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Digital Archiving and the Establishment of Open Access Digital Repositories in Selected Nigerian Universities

By

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Abstract

This paper focuses on digital archiving and the establishment of open Access digital repositories in three selected Nigerian Universities. Despite the abundance of vital information kept in the traditional archives of Nigerian universities, many researchers cannot easily access it due to the seeming absence of proper digitization and online visibility. It is also observed that the practice of archiving and the management of information in the repositories in Nigerian universities is limited to the central library, which makes access to information in the satellite archives across the departments and in the administrative units very difficult. This paper therefore, intends to; determine the nature, existence and the roles of digital repositories in the three selected Nigerian universities and to identify the types of information sources and resources available in their digital repositories, among others. Qualitative research methodology was adopted. Data was purposefully obtained from the websites of the three Selected Nigerian universities. The findings of this study indicate that the Digital Repositories existed in the three selected universities studied with different names, and were found to contain volumes of scholarly information sources and resources, which were organized in a systematic and chronological order, but it is not well structured to specifically link resources in the departments, faculties and other units of the universities with the central repositories. It was also found that Digital Repositories were not always accessible, possibly due to inadequate ICT infrastructure and necessary staff skills for their effective maintenance. It was concluded that the repositories existed for over a decade and were providing information services to its users. It was recommended that, the management of the universities studied should imbibe strong maintenance culture to effectively manage the Digital Repositories for sufficient access to scholarly information sources and resources and should consider the installations and deployment of necessary ICT infrastructure, as well as the right software configurations including the provision of regular staff training for proper

digitisation and digitalisation of work processes and procedures in the repositories for efficient results and the promotion of Digital Data Literacy in Africa.

Keywords: Digital Archiving, Open Access, Digital Repositories, Nigerian Universities.

Introduction

There are volumes of important information generated in the Nigerian Universities. This information is needed by scholars, students, policy-makers, among others. It is mostly in form of sources such as dissertations, theses, books, etc. These data is used as Open Educational Resources that can be preserved in the Digital Repositories of the universities, as well as in the promotion of Digital Data Literacy in Africa. However, despite the abundance of the vital information kept in the traditional archives of Nigerian universities, many researchers cannot easily access it due to the seeming absence of proper digitization and online visibility. It is also observed that the practice of archiving and the management of information in the repositories in Nigerian universities is limited to the central library, which makes access to information in the satellite archives across the departments, especially in the administrative units very difficult. Even where digitization has been achieved and online visibility is desirable, technology is limiting for sharing to be achieved.

In spite of the fact that many scholars have written on the different aspects of digital archiving in Nigeria and beyond, such contributions seem to be more generic than specific to the University systems of digital archiving from all its ramifications (Foot, 2001; Heslop, Davis and Wilson, 2002; Bearman, 2005; Kanyergo, 2006; Ezeani and Ezema, 2009; Pozo, Long and Pearson, 2010; Knight, 2010). This paper therefore, purposely sampled three selected Federal Universities in Nigeria; Ahmadu Bello University, University of Ibadan and the University of Nigeria. Their

selection is informed not only by their position as the first-generation universities in the country, but also because they deploy modern technology, as well as digital archiving than any university in Nigeria.

Using the three Nigerian public universities that are purposively sampled as case studies, this paper intends to examine the nature, dynamics, contributions and challenges of digital archiving of the selected universities giving currency to (1) the nature of digital repositories in the Nigerian Universities (2) the existence of digital repositories in Nigerian Universities (3) the types of information available in the digital repositories of Nigerian Universities (4) the level of digitization of repositories in the Nigerian Universities and (5) the challenges and implications of the existing forms of repositories in the Nigerian Universities. It is therefore, hoped that knowing the status of the Digital Repositories of the universities in terms of existence, accessibility, functionality among others will greatly help decision makers in institutions of higher learning towards the improvement and management of repositories in Africa and hence, which is central to the thrust of this paper.

