

SUSTAINABILITY PRACTICES FOR LONG-TERM PRESERVATION OF DIGITAL ARCHIVAL RECORDS IN UNIVERSITY ARCHIVES

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ABSTRACT

This study is on sustainability practices for long-term preservation of digital archival records in university archives based on the UNESCO (2003) Digital Preservation Guidelines. The UNESCO digital preservation guidelines (2003) have been outlined as a working guide for preserving digital heritage in archives, libraries, and museums worldwide. The research design adopted for the study is a historical research method. It involves collecting information from primary and secondary sources. In the study, the concepts of digital archival records, digital archival preservation practices, and sustainability measures as related to university archives were discussed. Recommendations based on UNESCO digital preservation guidelines were made.

Keywords: Archival Records, Digital Preservation, UNESCO, University Archives

Introduction

Histories are made every day by human beings. Some of these histories are documented by people and put in different formats; either in manuscripts, photographs, audio recordings, videos or electronic/digital formats for preservation purposes. According to the National Archives of the UK (2024), “digital records exist either because a digital version has been made of a paper record or because they were born digital. Digital records are documents that can be viewed on a computer screen, whether on a desktop, laptop, tablet, or mobile phone screen. These digital records can be made of archival records and they are called digital archival records”. Sam Houston State University (2024), in conformity with the National Archives of the UK states that, digital archival records refer to digitized versions of historical documents, photographs, audio recordings, videos, and other materials that are preserved for long-term access and storage. This recorded information, or documents, is kept in collection centres like the archives for research, references and insights into the past. Formerly, before the advent of Information and Communication Technologies (ICTs), recorded knowledge were predominantly in paper form, but, today across the globe, recorded information and documents are prevalent in digital forms (Nworie & Anunobi, 2022). Some are born digital records, while some were converted from the analogue formats into the digital formats (Retrospective conversion). These digital records are kept in various centres, including the archives.

According to the Society of American Archivists (SAA) (2024), there are many varieties of archives, and the types of materials they collect differ as well. The different varieties of archives include: Government Archives, Corporate archives, Historical societies, Museums, Religious archives, Special collections, Colleges, and University archives. Those records kept in college or university archives are primarily for research and consultation. The university archives, among other types of archives, are established to serve their parent institutions and the public. Because of the large population that the universities serve, the university archives are the most widely consulted (SAA, 2024). More people are likely to consult them. And because of the position of the university in society, digital records in the university archives are expected to be properly taken care of, especially for a very long time.

The digital archives are being set up in various university archives, and some co-exist with traditional archives to provide information services side by side. Meanwhile, most archival records in digital formats deteriorate easily and become obsolete, some also become inaccessible because of lack of sustainability programmes (Shaffer, 2010). Archivists are therefore expected to take proper care of the resources in the archives, including the digital records, in good condition. Brindely (2000), made this remark: “Most institutions in the world may run the risk of losing their digital material contents if proper preservation steps are not taken care of, thus the need for good sustainability programmes, especially as it concerns staffing and funding”.

Digital records, unlike the texts of print media, are subject to inadvertent destruction of the physical medium on which they exist and the information that are contained in them. Electronic texts are so easy to edit, manipulate, revise, and improve, and can lose their assurance of permanence, especially if they are not properly locked or cared for. Nworie (2019) called this; fragility of the media. Many types of accidental changes may occur. A document may be damaged accidentally or as a result of the nature of the electronic resource.

Moreover, the problem of technological obsolescence is inevitable. Digital media have continued to evolve over the years. The equipment to use changes from time to time, creating problems in retrieving the information content. For example, there have been transitions of digital storage devices from 8-inch floppy disks to 5.25-inch floppies, to 3-inch diskettes, to flash drives, CDs, CD-ROMs, VCDs, DVDs, external hard disks among others. These storage devices become obsolete very quickly and today it is very difficult to find one drive for all storage devices. Additionally, there is the problem of inconsistency in the existing preservation policy of many institutions and some archives do not have any plan or policies at all.

