



CATALOGUING AND CLASSIFICATION IN THE ERA OF ARTIFICIAL INTELLIGENCE, PROSPECTS, CHALLENGES AND WAY FORWARD: A LITERATURE REVIEW

Kikelomo ADEEKO, CLn, PhD

McPherson University; McPherson University Library; Seriki Sotayo, Ogun State, Nigeria; adeeko308@gmail.com or adeekok@mcu.edu.ng; +2348060602146;

Orcid Id: <https://orcid.org/0009-0000-2590-5998>

Japheth Abdulazeez YAYA, PhD; CLn, MNLA

Federal University Oye-Ekiti; Faculty of Education; Department of Library and Information Science; Oye Ekiti, Ekiti State, Nigeria; japheth.yaya@fuoye.edu.ng; +2347033762965;

Orcid Id: <https://orcid.org/0000-0003-2566-1406> (correspondence author)

Seun Gbolahan KOLAWOLE

McPherson University; McPherson University Library; Seriki Sotayo, Ogun State, Nigeria; Kolawoleseun4real@gmail.com or kolawolesg@mcu.edu.ng; +2348137735429

&

Richard Olumayowa OGUNJOBI

Department of Library and Information Science; Faculty of Education; Federal University Oye-Ekiti, Ekiti State, Nigeria; talk2richardolumayowa@gmail.com; +2349039889259

Abstract

Libraries have always been centers of knowledge, involved in gathering, preserving and disseminating information resources to various information seekers in divers' form and formats to the academic and research community. The increase in the volume and variety of information materials in the digital age has expand the scope of work of Cataloguer. Cataloguing and organizing these resources become increasingly complex. Consequently, this paper reviewed cataloguing and classification in the era of artificial intelligence. The paper specifically focused on: Cataloguing and Classification of Information Resources in the Library; Concept of Cataloguing, classification; artificial intelligence; prospects of book cataloguing and classification in AI era, their challenges and the way forward. It concluded by proffering solutions to some of the factors affecting cataloguing and classification practices in libraries. It is therefore recommended that libraries should be adequately equipped with modern and sophisticated technologies that will hasten operations and services of libraries towards meeting the information needs of the library users, and also there should be adequate and progressive staff training on the various techniques of AI adoption into the library operations and services. AI adoption necessitates ongoing training for library staff. Professionals must be equipped to manage, interpret, and utilize AI applications effectively. amongst others.

Keywords: Cataloguing, classification, artificial intelligence, cataloguer, libraries

Introduction

Libraries have always been centers of knowledge, involved in gathering, preserving and disseminating information resources of divers' form and formats to the academic and research community in an easier and more accessible way. The increase in the volume and variety of information materials in the digital age has expand the scope of work of Cataloguer. Cataloguing and organizing these resources become highly tasking and demanding. Thus, the need for a more efficient way of processing these

information resources. Similarly, the massive production of human knowledge in all facets of human endeavour caused by easy of production through technological advancement in the information industry; has also led to increased need for librarians and particularly cataloguers to organize this knowledge such that like classes/subject are brought together based on the mutual relations between them for quick and easy retrieval by clients. Martins (2024) submitted that the task of cataloguing and classification is very central to any library because it is the function



that ensures easy and fast organization and retrieval of information resources for use by clients. Ejiroghene (2020) opined that manual cataloguing and classification involve a lot of brain work and labour. The author further argued that cataloguing and classification were not very demanding at inception, like in recent times, where there is so much in print format and so much published both electronically and physically. The reality of massive publications because of the proliferation of printing technology has only added to the workload of librarians and cataloguers in particular (Martins, 2024).

Furthermore, Frederick (2020) in a study on Librarians in the era of artificial intelligence and the data deluge emphasized that though the new era brings many challenges to librarianship, yet librarians should break down the existing service models which are not working and build up new models and services which are both agile and responsive through the use of AI technology. The author noted that AI is playing an increasingly important role in our society globally. AI impacts are widely recognized in diverse areas such as medicine, security, business, as well as library management/ information processing. “Artificial intelligence (AI) is one of the emerging trends and applications of computing in libraries. It involves programming computers to do things, which, if done by humans, would be said to require intelligence. The ultimate promise of artificial intelligence in libraries is to develop computer systems or machines that think, behave, and rival human intelligence, and this has major implications on librarianship” (Omame & Alex-Nmecha, 2020: 120). While Guerrini (2023) posited AI as a tool that complements the cataloguer's judgment, emphasizing its role in enhancing the fundamental intellectual activity in cataloguing. The application of artificial intelligence in the library has become pervasive. They include expert systems for reference services, book reading and shelf-reading robots, virtual reality for immersive learning among others (Omame & Alex-Nmecha, 2020).