Review of Related Literature

Many scholars have written on digital archiving and open access repositories. Digital archiving is a process of storing information sources and resources in the digital space. These documents are stored, retrieved and disseminated from the repositories (Anene, Ozor and Baro, 2020) and they include dissertations, theses, books etc. Information seekers such as researchers, historians, students, among others use digital repositories for access to information sources and resources. Eke (2011) submits that digitization of documents helps in reducing handling and use of fragile documents because it is contained in the digital spaces. According to him, an institutional repository is a set of services and technologies that provide the means to collect, manage,

provide access to, disseminate and preserve digital materials produced at an institution. Digital Archives are used for teaching, learning and research. They can be used to preserve, retrieve, and disseminate data using electronic technology.

Anbu (2006), Kanyergo (2006), Olatokun (2008) and Ezeani and Ezema (2009) examine digital preservation and its strategies as deployed by many Nigerian universities, libraries and national information centres. Most of these studies reveal that migration is the most popular digital preservation strategy adopted with no viable plan to assess digital objects for preservation purposes.

Saha (2006) defines digital archiving as long-term maintenance of a byte stream with the aim of reproducing a facsimile of the original document mainly for continued accessibility of the document contents through time and changing technology. These documents according to the author range from texts, databases, films, other audio-visual contents, satellite surveillance, websites to museum catalogues. While commenting on the problems of digital archiving, the author argues that until recently, there has never been a storage platform that is trusted to store critical electronic records for long time. The author equally observes that preserving digital information is more difficult than preserving records on materials such as paper, or film. This is because, apart from the fact that it deals with a large volume of volatile information, which demands for new software architecture that can prevent accidental changes to records, unique procedures have to be put in place to identify, classify, move and access data.

In a similar vein, Boudrez and Dumortier (2005) state that, the invention of archives served a lot of purposes apart from expanding the frontiers of learning and knowledge production. This development according to them made it possible the transmission of specialized knowledge from one generation to another. The authors further observe that the invention of computers and more

recently, the internet as a modern *modus operandi*, also give people the ample opportunity to save, manage, preserve and retrieve enormous data electronically. They also maintain that despite this technological advancement, some highly sensitive questions regarding the safety, maintenance and durability of electronic archives do not receive adequate and convincing answers. Other important issues raised by the authors include; data preservation strategy, archiving standards, policy and procedures, archiving procedures, to mention, but just a few.

Furthermore, Smith and Diego (2007) study the dynamics of Digital Archiving Policies, as well as Trusted Digital Repositories of the MIT libraries. Under the PLEDGE Project of the San Diego Supercomputer Centre and the University of California, the authors examine the sets of policies that affect operational digital preservation of archives with a view to developing a standardized means of recording and enforcing them, using rules engines. They also evaluate the completeness of other efforts to define policies for digital preservation such as the RLG/NARA Trusted Digital Repository checklist and the PREMIS metadata schema. The authors postulate that preservation environment might be assessed to ensure that the system is complete. The authors argue that there should be an associated repository assessment criterion, a related management policy, set of rules and technical metadata for the application of associated preservation services. Through this process they believe that preserved metadata can be examined to determine the trustworthiness of the preservation environment.

Cunningham (2008) argues that digital archiving requires a more robust intervention across the entire records continuum. He equally maintains that the Open Archival Information System (OAIS) reference model is deficient because it ignores pre-ingest archival activity giving a classic example with the National Archive of Australia. The author in his work focuses mainly on

the challenges associated to digital archiving, especially in terms of securing access to the various skills and capabilities needed for digital curation.

Writing on some important strategies for digital archiving and maintenance of repositories, Ismail and Affandy (2018) highlight some viable processes and methods used in the implementation and preservation of digital records/archives. The authors also aver that digital records must be fixed, inviolate representation of business activity that is preserved within a particular space and context apart from being protected from loss and alteration.

