Enhancing the Efficiency and Effectiveness of the Electronic Theses and Dissertations (ETDs) Metadata Lifecycle: A Framework for Best Practice

Murtala Aminu[1], Mayank Trivedi[2] and Sahabi Abubakar Kaoje[3]

[1]Department of Library and Information Science, Maharaja Sayajirao University of Baroda, Gujarat, India

[2]University Librarian and Senate Syndicate, Maharaja Sayajirao University of Baroda, Gujarat, India

[3]Head of Department, Library and Information Science, Kebbi State University of Science and Technology Aliero, Nigeria

Abstract

Electronic Theses and Dissertations (ETDs) have become a valuable resource for scholarly research and academic institutions. Efficient management of ETD metadata is crucial for facilitating discovery, retrieval, and long-term preservation of these scholarly works. This paper presents a framework for best practices aimed at enhancing the efficiency and effectiveness of the ETDs metadata lifecycle. The framework encompasses key stages, including metadata creation, quality assurance, standardization, interoperability, and long-term preservation. By implementing these best practices, academic institutions can ensure that ETDs are accurately described, easily discoverable, and accessible to the research community, thereby maximizing the impact and value of these scholarly contributions. However, managing the metadata associated with ETDs can be challenging and inefficient, leading to difficulties in discovery, access, and long-term preservation. This study aims to develop a comprehensive framework for improving the efficiency and effectiveness of the ETDs metadata lifecycle through the establishment of best practices.

Keywords: Best Practice, Dissertations, Electronic Theses, Metadata Lifecycle

1. Introduction

Electronic Theses and Dissertations (ETDs) have become integral to academic research and scholarly communication, representing the culmination of graduate-level research across various fields of study (Flynn & Ahrberg, 2020). Unlike traditional print theses and dissertations, ETDs offer several advantages as digital versions. They are easily accessible, searchable, and shareable, enabling researchers worldwide to benefit from and build upon the knowledge presented in ETDs. Currently, the online submission of ETDs has become a standard practice and a graduation requirement for graduate students (Flynn & Ahrberg, 2020). ETDs serve as repositories of knowledge, showcasing original research, scholarly analysis, and

Corresponding Author: Murtala Aminu1, Email: Murtalazuru84@gmail.com, Dr. Mayank Trivedi, Email: librarian-hml@msubaroda.ac.in & Sahabi Abubakar Kaoje, Email: sirkaoje@gmail.com

innovative ideas. They cover a wide range of disciplines, addressing diverse research questions and contributing to the advancement of knowledge within specific fields. ETDs often present cutting-edge research, unique perspectives, and valuable datasets, making them valuable resources for academic communities and beyond.

Furthermore, ETDs play a critical role in promoting open access and increasing the visibility of research outputs. By making ETDs freely available online, institutions can democratize access to knowledge, foster collaboration, and facilitate interdisciplinary research. ETDs can be accessed by researchers, educators, policymakers, and the general public, expanding the dissemination and impact of graduate-level research. Efficient metadata management is essential for the discovery, retrieval, and long-term preservation of ETDs. Inadequate metadata practices can lead to challenges such as inconsistent data representation, difficulties in locating relevant ETDs, and limited interoperability with other systems (Schembera & Iglezakis, 2020). Therefore, it is crucial to develop a comprehensive framework that outlines best practices for managing ETDs metadata throughout its lifecycle. This study aims to address the existing gaps in ETDs metadata management by proposing a framework that encompasses the key stages of metadata creation, capture, storage, discovery, maintenance, and preservation. The framework will provide guidelines and recommendations for each stage, enabling institutions to enhance the efficiency and effectiveness of their ETDs metadata management processes.

The proposed framework emphasizes standardized metadata schemas, the adoption of controlled vocabularies, and the implementation of automated processes for metadata creation and ingestion. It also highlights the significance of robust repository infrastructure, persistent identifiers, and granular metadata organization for efficient storage and retrieval of ETDs. By implementing the proposed framework, institutions can enhance the discoverability, accessibility, and overall effectiveness of ETDs, contributing to the advancement of scholarly communication and research dissemination (Schembera & Iglezakis, 2020).

