

Deployment of Ahmadu Bello University Zaria, Nigeria Institutional Digital Repository By

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Abstract

The paper discussed the concept of open access initiative and its relevance to the development of digital repositories. It primarily focused on the institutional digital repository project of the Ahmadu Bello University, Zaria, Nigeria. The University library administration setup, policy, equipment and facilities including software for the project were highlighted. The digitisation process, test running, training, system installation and the workflow developed by the institution were discussed. The successes recorded and challenges faced by the project were equally presented. The paper concluded that repositories are very important to universities in helping them showcase, manage and capture their intellectual assets as a part of their information service strategy and contribution to universal access to knowledge and information.

Introduction

The Open Access movement is a social movement. The movement was said to have started in the 1960s, but became much more prominent in the 1990s with the advent of digital communications, in particular, the Internet. Before the advent of the Internet, File Transfer Protocol, Gopher, and the World Wide Web were used to increase availability of scholarly material by lowering the barriers to distribution, (Registry of Open Access Repositories, 2011).

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 and academic societies dominated scholarly communication and researchers channeled their research output solely through authoritative publishers and academic societies. 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 at colleges, polytechnics and universities. The current evolving information access model is referred to as Open Access.

The development of Open Access model was as a result of what has been observed over the years to respond to the rising costs of publishing as well as the increasing prices of scholarly journal published by commercial publishers. Subsequent upon this, the Association of Research Libraries (ARL) of North America introduced the concept of Institutional Repository (IR) in 2002 as a strategy to combat the rising cost of scholarly journal publications. This called for the construction of repositories especially by academic and research libraries. Essentially, an Institutional Digital Repository (IDR) is an academic locus for collecting, preserving and disseminating, in digital

form, the intellectual output of an institution, particularly academic and research institutions such as Universities and Research Centres.

“Repository” could simply be considered as “storehouse” or “treasure house”. Academic and Research Institutions were more often than not, undertake various kinds of educational and research activities leading to the production of vast amount of valuable academic articles and materials. The system where these academic and research outputs are preserved in digital forms on a server and freely accessed through the Internet is called an “Academic (Institutional) repository”. It has been observed that the construction of the repositories has reached advanced stage in the developed nations. In the United State for instance, major Universities have established their institutional repositories.

By design, Institutional Repository makes scholarly information produced in an institution available to wider communities. It offers greater visibility and higher impact for the information resources and records to be globally accessible over the Internet. The development of repository could be said to be underpinned by the principles of Open Archive Initiative (OAI). Following OAI-PMH (Open Access Initiative-Protocol for Metadata Harvesting), an international standard protocol for metadata, the information to be used for retrieving articles (metadata) is attached to each of the records of the repository. As a result, the records can be retrieved by many search engines like Google, and also by nation-wide databases like the Croatian scientific journals HRČAK repository. Through these channels, institution repositories can disseminate information much more effectively than personal websites.

Ahmadu Bello University (ABU) Library Digital Repository

The Ahmadu Bello University, Zaria University Library Complex comprised of the 8 Divisions of the Main Library (KIL) and the Satellite libraries: - President Kennedy Library (PKL); Centre for Islamic Legal Studies (CILS); Law Library; Medical Library; Abdullahi Muhammad Public Library; LEE T. Rail Back Library (former Veterinary Medical Library); Division of Agricultural Colleges Library (DAC Library); Arewa House Library; and the Institute for Agricultural Research Library (IAR Library). Others are the Centre for Energy Research Library (CERT Library); National Animal Production Research Institute Library (NAPRI Library); and the National Agricultural Extension Research and Liaison Services (NAERLS Library). The need to move along with the current trends of making information resources easily available and accessible to customers especially using the online system motivated the Ahmadu Bello University library to design, establish, develop and manage its digital information resources of enduring value to students, lecturers, and researchers. To this end, the library management established a digitisation unit in 2005 in the main library (KIL) to digitise the title pages and abstracts of all the theses and dissertations submitted to the University for the Award of higher degrees and certificates. The digitised resources were subsequently saved on CDs and managed on DATAD (Database of African Thesis and Dissertation) flat form.

A.B.U. Library Complex Policy Review

With the review of the library's policy and the creation of ICT division, the University Librarian in 2009 set up a five man committee to, among other things, design, develop and install Digital Repository in Kashim Ibrahim library being the Central library of the University within two months. The committee successfully came up with the basic requirements for the project and strategies for implementation, maintenance and sustenance within the two months period given to it, (Mohammed, 2012).

The library hosted the digital repository in 2010 with the purchase of a server and other facilities for digitisation. A new office was equally provided for the smooth take off of the project. The Dspace management software was recommended by the committee and it was subsequently installed on the server using the Windows platform in 2010.