In Nigeria, Kanyergo (2006), Anbu (2006), Olatokun (2008), Gbaje (2011), Ezeani and Ezema (2009), as well as Nasidi (2022), examine digital preservation and its strategies as deployed by many Nigerian universities, libraries and national information centres. Most of these studies reveal that migration is the most popular digital preservation strategy adopted with no viable plan to assess digital objects for preservation purposes. They also observe that most Nigerian librarians are falling short of the needed technological skills to properly handle issues such as book-marking, characterization of scanned documents, trouble-shooting equipment among other things.

Based on the reviewed literature, it can be deduced that while such works play a significant role, especially in defining concepts such as archiving, repositories and preservation, however, many of the researches on the different aspects of digital archiving of repositories in Nigeria give a generalized picture of digital archiving in Nigerian universities with little, or no effort made to study the specifics of the archiving of such institutions. This is because most of the works focus largely on the Nigerian universities' libraries, their management and preservation of data, but overlooking other important areas of the university digital archiving, which include; journals,

inaugural lectures, bulletins, theses and dissertations that this present study seems to have prioritized.

Research Methodology

This study adopted a qualitative research methodology. The paper specifically utilised a content analysis technique in analyzing data obtained from websites of the three selected first-generation Federal Universities in Nigeria. The researchers purposely explored websites of the selected universities namely: Ahmadu Bello University, Zaria from Northern Nigeria; University of Ibadan from South-Western Nigeria and University of Nigeria, Nsukka from the South-Eastern Nigeria. The website data was obtained from DSpace 7 (2022), another DSpace 7 (2022), UISpace (2013) and University of Nigeria (2022).

Similarly, the paper uses both published and unpublished secondary materials. These include; books, journal articles, technical reports and conference papers. Effort is equally made to juxtapose between the data obtained from both the primary sources (the universities' websites) and the secondary sources (both published and unpublished).

Institutional Repositories of the three selected Universities:

1. The University of Ibadan (UI) Repository

Established in 1948, the University of Ibadan, popularly referred to as UI is considered the first University in Nigeria (Amoo, 2019). Before 1962 when it became a full-fledged University, it was a College of the University of London in a special relationship scheme. It is also one of the first generation Universities in Nigeria (Tamuno, 1981; Williams and Omoverere, 2008; *Livsey, 2017*). The University took off with academic programmes in Arts, Science and Medicine. Presently, it has more academic programmes in sixteen Faculties namely, Arts, Science, Basic

Medical Sciences, Clinical Sciences, Agriculture, the Social Sciences, Education, Veterinary Medicine, Pharmacy, Technology, Law, Public Health, Dentistry, Economics, Renewable Natural Resources and Environmental Design and Management. The Faculties of the Basic Medical Sciences, Clinical Sciences, Public Health and Dentistry are organised as a College of Medicine (University of Ibadan, 2022).

Other academic units of the University include the Institute of Child Health, Institute of Education, Institute of African Studies, Centre for Child Adolescent and Mental Health, Centre for Educational Media Resource Studies, African Regional Centre for Information Science (ARCIS), Centre for Peace and Conflict Studies (CEPACS), Centre for Petroleum, Energy, Economics and Law (CPEEL), Centre for Sustainable Development (CESDEV), and Centre for Entrepreneurship and Innovation (CEI), Institute for Advanced Medical Research and Training (IAMRAT), Centre for Drug Discovery, Development & Production (CDDDP), Centre for Control & Prevention of Zoonosis (CCPZ) (University of Ibadan, 2022) . A new National Institute for Maternal Child & Neonatal Health (NIMCNH) & Institute for Infectious Diseases are under construction.

The University of Ibadan Postgraduate School is renowned for its well acknowledged Postgraduate programmes within and outside Nigeria. The Postgraduate School enrolment takes about 50% of the entire student enrolment. University of Ibadan produces an average of 3,000 Masters & 250 PhDs every year (University of Ibadan, 2022). The University also hosts the Pan African University Life & Earth Sciences Institute on behalf of the West African Sub-region as an initiative of the African Union. The programme, which is now in its 2nd year, has 97 students from all over Africa.

