ASSESSMENT OF ICT FACILITIES FOR DIGITAL PRESERVATION IN KASHIM IBRAHIM LIBRARY, AHMADU BELLO UNIVERSITY, ZARIA

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Abstract
The paper investigated the Assessment of ICT Facilities for Digital Preservation in Kashim Ibrahim Library, Ahmadu Bello University, Zaria. To achieve this four research question were formulated: to find out the type of ICT facilities available for preservation of digital information resources, determine how the ICT facilities are utilized for preservation of digital information resources explore the purpose of using ICT facilities in preservation of digital information resources, and examine challenges faced in the preservation of digital information resources in Kashim Ibrahim Library, Ahmadu Bello University, Zaria. Quantitative descriptive survey research method was used, 48 participant were used to analyze the data using descriptive simple analysis of frequency and percentage. The study found that the ICT facilities available for digital preservation were Computer system, scanner uninterruptible power supply, internet and storage devices, the extents of ICT utilization for digital preservation were computer, internet facilities, library software, and scanner were the ICT facilities that are highly utilized, the purpose of ICT for digital Preservation were for maintenance of records, curation of records and access to unlimited users4. The challenges associated with digital preservation were network access problem, software problem, law or inadequate staff were the problems associated with ICT for preservation of Digital Information Resources in Kashim Ibrahim Library.

Keywords: Assessment, ICT Facilities, Digital, Information, Preservation

Introduction

Going by tradition, preserving things meant keeping them unchanged; however, the digital environment has fundamentally changed our concept of preservation requirements. If we hold on to digital information without modifications, accessing the information will become increasingly more difficult, if not impossible. Digital preservation presents its own unique challenges, arising from the basic nature of digital data as machine-readable, not eye-readable. Unlike the fairly straightforward process of decoding other machine-dependent media, such as microfilm or LPs, maintaining digital data in a form that is intelligible to humans involves the use of a complex set of tightly interwoven technologies. (Ravinder Kumar Chadha 2009)

Even if we could find a physical medium to contain unaltered digital data permanently, formats for recording the information would change and the hardware and software needed to recover the information would become obsolete. Digital preservation is plagued by the short media life, obsolete hardware and software, and slow read times of old media. Rapid technological advances do not solve the problem; instead, we need to migrate digital materials from one technology generation to another every few years. For digital records, the preservation issues extend beyond media life considerations. Devices for reading these media rapidly become obsolete; the various formats for digital documents and images introduce additional complications. Using research to develop policies, procedures, standards, and protocols based on solid frameworks provides accurate concepts and essential attributes of preservation in the digital information life cycle.

As digital material has become increasingly ubiquitous in the day-to-day lives of normal people, the realization that it needs to be carefully managed to ensure its survival and continuing access has gradually grown. Digital preservation efforts originally focused on ensuring that material survived technical obsolescence and organizational mismanagement. Preservation implied a passive state, where material would be mothballed in an inaccessible “dark archive”, with only a few authorized users, to ensure that it

retained its integrity and authenticity. Over the last few years, the focus has shifted to ensuring that digital material is managed throughout its lifecycle so that it remains accessible to those who need to use it. Metadata is used to both improve accessibility and discoverability; and to control authentication procedures, creating audit trails to ensure that material cannot be accessed or altered by those not authorized to do so. Digital material is actively preserved, used and reused for new purposes, creating new materials (Abbott, 2008).

Statement of the Problem

Information technology helps to provides access to resources to several people at a time, unlike the manual way of information delivery services. Today, one of such tremendous improvements in the library services is the introduction of digital information resources with seemingly good features and potentials at aim to preserve digital information resources. However, in spite of the applause and recommendations of digital content, there appears to be intriguing ignorance on its performance. Some scholars are yet to understand how the software works. Many need clarification, assurance and certainty that the innovation is effective as well as workable. However, these studies really do not illuminate the full range of developments surrounding institutional repository utilization rather than to establish how such digital information preserved. With particular reference to Kashim Ibrahim Library, Ahmadu Bello University, Zaria. It is against this background this study was conducted to assess the ICT facilities for digital preservation in Kashim Ibrahim Library, ABU, Zaria.