Cataloguing and Classification of Information Resources

Library could be comprehensively seen as a place, well-ventilated and serene room(s) and environment where books and other educational resources or materials (books, non-book and information carriage resources) are systematically selected by the professional librarian(s), acquired, processed, organized and displayed on the shelves for reading, reference and for research purposes. The resources selected and acquired in any library, especially in the academic library, must be properly processed and organized for easy accessibility and retrieval by the library users/readers/clientele/customers/patrons. The art of processing and organizing library educational resources is known as cataloguing and classification. The library, as a social institution and service institution, depends upon the catalogue for its successful functioning and effective service delivery to clients. Therefore, accurate and adequate cataloguing and classification of resources is required from cataloguers and classifiers. Unfortunately, these days, cataloguers have so much to catalogue and classify that the work is overwhelmingly much and therefore are prone to error, skip some steps or observe those steps with less precision. hence, cataloguers are likely to do their work with less details and excellence (Martins, 2024; Ejiroghene, 2020). Wikipedia (2024) defined cataloguing as the process used to organize, create an index of the recently acquired library collections for easy accessibility and retrieval. It describes what a library has on a particular book and where to find it in the library; this is stored in the library catalogue. The catalogue describes each title of the educational resources stocked in the library.

Thus, the library and its resources must be adequately processed and organized for easy accessibility and retrieval by all potential information seekers. It can be pointed out that every newly acquired library resource must go through some technical processes before it can be made available for use. David-Westonck and Angrey (2018:94) asserted that “information resources in the library will not be useful if there



is no access to them and that this important function is within the concept of cataloguing and classification". The authors further posited that the processing of library materials is an aspect of technical services in the library and that cataloguing and classification play a vital role in information dissemination. In other words, information resources must be systematically described and carefully classified before it can be easily accessed by any potential library user. Hence, cataloguing and classification is highly essential in the provision of the library services to the end information seekers. Everyone in the human society needs information and they look forward to seeing that such information could be easily gotten from the library.

David-West and Angrey (2018:94) emphasized that "cataloguing and classification is the central nervous system of librarianship. The current trends in cataloguing have re-engineered the basic structure of the library organization". The authors further noted that in the past, cataloguing and classification were done manually which made the work very difficult, boring and time consuming. Recently, most university libraries in Nigeria have joined their counterparts in advanced countries in the use of computers for processing library collections. Additionally, the authors opined that three major steps of cataloguing and classification which are allocating access points, subject headings and classification numbers have made library materials to be easily accessed and retrieved by users.

Historically, Miksa (2021:97) opined that "modern cataloging principles and objectives started in 1841 with the creation of Panizzi's 91 Rules for the British Museum and gained momentum with Charles Cutter's Rules for Descriptive Cataloging (1904). The first Statement of International Cataloguing Principles (ICP) was adopted in 1961, holding their place through such codifications as AACR and AACR2 in the 1970s and 1980s". Imo and Igbo (2011) stated that cataloguing is aimed at creation and organizing information to promote access to information, and thereby to improve the end users experience of locating and retrieving information resources in the library. The scholar argued that information explosion has presented a

scenario that will necessitate the cataloguers to adapt to new technology in order to disseminate information appropriately. While, Bello and Mansor (2011) believed that a cataloguer must be skilled enough to perform bibliographic description of all kinds of resources with the use of appropriate bibliographic tools such that users could easily and efficiently access the resources in the library irrespective of the method used whether manually or technologically.

Concept of Cataloguing and Classification

What is cataloguing? Literally, in library and information science, **cataloging** (US) or **cataloguing** (UK) is the process of creating metadata representing information resources, such as books, sound recordings, moving images, etc (Wikipedia, 2024). In this paper, the researchers shall prefer the UK terminology. Similarly, Esse (2013) submitted that cataloguing is the bibliographic description of information resources for easy identification whereas classification is the appropriate placement of an information resource with the view of making available, accessible in a specific location among other information resources. The technical term for describing information organization in library and information centers is Cataloguing and classification.

Furthermore, cataloguing can be defined as, the process of creating metadata for resources by describing a resource, choosing name and title access points, conducting subject analysis, assigning subject headings and classification numbers, and maintaining the system through which the cataloguing data is made available (Joudrey, Taylor & Miller, 2015 cited in Janis & Daniel, 2020). This simply implies creating bibliographic metadata comprising of all the library holdings or resources available for clients use which are organized and kept in a library catalog. Cataloguing is an art of providing bibliographic descriptions of all educational resources stocked or housed in the library collection for an easy accessibility and retrieval by the library patron.

