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INNOVATIVE DIGITAL PRACTICES: TRANSFORMING LIBRARIES FOR INFORMATION SERVICES SUSTAINBILITY

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Digital Preservation for Prolonging the Lifespan of Information Resources in an Electronic Age

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Abstract
Digital preservation of information resources has increasingly become important in libraries and archival institutions in the electronic era. The Increase in the subscription to electronic information resources in libraries and information centers creates a need for ensuring the long-term availability of these electronic resources. Digital preservation provides a stable and sustainable platform for the continued accessibility of digital materials. Its initiative helps to see that digital resources remain available and accessible beyond time and geographical boundaries. Digitization, one of the critical aspects of current global information trends, is essential for facilitating the integration of library services into the learning process of academic institutions and library and information services dissemination and preservation of information resources. This paper highlights some critical issues on digital preservation. These include resources for digital conservation, digital protection and archiving, digital preservation in libraries and archives, challenges of digital preservation, technology obsolescence, strategies adopted in digital preservation, etc. The paper concludes that the ever-growing amount of electronic information resources and the possibility of technological obsolescence necessitate the protection of the resources for long-term availability and accessibility. Recommends to the management of libraries and archives to set trusted standards for digital preservation, provide for leadership and coordination in emerging standards for digital the preservation and development of various policies concerning acquisitions, conversion, storage, and maintenance of digital materials.

Keywords: Preservation, Archives, Digital Preservation, Archiving

Introduction

The fragility, volatility, and ease of losing valuable digital information in the twenty-first century by libraries and other information providers necessitated the knowledge of digital preservation written to enlighten handlers of information resources of its concept, strategies, challenges, and the benefit of adopting digital preservation for enhancing the life span of information resources. Information resources are acquired in diverse formats

thus, require exceptional management for ease of retrieval by clientele long after purchase. In addition, the uncertainty of life events like war, terrorism, and unplanned disaster has seen the library embarking on digital preservation measures to digitize hardcopy information resources to digital format, thus providing a backup plan of library resources. It is, therefore, necessary for librarians, paraprofessional staff, archivists, and other students in training to learn the process involved in the preservation of electronic information resources throughout its life cycle.

Background

The paper introduces digital preservation, types of electronic information resources used in libraries, their importance, and challenges hindering digital preservation. However, newer digital preservation strategies are proposed in the study to enhance the digital information life span. Also, protection of archives, a unique record kept in Libraries that have permanent use are discus. They are the only copy admissible in a law court because its evidential value used for legal, historical, and administrative purposes is in line with the statutory requirements of which libraries and other information resources are part.

The electronic era has made organizations, including libraries and archives, develop methods of converting previous hard copy records to digital format for ease of use by patrons. Prompt accessibility is associated with digital information resources than printed copies kept in Libraries. They serve as a backup of the vital documents in disasters, the ease of multiple-use than a single book per user, and cost savings of physical space used in shelving hardcopy resources in information centers. Digital information resources are shared via technological devices, thus increasing collaborations with researchers beyond geographical boundaries. Despite the advantages of digital information resources, they faced challenges during their preservation. These challenges include technological obsolescence of hardware and software, difficulty with metadata indexing, insufficient system control, virus attack, incompetent staff with requisite skills, and inadequate infrastructure Anyaoku, Echedom, & Baro (2019).

Therefore, libraries must develop and learn new strategies for mitigating the challenges associated with the digital preservation of electronic resources as new sophisticated technologies are introduced daily in the management and preservation of electronic resources; examples are cloud storage. They are then required to develop proactive measures to institute a digital preservation plan that ensures the continuous availability of information resources from creation to preservation. Learning new methods of improving the life span of acquired electronic information resources should be the goal of Libraries, Archives, and other information centers. Professional agencies support previous strategies such as technology emulation, Information migration, encapsulation, and information refreshing (Kar & Baro, 2016). Professional agencies provide information technological (technical support) for organizations; however, information professionals in information management need to demonstrate their expertise in ensuring the completeness of information resources. Their original features of the resources, their content, context, and format remain the same as the original resource.