Like most Universities in the world, UI has a website (www.ui.edu.ng), which is powered by ITeMS (Thelwall, & Wilkinson, 2005; Thelwall, Harries & Wilkinson, 2003). The website has a number of important archival sources and unique repositories. The UI Space for instance, is an important repository that is managed by Kenneth Dike Libarary of the University. The UI Space has a collection of theses, articles, books, videos, images, lectures, papers, data sets and all types of digital contents originating from the University. Unfortunately, despite the richness of this important repository, it is no longer functional. This problem must have stemmed up from the cavalier attitude of the University management to oversee the maintenance, management and upgrade of its website.

The UI University website also has provided a special online bulletin with the motto ‘Knowledge is Power’. One can access and download the previous editions of the bulletin from 2007 when it was first incorporated into the site to 2022. In each year, a collection of the monthly editions of the bulletin is made available to visitors of the University website. The bulletin has been a significant source of information not just for the University community, but also for global audience.

Furthermore, the UI website has a collection of its inaugural lecture series. The lectures are properly serialized with numbers, dates of delivery, names of inaugural lecturers, their departments, the titles of their lectures, the PDF versions of the lectures’ abstracts, as well as the downloadable videos of such inaugural lectures. Since the establishment of the University, it now has a total number of 508 inaugural lecture series available on its website. This repository keeps visitors to the website abreast of the University’s intellectual contributions to global scholarship, particularly through the individual roles of its staff.

The UI website also has a special section for the download of its research reports, memos, memorandums of understanding, as well as staff handbook. On the contrary, there are very few downloadable materials in the repository. This is because of the lack of maintenance and updating.

The UI News Archive is no doubt another vital repository that is well-equipped with hands-on materials on all important events taking place in the University. These events include congregational elections, seminars presented, disclaimers, calls for application of all kinds, fellowships, results of accreditation exercises, collaborations, workshops, notice to students, appraisal form, to mention, but just a few.

Upon all the plethora of information available on the UI website, there are only 6 journals that are available online (Fig. 1). However, individual departments also have internationally recognized peer-reviewed journals. The only challenge is that such journals are mostly hosted at different domains independent of the University website. Most of the UI journals are hosted on different databases one of which is the African Journals Online (Ajol) (See; Fig. 2).

Figure 1: A List of UI Online Journals (Source: Nadir A. Nasidi, 2022)

S/N	Name of Journal	Link	Number of Editions
1.	Journal of Science Research	https://sci.ui.edu.ng/node/1563	0
2.	African Journal of Fisheries and Aquatic Resources Management	https://journals.ui.edu.ng/index.php/ajfarm	4
3.	African Journal of Educational Management	http://journals.ui.edu.ng/index.php/ajem/article/view/223	24
4.		https://journals.ui.edu.ng/index.php/njred	3

	The Nigerian Journal of Rural Extension and Development		
5.	University of Ibadan Journal of Science and Logics in ICT Research	https://journals.ui.edu.ng/index.php/uijslictr	8
6.	Ibadan Journals Planning	http://journals.ui.edu.ng/index.php/ipj	1

Figure 1 shows the names and the links of the available online UI journals. It also itemizes the number of editions published by each of the 6 journals. The total absence of online editions for the *Journal of Science Research* for instance, further brings out the problem of proper digitisation, while lack of continuity in the case of *The Nigerian Journal of Rural Extension and Development*, as well as *Ibadan Journals Planning* reveals lack of concern by the university members in charge of the journals to update.

Fig. 2: A List of Selected UI Journals hosted on Ajol (Source: Nadir A. Nasidi, 2022)

S/N	Name of Journal	Database	Link
1.	Nigerian Journal of Pharmaceutical Research	Ajol	https://www.ajol.info/index.php/njpr/about/contact
2.	Ibadan Journal of Humanities	Ajol	https://www.ajol.info/index.php/ibjhs
3.	Annals of Ibadan Postgraduate Medicine	Ajol	https://www.ajol.info/index.php/aipm
4.	African Journal of Sustainable Development	Ajol	https://www.ajol.info/index.php/ajsd/about
5.	Journal of Librarianship and Information Science in Africa	Ajol	https://www.ajol.info/index.php/jlisa/about/contact
6.	African Journal of Biomedical Research	Ajol	https://www.ajol.info/index.php/ajbr