According to Read cited in Wikipedia (2024) cataloguing provides information such as author's



names, titles, and subject terms that describe resources, typically through the creation of bibliographic records or details which serves as surrogates for the stored information resources. Again, Wikipedia (2024) highlighted that since the 1970s these metadata are in machine-readable form and are indexed by information retrieval tools, such as bibliographic databases or search engines, leading to production of library catalogs and other types of discovery tools for documents and collections. In the opinion of Akidi & Omekwu (2019:22) cataloguing and classification of information resources in the digital age is fundamentally required to enhance effective bibliographic control and bring about universal access to information resources. The authors further noted that “cataloguing and classification practices are gateways to information resources access and utilization as they are means of organizing library resources in order to ensure that access and retrieval of such information resources are made easy”. These essential services are characterized with: creating a record for each item that describes subject, author, title, and other identifying information; classifying items by adding a call number to help patrons and staff find them on the shelves; providing accurate, consistent, and complete information about library resources; and adhering to principles of accuracy, consistency, and standardization in descriptive cataloguing.

A library classification is a system of coding and organizing library materials (books, serials, audiovisual materials, computer files, maps, manuscripts, regalia) according to their subject and allocating a call number to that information resource. This is quite similar to library (descriptive) cataloguing. Both cataloguing and classification are often referred to as technical services. Library classification systems is similarly a tool which facilitate subject access. The library professional responsible for the processes of description, subject analysis, classification, and authority control of library materials are refers to as cataloguer or catalog librarian.

Artificial Intelligence and Library Resources

Libraries been a recipient of knowledge where people with different information needs sought

after in search for divers’ sources of information materials relevant to their daily needs. Consequently, libraries must keep up with the changes evolving in the present technologically driven world in order to remain relevant. Artificial intelligence (AI) is one of the most promising technologies that can help libraries achieve this goal, as AI can help libraries automate processes, provide personalized services, and improve user experiences (Hodonu-Wusu, 2024). According to Canda (2024), Artificial Intelligence (AI) refers to a wide range of computer tools and techniques that are designed to imitate human intelligence. This includes things like learning, reasoning, problem-solving, understanding language, and perceiving things through senses like vision or hearing.

Similarly, Esq (2023) defined Artificial intelligence (AI) as the simulation of human intelligence in computers that are trained to think and act like humans. The phrase can also refer to any machine that demonstrates human-like characteristics like learning and problem-solving. Mali & Deshmukh, (2021) cited by Dyiltu (2024) asserted that artificial intelligence is a branch of computer science that works with providing machines the ability to appear to have natural human intelligence. Misau (2021) defined artificial intelligence as a branch of computer science that focuses on creating machines that can engage in behaviours that humans consider intelligent. Artificial intelligence according to Heath (2018), could be described as the technology that enables robots to plan, learn, reason, solve problems, move, and to some extent be creative. The author further stressed that Artificial Intelligence's goal is to create computers that can think, see, hear, walk, communicate, and feel, and the beauty of this technology is that it can recognize patterns at a size and pace that humans cannot.

However, it can be reiterated that the increase in the volume and variety of information materials in the digital age has expand the scope of work of cataloguers, and thereby necessitated the transformation of book processes from the agelong traditional method into a modern and digitalized method using artificial intelligence. This helps in providing fast and accurate



organisation of the information resources stocked in the library. In other words, AI is an essential tool that could be used to facilitate this ever-needed service before educational materials can be easily accessible to the library users.

Al-Aamri and Osman (2022) reported that applications of artificial intelligence are a major development that affected and facilitated many of the processes that humans perform. Yet it is a vast and complex field of study which can be difficult for non-professionals to understand. However, its ultimate goal is to create computer systems that rival human intelligence, and this clearly has major implications for libraries (Asemi & Asemi, 2018 cited in Moustapha & Yusuf, 2023). In particular, Moustapha and Yusuf (2023) highlighted various applications of artificial intelligence in the library system, such as descriptive cataloguing, technical services, and collection development; subject indexing; reference services; database search; and delivery of documents. Similarly, the findings of the literature review carried out by Subaveerapandiyan (2023) on the application of artificial intelligence in libraries and its impact on library operations indicated that AI can improve information retrieval, automate routine tasks, personalize users' interactions, and provide innovative services. The author further emphasized that intelligent libraries equipped with AI technologies can streamline cataloguing, classification, and recommendation processes which invariably enables efficient information access for patrons.

