

Metadata Standards Implementation and Practices among Information Professionals in Nigeria

By

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Abstract

This study investigates the implementation of metadata standards and practices among information professionals in Nigeria. Specifically, the research aims to examine the types of metadata standards being implemented, the roles of librarians and IT professionals in managing these standards, and the challenges faced by Nigerian institutions in adopting and implementing metadata practices. Employing a descriptive survey research design, data were collected through an online questionnaire (google form) administered to librarians, IT professionals, and stakeholders involved in managing IRs across Nigerian institutions with a total population of 63 respondents cut across various institutions in Nigeria. The findings reveal that 82.54% of respondents primarily use the Dublin Core metadata standard, which is favoured for its simplicity and flexibility in describing digital resources. The study also highlights the crucial roles played by librarians, such as metadata creation and curation (52.38%), end-user support (61.90%), and advocacy for repository usage. IT professionals also contribute by maintaining the technological infrastructure (53.97%). However, the implementation of metadata standards faces several challenges, including lack of expertise, limited financial resources 57.14% strongly agree, technological constraints, interoperability issues (53.97%), and limited awareness of metadata practices. Resistance to change among librarians and the absence of standardised guidelines further hinder effective implementation. The study recommended the need for better training, awareness programs, and financial investment to enhance the effectiveness of metadata standards in institutional repositories in Nigeria.

Keywords: Metadata, Metadata standards, Institutional repository, Nigeria

1. Introduction

Institutional Repositories (IRs) are digital archives that collect, preserve, and disseminate the scholarly output of an institution. In Nigeria, the establishment of IRs has gained momentum over the past decade, driven by the need to enhance the visibility of Nigerian research, support open-access initiatives, and preserve academic works. However, the success of IRs in achieving these goals is heavily dependent on the effective management of metadata. Metadata, which is data about data, plays a critical role in the organization, retrieval, and preservation of digital content in

repositories. In the Nigerian context, the implementation of standardized metadata is crucial for ensuring that IRs are accessible, interoperable, and sustainable.

Miller (2022) reported that metadata standards provide a structured framework for describing digital resources, enabling consistent data management across repositories. These standards, such as Dublin Core, MARC (Machine-Readable Cataloging), and others, ensure that digital content in IRs can be easily discovered, shared, and preserved over time. In Nigeria, where the development of IRs is still in its nascent stages, the adoption of metadata standards is vital for overcoming challenges related to data inconsistency, lack of interoperability, and the long-term preservation of digital assets. Metadata standards also facilitate the integration of Nigerian IRs with global research networks, thereby increasing the visibility of Nigerian scholarship on the international stage (Olubiyo and Olubiyo, 2023).

1.2 Statement of the Problem:

The development of institutional repositories (IRs) in Nigeria is crucial for preserving academic output, enhancing research visibility, and supporting open-access initiatives. However, the effectiveness of these repositories is significantly influenced by the quality and consistency of the metadata used to describe digital resources. Despite the recognized importance of metadata standards, many Nigerian IRs face challenges in adopting and implementing these standards. Issues such as lack of expertise, limited resources, and technological constraints result in inconsistencies in metadata practices, which can hinder the accessibility, interoperability, and long-term preservation of digital content. This study aims to investigate how the adoption of metadata standards impacts the development of IRs in Nigeria and to identify the barriers that institutions face in achieving standardized metadata practices.

1.3 Research Objectives and Questions:

This research aims to assess the impact of metadata standards on the development of institutional repositories in Nigeria. The study seeks to explore the following research questions:

1. What are metadata standards being implemented in Nigerian IRs?
2. What role do librarians and IT professionals play in the implementation and management of metadata standards in Nigerian institutional repositories?
3. What challenges do Nigerian institutions face in adopting and implementing metadata standards in their repositories?

2. Literature Review

Institutional repositories have emerged as essential tools for academic institutions worldwide, serving as centralized platforms for the collection, preservation, and dissemination of scholarly output. The development of IRs is driven by the need to support open access to research, enhance the visibility of academic work, and preserve intellectual assets. Globally, IRs have evolved to include a wide range of digital content, including theses, dissertations, journal articles, conference papers, and multimedia materials. The success of IRs is closely linked to the quality and consistency of metadata used to describe the digital resources they contain.

