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COMPARATIVE STUDY OF TRADITIONAL AND AI-DRIVEN CATALOGUING SYSTEMS IN RUFUS GIWA POLYTECHNIC OWO AND FEDERAL POLYTECHNIC ILE-OLUJI

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Abstract

The emergence of Artificial Intelligence (AI) has transformed cataloguing and classification processes in academic libraries globally. This study comparatively examined traditional and AI-driven cataloguing systems in Rufus Giwa Polytechnic and Federal Polytechnic Ile-Oluji libraries in Ondo State, Nigeria. The study investigated the effectiveness, speed, accuracy, and operational challenges associated with both systems. A descriptive survey research design was adopted for the study. The population consisted of forty-two (42) library personnel, including professional librarians, para-professionals, and cataloguers from the two selected polytechnic libraries. Due to the manageable size of the population, total enumeration sampling technique was adopted. Data were generated through structured questionnaires and analysis of existing literature related to AI applications in library technical services. Findings revealed that AI-driven cataloguing systems improve metadata consistency, speed of information processing, and information retrieval efficiency, while traditional cataloguing systems provide stronger intellectual control and human supervision. The study also identified major challenges affecting AI implementation, including inadequate funding, poor ICT infrastructure, unstable power supply, and insufficient technical expertise among librarians. The study concluded that integrating AI technologies with traditional cataloguing methods would significantly enhance library operations and service delivery in polytechnic libraries. The study recommended continuous training for librarians, improved ICT infrastructure, and institutional support for AI adoption in academic libraries.

Keywords: Artificial Intelligence, Cataloguing, Classification, Academic Libraries, Metadata, Machine Learning, Polytechnic Libraries, Information Retrieval, Nigeria, Library Automation

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Introduction

Cataloguing and classification constitute core technical services in libraries, enabling the systematic organization, storage, and retrieval of information resources. Traditionally, cataloguing activities are performed manually by professional librarians using established standards such as the Anglo-American Cataloguing Rules (AACR2), Resource Description and Access (RDA), Dewey Decimal Classification (DDC), and Library of Congress Classification (LCC). These systems have historically ensured consistency and intellectual organization of library collections (Tella & Oluwole, 2023).

The advancement of Artificial Intelligence (AI) technologies has introduced modern innovations into cataloguing and classification practices. AI-driven cataloguing systems employ machine learning, natural language processing, automated metadata extraction, and semantic indexing to improve the speed and efficiency of library operations. According to Cox, Pinfield, and Rutter (2019), AI technologies are increasingly reshaping academic library operations by automating repetitive technical processes and improving information retrieval systems.

AI-driven cataloguing systems have become essential in digital library environments due to their ability to process large volumes of information resources efficiently. Machine learning algorithms can automatically assign subject headings, generate metadata, and classify resources with minimal human intervention (Mahmud, 2024). This has improved operational efficiency and reduced the workload of cataloguers in many academic libraries worldwide.

Despite these advancements, many academic libraries in developing countries, including Nigeria, still rely heavily on traditional cataloguing methods because of infrastructural limitations, poor funding, inadequate technical expertise, and unstable power supply (Tella & Oluwole, 2023). Polytechnic libraries in Ondo State are gradually adopting digital technologies, yet the integration of AI-driven cataloguing systems remains relatively low.

Rufus Giwa Polytechnic and Federal Polytechnic Ile-Oluji are important tertiary institutions that provide academic and research support through their libraries. As information resources continue to grow in both print and digital formats, there is a need to examine how traditional cataloguing systems compare with AI-driven systems in these institutions.

This study therefore comparatively investigates traditional and AI-driven cataloguing systems in the selected polytechnic libraries with emphasis on effectiveness, operational efficiency, challenges, and prospects for improved service delivery.

Statement of Problem

Many polytechnic libraries in Ondo State still depend on traditional cataloguing systems, which are often slow, manual, and prone to errors. Although AI-driven cataloguing systems can improve speed, metadata accuracy, and information retrieval, their adoption remains limited due to inadequate funding, poor infrastructure, unstable electricity, weak internet connectivity, and lack of technical expertise

among librarians. In addition, there is limited research comparing traditional and AI-driven cataloguing systems in polytechnic libraries within Ondo State. Therefore, this study examines the differences, benefits, and challenges of both systems in order to determine how AI can improve cataloguing efficiency and library service delivery.

Objectives of the Study

The objectives of this study are to:

1. Examine the traditional cataloguing and classification practices used in the selected polytechnic libraries.
2. Determine the extent of AI adoption in cataloguing and classification operations.
3. Compare the effectiveness of traditional and AI-driven cataloguing systems.
4. Identify the challenges associated with implementing AI-driven cataloguing systems.
5. Suggest strategies for improving AI adoption in polytechnic libraries.

Research Questions

1. What traditional cataloguing practices are used in the selected polytechnic libraries?
2. To what extent are AI technologies adopted in cataloguing and classification?
3. What are the comparative advantages of AI-driven cataloguing systems over traditional systems?
4. What challenges affect the implementation of AI-driven cataloguing systems?
5. What strategies can improve AI adoption in polytechnic libraries?

