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Librarians' Preservation Skills of Born-Digital Resources

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Abstract

Born-digital resources usually created in digital formats without print equivalents are increasingly becoming prevalent in Nigerian academic libraries due to their inherent features. The preservation of born-digital resources is essential for ensuring long-term accessibility, supporting scholarly communication and safeguarding digital heritage. This study therefore assessed the digital preservation skills of 104 librarians in Ekiti State using a descriptive survey design that employed a self-designed and validated questionnaire with a response rate of 94.55%. Results revealed moderate skill score ($\bar{x}$ = 2.80) as against criterion mean ($\bar{x}$ = 2.50) on a 4-point Likert scale. This indicated moderate competencies in basic preservation tasks such as retrieving and using born-digital resources ($\bar{x}$ = 3.22) and searching and locating born-digital resources ($\bar{x}$ = 3.18) but weaker proficiencies in more technical skills like file transforming digital files into different formats ($\bar{x}$ = 2.44) and repair damaged files ($\bar{x}$ = 2.44). Institutional barriers such as poor maintenance culture, digital divide, rapid technological changes, lack of incentives for preservation efforts and insufficient funding were pronounced. The study concludes that strengthening of technical competencies of librarians and institutional support among other suggestions are essential for the sustainable preservation of born-digital resources in Nigerian academic libraries.

Keywords: born-digital materials, digital preservation, digital resources, librarian skills, preservation skills.

Introduction

The impact of information and communication technologies (ICTs) on the creation, organization and dissemination of information has been transformative for libraries and librarians. ICTs, particularly the internet, have revolutionized how information is located, retrieved and shared, while also simplifying its creation, management and accessibility (Ahmad and Rafiq, 2022). As a result, information now exists in both digitized and born-digital formats, marking a significant shift from analogue to digital, and increasingly toward resources that originate in digital form. In response, libraries have intensified efforts to create, curate and provide access to resources in purely digital formats, maximizing technological tools to meet user needs. Although born-digital resources offer unprecedented convenience in accessing, managing and sharing information, they also present significant preservation challenges for libraries (Badaway, 2017).

Born-digital resources are those created, managed and stored entirely in digital formats from inception. Unlike analogue resources later converted to digital through digitization, born-digital resources exist exclusively in digital form with no physical counterpart. Examples include digital manuscripts, photographs, documents, websites and social media content. While these resources enrich scholarly communication and cultural heritage, they remain highly vulnerable to risks such as technological obsolescence, media failure, cyber-attacks, data breaches and unauthorized access. Consequently, libraries must prioritize digital preservation and strengthen librarians' competencies in data curation to prevent the loss of valuable born-digital content.

Historically, libraries, particularly academic libraries, have fulfilled the responsibility of preserving knowledge embodied in physical formats. However, preserving born-digital resources requires more complex and multifaceted approaches that integrate advanced technical skills and strategies to ensure long-term accessibility. Techniques such as migration, replication, normalization, emulation and encapsulation demand a high level of preparedness and specialized competencies among librarians. Yet, studies indicate persistent challenges, including lack of long-term planning, inadequate funding and skill gaps (Anyaoku, Echedom and Baro, 2019). Against this backdrop, examining the preservation skills of librarians is crucial to sustaining access to born-digital resources and safeguarding them for future generations.

Problem statement

Despite the value and corresponding rise in the demand of born-digital resources, many librarians still lack the technical skills needed for their development and long-term preservation. Probing into the nature of threats, prolonged usage of born-digital resources call for indispensable actions or strategies for their preservation. While studies (for instance Anyaoku et al., 2019; Ahmad and Rafiq, 2022) highlight several preservation tools and challenges, there is however, limited focus on evaluating the actual competencies of librarians who are responsible for implementing these strategies. Understanding the current skill levels of librarians and the factors that promote or hinder born-digital resources preservation are critical for developing effective training programmes and also building robust digital preservation system. Hence, this study seeks to fill that gap by assessing the skill sets of academic librarians in the preservation of born-digital resources of libraries in Nigeria.

Research objectives

This study seeks to:

1. Assess the extent to which academic librarians possess born-digital resource preservation skills; and
2. Examine the challenges academic librarians face in acquiring and applying born-digital resource preservation skills.

Research Questions

1. To what extent do academic librarians possess born-digital resource preservation skills?
2. What are the challenges faced by academic librarians in acquiring and or applying born-digital resource preservation skills?

Literature review

What are Born-digital resources?