An institutional repository is a digital collection or archive managed by an academic institution, research organization, or cultural heritage institution to preserve, disseminate, and provide access to scholarly and research outputs produced by its members or affiliated entities. These repositories typically include various types of digital content such as research articles, conference papers, theses and dissertations, datasets, multimedia materials, and other scholarly works (Abduldayan, *et al*, 2021).

According to Nneka & Kaosisochukwu (2021), an institutional repository is a digital platform managed by an academic institution, typically a university or college, to collect, preserve, and disseminate scholarly and intellectual outputs created by the institution's faculty, researchers, students, and staff. These outputs may include research articles, theses and dissertations, conference papers, reports, datasets, multimedia materials, and other scholarly works.

The primary purpose of an institutional repository is to provide open access to the institution's intellectual output, thereby increasing its visibility, impact, and accessibility. Institutional repositories serve as centralized repositories for storing and organizing scholarly materials such as research data, articles, conference papers and all intellectual output from the institution (Abduldayan, *et al*, 2021), making them easily discoverable and accessible to a global audience. They also support the long-term preservation of digital content, ensuring that it remains accessible and usable for future generations (Nwokedi & Nwokedi, 2018).

Metadata standards are crucial for the effective functioning of IRs. They provide a common language for describing digital resources, enabling consistency in data management and facilitating the discovery and sharing of content across platforms. According to Rogushina *et al*. (2023), Dublin Core (DC) is one of the most widely used metadata standards in IRs, it provides a simple and flexible schema for describing a wide range of digital resources. Other standards, such

as MARC (Machine Readable Cataloguing), EAD (Encoded Archival Description), METS (Metadata Encoding Transmission Standards), and MODS (Metadata Object Description Schema), offer more detailed and specialized frameworks for cataloguing specific types of digital content. The adoption of metadata standards ensures that digital content in IRs can be easily discovered, shared, and preserved, making them indispensable tools for libraries and institutions. Dashrath (2014) reported the role of metadata as increased accessibility, system improvement, effective information retrieval and exchange, rights management, and preservation of documents

Librarians play a crucial role in managing metadata in Nigerian IRs. They are responsible for ensuring the consistency and quality of metadata, as well as facilitating the discoverability and accessibility of digital content. Mali and Deshmukh (2022) reported that librarians are tasked with selecting and acquiring resources for the repository, generating metadata to describe these resources, and ensuring that the content remains accessible and preserved long-term. Additionally, librarians often offer training and assistance to faculty and staff on how to contribute content to the repository, while also working to enhance the repository's visibility and use both within the institution and externally. Institutional repositories serve as essential platforms for institutions to showcase their research and academic work, boosting visibility and influence, while safeguarding intellectual contributions for future generations. Librarians are integral to the success of these repositories by providing their expertise in organizing information, ensuring access, and managing preservation.

3.0 Methodology

This study adopts a descriptive survey research design to investigate the implementation and practices of metadata standards among information professionals in Nigeria. The population of the study comprised 63 participants, including librarians, IT professionals, and other stakeholders actively involved in the management of institutional repositories (IRs) across various institutions in Nigeria. The primary instrument for data collection was an online questionnaire designed using Google Forms. The questionnaire consisted of both closed-ended and open-ended questions to gather quantitative and qualitative data. To ensure validity, the questionnaire was subjected to content validation by two experts in the fields of library and information science and metadata standards. Their feedback was used to refine the questions for clarity, relevance, and comprehensiveness.

Data collection was conducted exclusively online to facilitate access to participants across different locations in Nigeria. The Google Form link was distributed via professional networks, email lists, and social media platforms frequently used by information professionals. Participation was voluntary, and participants were given a two-week window to complete the questionnaire. The collected data were analysed using descriptive statistical methods such as Frequency counts and percentages were used to summarize categorical data. Also charts (bar charts and pie charts) were employed to visualize key findings for better comprehension.

Ethical Considerations

Ethical considerations were prioritised throughout the study.