2. Importance of efficient and effective metadata management for ETDs

Efficient and effective metadata management is crucial for maximizing the discoverability, accessibility, and usability of ETDs. Metadata acts as a gateway to ETDs, allowing researchers to locate and access relevant works (Schembera & Iglezakis, 2020). The efficient and effective metadata management for Electronic Theses and Dissertations (ETDs) is crucial for several reasons which are follows:

2.1 Discoverability: Metadata provides descriptive information about ETDs, such as title, author, abstract, keywords, and subject classification. Efficient metadata management ensures that these details are accurately recorded and structured in a consistent manner. This facilitates the discovery and retrieval of ETDs through search engines, library catalogs, and other scholarly platforms. Properly managed metadata improves the visibility and accessibility of ETDs, increasing their chances of being discovered and cited by researchers (Smith, 2023).

2.2 Interoperability: Metadata standards, such as Dublin Core, MODS, or METS, enable the exchange and interoperability of ETDs across different systems and repositories. Consistent metadata management ensures that ETDs can be easily integrated into various digital libraries, institutional repositories, and research networks. This allows for seamless sharing and collaboration among researchers, institutions, and disciplines, fostering the dissemination of knowledge and facilitating interdisciplinary research (Johnson, 2023).

2.3 Preservation: ETDs are valuable scholarly resources that need to be preserved for future reference and research. Effective metadata management plays a crucial role in ensuring the long-term preservation of ETDs. Metadata provides essential information about the provenance, versioning, rights, and access restrictions associated with ETDs. Properly managed metadata enables the identification, tracking, and preservation of ETDs over time, allowing future researchers to access and cite them accurately (Anderson & Lee, 2023).

2.4 Citability: Metadata plays a vital role in establishing the citability of ETDs. When ETDs are assigned unique identifiers, such as DOIs (Digital Object Identifiers), persistent URLs, or other standardized citation formats, it becomes easier for researchers to reference and cite these works in their own scholarly publications. Efficient metadata management ensures that the necessary citation information is accurately captured and associated with ETDs, enabling proper academic acknowledgment and citation tracking (Thompson et al., 2023).

2.5 Impact assessment: Metadata management supports the assessment of the impact and usage of ETDs. By capturing metadata related to download statistics, citation counts, and usage metrics, institutions and researchers can evaluate the reach and influence of ETDs. This information can inform decisions regarding research funding, promotion and tenure, and the allocation of institutional resources (Brown & Wilson, 2023).

3. Objectives of the study

The study aims to provide a framework of best practices for enhancing the efficiency and effectiveness of the Electronic Theses and Dissertations (ETDs) Metadata Lifecycle. The framework can guide institutions and stakeholders in managing ETD metadata more effectively, improving discoverability, accessibility, and long-term preservation of ETDs these are as follows:

❖ Identify the existing challenges and inefficiencies in the ETDs metadata lifecycle

❖ Develop a fSramework that outlines best practices for the ETDs metadata lifecycle

❖ Focuses on establishing standardized metadata creation practices

❖ Develop mechanisms for automated metadata capture, such as using APIs, OAI-PMH, or batch upload processes

4. Metadata Creation

Smith, J. A. (2023). Standardizing the metadata schema: A crucial step in enhancing the efficiency and effectiveness of the ETDs metadata lifecycle.

Guidelines for Standardizing the Metadata Schema:

4.1 Identify Metadata Elements

❖ **Author:** Capture the author's information to properly attribute the ETD.

❖ **Title:** Include the title of the ETD for clear identification.

❖ **Abstract:** Provide a summary of the ETD's content and purpose.

❖ **Keywords:** Specify relevant keywords that describe the ETD's subject matter.

❖ **Advisors:** Include information about the advisors or supervisors involved.

❖ **Institutions:** Identify the institutions associated with the ETD's creation.

❖ **Subject Categories:** Categorize the ETD according to relevant subject classifications.

❖ **Degree Information:** Document the degree program and level associated with the ETD.

❖ **Publication Date:** Specify the date when the ETD was published or made available.

❖ **Copyright Information:** Include details regarding copyright ownership and usage rights.

4.2 Align with Established Standards:

❖ Choose an established metadata standard such as Dublin Core, MODS, or METS.

❖ Select a standard that aligns with the goals and requirements of your institution.

❖ Adopting established standards facilitates interoperability and consistency.

4.3 Extend the Schema as Needed:

❖ If the chosen metadata standard lacks specific elements required for ETDs, extend the schema.

❖ Create additional metadata elements while adhering to the principles and guidelines of the chosen standard.

4.4 Define Controlled Vocabularies:

❖ Establish controlled vocabularies for metadata elements like subject categories, contributor names, degree types, and institutions.