In agreement with the above, Sivrajah, Krishnan and Desai (2017) cited by Moustapha and Yusuf (2023) noted that the use of AI in academic libraries allows for better analysis of data sets, especially large data sets used for analysis across multiple data sets; which also helps get rid of repetitive and boring tasks. This means that the application of AI to library operations helps libraries develop capabilities that can exceed those of the human mind. Also, Asemi and Asemi (2018) conceptualized artificial intelligence in library as the application of computer and utilization of computer-based products and services in the performance of different library operations and functions. According to these

scholars; the ideas of utilization of intelligent system instead of classic system in libraries started from 1990, when intelligent library systems utilize AI technologies to provide knowledge-based services to library patrons and staff. The scholar further submitted that with the advent of the computer and 50 years of research into AI programming techniques, the dream of smart libraries is becoming a reality as researchers are creating systems which can mimic librarian thought and behavior which never before was possible.

Additionally, Tredinnick (2017) cited in Moustapha and Yusuf (2023) described artificial intelligence as a combination of technologies and various approaches to computing science for making flexible and rational decisions in line with unpredictable environmental conditions. Significantly, Moustapha and Yusuf (2023) submitted that this trend can be linked to process automation, the Internet of Things, data processing, concrete robots, conversational interactions, and decision support. In the library, AI can also be used to develop programs for efficient reference services, good textbook scanning, and appropriate subject categories. Moreover, AI technologies can help library users locate library materials through smart teaching systems and automated library services. Consequently, these authors affirm that the adoption and use of artificial intelligence in libraries will allow better processing of information and, at the same time, better search for information, which will excite both library staff and users as there will be easier and faster access to information.

Besides, Artificial Intelligence (AI) is another innovation that intelligently uses machines to do what humans can do and perform more faster than humans at processing vast volumes of data and making predictions. While the enormous amount of data generated every day would require a long time to be processed, AI technologies that use machine learning can swiftly transform that data into useful knowledge (Ajani, Abiodun & Adeleke, 2022). The cost of processing the enormous amounts of data that AI programming demands is now the main drawback of employing AI. Nevertheless, researchers testified that the benefits of AI to its users significantly outweigh



its cost (Ali, Smith & Jones 2020). For instance, Hayani, Mohammed & Ahmed (2021) acknowledged that when properly utilized, AI can enhance its users' research productivity, economy, and decision-making process, as well as solving complex problems and manage repetitive task accurately than ever before. AI is one of the most recent digital transformations that academic libraries can unlock its potentials to provide patrons with varying library service alternatives more conveniently (Arlitsch & Newell, 2017). Currently, the field of artificial intelligence (AI) has the ability to update, improve, and supplement many digital applications, providing these technologies with some autonomy without the need for human intervention (Ali et al., 2020).

Tella (2020) stressed the need for academic libraries to change their position to take advantage of the relative potential of artificial intelligence by improving the quality of library services in this information age. The scholar emphasized that libraries in developed countries have accepted and used AI technologies in almost all spheres of life, while those in developing countries are still struggling to find their feet. Moustapha and Yusuf (2023) revealed that artificial intelligence (AI) has made it possible to provide solutions to pressing challenges facing libraries, such as bookshelves, other library materials, cataloguing, and the acquisition of library materials, among others.—Artificial intelligence (AI) has had a significant impact on library cataloguing. AI technology has been utilized to enhance the efficiency and accuracy of cataloguing processes. It enables automatic cataloguing and classification using optical character recognition, which saves time and reduces errors. AI also assists in generating metadata for digital resources and increases the speed of metadata generation. Additionally, AI has facilitated the development of intelligent library systems for classifying, indexing, and data retrieval. These advancements in AI have greatly improved library operations and services, making them more efficient and relevant in the digital age. However, the adoption of AI in cataloguing still faces challenges such as funding, inadequate skilled personnel, and the lack of a strategic plan

for implementation. (Omame & Alex-Nmecha, 2020).

Moreover, it can be noted that the use of artificial intelligence in libraries can be seen as the culmination of a number of cutting-edge technological advancements that have made it possible for libraries to have access to devices that can perceive, understand, act, and learn. Using cutting-edge technologies is one new trend in libraries, making librarianship a profession known for doing so (Owolabi, Bamidele & Osunmuyiwa, 2022). Artificial intelligence has been dubbed the fourth industrial revolution (Park, 2019). Artificial intelligence (AI) refers to machines that mimic human reasoning, decision-making, learning, and social skills (CILIP, 2021). Holmes, Williams & Brown (2019) asserted that AI can be conceptualized as computer programmers that carry out tasks that ordinarily require human Intelligence in the library services and operations including cataloguing and classification services.