1. A detailed introduction at the beginning of the questionnaire informed participants about the purpose of the study, their rights, and the voluntary nature of their participation.
2. No personally identifiable information was collected, and responses were stored securely. Only aggregated data were reported in the study.

4.0 Data presentation and analysis

Social Demographic Information of Respondents

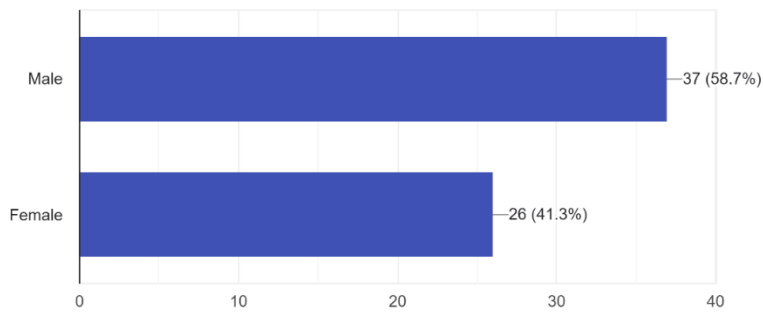
Table 1: Institution of Respondents

S/n	Institution	Frequency/Percentage
1	Federal University of Technology. Minna Niger State	13 (20.63%)
2	National Institute for Legislative and Democratic Studies, Abuja	5 (7.94%)
3	Nile University of Nigeria, Abuja	1 (1.59%)
4	Federal University of Education Kontagora, Niger State-Nigeria	1 (1.59%)
5	Ladoke Akintola University of Technology, Ogbomoso Oyo State	1 (1.59%)
6	University of Ilorin, Kwara State	1 (1.59%)
7	University of Maiduguri, Borno State	1 (1.59%)
8	Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State.	1 (1.59%)
9	University of Port Harcourt Rivers State	1(1.59%)
10	Baze University Abuja	1 (1.59%)
11	Bayero University Kano, Kano State	1 (1.59%)
12	Niger State Polytechnic Zungeru Niger State	1(1.59%)

13	University of Abuja	1 (1.59%)
14	Federal University Lafia, Nasarawa State	1 (1.59%)
15	Benue State University, Makurdi Benue State	2 (3.17%)
16	Ibrahim Badamasi Babangida Lapai Niger State	3 (4.76%)
17	University of Agriculture Makurdi Benue State	1 (1.59%)
18	Veritas University Abuja	1 (1.59%)
19	National Open University Nigeria Abuja	1 (1.59%)
20	The Federal Polytechnic, Bida Niger State	1 (1.59%)
21	Lead City University, Ibadan Oyo State	6 (9.52%)
22	Central Bank of Nigeria Abuja	1 (1.59%)
23	University of Lagos, Lagos State	1 (1.59%)
24	Crescent University Abeokuta Ogun State	2 (3.17%)
25	Osun State University, Osun State	1 (1.59%)
26	Yobe State University, Yobe State	1 (1.59%)
27	Lagos State University, Lagos State	2 (3.17%)
28	The Federal Polytechnic Ilaro Ogun State	2 (3.17%)
29	The Polytechnic Ibadan Oyo State	1 (1.59%)
30	Gateway (ICT) Polytechnic Saapade, Ogun State	1 (1.59%)
31	College of Health Sciences and Technology Jahun Jigawa State	1 (1.59%)
32	Federal School of Surveying, Oyo State	1 (1.59%)
33	Ignatius Ajuru University of Education Port Harcourt	2 (3.17%)
34	Dame Patience Automated Library, Rivers State	1 (1.59%)
35	University of Africa, Bayelsa State	1 (1.59%)