Born-digital resources are essentially materials or items created in purely digital forms from inception and they are often without print equivalents (Ries, 2019). They are essentially different from analogue materials that have been digitised or converted to digital formats. Born-digital resources mostly contain indigenous knowledge and cultural heritage that span all areas of human

endeavors obtainable in a wide range of formats, such as websites, social media avenues and e-mails. Other formats are the electronic books, online or e-journals, e-theses, e-dissertations, datasets, digital manuscripts, multimedia contents and institutional generated documents such as lecture notes, records, reports and memos (Saka, Yusufu and Mommoh, 2024). These resources are characteristically searchable, linkable and shareable offering a vast amount of data or information that are accessible any time anyhow as long as the Internet connection is guaranteed. Due to these features, Nigerian libraries are now acquiring born-digital resources to complement traditional collections which in turn offer unique advantages to universities, libraries and library users (Omosekejimi and Eda, 2024).

Born-digital resources provide significant benefits to university libraries because they improve access to information, support innovative research methods and ensure long-lived preservation of digital content. This has allowed university libraries in particular to effectively serve the evolving needs of the academic community, enable efficient management of physical resources and space, saves cost and contributes to open access. Born-digital resources offer fast, easy and remote access, rich multimedia formats, advanced search tools, inclusivity and opportunity for digital engagement to users (Duddu and Dhanamjaya, 2018). Importantly, these digital materials incorporate diverse formats and often include embedded links, interactive elements and updates that print resources cannot offer (Yaya and Adeeko 2024). Additionally, born-digital resources foster global collaboration and resource sharing thereby enabling simultaneous access for multiple users, eliminate geographical barriers and support academic networking (IntechOpen 2024). Librarians as custodians of knowledge are therefore expected to be tasked with role of preserving born-digital materials to ensure long-term access, use and re-use of information (Onwueme *et al*., 2024).

Preservation of born-digital resources

The growing abundance and presence of born-digital resources in Nigerian academic libraries necessitated proactive preservation measures to ensure their long-term value, accessibility and integrity. Academic libraries and librarians are expected to safeguard these resources to enhance their long-term use. Born-digital resources are highly vulnerable and highly susceptible to hardware failures, software incompatibilities and data degradation if not properly preserved (Azobuogu, 2019). In addition, the resources including their storage media are prone to dust, heat, physical degradation, humidity, technological (hardware and software) obsolescence, malicious attacks,

and other issues. Aregbesola and Nwaolise (2023) reported that cyber-attacks present significant risks to born-digital collections, hence, the importance of implementing cyber-security best practices in academic libraries to protect digital assets from hacking, data breaches and unauthorized access. Essentially, digital preservation techniques prevent technological obsolescence and incompatibilities, data loss, ensure data integrity while promoting user trust and boosting reliability of library services. Chigwada and Ngulube (2024) highlighted librarian's role in safeguarding these resources to prevent the erosion of valuable information and also ensuring accessibility for future generations.

Born-digital preservation skills among librarians

The management and preservation of born-digital resources present unique challenges and opportunities, particularly in the context of technological advancements and evolving user needs. Digital preservation involves the intentional activities or processes (such as migration, replication, media refreshing, online archiving and so on) required to ensure continued access to digital materials over long period of time, despite changing technologies and evolving user needs (Digital Preservation Coalition, 2022). In practice, many library professionals in Nigerian universities lack these skills. Very few professionals are conversant with digital preservation skills and strategies. This is evident from the study of Oluranti, Arowolo and Atanda (2023) who surveyed academic library staff in Ogun State, only basic competencies such as managerial planning and communication were common, whereas technical tasks like format encapsulation and replication were less familiar to staff. A study conducted by Omosekejimi and Eda (2024) at the Federal University of Petroleum Resources, Effurun, revealed that the library employed strategies such as refreshing, migration and replication to manage born-digital records.

Challenges to acquiring or applying born-digital preservation skills

Studies have highlighted both efforts and constraints related to digital preservation in academic libraries. Sambo, Urhefe and Ejitagha (2017) conducted a survey that revealed librarians faced numerous challenges including technological obsolescence, absence of strategic preservation policies and inadequate funding. Nworie and Nwosu (2019) examined the extent to which university libraries in South East Nigeria have adopted the UNESCO digital preservation guidelines and findings revealed a lack of policy alignment and a low level of implementation. Obiozor-Ekeze (2022) also noted that digitization efforts are hampered by insufficient ICT

infrastructure, legal ambiguities and financial constraints. These findings were also echoed by Rhima (2023), who documented that most preservation activities were limited to storage of theses and periodicals on external drives, with little integration of modern preservation technologies. Additionally, Owate and David-West (2024) highlighted emerging concerns such as the curation of AI-generated content and emphasized the need for sustainable digital preservation frameworks.