Digital Repository Equipment and Facilities

In order to ensure the success of the IDR project, some of the equipment and facilities acquired and installed included the digitisation equipment needed for converting source materials from physical/ analogue formats to digital one. These included:

1. Hardware:

(a) **Scanners:** Based on the fact that there is no single scanner that can provide all digitisation needs and that a variety of scanners are needed to complete different digitisation tasks, three Xerox Documate 752 high-speed duplex scanners were procured for the take-off of the project to replace the old HP flatbed scanners being used previously. The scanners were selected based on the following reasons:

- i. Volume (average number of pages and images to be scanned)
- ii. Scanner duty cycle (average number of scans recommended for a scanner model)
- iii. Need for color, black and white, or gray scale scans
- iv. Resolution and format
- v. Document size
- vi. Single or double sided (also referred to as simplex or duplex)
- vii. Scanner warranty
- viii. Maintenance requirements.

(b) **Computers:** Normally, the computer to be used for any scanning activity/tasks must be able to handle very large files which can be memory and processor intensive. Thus, new computers with 2GB Random Access Memory (RAM) and disk space were acquired. The image-processing speeds have a direct impact on the workflow and the speed of the scans.

(c) **Monitors:** Monitors are used to preview the quality of images to be captured. A large-screen monitor that supports a high-resolution display should be used for image editing and quality control. This was why 19 inches (flat panel) was acquired to properly review images. The ability to calibrate and control the monitor contrast, brightness, and color temperature is very important.

2. Software

Naturally, software are needed for the hardware to work. Some relevant software were thus acquired and installed for such purposes. These included:

(a) Scanning and OCR to convert the hardcopy image to a digital one and then into text that a word processor can understand what is being done using the Abby Fine Reader 8.0 installed.

(b) Usually, files could be converted from one format to another e.g. Documents are

typically stored as Tagged Image File Format (TIFF), Portable Document Format (PDF), Portable Document Format for archiving (PDF/A), or Joint Photographic Experts Group (JPEG) files. The most preferred format selected for use is the PDF formats specifically; the Nitro PDF express was adopted.

- (c) Content Management software: Indexing by record can be the most costly part of any digitisation effort, yet it is vital for allowing users to find the information they require. Indexing can include assigning and capturing various metadata including bibliographic data and subject terms. The Dublin Core metadata has been adopted for such purpose.

Establishment of Digitisation Centre and Processes

Under normal circumstances, Institutional Repository has four characteristics as outlined by Johnson (2002). They should be:

- institutionally defined (as opposed to discipline- or subject-focused);
- scholarly (containing the products of faculty, research staff, and students);
- cumulative and perpetual (the content should be preserved on a long-term basis); and
- Open and interoperable (attentive to the Open Archives Initiative—Protocol for Metadata Harvesting).

Consequently, the digitisation centre purposely established for the IDR project performs the following tasks:

1. Digitisation of non-digital born theses and dissertations submitted for the award of postgraduate degrees and certificates of the University for ingest into the university institutional repository;
2. Uploading of the digital born theses and dissertations into the university institutional repository;
3. Collection and uploading of post-print and pre-print scholarly publications of the scholars within the university community and also from outside the University as the case may be; and
4. Collection and uploading of other relevant information resources generated within the university committees such as inaugural lectures, conference proceedings; seminar and workshop papers etc.

Test Running of IDR Pilot project

Hitherto, an IDR pilot project was setup in 2009 to familiarise the library staff with the

Institutional Repository system. During this period, various training programmes were held for different categories of the library staff on the project to understand their different roles. In 2010, the University management purchased a HP proliant server with 600GB Hard drive to facilitate the take-off of the project. The Dspace software was deployed on windows server platform and made accessible to the public via the University Intranet. By the end of 2010, over 1200 theses and dissertations were already uploaded.

IDR Trainings and Installation

Due to the advantage of UNIX platform over Windows within this context, the library management agreed to the installation of an open source operating software. The Dspace was therefore deployed on Ubuntu Open Source. The Linux installation, configuration and deployment took about 3 days due to the difficulties encountered during the exercise. In order to ensure an enduring success, installation and configuration training workshop was organised for the installation and deployment of the Dspace software from 1st – 4th August 2012.