Archives are being set up in many universities today and most of them hoist their records in various websites, servers, hard disks and other storage media. Some of their records are in text documents, images, audios, emails and digital correspondences etc, if proper sustainable preservation guidance and care are not taken, any disaster can wipe out the entire records and the

archives will be left with little or nothing. The problem of this study therefore is that university archives in this digital era may not be able to meet their primary objective of providing the information needs of their clients in digital formats if digital preservation is not taken seriously. In order to keep digital records in the university archives accessible and usable, there is need for archivists to apply long term sustainable digital preservation guidelines in their practices.

Digital Archival Records

Digital archival records, otherwise known as e-archives, are records that hold archival documents that are in digital formats. They may be born digitally or converted from the analogue format to the digital format. They include photographs, documents, maps, emails, websites etc (Purdue, 2024). According to the National Archives and Records Administration (NARA) (2024), the digital records are public documents; they include: textual materials, emails, data files, maps, aerial and still photographs, motion pictures, sound and video recordings. NARA have responsibility for maintaining the records in its holdings: Preservation, with the mandate to care for the physical holdings and perform preservation reformatting digitization of physical items, and digital preservation, with the mandate to support electronic records processing archivists, perform audits of the holdings, and assess the need to perform preservation actions. Innovations have continued to be witnessed in the archives. Today, services and activities in the archives are shifting from the traditional closed access to the digital open access archives. A digital archive is the opposite of the traditional archive and practice, which holds its resources in printed format. The term digital archival records are often used interchangeably with electronic archival records. It is an environment that supports the full life cycle of creation, storage, preservation, dissemination, and the use of data, information, and knowledge. Digital records are collected, managed, and disseminated for scholarship so as to assist and provide useful information for the communities or institutions that established it (Nworie & Anunobi, 2022). Collecting the digital records is the first step in building digital archives, and this can be done in different ways. How digital materials are collected may affect the quality as well as the ability to preserve them. It is important to know how digital materials in the archives are collected and how quality is ensured; this is imperative because different levels of preservation efforts will be dependent on both the initial quality of the content and its format.

In defining the digital records which Nworie (2019) called digital materials, he states that digital materials may include multimedia types or any other form, such as digital audio, video, full-text information, photographs, drawings, digitized sound, e-books, v-books, electronic texts, maps, images, 3D representations, etc. UNESCO (2003), a global organization responsible for providing guidelines for the preservation of recorded collections, states that digital collections include scholarly works, archives of historical figures and events, corporate and government records, museum collections, and religious collections. Some of these digital collections are created by scanning and posting documents on the World Wide Web. In summary, digital archival records are collections that can back up information or serve as a stored supply of

records in digital formats, accessible through a computer or computers, either via the internet or offline. Examples of digital archival records are:

1. Text documents: Letters, diaries, manuscripts, government records, and reports.
2. Images: Photographs, maps, drawings, and paintings.
3. Audio recordings: Speeches, interviews, oral histories, and music.
4. Video recordings: Documentaries, news footage, and personal videos.
5. Emails and digital correspondence.
6. Databases and datasets.
7. Websites and web pages captured through web archiving.
8. Social media posts and interactions.
9. Software and code repositories.
10. Digital artworks and designs.

They control a very large part of the world's business and government records, which now exist in an electronic record-keeping system (UNESCO, 2003).

Digital Preservation Practices of Archival Records

Digital preservation was defined by Reitz (2004) as the process of maintaining in a condition suitable for use, materials produced in digital formats, including preservation of the bit stream and the continued ability to render or display the content represented by the bit stream. The task is compounded by the fact that some digital storage media deteriorate quickly ("bit rot"), and the digital object is inextricably entwined with its access environment (software & hardware), which is evolving in a continuous cycle of innovation and obsolescence. It also refers to the practice of digitizing materials originally produced in non-digital forms (print, film etc) to prevent permanent loss due to deterioration of the physical medium.