Challenges such as erosion of technical functionality, limited digital storage facilities, copyright and intellectual property rights issues were similarly prevalent in the study of Omosekejimi and Eda (2024). The findings underscored the necessity for sustainable library operations and recommended strategies for effective preservation of such digital materials. Finally, the authors recognised that while library managers might grasp broad preservation concepts, specialized technical skills remain underdeveloped, which pointed to an urgent training and capacity-building agenda for academic librarians. Bello and Salawu (2024) expressed that digital preservation lack strategic integration into library management systems, which usually results in reliance on informal or inconsistent practices. Addressing these barriers will require a combination of capacity building, policy formulation and investment in infrastructure of libraries in the country. Conclusively, Adegboye and Hassan (2025) argue that without structured institutional support, librarians are unlikely to adopt or sustain proactive digital preservation practices.

Research methodology

A descriptive survey research design was employed for this study. The study population comprised 104 librarians who were present at the Nigerian Library Association (NLA) Ekiti State Chapter 2024 Conference and Annual General Meeting. Data was collected via a self-structured questionnaire with a 94.55% response rate. The data collected was subsequently subjected to descriptive statistics, that is, frequencies, percentages, means and standard deviation.

Results and discussion of findings

Table 1.0: Evaluation of Librarians' Preservation Skills

S/N	I can	SA	A	D	SD	$\bar{x}$	S.D
1.	Search and locate born-digital resources.	31 29.81%	64 61.54%	6 5.77%	3 2.88%	3.18	0.662
2.	Organise digital files in chronological order.	30 28.85%	60 57.69%	9 8.65%	5 4.81%	3.11	0.746
3.	Assign metadata to describe born-digital resources.	26 25.00	53 50.96	15 14.42	10 9.62%	2.92	0.878
4.	Classify born-digital files using controlled vocabularies.	23 22.12%	48 46.15%	18 17.31%	15 14.42%	2.77	0.956
5.	Check if digital files still open appropriately.	26 25.00%	58 55.77%	11 10.58%	9 8.65%	2.97	0.837
6.	Back up digital files like e-books, e-journals, e-thesis.	22 21.15%	42 40.38%	23 22.12%	17 16.35%	2.67	0.987
7.	Check digital files for errors or damages.	25 24.04%	59 56.73%	12 11.54%	8 7.69%	2.97	0.814
8.	Transform born-digital files into different formats.	19 18.27%	28 26.92%	36 34.62%	21 20.19%	2.44	1.007
9.	Collect born-digital resources for archiving.	23 22.12%	46 44.23%	18 17.31%	17 16.35%	2.73	0.985
10.	Detect virus attack on born-digital resources.	30 28.85%	55 52.89%	11 10.58%	8 7.69%	3.03	0.837
11.	Deter a virus attack on born-digital resources.	24 23.08%	32 30.77%	21 20.19%	27 25.96%	2.52	1.109
12.	Repair a damaged born-digital file.	21 20.19%	30 28.85%	26 25.00%	27 25.96%	2.44	1.081
13.	Set access controls based on user rights.	24 23.08%	46 44.23%	21 20.19%	13 12.5%	2.78	0.940
14.	Move born-digital resources from one database to another.	20 19.23%	35 33.65%	30 28.85%	19 18.27%	2.55	0.999
15.	Make digital resources available through remote access	17 16.35%	42 40.38%	24 23.08%	21 20.19%	2.54	0.990
16.	Make digital resources available through a database.	23 22.12%	38 36.54%	29 27.88%	14 13.46%	2.68	0.965
17.	Follow and apply copyright rules when handling born-digital resources.	28 26.92%	51 49.04%	17 16.35%	8 7.69%	2.96	0.859
18.	Use digital library system like DSpace.	30 28.85%	48 46.15%	15 14.42%	11 10.58%	2.94	0.923
19.	Assist users in retrieving and using preserved digital resources.	42 40.38%	48 46.15%	9 8.65%	5 4.81%	3.22	0.796
20.	Asses the quality and completeness of received born-digital files.	23 22.12%	37 35.58%	28 26.92%	16 15.38%	2.65	0.990

AVERAGE MEAN = 2.80

The data in **Table 1.0** reveal that librarians overall demonstrated strong or high digital preservation skills with an overall average mean score ($\bar{x}$ = 2.80) against a criterion mean of ($\bar{x}$ = 2.50) on a 4-point Likert scale. However, user-focused skills and activities such as retrieving and using preserved files ($\bar{x}$ = 3.22) and locating born-digital resources ($\bar{x}$ = 3.18) were prevalent among the librarians. These skills reflect the more familiar and service-oriented aspects of librarianship that have gradually been adapted to the digital environment. This finding aligns with Adebayo and Nwachukwu (2024), who reveal that most Nigerian academic librarians possess moderate digital literacy focused on access and retrieval rather than technical preservation functions. Similarly, finding corroborate the results of Udo and Amadi (2025) which indicate that while librarians are increasingly comfortable with digital tools, their expertise is generally limited to basic usage, especially in university libraries where digital transformation is still unevenly distributed.