In adopting any digital preservation strategies, the goal is to ensure that the integrity and authenticity of the information resources are retained in line with the archival principle of the original order or the provenance of records origin. None of the features of the information should be lost or defaced during the digital preservation process. If this happens, the usability of records for legal purposes becomes defeated. Therefore, information services centers adopting digital preservation to promote long-term use of resources must be competent in overcoming the challenges experienced a few years back.

Concept of Digital Preservation and Archiving

Digital preservation is the actions taken to maintain access to digital materials beyond the limits of media failure or technological change (Adila & Habee, 2017). According to Yale university library's digital preservation policy (2014) reported in Ebunuwele (2016), digital preservation means the whole activities and process involved in the physical and intellectual protection and technical stabilization of digital resources through time to reproduce authentic copies of these resources. The author stressed that the digital preservation practice is to produce exact replicas of library resources. Digitizing could be described as creating digital objects and submitting digital resources to delivery systems and a repository environment.

The primary purpose of digital preservation is to ensure the protection of information of enduring value for access by present and future generations (Anil, 2018). It involves finding ways to re-present the original data to users by combining software and hardware tools acting on data (Gorsel, Leenaars, Milic-Frayling & Palm, 2014). According to UNESCO (2011), the most significant threats to digital continuity concern loss of the means of access. Thus, digital preservation involves choosing and implementing an evolving range of strategies to achieve accessibility to digital materials by addressing the preservation needs of the different layers of digital objects.

Format of Resources for Digital Preservation

Different content types have, over time, developed their own file formats as they strive to accommodate functionality specific to their needs. The main content types are images, video, audio and text; however, a growing number of formats are being structured to address the demands of new media, including formats for 3D models and archiving the web. File formats vary enormously in terms of complexity, with some data being encoded in many layers. In some cases, the file formats involved are just one part of a larger picture, a picture that includes software, hardware, and even entire information environments.

Therefore, any preservation policy should recognize the requirements of the collection content and decide upon a file format that best possesses those qualities. The content with a suitable preservation format or access format; identifying what is essential in the content. Different content types have, over time, developed their file formats as they strive to accommodate functionality specific to their needs. File formats vary

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The main content types are images, video, audio, and text; however, there are many newer formats as 3D models and archiving the web. Digital preservation strategy should, however, strive to mitigate the effects of obsolescence and proliferation. Strategies as migration, emulation, normalization, and a careful selection of file formats are all valid and worth considering in the context of collections and the organization (Digital Preservation Coalition).

Importance of Digital Preservation in Libraries and Archives

The importance of digital preservation is enormous in the electronic era, with more records generated during administrative activities by an organization, which calls for its management and preservation. Secondly, libraries are embarking on automation for increased visibility and service delivery while other resources are acquired in electronic format examples are databases. Other Libraries have keyed into digital preservation by digitizing hard copy thesis and other unique information resources to help patrons meet their research needs. Information centers, websites, institutional repositories, and digital archives that have embarked on such project enhances service delivery to library clientele, thus having a competitive edge over others.

Some of the reasons for venturing into digital service delivery include instant use by multiple users, thus increasing the accessibility of information resources, compliance with statutory requirements, preservation of an institution's cultural heritage, among others (Ogbu, Abubakar & Batagarawa, 2020). Furthermore, digital protection enhances the backup of vital documents. It serves as a backup plan for business continuity in disasters and cost savings of physical space shelving hardcopy resources in information centers. Furthermore, Ebunuwele (2016) affirmed that digital preservation of library resources would enhance timely access to information, improve information searching, offer unlimited access to information, and help reduce stress on the users visiting the library physically to access the needed information resources.

Challenges faced in digital preservation.

Some of the experienced challenges of digital preservation include:

1. Information policies -libraries and archival institutions without policy framework would have the problem of digital preservation. An enabling policy framework would allow institutions to implement various preservation strategies that are in line with their own parent institution but operate within the overall country policy framework
2. Infrastructure - Digital preservation requires access to ICT facilities. Lack of these facilities hinders digital preservation agenda.
3. Financial Constraints - Preservation of knowledge resources is a continuous process not just a one off issue. To implement an effective and efficient

preservation policy, there is need for financial commitment on the part of the libraries parent institutions