This definition of Reitz was supported by the Digital Preservation Coalition (2024), which states that Digital preservation is the application of a series of managed activities necessary to ensure continued access to digital materials for as long as necessary. Digital preservation refers to all of the actions required to maintain access to digital materials beyond the limits of media failure or technological and organizational change. According to the National Archives and Records Administration (NARA) 2024, the goal for digital preservation is to enable the continued, ongoing usability of records, retaining the qualities of authenticity, accuracy, and functionality deemed to be essential and feasible. This is accomplished through risk assessment and planning, staff training, ongoing improvement of its processes and infrastructure, and internal and external collaboration". The British digital preservation research also stated that no computer storage medium can be considered archival, irrespective of its physical longevity; most electronic media resources are technologically obsolescent and are soon replaced by smaller and faster media, sometimes with a life span of five years or less. For example, the 8.5 floppy disk is now being

replaced with DVDs and CD-ROMs (Nworie, 2019). For the foreseeable future, the need to periodically refresh electronic records onto new media is therefore inescapable. Careful selection of storage media can maximize the periods between refreshment cycles and simplify the refreshment process, in addition to ensuring that the data is as secure as possible.

Meanwhile, Brindley in Nworie (2019) warned that some unpleasant neglect in the caretaking of printed materials would no longer work in the digital environment. Brindley, therefore, posited that if the digital heritage is to be passed to the next generation, preservation decisions would have to be integrated into the creation process of the materials. It was as a result of these assertions and the need for effective preservation of digital materials that UNESCO (2003) developed digital preservation guidelines to assist university archives, libraries, government and non-government organizations in reducing damages to their digital materials.

Developing preservation policies in the archives ought to be the first step toward guaranteeing preservation actions. UNESCO (2003), buttressed that policies should be formed on what should be preserved in the archives. There are so many digital records being generated daily. It is expected of the archives to adopt certain policies that will guide the standard for procurement, organization, and preservation of their digital contents. Though the selection principle may vary between countries and different archives, the main criteria for deciding what digital materials to keep would be their significance and lasting cultural, scientific, evidential or other value. Meanwhile, the UNESCO (2003) Digital Preservation Guidelines has this to say concerning formulation of preservation policies: a large part of the vast amounts of information produced in the world is born digital, and comes in a wide variety of formats: text, database, audio, film, image. For cultural institutions traditionally entrusted with collecting and preserving cultural heritage, the question has become extremely pressing as to which of these records should be kept for future generations, and how to go about selecting and preserving them. This enormous trove of digital information produced today in practically all areas of human activity and designed to be accessed on computers may well be lost unless specific techniques and policies are developed to conserve it. Preserving valuable scientific information, research data, media output, and digital art, to name but a few areas, pose new problems. If such material is to be accessed in its original form, technical equipment – original or compatible hardware and software - must be maintained alongside the digital files that make up the data concerned. In many cases, the multimedia components of websites, including Internet links, represent additional difficulty in terms of copyright and geography, sometimes making it difficult to determine which country a website belongs to. UNESCO has been examining these issues to define a standard to guide governments' preservation endeavours in the digital age. The General Conference adopted Resolution 34 at its 31st session, drawing attention to the ever-growing digital heritage in the world and the need for an international campaign to safeguard endangered digital memory. The General Conference also invited the Director-General to prepare a discussion paper for the 2001 Spring session of the Executive Board containing elements of a draft charter on the preservation of born-digital documents, as well as to encourage the governmental and nongovernmental

organizations and international, national and private institutions to ensure that preservation of the digital heritage be given high priority at the national policy level.”

Imperatively, UNESCO outlined that Preservation policies in the archives should be able to cover the following:

1. Guidelines on collection management (selection of content during the acquisition of digital records, what to store etc)
2. Guidelines on security of digital materials such as disaster preparedness, backups, use of antivirus
3. Guidelines on handling and usage and,
4. Guidelines on the use of metadata and long term preservation techniques.

Effective preservation begins with archives having a well-stated collection policy. According to Yuani Li and Meghan (2011), no matter how digital materials are deposited in the library, the quality of the deposited content should be examined before digital preservation actions are considered. The quality of the deposited content can directly affect the success of digital preservation efforts. If the quality of the content cannot be assured, then significant problems may arise. These problems may include format obsolescence, poor quality, or unreadable images or scans, insufficient metadata to manage and preserve the materials, etc. For this reason, it is so important to have mechanisms in place to ensure the quality of digital materials submitted.