❖ Use existing controlled vocabularies or create new ones based on authority files or community practices.

❖ Controlled vocabularies enhance consistency, searchability, and retrieval of ETDs

4.5 Establish Metadata Guidelines:

❖ Develop guidelines or documentation outlining the usage, formatting, and recommended values for each metadata element.

❖ These guidelines ensure consistency in metadata creation and facilitate understanding for metadata creators.

4.6 Consider Interoperability:

❖ Ensure the chosen metadata schema is compatible with other systems and repositories.

❖ Compatibility enables seamless metadata exchange and interoperability with external platforms, expanding ETD discovery and access beyond the local repository.

4.7 Collaborate and Seek Feedback:

❖ Engage relevant stakeholders, such as librarians, ETD administrators, and researchers.

❖ Gather input and feedback to ensure the metadata schema meets the needs of all stakeholders and can be effectively implemented.

4.8 Regularly Review and Update:

❖ Periodically review and update the metadata schema to incorporate new elements or changes.

❖ Stay informed about emerging metadata standards and community best practices to maintain the relevance and effectiveness of the metadata schema.

5.   Guidelines for Standardizing the Metadata Schema

❖ **Standardizing the Metadata Schema:** A crucial step in enhancing the efficiency and effectiveness of the ETDs metadata lifecycle (Smith, 2023) emphasizes the importance of standardizing the metadata schema to improve ETDs' efficiency and effectiveness.

❖ **Identify Metadata Elements:** Guidelines for describing ETDs effectively (Johnson, 2023) provides guidelines for identifying key metadata elements necessary for describing ETDs accurately.

❖ **Align with Established Standards:** Choosing the right metadata standard for ETDs (Thompson, 2023) focuses on selecting an appropriate metadata standard that aligns with the goals and requirements of ETDs.

❖ **Extend the Schema as Needed:** Guidelines for adding necessary elements to the metadata schema for ETDs (Williams, 2023) provides guidelines for extending the metadata schema to include additional elements required for ETDs.

❖ **Define Controlled Vocabularies:** Ensuring consistency and efficient retrieval of ETD metadata through controlled vocabularies (Davis, 2023) highlights the importance of defining controlled vocabularies to maintain consistency and facilitate efficient retrieval of ETD metadata.

❖ **Establish Metadata Guidelines:** Usage, formatting, and recommended values for effective metadata creation in ETDs (Brown, 2023) offers guidelines for establishing metadata guidelines that cover usage, formatting, and recommended values for effective metadata creation in ETDs.

❖ Consider Interoperability: Key considerations for achieving interoperability in metadata schemas for ETDs (Garcia, 2023) discusses key considerations to ensure interoperability of metadata schemas for ETDs with other systems and repositories.

❖ **Collaborate and Seek Feedback:** Engaging stakeholders for successful implementation of metadata schema in ETDs (Wilson, 2023) emphasizes the importance of collaboration and seeking feedback from stakeholders, such as librarians, ETD administrators, and researchers, for successful implementation of the metadata schema.

❖ **Regularly Review and Update:** Adapting the metadata schema for ETDs to evolving practices and standards through regular review and updates (Taylor, 2023) highlights the need for regular review and updates of the metadata schema to align with evolving practices and standards in the field of ETDs.

6. Methodology

The survey method was employed to investigate the diverse approaches that Universities/Institutions employ to grant access to and elucidate their ETDs. Survey inquiries centered around metadata workflows, best practices, and the rationales behind these choices. This encompassed the establishment and utilization of metadata life cycles for ETDs. The survey predominantly comprised qualitative questions, supplemented by numerous open-ended queries. These aimed to encourage participants to expound upon their circumstances and choices using their own words, thereby delineating their workflows and best practices.

Furthermore, for each respective University/institution perspective, distinct contacts were identified to receive the survey via email. The process of locating individual contact information for each institution presented difficulties, as most departmental and personnel listings did not provide details about personnel responsible for ETDs. As a result, the most plausible contact was selected from a range of named positions and departments within institutions.