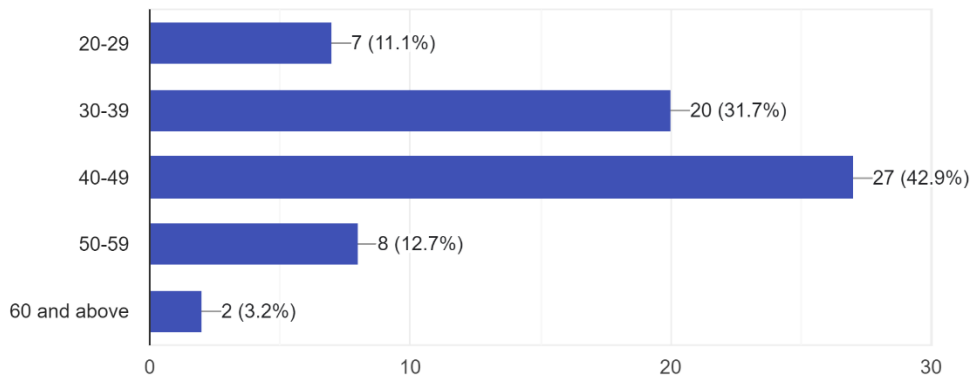
Table 1 shows the institution of respondents. The majority of respondents 20.63% are from FUT Minna, followed by Lead City University with 9.52%. National Institute for Legislative and Democratic Studies 7.94%. Ibrahim Badamasi University Lapai 4.76%. Ignatius Ajuru University, The Federal Polytechnic Ilaro, Lagos State University, Crescent University Abeokuta and Benue State University all have 3.17% of respondents. The remaining institution had 1.59% representation each.

4.1.1 Gender of Respondents



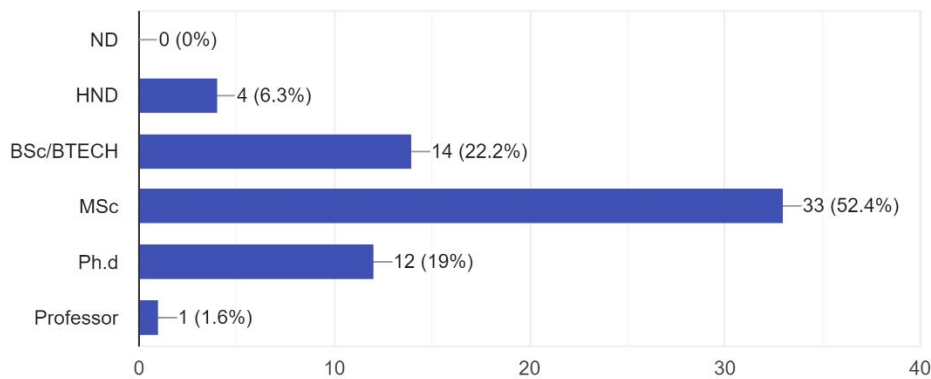
The chart above shows the gender of the respondents. It is evident that male respondents have the majority 58.7% while their female counterparts have 41.3%.

4.1.2 Age of respondents



From the above chart, the majority of respondents fall between the age bracket of 40-49 representing 42.9%, followed by 30-39 years representing 31.7%. Others are 20-29, 50-59, 60 and above representing 11.1%, 12.7% and 3.2% respectively.

4.1.3 Education Qualification of Respondents



The above chart reveals that the majority of respondents are masters degree holders which represent 52.4%, and BSc/BTech came second with 22.2%. Ph.D. holders are 19%, HND holders are 6.3% while Professors are 1.6%.

4.2 Research question 1: What are the Metadata Standards Used in Nigerian IRs?

Metadata Standards	A	D
Dublin Core Metadata Element Set	52 (82.54%)	11 (17.46%)
MARC (Machine-Readable Cataloguing)	41 (65.08%)	22 (34.92%)
EAD (Encoded Archival Description)	30 (47.62%)	33 (52.38%)
MODS (Metadata Object Description Schema)	40 (63.49%)	23 (36.51%)

The table above shows the metadata standards utilized by institutional repositories in Nigeria. It is evident that the majority of respondents agree that Dublin core (82.54%) is widely used and accepted while 17.46% disagree. 65.08% of respondents agreed that MARC is used in Nigeria IRs while 34.92% think otherwise. The majority of respondents 52.38% disagreed that EAD is widely used in IR in Nigeria while 47.62% agreed. 63.49% which is the majority agreed that MODS is used in Nigeria while 36.51% did not agree.