Cataloguing and classification of ever-growing educational resources as postulated by S.R. Ranganathan in 1931 that library is a growing organism. Periodically, newly acquired educational resources are added into the library collection and these are becoming increasingly complex as manual cataloguing and classification involves a lot of brain work and labor hence, cataloguers are likely to do their work with less details and excellence (Ejiroghene, 2020; Martins, 2024). Thus, the need for a more efficient way of processing these information resources. AI technology has been utilized to enhance the efficiency and accuracy of cataloguing processes. It enables automatic cataloguing and classification which saves time and reduces errors. Despite the significant impact and benefit of AI on library cataloguing, studies have shown that AI in cataloguing still faces challenges such as funding, Privacy and Data Security, bias and the lack of a strategic plan for implementation (Omame & Alex-Nmecha, 2020; Sangapur & Kumbar, 2021; Lowagie, 2023). In view of that, the current study examines the benefits and challenges of AI in cataloguing and classification in AI era and to recommend way forward to stake holders so as to enhance the adoption of AI technology in library operations.



Artificial Intelligence in Library Cataloguing: The Basics

According to LibLime (2023), AI is the simulation of human intelligence in machines, allowing them to think, learn, and solve problems. In library cataloguing, AI is being used to automate and enhance several processes, including:

Metadata Enrichment. Traditionally, cataloguers manually add metadata to library resources. AI algorithms can now automatically extract and enrich metadata, such as author information, subject keywords, and publication dates, from digital resources. This not only saves time but also improves the accuracy of catalogue entries. This isn't to say the librarian who did the cataloguing before was inaccurate, rather, this can enhance their work.

Classification and Categorization. AI models, particularly natural language processing (NLP) algorithms, are employed to categorize and classify materials accurately. They can analyze the content of books, articles, and other resources, making it easier to place them in appropriate categories. Despite this, it's important for a librarian to review the records to ensure library collection development policy is adhered to with the placement of these sources.

Recommendations and User Experience. AI-driven recommendation systems analyze user behaviour, such as search queries and borrowing history, to suggest relevant materials. This enhances the user experience by guiding patrons to resources aligned with their interests and needs. For those patrons who don't know what they need or struggle to communicate it, a human librarian is most certainly needed.

Language Translation. For libraries with multilingual collections, AI-powered language translation tools are invaluable. They can help translate book titles, descriptions, or even entire texts, broadening the accessibility of materials to a wider audience (LibLime, 2023).

Prospects of Book Cataloguing and Classification Through AI

According to Canda (2024), cataloguing and classification of books in the library through AI has several benefits, some of which are as follows:

1. **Automating complex tasks:** AI can take on complex jobs that used to require a lot of time and effort from library staff. This means tasks like sorting books or searching for specific information can now be done much faster and with fewer errors.
2. **Creating personalized experiences:** With AI, libraries can offer customized recommendations based on individual interests and preferences. This makes it easier for people to discover new books or resources that they might not have found otherwise.
3. **Using data for better service:** Libraries collect a huge amount of data every day — from borrowing records to user feedback. By using AI tools, this data can be analyzed quickly and turned into insights that help improve library services.
4. **Classification Systems:** AI enhances classification by streamlining the categorization of books and resources, ensuring that users can find what they're looking for swiftly and accurately.
5. **Search and Recall Precision:** Through machine learning techniques, libraries are able to offer higher precision in search queries, significantly reducing the time users spend looking for information.
6. **Digital Collection Analysis:** AI tools analyze vast digital collections to extract insights, uncover trends, and identify gaps in the library's offerings.
7. **Personalized User Services:** Libraries are now providing personalized recommendations and assistance using AI algorithms that learn from individual user behaviour and preferences.
8. **Data and AI Literacy:** For library professionals, understanding data analysis and AI systems has become essential. This literacy empowers them to make informed decisions and stay ahead in a rapidly evolving field.
9. **Library Analytics:** By harnessing data analytics powered by AI, libraries optimize operations and tailor user experiences to meet evolving demands (Canda, 2024).

Other benefits, according to Liblime (2023) include:

10. **Efficiency.** AI significantly speeds up cataloguing processes. It can process vast quantities of data rapidly, reducing the time



required for manual entry and making resources available to patrons more quickly.

11. Accuracy. AI is less prone to human errors, ensuring catalog entries are consistent and precise. This leads to improved search results and a better user experience.

12. Scalability. AI can handle the increasing volume of digital resources efficiently. As libraries expand their collections, AI adapts to the growing workload seamlessly.