Objectives of the Study

The study was guided by the following specific objectives:-

1. To find out the type of ICT facilities available for preservation of digital information resources in Kashim Ibrahim Library,Ahmadu Bello University, Zaria
2. To determine how the ICT facilities are utilized for preservation of digital information resources in kashim Ibrahim library, Ahmadu Bello University, Zaria
3. To explore the purpose of using ICT facilities in preservation of digital information resources in Kashim Ibrahim library,Ahmadu Bello University, Zaria
4. To examine challenges faced in the preservation of digital information resources in Kashim Ibrahim Library,Ahmadu Bello University,Zaria

   Research question is very important as they will lead the researcher to the use of descriptive statement analysis.

Literature Review

We review OAIS and some other main standards, as well as, some protocols that are relevant for digital information preservation.

The Open Archival Information System (OAIS) Reference Model

The emergence of digital information preservation took a while. In 1994, a task force was created from the joint effort of two groups, the Commission on Preservation and Access (CPA) and the Research Libraries Group (RLG), both comprised of archivists and publishers. This task force studied the needed actions for ensuring long-term preservation and continued access to digital materials. Later, the Consultative Committee for Space Data Systems (CCSDS) was asked to define rules and methodologies for long term archival/storage of digital data generated from space missions. The result of this effort was the Open Archival Information System (OAIS) reference model. OAIS is the first reference model on digital data preservation (Consultative Committee Space Data System, 2012).It became a standard for digital information preservation in January 2002 as ISO-STD 14721. In 2012, an updated version of this model was published (ISO 14721:2012) (Lavoie, 2014).This model focuses on providing a structure along with a lexicon of well-defined concepts and frameworks for any archive or system to be built with the purpose of preserving information and making it available for long-term use by a designated community or target group.

To be OAIS-aware, an information preservation solution needs to provide functionality to deal with ingestion, preservation and dissemination of archived digital materials. For this purpose, the OAIS reference model defines that at least the following six high-level services need to be provided by the archival and preservation solutions. They are:

- ingest;
- archival storage;
- data management;
- preservation planning;
- access and
- administration

Lavoie, (2014) further explains that, OAIS defines an environment with three main roles: management, producer and consumer. Management is in charge of the system, while a producer is the entity that aims to preserve data in the archive preservation solution. Finally, consumers are the individuals/organizations that can access the preservation system to retrieve information. Regarding the content to archive and preserve, the OAIS model is centered on the information package. The information package comprises the object to preserve, the needed metadata for long time preservation, the access permissions and how the whole data should be interpreted when accessed. Specifically, the OAIS defines three distinct information packages: i) Submission Information Package (SIP); ii) Archival Information Package (AIP) and iii) Dissemination Information Package (DIP). The SIP represents the source information which is inserted into the archival system by the producer entity. The AIP is the information that is actually archived, complemented with the metadata needed for a proper preservation and future accesses. The DIP represents the information provided to a consumer's request. Its format and content may adapt to the profile of the consumer. For instance, a content archived under a given encoding format, e.g. UTF16, may be delivered to consumers in another encoding format, such as, UTF8.

Main Standards and Protocols

Two main protocols for interoperability are the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) and the Search/Retrieval via URL (SRU) (McCallum, 2006). OAI-PMHwas created by the Open Archives Initiative for repository interoperability. It consists of six services invoked over (HyperText Transfer Protocol) HTTP. The verbs/services are:

- GetRecord;
- Identify;
- ListIdentifiers;
- ListMetadataFormats;
- ListRecords;
- ListSets

Sompel, et al., (2004) describe the repositories as something that can act as data providers, exposing structured data through the protocol or as service consumers making requests through the protocol to harvest metadata from the providers.SRU is a (eXtensible Markup Language) XML-based protocol to allow search queries over the internet. It uses the Contextual Query Language (CQL) standards explains syntax for representing queries to retrieve data from the repository and exposes them in a structured form through XML McCallum, (2006). Metadata standards define the main characteristics needed to describe digital objects, such as, videos, sounds, images, texts and web sites. The main standards are Dublin Core, Weibel, et. al, (1998), Preservation Metadata Implementation Strategies (PREMIS)Caplan& Guenther, (2005), Machine Readable Cataloguing (MARC)Rebecca, (1997) Encoded Archival Description (EAD)Pitti, (1999), Metadata Encoding and Transmission Standard (METS)Guenther & McCallum (2003) and the Metadata Object Description Schema (MODS).