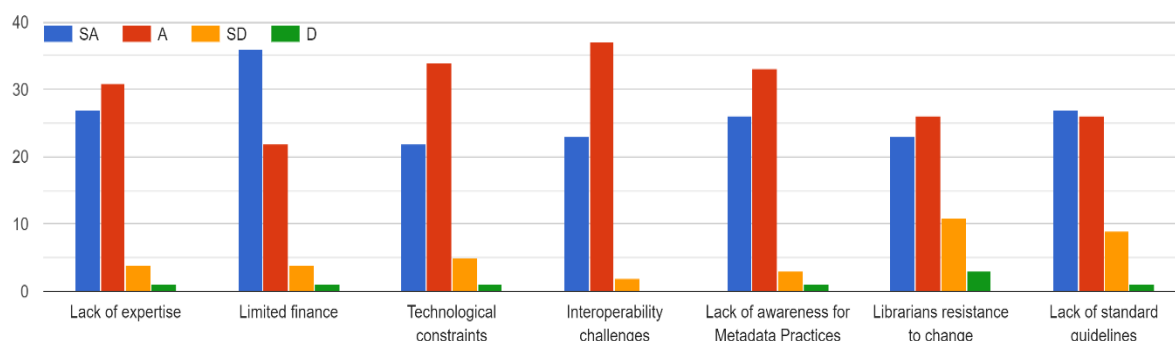
4.3 Research question 2: What role do librarians and IT professionals play in the implementation and management of metadata standards in Nigerian IRs?

Role of Librarians and IT professionals	SA	A	SD	D
Librarians are responsible for creating and curating metadata for institutional repositories	33 (52.38%)	24 (38.09%)	5 (7.94%)	1 (1.59%)
Librarians oversee the quality of metadata, ensuring consistency, accuracy, and completeness	34 (53.97%)	23 (36.51%)	5 (7.94%)	1 (1.59%)
Librarians often provide training to other staff members, including IT professionals	27 (42.86%)	29 (46.03%)	5 (7.94%)	2 (3.17%)
Librarians support end-users, such as researchers and students, by helping them navigate the repository	39 (61.90%)	20 (31.75%)	3 (4.76%)	1 (1.59%)
IT professionals are responsible for developing, maintaining, and integrating the technical infrastructure that supports metadata management in IRs	34 (53.97%)	27 (42.86%)	1 (1.59%)	1 (1.59%)
IT professionals implement metadata standards at a technical level, ensuring that the IR's software supports the necessary metadata schema	32 (50.79%)	28 (44.44%)	-	3 (4.76%)
IT professionals ensure the security and integrity of metadata records within the repository.	34 (53.97%)	27 (42.86%)	1 (1.59%)	1 (1.59%)
IT professionals work on ensuring that the IR can interoperate with other repositories, databases, and research networks	30 (47.62%)	29 (46.03%)	4 (6.35%)	-
Librarians and IT professionals work together to diagnose and resolve problems.	32 (50.79%)	26 (41.27%)	4 (6.35%)	1 (1.59%)
Both librarians and IT professionals collaborate on developing policies and procedures related to metadata management	35 (55.56%)	24 (38.09%)	4 (6.35%)	-

The above tables present the role librarians and IT professionals play in the implementation and management of metadata standards in Nigerian IRs. The majority of respondents 61.90% agreed strongly that librarians support end-users in navigating the repository. The majority of respondents representing 52.38% strongly agreed that librarians are responsible for creating and curating metadata for institutional repositories. Also, 53.97% which is the majority of respondents strongly agree that librarians oversee the quality of metadata, ensuring consistency, accuracy, and completeness. The majority 46.03% agreed that librarians often provide training to other staff

members, including IT professionals. 53.97% strongly agreed that IT professionals are responsible for developing, maintaining, and integrating the technical infrastructure and that IT professionals ensure the security and integrity of metadata records. 50.79% of respondents strongly agreed that IT professionals implement metadata standards at a technical level and librarians/IT professionals work together to diagnose and resolve problems. 47.62% agreed strongly that IT professionals work on the interoperability of the IRs. Finally, 55.56% of respondents being the majority strongly agreed that both librarians and IT professionals develop policies to manage metadata.