13. Enhanced User Experience. With AI-driven recommendation systems, patrons discover resources they might not have otherwise encountered, fostering a more engaging library experience.

Furthermore:

14. It gives a clear picture of the educational resources stocked in the library
15. It provides easy accessibility and retrieval of books and non-book materials
16. It makes it easier to find all the available books in the library under author, title and subject.
17. It saves the time of the library users when locating and retrieving the needed literary materials from the library
18. It gives a clear idea of books available in the library
19. It helps to know what books you lent or borrowed.
20. Cataloguing is also a critical aspect of library management that helps in providing accurate and comprehensive information about library materials.
21. Effective cataloguing is essential to the smooth functioning of a library, as it enables users to locate and access resources quickly and easily. In addition, proper cataloguing ensures library materials are organized logically and coherently, which can facilitate research, scholarship, and other academic pursuits.

Tools for Book Cataloguing and Classification

The following tools are needed for cataloguing and classification exercises in the library:

- i. Books and other educational resources to be catalogued
- ii. Anglo American Cataloguing Rules, 2nd edition (AACR2)
- iii. Classification schemes

- iv. Classification schedules
- v. List of subject headings
- vi. Public or online catalog
- vii. Shelf list
- viii. Computer and its accessories
- ix. Catalog cards
- x. KOHA cataloguing schedules
- xi. Qualified library personnel preferable professional librarians
- xii. Stationeries
- xiii. National Union Catalog

Challenges of Cataloguing and Classification

It can be reiterated that cataloguing and classification of library materials are central to the accessibility and utilization of the library resources. However, it can be affected by the following issues:

1. Frequent changing in cataloguing rules. With the frequent changing of cataloguing rules, it is difficult to accommodate the technological innovation with data created using the old rules. Cerbo (2011) opined that, as technology continues to change and information is gathered from the overabundance of sources that once were unimaginable, librarians continue to adapt so as to meet the needs of those researchers, students, teachers and the general public. In so doing, the librarians' knowledge and workload is consistently shifting to keep up with the latest information technology, including databases, electronic resources, repositories, web searches, online catalogues, e-books, and more.
2. Cost implication. High cost of purchasing cataloguing software and hardware
3. Inadequate library budgeting for the library services and operations.
4. Bias mitigation
5. Inadequate manpower for the cataloguing. Lack of staff training and professional development presents a significant barrier to the cataloguing and classification services in the library.
6. Interpretability and Explainability AI models can be difficult to interpret and



explain, which can make it difficult for organizations to understand how decisions are made. It is important to ensure that AI models are transparent and explainable. To address this challenge, organizations should implement interpretability and explainability controls such as feature importance analysis and model visualization tools.

The Way Forward

In order to successfully integrate AI into the library service especially into cataloguing and classification processes, librarians and other custodian of information according to Canda (2024), must take cognizance of the following:

1. **Integration Complexity.** Implementing AI systems in libraries requires sophisticated IT infrastructure and expertise. Libraries must evaluate the compatibility of new AI tools with existing systems and workflows. Besides, library should be equipped with modern and sophisticated devices that hasten operations towards meeting the information needs of the library users
2. **Adequate Staff Training.** There should be adequate and progressive staff training on the various techniques of AI adoption into the library operations and services. AI adoption necessitates ongoing training for library staff. Professionals must be equipped to manage, interpret, and utilize AI applications effectively. Libraries should organize regular training and retraining for its employees. More workshop, seminars and conferences should be organized with moderate fee to train library personnels. It can be re-emphasized that ongoing professional development is essential for keeping library staff up-to-date with evolving technologies, information resources, and best practices in the field (Oakleaf, 2013). Investing in staff training and development programs enhances their knowledge and skills, enabling them to meet the diverse needs of library users effectively (Smith & Johnson, 2019). Continuous learning opportunities ensure that staffs are well-equipped to adapt to new challenges and provide high-quality service in an ever-changing environment (Jones, 2020).
3. **Cost Implications.** The financial investment for AI technology — including software, hardware, and human resources — can be significant and cumbersome to bear by the small libraries. Libraries should collaborate and put their financial resources together in acquiring the needed technologies and digital devices rather than going solely. Libraries must balance these costs with their budget constraints and justify the return on investment.
4. **Data Privacy.** With AI relying on user data to function optimally, libraries must uphold their commitment to protecting patron privacy. Ethical considerations are also paramount when implementing AI in library services. AI systems require access to patron data to provide recommendations and enhance the cataloguing process. Libraries must prioritize user privacy and data security, implementing robust policies and safeguards.
5. **Bias Mitigation.** There should be unbiased mitigation in using AI in the library operations. AI algorithms can inadvertently perpetuate biases present in their training data. It's essential for library professionals to understand these risks and work towards developing neutral, fair systems.
6. **Transparency.** Users should be informed about how their data is used by AI systems. Libraries have a responsibility to maintain openness about AI-driven processes and recommendations.
7. **Frequent changing in cataloguing and classification rules.** Libraries should adopt the cataloguing software that would serve the operations and



services of the library for a longer period.