The Dublin Core standard was created in 1995 and is maintained by the Dublin Core Metadata Initiative. It comprises 15 properties with metadata vocabularies and technical specifications, which can describe a wide range of resources (Weibel et, al.1998). PREMIS, MARC, EAD and METS are all XML-based standards. PREMIS, developed by the Online Computer Library Center (OCLC) and Research Libraries Group (RLG), consists of a data dictionary, an XML schema and supporting documentation. MARC was developed by the American Library of Congress for cataloguing digital objects stored in a repository. METS isa part of MARCfor encoding descriptive, administrative and structural metadata about digital objects within a repository. MARC21 is the most recent version, while MARCXML is an extension of MARC21 with additional features for sharing and networked access of bibliographical information(Radebaugh, 2007). MODS is another MARC21 compatible XML for descriptive metadata.

EAD is a descriptive XML-based standard aimed at describing the hierarchy structure of archival data. It bears some similarity with MARC, although EAD focuses on archives, while MARC is oriented towards bibliographical materials (Pitti, 1999).

Research Methodology

Quantitative research method adopted using survey design method for the study. It is a commonest way of gathering information on a particular issue, with a view to solving it. Oyedum (2011) stated that surveys are used extensively in obtaining statistical and mathematical information to assess attitudes and characteristics of a wide range of subjects and can be useful when a researcher wants to collect data on phenomena that cannot be directly observed. The wisdom for choosing the survey method was based on the notion that the survey research method is used to seek the opinions of individuals on a particular subject, particularly the one under study.

Population of the Study

The target population for this study consisted staff of ICT Division in Kashim Ibrahim library, ABU Zaria which constitute the total number of 48 at August, 2018.

Sample Size and Sampling Technique

Complete enumeration thus census was used in this study

Result and Findings

In order to determine the availability or otherwise of ICT facilities, observation checklist was used.

Table 1: ICT Facilities available for Preservation of Digital Information Resources

ICT Facilities	Availability	No. of the Items	Percentage
Computers	√	15	31.25%
Uninterruptible power supply (UPS)	√	5	10.42%
Internet facilities	√	1	2.08%
Air Conditioners	√	4	8.33%
Scanners	√	10	20.83%
Printers		X	0%
Digital Camera		X	0%
Library Software	√	1	2.08%
Storage Devices	√	13	27.08%
Total	√	48	**100** %

Key: √=Available X =Not Available

Based on the above table 1 it can be seen that computer system is the type of ICT facilities with the highest frequency score of 15 (31.25%) scanners 10(20.8%) while Uninterruptible power supply (UPS) 5 (10.42) library software and internet scored the frequency 1 (2.08%) respectively as the types of information and communication technology facilities available for preservation of digital information resources in Kashim Ibrahim Library Ahmadu Bello University, Zaria. While air conditioners uninterrupted power supply were the internet facilities with the lowest frequency score. The analysis done on the ICT facilities for Preservation of Digital Information Resources in Kashim Ibrahim Library shows that scanner, computer; internet facilities, library software, storage devices, etc are were the type of ICT facilities available in KIL. This is in line with Nwakolo (2000) who concluded by saying that without ICT facilities in academic library, the preservation of digital resources will go no-where.

Table 2: ICT Facilities Utilized for Preservation of Digital Information Resources

Extent Are ICT Facilities Utilized For Preservation	Frequency	Percentage
Computers	15	31.25%
Projectors	-	-%
(UPS)	3	6.25%
Internet facilities	7	14.58%
Air Conditioners	-	0%
Scanners	8	16.67%
Printers	-	0%
Digital Camera	-	0%
Library Software	8	16.67%
Storage Devices	7	14.58%
Total	**48**	**100**%

Also based on the analysis in the table above with regards to ICT facilities utilized for preservation of digital information resources in kashim ibrahim library, it can be observed that computer with the frequency score of 15 (31.25%) library software 8(16.67) scanner 8(16.67) internet facilities 7 (14.58) were the types of ICT facilities with extent of used in Kasim Ibrahim library Ahmadu Bello University Zaria. The analysis from this study is in agreement with the positions of Eke (2006) whom shows that ICT facilities are being used extensively by professionals in major disciplines of the world because it offers current information to the users and addresses the short comings experienced with manual system of information provision and digital preservation. Similarly, Aguolu (2002) on ICT in library services noted that these tools are utilized extensively to carry out the following library operation: preservation of information, resource sharing, information subscription and bibliographic control services, information storage and information networking.