7.	Journal of Applied Science, Engineering and Technology	Ajol	https://www.ajol.info/index.php/jaset/about/contact
8.	African Journal of Physiotherapy and Rehabilitation	Ajol	https://www.ajol.info/index.php/ajprs#:~:text=
9.	African Journal of Sustainable Development	Ajol	https://www.ajol.info/index.php/ajsd/about/submissions

Figure 2 provides the list of 9 UI online journals that are hosted by the African Journals Online (Ajol) database. It also itemizes the in link of each journal for people interested in visiting the repositories.

2. Ahmadu Bello University (ABU), Zaria Repository

Ahmadu Bello University, Zaria (popularly referred to as ABU) is one of the first generation universities in Nigeria. It was established on the 4th of October, 1962 with Dr. Norman S. Alexander as its first vice-chancellor from 1965-1966. The university took off with only four faculties and fifteen departments namely; Agriculture, Engineering, Law and Science. Presently, the University turned out to be one of the largest and most extensive of all universities in Sub-Saharan Africa (Ahmadu Bello University, 2017). ABU covers a total land area of about 7,000 hectares and presently has thirteen faculties, a Postgraduate School and 82 departments. It now has over 500,000 strong Alumni occupying important positions in both Nigeria and abroad.

The ABU has an active website (<https://abu.edu.ng>), with many sources of digital repositories open accessed to its local, as well as global community. Most of these digital collections however, are managed by the central university library named Kashim Ibrahim Library (KIL).

Interestingly, the library has a policy that guides the operations and management of their collections including the digital ones which can make the operation more effective (Ibrahim & Umar, 2020; Ahmadu Bello University Zaria, Kashim Ibrahim Library, 2021). The pages from the site home page for example, contain digital materials created by the university and its community: News, journals, resources and a library page link. Two important digital materials under the news section are ABU special bulletin and symposia. The special bulletin keeps members of the university community abreast of the happenings around its campuses and affiliates. Information is kept in chronological order according to date of its publishing on the site, title and the view option for downloads. News item of the bulletin is available from October, 2017 to August, 2022, showing 153 entries. The symposium is arranged in a similar order as news bulletin containing 14 entries from February to March, 2021. The journal section lists 11 journal entries sequentially arranged showing titles, ISSN and the downloadable documents. The resources section contains the current academic brief and the university strategic plan.

Even though pages on the home page of the university site provides useful insights into the university digital repository, the library section is hosting most of the university digital resources such as the Digital repository, Arabic resources, government documents, open access databases, subscribed databases, special collections, United Nation publications, newsletters and other publications including online references and tutorials. Among these pages, digital repository resides in Kubanni server, which is hosted by the university's Data Centre (Aliyu & Mohammed, 2013). It contains the university's institutional repository where large volumes of publications from various communities across departments, faculties and other relevant units emanated. Unfortunately, the page is sometimes very difficult to load due to some technical issues in the network, software installation, or probably software crash as a result of incessant power failure.

It has also been observed by the researchers that the page sometimes requires very strong network signals before it can load successfully.

Dspace open-source repository platform is being used in managing the university institutional repository (Aliyu & Mohammed, 2013). Information is therefore, kept in chronological order and can be viewed by recent submissions, issue dates, authors, titles and subjects. The platform also manages nine communities and sub-communities including: Agricultural Research Collections, which has three sub-communities; Noma, Samaru Bulletin and Samaru Miscellaneous Papers. Other resources are books, compendiums, conference proceedings and seminar papers, government documents, inaugural lectures, preprint and post-print journal articles, School of Postgraduate Studies Collections, theses and dissertations with sub-communities as Administration, Agriculture, Arts, Education, Engineering, Environmental Design, Law, Medicine, Pharmaceutical Sciences, Science, Social Sciences and Veterinary Medicine (See Fig. 3).