4. Technical Knowledge - Technical knowledge on the digital elements of electronic documents is lacking among staff that are in preservation department of some libraries and archival institutions. This is coupled with the lack of preservation training. This lack of knowledge extends to deficient know-how on the equipment and software that is required for the preservation of digital information resources
5. Legal Barriers - Digitization of information requires obtaining copyright permission from various publishers to be able to duplicate anything in large quantities
6. Media Deterioration - Recording media for digital materials are vulnerable to deterioration and catastrophic loss, and even under ideal conditions they are short lived relative to traditional format materials
7. Technological Obsolescence - Information technologies are essentially obsolete shortly after purchase. Devices, processes, and software for recording and storing information are being replaced with new products and methods on a regular three - to five-years cycle, driven by market forces.
8. Concerns of authenticity and reliability - The authenticity and reliability of electronic records are often questioned because of possible changes to contents or structure.
9. Power cuts and backup strategies - Power cuts and irregular electricity supplies are a major barrier in terms of digital preservation
10. Internet bandwidth - The digital divide is still a major hinderance. In those libraries where there is Internet access, the resources, such as bandwidth, are severely limited or extremely expensive.
11. Skills and Education - Digital skills are lacking amongst librarians, archivists and informational professionals in most of the developing countries compare to their counterparts in other parts of the world.

Obsolescence of Technology

The primary processing device for digital preservation is the computer system, and the device is not stable. It is susceptible to change and upgrade after every five year. Electronic records captured by computer hardware and software are prone to constant change, unlike the paper medium for capturing documents that last five hundred years and more. Some computer systems are outdated every five years, hence migrating information content to recent technology. The process of migration poses a challenge to the maintenance of records context, integrity, and structure. Ngoepe (2017) agreed that valuable records get lost during the migration of digital documents to preserve records for future use caused by the high pace volatility of technology. Alegbeleye (2009) maintained that digital archives should be transcribed every ten to twenty years to ensure that they will not become technologically obsolete. The authors lamented that continuous upgrades of programming language, operating system, and storage media lead to technological obsolescence.

Strategies Adopted in Digital Preservation.

There are various strategies adopted in the digital preservation project in libraries, starting with the policy plan.

Emulation: refers to 're-creation on current hardware of the technical environment required to view and use digital objects from earlier times. Emulation in digitization is a means to preserve the functionality of the original technology through artificially simulating it under a newer technological environment. The technical environment that may need to be emulated may include the original hardware, operating systems and application software. In essence, emulation combines software and hardware to reproduce in all essential characteristics the performance of another computer of a different design, allowing programs or media designed for a particular environment to operate in a different, usually newer environment. It requires creating emulators, programs that translate code and instructions from one computing environment to another.

Refreshing: involves a periodical movement of files from one physical storage medium to another to avoid the obsolescence or degradation of the storage medium (Lucidea,2018). Due to decay in physical storage, technological changes, and the inaccessibility of older storage devices to fit into new computers, an ongoing form of refreshing becomes necessary for future benefits.

Provenance - Maintaining the authenticity or trustworthiness and provenance, i.e., history of creation, ownership, accesses, and changes of the preserved materials for the long term, is of great importance since users must be confident that the materials in the changing environment are authentic. An increasing amount of digital materials are designated for long-term preservation in which technologies, formats, and communities are very likely to change. Therefore, trusted standards, models and technologies are needed to strengthen the long-term usability of the preserved materials.

Conclusion and Recommendations

Advancement in information communication technology (ICT) has revolutionized the creation, management and, accessibility of information through the Internet. With the various advances achieved, so also the challenges experienced in the preservation of digital information. Most hardware and software have a short lifespan, coupled with the newer software version released frequently. This problem will continue to evolve with the speed of technological obsolescence. Hence, there is a need for digital preservation to ensure the long-term availability and accessibility of digital information resources. Digital preservation of library and archival resources will enhance timely access to information, improve information searching, offer unlimited access to information, and help reduce stress on the users in having to visit the library's location physically to access the needed information resources. The paper, therefore, recommends the following:

1. The management of libraries and archives should set trusted standards for digital preservation encapsulated in digital preservation policy.
2. The management of libraries and archives should provide for leadership and coordination in emerging standards for digital preservation.

3. The management of libraries and archives should develop policies for acquisitions, conversion, storage, and maintenance of digital materials.
4. The management of libraries and archives should provide trusted tools to support digital preservation.

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