448		
Total	22865.910	345			

Table 4.8 Showed that the F – calculated value is 0.706 and the P value is 0.549 which is greater than $\alpha = 0.05$. Thus the null hypothesis two is retained. This shows that there is no significant difference in the extent of satisfaction with the contents of Open Access Institutional Repositories by academics in Federal Universities in North Central States of Nigeria. This implies that there are similarities in the extent of satisfaction with the contents of Open Access Institutional Repositories among academics in Federal Universities in North Central States of Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presented the summary, conclusion and recommendations of the study. The chapter also advanced some suggestions for further research.

5.2.1 Summary of the Study

The purpose of this study was to investigate the Awareness and Use of Open Access Institutional Repositories by Academics for Accessing and Dissemination Research Outputs, with a view to improving the propagation of Open Access IR outlets whose utilization was low.

The study was guided by the following objectives: To find out the level of awareness of Open Access IR by academics, identify the sources of their awareness of Open Access IR by academics, find out the extent at which academics use Open Access IR for accessing and disseminating of research outputs, determine the extent of satisfaction with the contents of Open Access IR by academics, and to find out the challenges facing academics in accessing Open Access IR in Federal Universities in North Central States of Nigeria. In order to achieve the objectives of the study, five research questions and two hypotheses were formulated and tested.

Survey research method was adopted in conducting this study. The population of the study was the academics in the Federal Universities in North Central States of Nigeria. A total of 355 copies of questionnaire were distributed to the respondents, 346 (97.4) were duly completed and returned. Questionnaire served as an instrument used for data collection in this study.

The data collected for the study were presented and analyzed using descriptive and inferential statistics (ANOVA). The findings from the descriptive analysis were presented in

tables, percentages, mean and standard deviation while one way **ANOVA** were used to test the two hypotheses formulated for the study.

5.3 Summary of the Major Findings

In the light of the major findings of the study it was discovered:

1. Academics in Federal Universities in North Central States of Nigeria are aware of the existence of Open Access Institutional Repositories.
2. It was discovered that academics major sources of awareness of Open Access IR were through academics/colleagues in Federal Universities in North Central States of Nigeria.
3. Some academics use some Open Access Institutional Repositories contents for Journal articles and Lecture notes in the Federal Universities in North Central States of Nigeria.
4. Academics are highly satisfied with theses and dissertations as well as journal articles and other contents of the Open Access Institutional Repositories in the Federal Universities in North Central States of Nigeria.
5. The study discovered that academics faced challenges of internet connectivity, inadequate infrastructure, and unreliable power in the Federal Universities in North Central States of Nigeria.

5.4 Limitation of the Study

In the course of carrying out this research, the researcher was faced with the challenges of copying with the office work with the research. This was due to the fact that the time approved to the researcher from the working place was elapsed while the study was going on. Also, the challenge of following up the distributed questionnaires was faced. This is due the fact that the universities studies were in different states within the North Central States of Nigeria.

5.5 Contributions to the Body of Knowledge

The following are the contributions to the body of knowledge in this study:

1. This study revealed that through academics/colleagues constituted the most important source through which academics in the Federal Universities in North Central States of Nigeria get aware with the existence of Open Access Institutional Repositories. This source among others helps the academics to tell their colleagues about the existence of the repositories. This implies that academics get aware about the Open Access Institutional Repositories through peer interaction which is more of informal method.
2. This research provided the empirical evidence that the academics in the Federal Universities in North Central States of Nigeria derived a lot of satisfactions from the contents of Open Access Institutional Repositories. These including theses and dissertations, journal articles, conference papers, seminar papers, inaugural lectures among others. This is because the activities they engage in require information resources that are obtained from the repositories.

5.6 Conclusion

From the analysis and summary of findings of the study, it was clear that awareness with the existence of Open Access Institutional Repositories by academics in the Federal Universities in North Central States of Nigeria is on the increase. Academics indicated that the Open Access Institutional Repositories is very important to the University community. This is because they accessed and disseminate scholarly works regularly.

Academics used materials from Open Access IR to prepare lecture notes, research work and seminar. Furthermore, the academics in the Federal Universities in North Central States of Nigeria showed that they were highly benefited with many of the contents of Open Access

Institutional Repositories including theses and dissertations, journal articles, conference papers, seminar papers, inaugural lectures among others. Lastly the study found that the major challenges of use Open Access IRs by academics were that of internet connectivity, inadequate infrastructure and power supply among others.