Figure 3: A List of Ahamadu Bello University Repository Items (Source: Ahmed Zakaria, 2022)

S/N	Repository Item	Entries
1.	Journals	11 (348)
2.	Theses & Dissertations	10,237
3.	Conference Proceedings and Seminar Papers	54
4.	Books	20
5.	News Bulletin	153
6.	Symposium	14
7.	Inaugural Lectures	1
8.	Arabic Resources	604
9.	Government Document	0
10.	Open access database	31
11.	Subscribed database	13
12.	Special collections	0
13.	United Nation publications	53
14.	Library Newsletters	6
15.	Other collections	10

16.	Government documents	1
17.	Preprint and Post-print Journal articles	348
18.	School of postgraduate studies collections	5

Figure there shows eighteen repository items available on the ABU website. It should however, be observed that journals, which have 11, 348 entries, form the bulk of the repository. This is followed by the 10,237 theses and dissertation, as well as 604 Arabic materials.

3. University of Nigeria, Nsukka (UNN) Repository

University of Nigeria, Nsukka was established on the 7th of October, 1960 as a regional university in South-Eastern Nigeria. The university has 15 faculties and 102 departments. It anchors 82 undergraduate programmes, as well as 211 postgraduate programmes distributed across its four campuses located in Nsukka, Enugu, Ituku-Ozalla and Aba.

UNN also has a functional website (<https://www.unn.edu.ng>). The Institutional repository of the University of Nigeria, Nsukka is an information centre of intellectual resources such as books, dissertations, theses, journals, academic volumes and manuscripts. The resources contain the educational contributions of past and present academia, broadening to include scholarly enterprise, literary achievements, hypothetical reasoning etc. In the repository, there is the United Nations Repository Library, which has the total sum of twenty thousand, eight hundred and fifty-five current books (20,855). The materials in the library are mainly research works and books from these UNO agencies, which are mainly used by postgraduate students, staff, final year students and researchers from higher institutions in the South-East Zone of Nigeria and beyond. There is government documents and archives section. Government documents are materials published by Federal, State, or Local Governments, parastatals, non-governmental organizations, groups, corporate bodies and

establishments of higher learning. The section houses the documents such as books, reports, journals, statistics, pamphlets, bulletins, newsletters, gazettes, biographies etc. There is also the Africana Section in the repository. The Section has a total of 46,106 volumes of documents. They include books, theses and other specialized documents. In the repository, there is Library Section having 99,760 bound volumes of Journals and 735,157 volumes of books (University of Nigeria, 2022).

Discussion/Analysis

In all the three selected universities, the Digital Repositories existed with different names. For example, while in Ahmadu Bello University, Zaria it is called Digital Repository, in both University of Ibadan and University of Nigeria Nsukka, it is referred to as Institutional Repository. This finding relates with that of Mohammed (2013) who indicates the existence of institutional repositories in some of the universities in Nigeria, which include Ahmadu Bello University, Zaria; University of Nigeria, Nsukka; Covenant University, Otta etc. Based on the finding on the existence of Digital Repository in the universities, it implies that the universities use different systems in naming their repositories.

The researchers also analysed the nature of the digital repositories by looking at it from the structure i.e., weather it includes links to the satellite repositories from across departments, faculties and other administrative units. It was also analysed in terms of information organization, accessibility and the period upon which information is being published in the repository, as well as whether it is up-to-date, or not.

In terms of how information sources and resources are being organised in the Digital Repositories of the three selected universities, it was found out that most information sources and

resources were organised in a systematic and chronologic order. In terms of the accessibility of information sources and resources, in all the universities, the information sources and resources were mostly accessible at different levels. With regards to the period of publication, most information in the repositories was published from 2007 to 2021, which means that they are not up to date. It was however found that, large volumes of information were being published in the repositories of the three universities. This information about the sources and resources in the university's central repositories with those in Satellites Digital Repositories (department and faculties online information sites), comes at the level of communities, which comprises publications from departments, faculties and other sources across various disciplines. It is not specifically linking resources in the departments and faculties. Many journals that are owned by the universities were however, not found in the central institutional repositories. Also, looking at the submission of Mohammed (2013), the Digital Repositories studied had different software for their operations. It therefore, implies that the Digital Repositories in the universities, were relatively active and functional.