Literature Review

Traditional cataloguing systems involve manual bibliographic description, subject analysis, indexing, authority control, and classification of information resources using established cataloguing rules and classification schemes. According to Raju and Schoombee (2013), traditional cataloguing promotes intellectual organization and standardization in library collections.

Artificial Intelligence has significantly transformed cataloguing and classification practices in libraries. AI applications such as machine learning, natural language processing, and semantic indexing have improved metadata generation and information retrieval systems. Cox et al. (2019) stated that AI technologies support automation of repetitive technical services and improve operational efficiency in academic libraries.

Mahmud (2024) observed that AI-driven cataloguing systems improve speed, metadata consistency, and automated subject indexing. AI applications can analyze textual content and automatically assign descriptors, keywords, and classification numbers to information resources.

Similarly, Tella and Oluwole (2023) found that librarians in Nigerian academic libraries acknowledge the benefits of AI technologies in cataloguing and classification, particularly in reducing repetitive manual tasks and improving

information retrieval. However, the study identified poor ICT infrastructure, inadequate funding, and insufficient technical expertise as major barriers to effective AI implementation.

Asemi and Asemi (2018) emphasized that AI technologies enhance library automation, digital knowledge organization, and semantic search capabilities. The authors further argued that AI systems can support multilingual metadata generation and intelligent user services in digital libraries.

Despite the advantages of AI-driven systems, ethical concerns such as algorithmic bias, transparency, and data privacy remain important issues in AI implementation within libraries (Cox et al., 2019).

Methodology

This study adopted a descriptive survey research design to comparatively examine traditional and AI-driven cataloguing systems in the libraries of Rufus Giwa Polytechnic and Federal Polytechnic Ile-Oluji.

The population of the study consisted of forty-two (42) respondents drawn from the two polytechnic libraries. The population included professional librarians, cataloguers, library officers, and para-professional staff involved in cataloguing and classification operations. Specifically, twenty-four (18) respondents were drawn from Rufus Giwa Polytechnic Library, while eighteen (24) respondents were drawn from Federal Polytechnic Ile-Oluji Library.

Due to the relatively small and manageable population size, the study adopted total enumeration sampling technique, where all members of the population were included in the study.

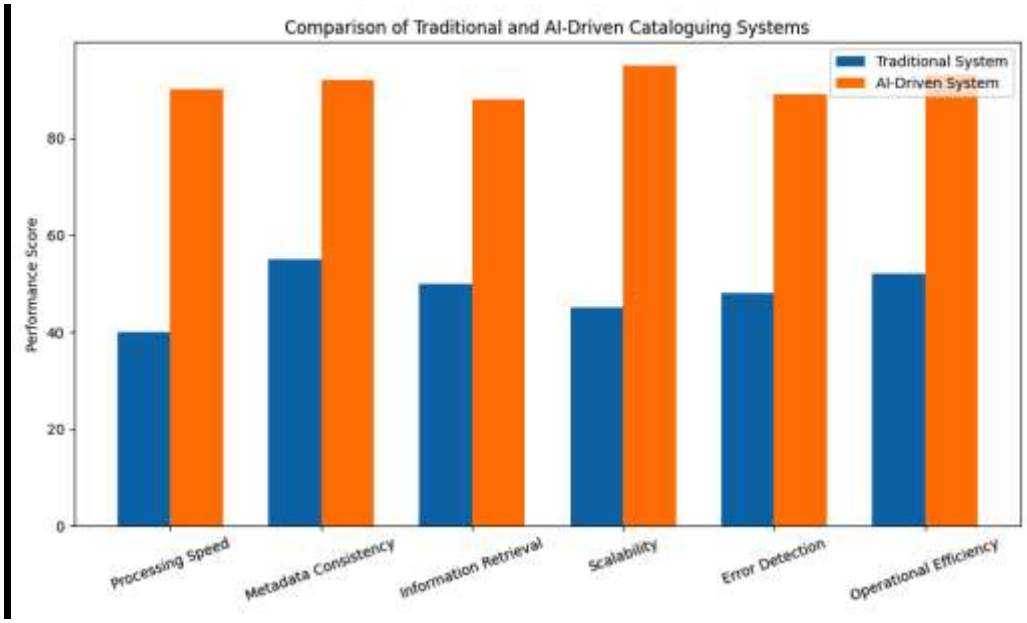
Data were generated through structured questionnaires and relevant scholarly literature on Artificial Intelligence and library cataloguing systems. The questionnaire consisted of sections on traditional cataloguing practices, AI adoption, efficiency of cataloguing systems, challenges of implementation, and strategies for improvement.