8. Inadequate library budget. It takes much financial investments to acquire the cataloguing and classification modern software and technologies, there must be adequate annual budget for the library services.

Conclusion

In this paper, the researchers had successfully reviewed some related previous studies on cataloguing and classification in the artificial intelligence era. Some prospects, challenges and the possible solutions to most of those spotted issues affecting cataloguing, classification and AI had been provided. It is therefore pertinent for various library managers to inculcate AI in their day-to-day operations and services in order to efficiently and effectively meet the information needs of their clientele rather than remaining in the old (traditional) method of providing such service(s). Hence, libraries should be equipped with modern and sophisticated devices that hasten operations towards meeting the information needs of the library users; organize regular training and retraining for its employees. More workshop, seminars and conferences should be organized with moderate fee to train library personnels as continuous learning opportunities ensure that staffs are well-equipped to adapt to new challenges and provide high-quality service in an ever-changing environment.

References

- Ajani, A. O., Abiodun, A. A., & Adeleke, F. (2022). The cost and benefits of artificial intelligence in data processing. *Journal of Information Technology*, 18(3), 254-267.
- Akidi, J. & Omekwu, C. O. (2019). Assessment of Cataloguing and Classification Practices of the National Library of Nigeria in the Digital Age: A Bibliographic Control Perspective. *International Journal of Library and Information Science*, 8(1), 20 – 34.
<https://www.academia.edu/80082398/As>

assessment_of_Cataloguing_and_Classification_Practices_of_the_National_Li

- Ali, A., Smith, J., & Jones, M. (2020). Benefits of AI in organizational decision-making. *International Journal of AI Research*, 14(2), 198-213.
- Al-Aamri, J., & Osman, N. E. (2022). The Role of Artificial Intelligence Abilities in Library Services. *The International Arab Journal of Information Technology*, 19(3A), 566–573.
<https://doi.org/10.34028/iajit/19/3A/16>
- Arlitsch, K., & Newell, B. (2017). Unlocking the potential of artificial intelligence in academic libraries. *Library Technology Reports*, 53(5), 1-35.
- Asemi, A. and Asemi, A. (2018). Artificial Intelligence (AI) application in Library Systems in Iran: A taxonomy study. *Library Philosophy and Practice (e-journal)*. 1840.
<https://digitalcommons.unl.edu/libphilprac/1840>
- Bello, M.A & Mansor, Y. (2011). Cataloger mentoring a survey of catalogers' perception on mentoring for skills development in academic libraries in Nigeria: An exploratory Study. *The International Information & Library Review*, 43(3),159-168.
DOI:10.1016/j.iilr.2011.07.004
- Benhamou, F., & Janin, L. (2018). AI and its impact on library systems. *Library Trends*, 66(4), 409-428.
- Canda, J. (2024). Revolutionizing library sciences with AI: Cataloguing and recommendation systems. Available in: <https://medium.com/@jam.canda/revolutionizing...>
- CILIP. (2021). The fourth industrial revolution and its impact on libraries. *Journal of Librarianship and Information Science*, 53(1), 75-91.