4.3 Research question 3: What challenges do Nigerian IRs face in Adopting and implementing metadata standards?



The chart above presents the challenges faced by institutions in adopting and implementing metadata standards for their repositories. For limited finance, the majority of respondents 36 (57.14%) strongly agree, 22 (34.92%) agree 4 (6.35%) strongly disagree, and 1 (1.59%) disagree that limited finance is the leading challenge facing IRs. For interoperability challenges, 37 (58.73%) the majority agree that it is a major issue, 23 (36.51%) strongly agree, and 2 (3.17%) strongly disagree 34 (53.97%) respondents agree that technological constraint is a problem, 22 (34.92%) selected strongly agree, 5 (7.94%) disagree strongly, and only 1 (1.59%) chose disagree. For lack of expertise, the majority 31 (49.21%) selected agree, 27 (42.86%) chose strongly agree, 4 (6.35%) strongly disagree, disagreed is 1 (1.59%). 33 (52.38%) respondents agree that lack of awareness is a major problem, 26 (41.27%) strongly agree, 3 (4.76%) while 1 (1.59%) disagreed. For librarians' resistance to change, 26 (41.27%) agree, 23 (36.51%) strongly agree, 11 (17.46%) strongly disagree, and 3 (4.76%) respondents disagree. For lack of standard guidelines, the majority 27 (42.86%) strongly agree, 26 (41.27%) agree, 9 (14.29%) strongly disagree while 3 (4.76%) disagree.

5. Discussion of findings

The analysis reveals that the majority 82.54% of respondents use Dublin Core as the primary metadata standard for describing digital resources. Dublin Core is favored for its simplicity and flexibility, which make it suitable for a wide range of digital content. This also agrees with the study of Zavalina and Burke (2021) which states that Dublin core is the most widely used metadata standard for metadata creation.

Findings from the study revealed that librarians and IT professionals play various roles in the implementation and management of metadata standards in Nigerian IRs. The majority of respondents agree that librarians support end-users, to navigate the repository, librarians are responsible for creating and curating metadata for institutional repositories among other roles. This is in line with the study of Idiegbeyan-Ose *et al.* (2020) which reported that the roles of librarians in the management of IR advocacy and promoting, purchase of software, formulating guidelines, assisting and persuading authors to upload their work, collection development and management, and copyright enlightenment.

Findings revealed that IRs are faced with several challenges which include: lack of expertise; limited finance; technological constraints; interoperability; and lack of awareness for metadata practices; librarians resistance to change; lack of standard guidelines. This is in agreement with the study by Idiedo *et al.* (2024) that reported the challenges faced by librarians and repository managers are inadequate funds, lack of expertise, inadequate facilities, and challenges in collecting content.

6. Conclusion

This study assessed the impact of metadata standards on the development of institutional repositories (IRs) in Nigeria, revealing key insights into the use of Dublin Core as the most common metadata standard due to its simplicity and flexibility. Librarians and IT professionals play critical roles in the management and implementation of metadata in IRs, with responsibilities ranging from metadata creation to supporting end-users. However, significant challenges such as lack of expertise, financial constraints, technological limitations, and resistance to change impede the effective adoption of metadata standards. Addressing these issues through targeted training, financial investment, and the development of standardized guidelines is essential for the advancement of IRs in Nigeria.

7. Recommendations

Based on the findings, the following recommendations were made:

1. To address the skills gap in metadata standards, institutions should invest in regular training programmes for librarians and IT staff. These programmes should focus on up-to-date metadata standards, such as Dublin Core, and provide hands-on experience in creating, curating, and managing metadata. Collaboration with international organisations that specialise in metadata can also help strengthen local expertise and facilitate knowledge exchange.
2. Nigerian institutions need to allocate more financial resources to develop and maintain institutional repositories (IRs). Investment in modern technological infrastructure will improve interoperability and the overall functionality of these repositories. Institutions can also explore external funding opportunities, such as grants or partnerships with global research organizations, to support the adoption of best practices in metadata management.
3. It is essential to create standardised metadata guidelines for all institutional repositories in Nigeria to ensure consistency and improve interoperability. These guidelines should reflect local needs while aligning with international standards like Dublin Core.

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