Table 3 Purposes of utilizing ICT facilities for Preservation of Digital Information Resources

Purpose of ICT for digital preservation	Frequency	Percentage
Maintenance of Digital content.	8	16.5%
Preservation of Digital Content.	18	37.5%
Curation of Digital Content	8	16.5%
Provision of Remote Access Digital Content to users	5	10.4%
Restoration of Digital Content	3	6.3%
Access of unlimited information from different sources.	6	12.5%
Total	**48**	**100**%

The purpose of information and communication technology facilities (ICT) for utilization for the preservation of digital information resources were preservation of digital content of with the frequency score of 18 (37.5%) maintenance of digital content 8(16.7%) curation of digital content 8(16.7%) and access to unlimited information resources from different sources 6(12.5%) restoration of digital contents 3(6.3%) respectively.

Table 4: Challenges Associated with ICT facilities for Preservation of Digital Information Resources

Challenges	Frequency	Percentage
Low or Inadequate ICT qualified staffs.	5	10.4%
Absence of scanner	0	0%
Software operational problem	12	25%
Hardware component problem	8	16.7%
Network access problem.	15	31.2%
Difficulty in training library Staff on appropriate ICT skills	5	10.4%
Reluctance among staff to use ICT	3	6.3%
Total	**48**	**100**%

The Challenges faced with information and communication technology for preservation of digital information resources in Kashim Ibrahim library were network problem with the frequency score of 15(31.2% soft were problem 12 (25%) hard ware problem 8(16.7%) difficulty in training library staff on appropriate information and communication technology skills 5(10.4%) reluctant among staff t used information and communication technology 3(6.3%) respectively. The result of the study as presented in Table 4 indicates that various problems ranging from Network access problem with the frequency score of 12 (26.1%) inadequate qualify staff 10(21.7%), software and hardware problems such as network access challenges, slow speed of server and restricted access to useful site, affect the utilization of ICT in digital preservation of records in Kashim Ibrahim Library library A.B.U Zaria. Another scholar whose findings supported this view is Fabunmi (2009) who conducted a study on virtual libraries. The finding reported that lack of fund, lack of qualified ICT personnel, erratic power supply led to the non-availability and under-use of ICT facilities.

Summary of the Major findings

1. The ICT facilities available for digital preservation were Computer system, scanner, and internet were the types of information and communication technology that are available for digital preservation of information resources in Kashim Ibrahim Library

2. The extents of ICT utilization for digital preservation were Computer, internet facilities, library software, and scanner were the ICT facilities that are highly utilized for digital preservation of information resources in in Kashim Ibrahim Library

3. Purpose of ICT for digital Preservation, were for maintenance of records, duration of records and access to unlimited users, are the major purposes of ICT facilities utilized for Preservation of Digital Information Resources in Kashim Ibrahim Library

4. Problem associate with digital preservation were network access problem, software problem, law or inadequate staff were the Problems Associated with ICT for Preservation of Digital Information Resources in Kashim Ibrahim Library

Conclusion

It has been conclude that Digital information resources serve as a motivating factor to students as it provides them opportunity to transmit, acquire or download, process and disseminate information on a subject of interest. Digital preservation of information importance and need is taking place, with many organizations elaborating plans to preserve their digital assets. A need once felt mainly by archivists and librarians, has now given place to a more generalized necessity. The software solutions have evolved from very specific to more general purpose repositories. They are able to ingest many different types of data and have important data recognition functionalities, much broader than the earlier solutions, which were mostly tailored for the needs of libraries and archives. Regarding standards and normalization, the continuous effort for the development and consolidation of the OAIS reference model, metadata and system interoperability standards has contributed to the quality of some of the digital preservation software solutions. New standards and preservation strategies are being developed and perfected. An example is federation, a preservation strategy which involves not only the most recent interoperability protocol OAI-PMH, but also the fine-tuned Dublin Core metadata standard for communication between systems. More project endorsers and support communities are joining this initiative because there is a consensus that decentralized repository networks are the future of digital preservation.

Recommendations

1. Latest digital scanners, should be used to capture picture in the document and storage devices such hard drive should be provided to enable them back up their digital records

2. Adequate fund should be provided for the purchase and maintenance of infrastructures, training and the day to day management of the project, latest library software and storage devices

3. There should be proper restoration of digital content, provision of remote access to user curation of digital content in case of saver crash

4. ICT staff should be train and retrain to overcome the challenges of ICT digital preservation

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