Some of the strategic training programmes organised or attended by the staff on the project include:

- ❖ Optical Character Recognition training workshop by XHS Nigeria Limited Lagos (20 library staff).
- ❖ Open Access Workshop organized by the Department of Library and Information Science on collaboration with Electronic Information for Libraries Network (EIFL.Net) with the theme “Open Access Repositories: New Model for Scholarly Communication” on April 28th -29th 2008. The training addressed Open Access state-of-the-art, policies and recommendations; subject and institutional repositories, and case studies on Open Access institutional repositories in developing and transition countries.
- ❖ Digitisation of Library Materials: Processes and Tools training from 16th – 20th July, 2007 at National Library of Nigeria, Jos, Nigeria (3 staff).
- ❖ Beyond the Basics “Illinois Digitization Institute” at Springfield, Illinois, U.S.A. (2 staff).
- ❖ International Workshop on Automation/Digital library Creation, Organised by Room to Read Initiative in Collaboration with Dr. L. J. Hararu

of Kasavan Institute of Information and Knowledge Management India, held at the Training Room, Kashim Ibrahim Library, A.B.U. Zaria from 24th-27th May, 2010 (20 staff).

- ❖ Linux installation, configuration and deployment training workshop for the installation and deployment of the Dspace software was organised from 1st – 4th August, 2012 (20 staff).
- ❖ NLA Kaduna State Chapter Sensitisation Workshop on Open Access held on the 21st March, 2007 at Kashim Ibrahim Library, Ahmadu Bello University, Samaru Zaria. (All the repository staff participated).

With the completion of the training programmes, the systems administrators configured the Dspace and created all the necessary customer communities. The staff responsible for populating the Institutional Repository commenced work accordingly. The new installation was hosted on a server named “kubanni”. The Repository can thus be accessed either through the following addresses: <http://196.220.64.8:8080/jspui>; <http://kubanni.abu.edu.ng:8080/jspui> or the library’s webpage www.abu.edu.ng/library. By the first quota of 2013, about **6000 copies** of full text theses and dissertations were scanned and converted into PDF and **3540** of them have been uploaded on the server.

IDR Digitisation workflow

The IDR project has adopted the following five processes of digitisation workflow:

Document>Data capture>Data processing>Storage>Retrieval and display.

The Digitisation workflow in the ABU/KIL has therefore been organised as follows:

- a. *Unbinding of document (e.g. thesis and dissertation)*
 - i. Jog the loose sheets
 - ii. Insertion of loose sheets into the scanner feeder
 - iii. Launch of software (AbbyFineReader 8.0)
 - iv. Click on Scan
- b. *Capture of the scan pages either as text or picture*
 - *Reading of the captured pages*
 - *Spell checking (text) and deleting of unwanted signs e.g. stamps etc.*
 - *Save pages according to the acceptable format e.g. PDF*

Successes

Some major achievements have been recorded since the successful take off of the ABU/IDR project. These are:

- a. A.B.U. has entered into partnership in 2010 with the Nigerian Centre of Expertise for Greenstone Digital collections for the establishment of National Digital Centre for the country’s Digital Repository.
- b. The creation of customer communities, sub communities and collections in the Dspace software for all the 12 faculties and 98 departments in Ahmadu Bello University, Zaria.
- c. The conversion and uploading of PDF full text theses, dissertations and conference papers onto IDR.
- d. The acquisition of additional six new DocuMate 752 Xerox Scanners for the digitisation project.
- e. The acquisition of 320 Gigabyte external hard drive as back up for the PDF files.
- f. The posting of 4 additional IT trained staff to the digitization centre to fast track the processes.
- g. The acquisition of 5 Abby Fine Reader OCR application software for the five Scanners.
- h. The scanning of over 300 NOMA publications, Samaru News Bulletin and Samaru Miscellaneous papers in Agricultural Library (IAR/ABU Library).
- i. Empowerment of 2 strategic satellite libraries with scanners to implement IDR project accordingly.
- j. A.B.U. has become one of the first 6 Universities in Nigeria to be enlisted onto the OpenDOAR flat form on the 6th of February 2013.

Challenges

It is not unusual for projects especially ICT based not to encounter some challenges. Some of the Challenges encountered include:

- (a) The crashing of the Dspace server in 2010 due to power surge leading to the loss of over 1200 scanned theses and dissertations.
- (b) Relocation of Dspace Server to the University data Centre due to incessant electric power problem in the library’s server room. The Dspace server had been relocated to the University’s data centre in January 2013 in order to reduce the downtime period.

Concluding Remarks

Repositories are important for educational and research institutions such as Universities, Polytechnics and Colleges to help them showcase, manage and capture the intellectual assets around as part of their information service provision strategy. A digital repository holds a wide range of information resources for a variety of purposes and users. It supports research, learning, and administrative processes. By providing the enabling support, environment and facilities, the Ahmadu Bello University library can sustain the niche it has created among its contemporaries, as exhibited in the implementation of its IDR.

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