Preservation policies for information resources are indispensable tools for organizations that are committed to facilitating the survival of information materials in their custody (Ngulube, 2005). Policies are very important to facilitate the survival of digital records in university archives. Policies help to set out goals to be achieved as well as guidelines for implementing them. Policies also facilitate creative allocation of funds and staff, strategies for preserving digital materials, and decisions about what digital collections require short, medium, or long-term preservation, and what digital collection to select, agreement and advocacy rights issues are all taken care of in the policy guidelines. Akande (2010), further asserts that there can be no serious commitment to a preservation programme without a policy that will guide efforts at solving identified preservation problems. Shaffer (2010) discovered that institutions lag behind when it comes to policies and procedures for long-term preservation and the licensing of their institutional repositories' contents.

Fortunately, there is in place the UNESCO digital preservation guideline that stipulates how digital materials should be preserved. It is the policy that states what the preservation programme is to do and how it will achieve it, especially in this world of complexities and information explosion.

The UNESCO (2003) digital preservation guidelines, among other international bodies that regulate digital collections, is a good guideline that, when adhered to, can help the digital records in the archives to last for a very long time. UNESCO (2003) states that:

- (1) Specific techniques and preservation policies should be developed to preserve digital records involving producers of digital information (including software) to include conservation as they design their products. There should be proper guidelines policy on collection management (what to select, acquire, and store); guidelines and policies on security of digital records (backups, use of antivirus); guidelines on handling and usage of digital records, encapsulation, and metadata.
- (2) Strategies for preserving digital materials should be adopted, which includes cooperation among institutions with similar intentions, refreshing, migration, emulation, and reproducing (back up) documents in the digital formats as often as possible, allocating responsibility to skilled staff, offsite storage for back up, establishing a data refresh regime suited to the life of the media, engaging the third party service providers for the protection of webpages against virus attacks and the use of antiviruses, employing the non digital approach by printing out some vital documents.
- (3) Managing rights and protecting software with license arrangement, protecting data by assigning passwords, and agreement on the principle of the right to copy, edit and manage digital records for preservation should be put in place.
- (4) Necessary sustainability programmes in terms of funding and staffing for long-term preservation and continuity of digital records should be established.

Every university archives in a bid to preserve its digital records must, from the planning stage, inculcate how to sustain the programme; otherwise, the preservation programme is already a failure. Many problems are encountered along the line in the preservation programme. Some of these problems can make or mar the preservation process, hinder the continuity of the preservation programme or improve it depending on how sustainable issues are well taken care of. This is the reason why the UNESCO (2003) digital preservation guidelines outline some challenges the preservation programme managers are likely to face in a bid to manage and preserve their digital collections. The challenges include:

- a. Lack of standard and policy plan – Preserving digital records involves choosing and implementing an evolving range of strategies to achieve accessibility. Any institution that needs an effective preservation of its digital contents should endeavor to work with producers (creators and distributors) to apply standards that will prolong the effective life of the available means of access and reduce the range of unknown problems that must be managed. There should be a policy plan, knowing well that it is not practical to preserve everything. Selection decisions and any other subsequent reviews need to be carried out in an accountable manner and be based on defined principles, policies, procedures, and standards.
- b. Lack of management support and good knowledge of digital preservation programmes
- c. Poor funding to support the preservation programme
- d. Shortage of trained staff to handle the digital materials
- e. Poor metadata and lack of proper documentation

- f. Inadequate space/infrastructure to accommodate the storage media/data carriers
- g. Technological obsolescence of most of the digital materials i.e, software/hardware
- h. Lack of adequate disaster control plan (disaster preparedness).
- i. Insufficient intellectual property rights clearance and legal issues.

Sustainability Practices for Long-Term Preservation of Digital Records in the Archives

Sustainability refers to the ability to maintain a certain rate or level (Oxford Learner's Dictionary, 2023). The entire academic community needs to take a leadership role in the effective use of information resources and the dissemination of knowledge to support and contribute to the lifelong learning of students, staff, and researchers. Barton, Mark, and Shearer (2006), in their study on “Creating an Institutional Repositories,” stated that greater emphasis must be placed on continuous education for archivists so they can keep sharpening their information literacy skills and advocacy. This suggests that archives are a growing organism. Therefore, archivists need to enhance their information literacy skills to stay aware of developments around them, keep up with innovations in the profession, and be ready to take a leading role in informing and educating their clients; digital preservation is no exception. This phenomenon is worldwide, especially considering the concept of digital archives.