5.7 Recommendations

In line with the findings of this study, the following recommendations were made:

1. Organizing series of conferences and capacity building workshops to educate and train stakeholders in academic and research institutions in Federal Universities in North Central States of Nigeria. In this way their knowledge of open access will be enriched and they will be in a better position to advocate for change in policies within their institution and at national level.
2. 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 so as to contribute to the existing body of knowledge not mere consumers.
3. The management of the Federal Universities in North Central States of Nigeria should continue to encourage the members of the University environment to be depositing their publications regularly in order to share their knowledge with colleagues, students among others.
4. It is advised that the management of the Federal Universities in North Central States of Nigeria should encourage the uploading of many of the locally created documents on the Open Access Institutional Repositories in order to improve the academics' satisfaction on the contents of the repositories.

5. Adequate funding is seriously needed for building and upgrading poor ICT infrastructure, standby generator and inverters, Connectivity and high Internet bandwidth are equally important.

5.8 Suggestions for Further Studies

The following areas have been suggested for further studies:

1. Assessment of the Deposit to Open Access Institutional Repositories for Scholarly Activities among Academics in Federal Universities in North Central States of Nigeria.
2. Influence of Open Access Institutional Repositories on Scholarly Activities among Academics in Federal Universities in North Central States of Nigeria.

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APPENDIX

Questionnaire

Department of Library and Information Science,
Ahmadu Bello University,
Zaria.

Dear Respondents,

I am a postgraduate student of the above named institution conducting a research titled "Awareness and Use of Open Access Institutional Repository by Academics in Federal Universities in North Central States of Nigeria".

Please kindly respond as accurately as possible to the items in it. All your responses are for academic purposes only and they will be treated with utmost confidentiality.

Thank you.

Yours Sincerely,

Hakeemat S. Bello

SECTION A: Demographic Information

1. Name of Universities: _____

SECTION B: Level of Awareness of Open Access IR by Academics in Federal Universities in North Central States of Nigeria

2. What is the Level of your awareness of Open Access IR among Academics in Federal Universities in North Central States of Nigeria?

Awareness of Open Access IR

Aware [ ]

Not aware [ ]

SECTION: Sources of Awareness of Open Access IR

3. Sources of Awareness of Open Access IR

S/N	Sources of Awareness of Open Access IR	Tick
1.	From academics/colleagues	[ ]
2.	Institution bulletins	[ ]
3.	Through internet browsing	[ ]
4.	Through publishers' handbills/flyers in the internet	[ ]
5.	Through workshops	[ ]
6.	Through the library/librarian	[ ]
7.	Through this questionnaire	[ ]
8.	Others specify ----------	

SECTION C: Extent of Use of Open Access IR for by Academics in Federal Universities in North Central State of Nigeria

4. To what extent do academics use Open Access IR in Federal Universities in North Central States of Nigeria?

S/N	Extent of Use of Open Access Irby Academics	HU	U	RU	NU
1.	Journal articles				
2.	Theses & Dissertations				
3.	Inaugural lectures				
4.	Conference papers				
5.	Seminar papers				
6.	Course Materials				
7.	Lecture Notes				
8.	Student projects				
9.	Committee papers				
10.	Computer software				
11.	Works of art				
12.	Photographs				
13.	Video recordings				
14.	Others specify				

Scale of 1- 4 HU =Highly Utilise, U=Utilise, RU=Rarely Utilise and Not Utilise

SECTION D: Extent of Satisfaction with Contents of Open Access IR by Academics in Federal Universities in North Central States of Nigeria

3. To what extent do academics satisfy with the contents of Open Access IR in Federal Universities in North Central States of Nigeria?

S/N	Extent of Satisfaction with Contents of Open Access IR	HS	S	RS	NS
1.	Journal articles				

2.	Theses & Dissertations				
3.	Inaugural lectures				
4.	Conference papers				
5.	Seminar papers				
6.	Course Materials				
7.	Lecture Notes				
8.	Student projects				
9.	Committee papers				
10.	Computer software				
11.	Works of art				
12.	Photographs				
13.	Video recordings				
14	Others specify				

Scale of 1- 4 = Highly Satisfy, Satisfy, Rarely Satisfy and Not Satisfy

SECTION E: Challenges the Academics Face in Accessing Open Access IR in Federal Universities in North Central States of Nigeria

4. What challenges Academics Faced with in Accessing Open Access IR in Federal Universities in North Central States of Nigeria?

S/N	Challenges faced by Academics in Accessing Open Access IR	Tick
1.	Awareness of Open Access IR	[ ]
2.	ICT connectivity Inadequate and infrastructure	[ ]
3.	Unreliable Power Supply	[ ]
4.	Inadequate Funding	[ ]

5. Inadequate advocacy [ ]

6. Copyright and Technical Barriers [ ]

7. Institutional culture and policy [ ]

8. Reward system in my institution [ ]

9. Others specify ----------