Similarly, the ability to confidently transform digital files into different formats ($\bar{x}$ = 2.44) and ability to repair damaged digital files ($\bar{x}$ = 2.44) ranked least. These lower figures point to a lack of technical preservation skills, particularly in tasks involving file migration, antivirus checks, error repair and remote access integration. Furthermore, the ability to make born-digital resources remotely accessible ($\bar{x}$ = 2.54) suggest that digitized services remain largely underutilised. These deficiencies support the findings of Etim and Falaye (2025), who reported that librarians in South-South Nigeria often lacked training in digital archiving processes due to outdated infrastructure and limited exposure to professional development. Also, findings on low preservation technical skills align with Oboh and Aina (2024) observed pattern of digital preservation skill disparities within Nigerian university libraries and described the stance as fragmented and highly dependent on individual initiative rather than systemic training and support.

Table 2.0: Challenges towards applying digital preservation skills

S/N	ITEMS	SA	A	D	SD	$\bar{x}$	STD
1.	Inadequate infrastructure	69 66.35%	26 25.00%	9 8.65%	0	3.72	0.646
2.	Insufficient funding	61 58.65%	43 41.35%	0	0	3.73	0.492
3.	Limited access to preservation tools and software	47 45.19%	32 30.77%	12 11.54%	13 12.50%	3.21	1.029

4.	Resistance to change	61 58.65%	40 38.46%	3 2.88%	0	3.70	0.552
5.	Outpacing of skills development by fast paced technological changes	78 75.00%	20 19.23%	6 5.77%	0	3.84	0.573
6.	Lack of incentives for preservation efforts	69 66.35%	31 29.81%	4 3.85%	0	3.77	0.558
7.	Copyrights and intellectual property rights	61 58.65%	35 33.65%	8 7.69%	0	3.65	0.635
8.	Poor maintenance culture	81 77.88%	23 22.12%	0	0	3.93	0.415
9.	Digital divide	74 71.15%	28 26.92%	2 1.92%	0	3.84	0.501
10.	Absence of institutional policies	45 43.27%	40 38.46%	13 12.50%	6 5.77%	3.32	0.867
AVERAGE MEAN = 3.67							

Table 2.0 reveal challenges to acquisitions and application of digital preservation skills is high, with an overall average mean of ($\bar{x}$ = 3.67) as against the criterion mean of ($\bar{x}$ = 2.50). Librarians face significant structural and institutional barriers such as poor maintenance culture ($\bar{x}$ = 3.93), rapid technological changes ($\bar{x}$ = 3.84) and digital divide ($\bar{x}$ = 3.84) ranking highest among the critical challenges identified. These findings mirror broader structural and infrastructural constraints that are common in Nigerian academic institutions. These are in agreement with Eze and Oladunjoye (2024) findings which emphasize that irregular power supply, outdated hardware and underfunded ICT departments continue to undermine digital preservation efforts in university libraries. The high mean scores for these barriers reflect a systemic context where even skilled librarians are limited by external, often unmanageable, technical and infrastructural conditions.

In addition, motivational ($\bar{x}$ = 3.77) and institutional ($\bar{x}$ = 3.73) gaps further restricted librarians' capacity to acquire and apply their skills effectively. Issues such as lack of incentives, resistance to change and the absence of clear digital preservation policies were rated highly in the dataset. These findings align with assertions of Bello and Salawu (2024); Adegboye and Hassan (2025) who shared the view that digital preservation in Nigeria still lack strategic integration into library management systems. The authors thus opined that unless strategies such as a combination of structured institutional support, capacity building, policy formulation and investment in infrastructure are put in place, librarians are unlikely to adopt or sustain proactive digital preservation practices.

Conclusion and Recommendations

This study have underscored a critical reality; while librarians in academic institutions within Ekiti State demonstrate a fair level of competency in basic digital resource preservation, there remains a considerable gap in their technical preservation capabilities which hampers the librarians' ability to effectively preserve born-digital resources. Therefore, addressing the identified skills and barriers is imperative. To improve the preservation of born-digital resources, multi-faceted interventions are necessary. These interventions as highlighted below will not only elevate librarians' technical capabilities but also establish a more robust and sustainable preservation environment for born-digital resources:

1. ***Capacity building***: Targeted training on advanced preservation strategies including metadata standards, file repair, cyber-security and format migration.
2. ***Infrastructure upgrades***: Provision of modern software, storage, and networking resources.
3. ***Policy development***: Institutions should establish clear mandates on digital preservation protocols and responsibilities.
4. ***Incentive structures***: Recognition and support mechanisms should be considered to encourage professional and skill development.
5. ***Bridging the digital divide***: Ensuring equitable access to digital preservation resources across institutions.

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