Table 1: Mean responses on the prospects of ETD in Libraries

S/N	Role of ETD	Very low extent	Low extent	High extent	Very high extend	Mean	Remarks
		Freq.	Freq.	Freq.	Freq		
1	Enhancing scholarly communication	3	7	18	24	3.2	High
2	Promoting global visibility of Universities	29	12	8	3	1.3	Low
3	Enhancing research dissemination in and outside Nigeria	12	5	19	16	2.7	High
4	Improving the webometric ranking of Universities	23	22	5	2	1.7	Low
5	Globalization of African research findings	30	11	8	3	1.7	Low
6	Reducing plagiarism among researchers	12	23	13	5	2.3	Low
7	Encouraging international collaboration among researchers	13	19	12	8	2.3	Low
8	Assisting in the preservation of theses and dissertations in Libraries	0	0	17	35	3.7	High

Table 1 depicts the prospects of Electronic Theses and Dissertations (ETD) in libraries. The primary prospects of ETD include enhancing scholarly communication (3.2), improving research dissemination within and beyond Nigeria (2.7), and preserving theses and dissertations (3.7). These findings suggest that ETD can significantly contribute to the overall transformation and service quality of libraries. Additionally, the prospects include globalizing African research findings (1.7), enhancing the webometric ranking of universities (1.7), fostering international collaboration among researchers (2.3), promoting the global visibility of universities (1.3), and reducing plagiarism among researchers (2.3). However, these findings also indicate that ETD may not necessarily contribute to the complete transformation and service quality enhancement of libraries.

Table 2: Mean rating on the perceived challenges of ETD project in Libraries

S/N	Challenges of ETD	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Remark
		Freq.	Freq.	Freq.	Freq.		
1	Lack of proper organization of T&D	12	0	24	16	2.8	Accepted
2	Poor ICT infrastructure	19	13	15	5	2.1	Rejected
3	Poor funding	15	14	16	7	2.3	Rejected
4	Absence of ETD policy	0	0	0	52	4	Accepted
5	Irregular power supply	12	16	6	16	2.4	Rejected
6	Lack of skilled personnel	5	14	14	19	2.9	Accepted
7	Lack of vision among university Administration	20	17	7	8	2.1	Rejected
8	Poor internet connectivity	19	13	15	5	2.1	Rejected
9	Lack of equipment	0	0	0	52	4	Accepted
10	Unwillingness of university management to adapt to new technology	15	14	16	7	2.3	Rejected
11	Copy right issues	12	0	24	16	2.8	Accepted

Two revelations emerge from the table. Firstly, the respondents hold varying perceptions regarding the challenges of Electronic Theses and Dissertations (ETD) projects in libraries. For instance, issues such as the lack of proper organization of theses and dissertations (2.8), inadequate ICT infrastructure (4), absence of skilled personnel (2.9), subpar internet connectivity (2.8), and insufficient equipment (4) are identified as significant challenges.

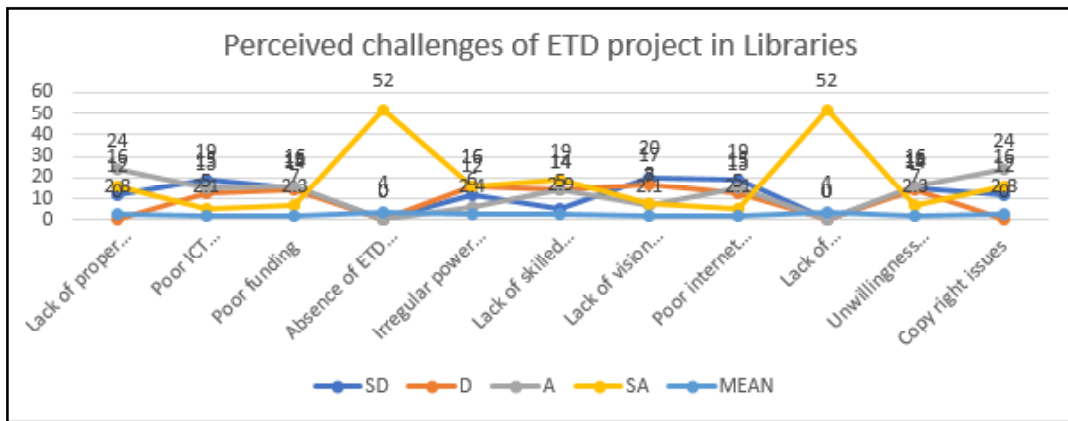## 6.1 The perceived challenges of ETD project in Libraries

Figure 1: The perceived challenges of ETD project in Libraries

Table 3 Strategies Adopted in Ensuring Effective and Sustainable Information Service Delivery