In all the three universities, their repositories, the types of information sources and resources, are journals, books, presentations, lectures, theses and dissertations. This finding agrees with that of Eke (2011), who indicated theses, dissertations, books, lectures etc., as information sources and resources kept in University repository. This implies that the Digital Repositories of the universities studied house scholarly information needed for access.

It is also established that there were sufficient scholarly information available in the selected universities' repositories. They include journals, books, presentations, lectures, theses and dissertations. This finding relates with that of Eke (2011), who indicated that information sources and resources such as books, dissertations, theses, lectures etc., were digitized for storage in the

university repository. This implies that the universities provide digital information service to the users.

Furthermore, it is also observed that the Digital Repositories of the selected universities were not always accessible. This is because some pages require very strong network signals before they can load successfully. It was also found out that the repositories are not showing records of users who access the scholarly information sources and resources. These may be due to the lack of available Information and Communication Technologies (ICTs) and the skills of utilizing them. This is in line with the finding of Anene, Ozor and Baro (2020) who revealed lack of ICTs and skills of using them as challenges in handling Institutional Repositories. This implies that the number of users of the Digital Repositories is not clear and the decision about the extent of use of the repositories will be difficult to evaluate.

Summary of the major findings

The following are the major findings in line with the objectives of this study:

1. The Digital Repositories existed in the three universities studied with different names and contain scholarly information sources and resources that are used for information acquisition.
2. The information in the Digital Repositories from the three universities studied, were organized in a systematic and chronological order, but it is not well structured to specifically link central repositories with resources in the departments, faculties and other relevant units. Many journals were found to be run in silos by the department and faculties.

3. The Digital Repositories contain scholarly information sources and resources. They include journals, books, presentations, lectures, theses and dissertations.
4. There are large volumes of scholarly information sources and resources though there were no records of users to enable assessment of resource utilisation.
5. The Digital Repositories are not always accessible, possibly due to inadequate ICT infrastructure and the necessary skills for their effective maintenance. However, the software used by the universities were not configured to show number of users of the Digital Repositories, as such, the extent of utilisation of the repositories will be difficult to evaluate.

Conclusion

It is concluded that there were repositories in the universities studied with different names and contain a decade of scholarly information sources and resources that are used for information acquisition. The names are Digital Repository and Institutional Repository. The repositories carried out digital archiving, in which information sources and resources such as dissertations, theses, books among others are kept. They are also Open Educational Resources, helping in promoting Digital Data Literacy in Africa. It was also concluded that, the repositories are not always accessible as the information needs of the users arise due to seeming absence of adequate ICT infrastructure and the necessary staff skills for their effective maintenance.

Recommendations

Based on the nature of the problems identified, this paper provides the following recommendations:

1. The management of the universities studied should imbibe strong maintenance culture to effectively manage the Digital Repositories for sufficient access to scholarly information sources and resources as Open Educational Resources for users in order to promote Digital Data Literacy in Africa.
2. Despite the fact that the Digital Repositories in the universities studied are being utilised, it is also recommended that, the central repositories should be structured to include resources from departments, faculties and other relevant units of the universities for effective access and utilisation of the resources.
3. Similarly, the management of the universities studied should make it as a matter of priority to ensure all journal publications of the universities are centrally displayed in their main repositories to improve their access and global visibility.
4. The management of the universities should consider installations and deployment of necessary ICT infrastructure and the right software configurations, as well as provide regular staff training for proper digitisation and digitalisation of work processes and procedures in the repositories for efficient results.
5. The management of the universities studied should encourage continuous digitization and upload of scholarly information sources and resources to the Digital Repositories of their universities, as Open Educational Resources.

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