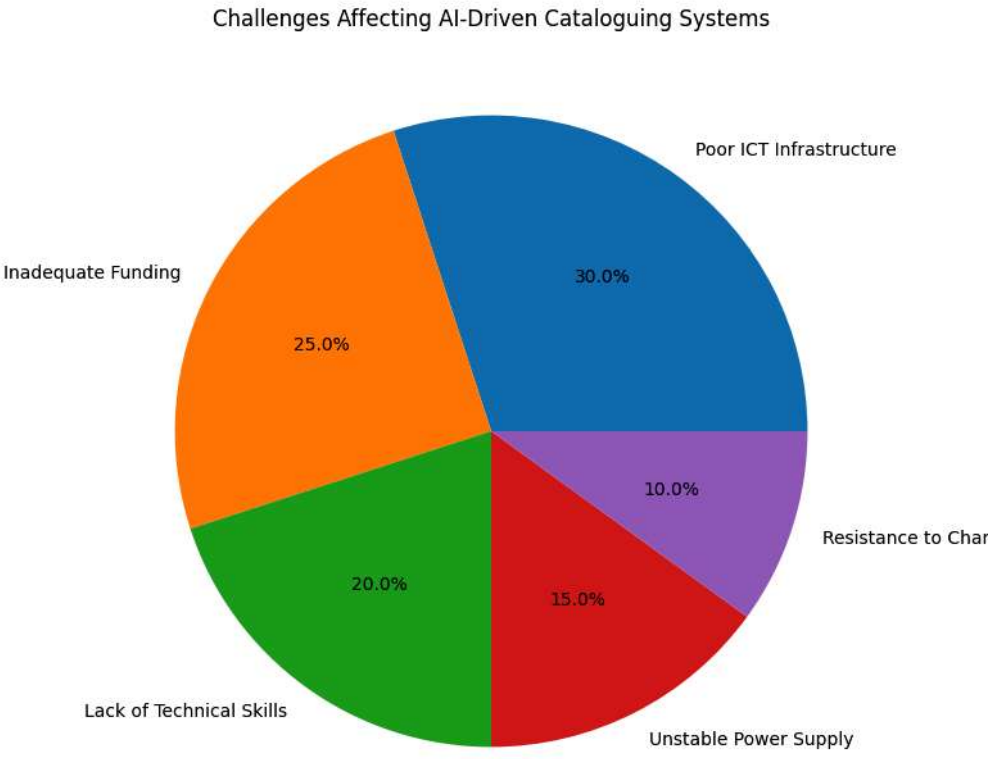
The data were analyzed using descriptive statistics such as frequency counts, percentages, and mean scores. Findings were presented in tables and discussed according to the research objectives.

Comparative Analysis of Traditional and AI-Driven Cataloguing Systems

Features	Traditional Cataloguing System	AI-Driven Cataloguing System
Processing Speed	Slow and manual	Fast and automated
Metadata Creation	Human-generated	Machine-generated
Accuracy Control	High intellectual supervision	Algorithm-based consistency
Cost Implication	High labour demand	High technological setup cost
Information Retrieval	Basic keyword search	Semantic and intelligent search
Scalability	Limited	Highly scalable
Error Detection	Manual correction	Automated detection

Features	Traditional Cataloguing System	AI-Driven Cataloguing System
Staff Requirement	Professional cataloguers	ICT-skilled librarians





Findings

The study further revealed that librarians perceive AI technologies as beneficial in reducing repetitive cataloguing tasks, improving metadata generation, and enhancing the organization and retrieval of digital resources. This finding agrees with Nduka, Tella, and Okiki (2023), who found that librarians in Nigerian academic libraries acknowledged the usefulness of AI in improving operational efficiency and service delivery. Similarly, Shehu et al. (2026) noted that AI-based metadata systems enhance discoverability, interoperability, and digital resource management in polytechnic libraries.

Major challenges identified in the study include inadequate funding, unstable electricity supply, poor internet connectivity, lack of AI training, low ICT competence, and resistance to technological change. These findings corroborate earlier studies which identified poor infrastructure, inadequate staff training, technophobia, and insufficient institutional support as major barriers to AI adoption and library automation in Nigeria (Obande, et al., 2023).

The findings also showed that the hybrid integration of traditional cataloguing methods with AI-driven systems would provide better operational efficiency and improved library service delivery. This aligns with studies emphasizing that while AI technologies can automate routine cataloguing functions, human expertise remains essential for quality control, contextual interpretation, and metadata accuracy (Shehu et al., 2026; Das & Islam, 2021). Therefore, a balanced integration of human cataloguers and intelligent systems is considered the most sustainable approach for academic libraries in developing countries.

Conclusion

The study concluded that AI-driven cataloguing systems offer significant advantages over traditional cataloguing methods in terms of automation, speed, consistency, and retrieval efficiency. Nevertheless, traditional cataloguing systems remain relevant because they provide intellectual supervision and professional quality control.

The integration of AI technologies into cataloguing and classification operations in polytechnic libraries would enhance efficiency, accessibility, and digital information management. However, successful implementation requires adequate funding, ICT infrastructure, technical training, and institutional support.

Recommendations

1. Polytechnic libraries should invest in AI-powered cataloguing software and digital infrastructure.
2. Librarians should receive continuous professional training on AI technologies and metadata management.
3. Government and institutional management should provide adequate funding for library automation projects.
4. Libraries should adopt hybrid cataloguing systems that combine AI automation with human intellectual supervision.

5. Policies guiding ethical use of AI technologies in libraries should be developed and implemented.

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