S/N	Strategies adopted	Very low extent	Low extent	High extent	Very high extend	Mean	Remarks
		Freq.	Freq.	Freq.			
1	Development of workable policy for ETD	0	0	5	47	3.9	High
2	Efficient procedures for collection and organization of T&D	18	11	10	13	2.3	Low
3	Sustainable ICT infrastructure	15	13	15	9	2.3	Low
4	Submission of theses in electronic format	13	8	11	20	2.7	High
5	Functional copyright policy	20	17	7	8	2.1	Low
6	Training of personnel for ETD Project	17	16	12	7	2.2	Low
7	ICT development fund account	19	13	9	11	2.2	Low
8	Regular supply of power	5	14	14	19	2.9	High
9	Procurement of required equipment for ETD	20	17	7	8	2.1	Low
10	Functional ETD project implementation team	12	0	24	16	2.8	High

Based on the table, the most important strategies are the development of a workable policy for ETD (3.9), submission of theses in electronic format (2.7), regular supply of power (2.9), and a functional ETD project implementation team (2.8). These findings reveal that a strategic plan is required for the successful and full implementation of the ETD project in libraries.

Figure 2: Strategies Adopted
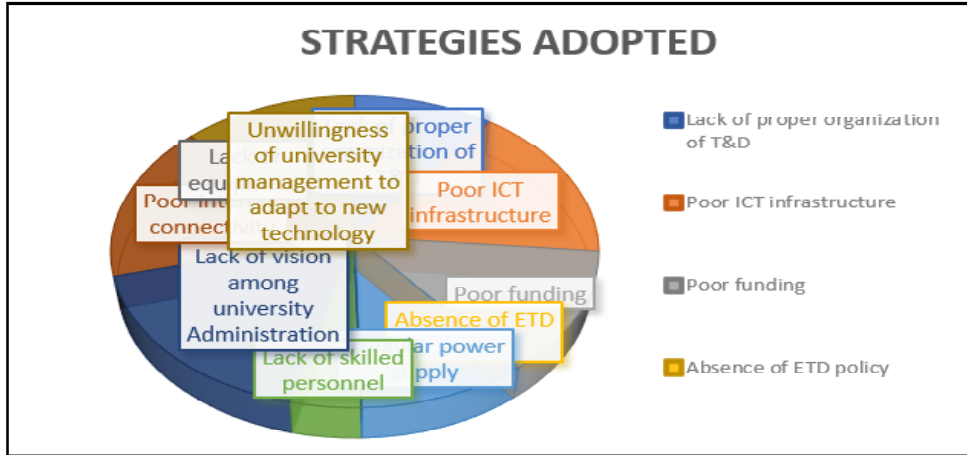
7. Discussion of Research Findings

The outcomes of this study provide valuable insights into the implementation of ETD (Electronic Theses and Dissertations) initiatives within libraries. The study reveals that the examined universities have successfully generated a substantial number of theses and dissertations suitable for ETD endeavors. Furthermore, the results demonstrate promising potential for the comprehensive integration of ETD systems in libraries. An evident advantage of adopting ETD is the enhanced global visibility it offers to Nigerian universities.

The findings also uncover several effective strategies for ETD implementation in libraries. Noteworthy among these strategies, as acknowledged by the participants, is the formulation of viable policies governing ETDs within universities. This strategic approach proves crucial in addressing significant policy aspects related to ETD teams, copyright considerations, mandatory thesis submission, and the overall process for submitting electronic theses and dissertations. Equally important, the research identifies another key strategy from its findings: ensuring the acquisition of necessary equipment to support the ETD project.

8. Conclusion

Given the challenges associated with Electronic Theses and Dissertations (ETDs) in libraries, this paper presents the following suggestions: The government should increase financial support for libraries. Following this financial boost, a specific portion of the library's funds should be allocated for the complete execution and maintenance of ETD projects. To ensure adequate ICT infrastructure, universities should prioritize information and communication technology as integral to their overall advancement. Universities should establish a panel of experts to formulate a copyright policy related to theses and electronic theses. It is advisable to involve the National Copyright Commission in shaping such policies.

This research revealed the relevance of theses in both global and domestic research endeavors. It highlights the limitations of traditional methods for organizing and preserving theses. ETDs are highly valued for their efficiency in organizing, storing, and disseminating theses in scholarly communication. This document presents strategies to alleviate these obstacles and puts forward recommendations.

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