The UNESCO (2003) digital preservation guidelines state that the sustainability of digital preservation of library materials is outlined that digital heritage is part of the wider continuum of digital information. To preserve digital records, measures will need to be taken throughout the record's life cycle. It is for each member state to designate one or more agencies to take coordinating responsibility for the preservation of digital heritage, and to provide the necessary staff and resources.

Of all the sustainability practices, the two major ones that are pertinent for long-term sustainability of preservation of digital materials are: funding and staffing. How these two issues are handled will determine to a great extent how the preservation programme will continue.

On the issue of funding, Oluwaniyi (2015) opined that finance is an essential ingredient for the preservation of information materials in any organization (archives included). After acquiring documents in the archives, the next step of thought should be on how these information resources would be preserved for the needed users. Finance is very important for the provision of digital records in the archives and likewise, the preservation of the digital collections is very imperative. Adequate funding on the aspect of preservation of digital collections is very imperative so that all the equipment and materials required for sustainable preservation programme like fumigators, fire extinguishers, adequate shelves and racks, air conditioners, internet subscriptions, purchase of antiviruses, computers, refreshing machines, personnel trainings etc can be actualized.

Yuan Li (2011), in supporting these digital preservation guidelines, stated that sustainable funding and adequate staff will enhance the successful implementation of digital preservation

programmes. It will be very important to address these sustainability issues as part of the planning process for building a digital preservation programme. Nevertheless, there are some legal frameworks in practical issues that allow preservation programmes to assume the right to collect and preserve specific digital materials. The most common of them include:

- Legal deposit or records management legislation
 - Organizational rules governing corporate information
 - Contractual requirements to deposit data
 - Conditions of grants, awards, employment or membership of organizations
 - Rights inherited by one organization from another
 - Negotiated or purchased license agreements
 - Rights implied by the voluntary submission of material to a preservation programme
- Capturing and storing publicly available materials, free-access websites, without seeking prior approval.

On the issue of staffing, there should be training and retraining of staff for continuity, continuous education, advancement of skills and leadership/succession plan. To these, Ngulube (2005) opined that for any preservation programme to succeed in archives and libraries, there must be adequate and well-trained manpower. This is because preservation and conservation of information resources is a specialized field of knowledge that requires information professionals who understand the peculiar nature of the materials in their archival collections. Ekwelem (2011) in firm support, further stated that training as a process of altering the behaviour and or attitudes of employees in a direction to increase organizational goals is highly recommendable for any institution that is looking forward to growth and development. Training has long been regarded as the bedrock of achieving quality productivity in any profession. Furthermore, Yuan Li (2011) stated that sustainable funding and adequate staff will enhance the successful implementation of digital preservation programmes. It will be very important to address these sustainability issues as part of the planning process for building a digital preservation programme.

In their article: Information Literacy Skills and Digital Collections, submitted to INASP on Building a Digital Library at the University of Zimbabwe, Gurira and Muganhiri (2007) stated that, there is a need to strengthen communication and collaboration between teaching staff, researchers, students and administrative staff, business, government and the entire educational community. Yuani Li and Meghan (2011) noted that there is an increase in digital preservation policy development in academic libraries in the United States of America which includes setting aside funding and intermediate trainings of staff on digital preservation and as a result, the librarians are committed to providing long term preservation for their institutional repositories (IRs) which are all digital materials.

Conclusion

Archives all over the world are mainly consulted for research, references, and consultations. The digital records in them are expected to be well taken care of. The provisions of adequate funding and proper staffing are to be among the top policies of the university archives. Any archives that want the future generations to continue to have access to the wealth of digital resources in their archives should take proper cognizance and place importance on funding and staffing in the preservation of their digital collections. Archival professionals and staff in the university archives should be subjected to training and retraining through seminars, workshops, conferences, and user education on the management and preservation of digital materials in the archives using the approved international Digital Preservation Guidelines as a set benchmark. In addition, sufficient funding should be allocated for the sustainability of digital preservation programmes of digital materials in all the archives.

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