- David-Westonck, B.T. & Angrey, C.U. (2018). Cataloguing and classification skills and information dissemination in libraries. *Journal of Educational Research and Review*, 6(7), 94-97, doi:10.33495/jerr_v6i7.18.147
- Dyiltu, N. Y. (2024). Artificial intelligence as correlates of service delivery among staff in three selected academic libraries in Ekiti State, Nigeria. A project submitted to department of library and information science, Federal University Oye-Ekiti, Ekiti State, Nigeria.
- Ejiroghene, E. (2020). Impact of ICT on cataloguing and classification of library materials. *Library Philosophy and Practice (e-Journals)*, 5088, <https://digitalcommons.unl.edu/libphilprac/5088>
- Esse, U. C. (2013). Current trends in cataloguing and the challenges of a cataloguer in the digital age. *Journal of Information and Knowledge Management*, 4(2), 16–23.
- Esq, M. U. (2023). A strategic evaluation of artificial intelligence for innovative libraries in the 21st century: The components and applications. *Information Horizons: American Journal of Library and Information Science Innovation*, 1(5), 30–39. <https://doi.org/10.2993/2777>
- Frederick, D.E. (2020). Librarians in the era of artificial intelligence and the data deluge. *Library Hi Tech News*, 37(7), 1-7. <https://doi.org/10.1108/LHTN-03-2020-0029>
- Guerrini, M. (2023) *From Cataloguing to metadata creation: a cultural and methodological introduction*. Facet Publishing, 1-119.
- Hanson, E. D. & Okorie, U. U. (2024). The roles of artificial intelligence in library automation: the prospects and challenges. erudite compendiums in education, <https://www.globalacademicstar.com/download/article/the-roles-of-artificial-intelligence-in-library-automation-the-prospects-and-challenges-49493.pdf>
- Hayani, S., Mohammed, A., & Ahmed, Z. (2021). Enhancing productivity through AI. *Journal of Applied AI*, 23(2), 120-135.
- Heath, D. (2018). Understanding artificial intelligence: Its applications and implications. *Technology Today*, 10(1), 45-60. https://www.researchgate.net/publication/338337072_Artificial_Intelligence_in_Libraries
- Holmes, D., Williams, K., & Brown, P. (2019). Conceptualizing AI in libraries. *Library Review*, 68(6/7), 412-427.
- Hodonu-Wusu, J.O. (2024). The rise of artificial intelligence in libraries: the ethical and equitable methodologies, and prospects for empowering library users, <https://link.springer.com/article/10.1007/s43681-024-00432-7>
- Imo, N. T. & Igbo, U.H. (2011). Providing access to knowledge in Africa: the need for capacity building in classification, indexing, and abstracting skills. *Library Philosophy and Practice (e-journal)*. Paper 601. <http://digitalcommons.unl.edu/libphilprac/601>
- Janis, L. Y. & Daniel N. J. (2020) Library of congress, library of congress subject headings: online training, <https://www.librarianshipstudies.com/2015/05/cataloguing.html>
- Jones, A. (2019). AI-powered chatbots in academic libraries: A new era of user interaction. *Information Technology and Libraries*, 38(4), 10-22.
- LibLime (2023). Revolutionizing Library Cataloguing with Artificial Intelligence (AI), <http://liblime.com>
- Lowagie, H. (2023). From Bias to Transparency: Ethical Imperatives in AI-Based Library Available in: <http://creativecommons.org/licenses/by/4.0>



- Martins, S. (2024). Cataloguing and classification tools and competencies in selected academic libraries in Adamawa state. *Nigerian Library and information Science Trends*.
https://www.academia.edu/121718884/Cataloguing_and_Classification_Tools_and_Competerencies_in_Selected_Academic_Libraries_in_Adamawa_State
- Miksa, S.D. (2021). Cataloguing Principles and Objectives: History and Development Available at:
<https://doi.org/10.1080/01639374.2021.1883173>
- Misau, A. Y. (2021). Application of artificial intelligence in academic libraries in Nigeria. *Library Philosophy and Practice*, 1–16.
<https://doi.org/10.2139/ssrn.3804685>
- Moustapha, A. A. & Yusuf, I.O. (2023), Adoption of artificial intelligence to improve library service delivery in academic libraries in Kwara state, Nigeria. *Library Philosophy and Practice (e-journal)*.
<https://digitalcommons.unl.edu/libphilprac/7915>
- Oakleaf, M. (2013). Value of Academic Libraries: A Comprehensive Research Review and Report. *Association of College and Research Libraries*.
https://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/value/val_report.pdf
- Oname, I.M. & Alex-Nmecha, J.C. (2020). Advances in library and information science - managing and adapting library information services for future users. *Artificial Intelligence in Libraries*, 120 – 144. [10.4018/978-1-7998-1116-9.ch008](https://doi.org/10.4018/978-1-7998-1116-9.ch008)
- Oname, I.M. & Alex-Nmecha, J.C. (2020). Artificial Intelligence in Libraries. DOI: [10.4018/978-1-7998-1116-9.ch008](https://doi.org/10.4018/978-1-7998-1116-9.ch008)
- Owolabi, K. A., Bamidele, O. & Osunmuyiwa, T. (2022). Cutting-edge technologies in libraries. *Library and Information Science*, 42(2), 187-201.
- Sangapur, S. G and Kumbar, M. (2021). Revolutionizing libraries: harnessing the Power of artificial intelligence in library science. *Webology*, 18 (16).
<http://www.webology.org>
- Sivrajah, R., Krishnan, T., & Desai, P. (2017). The use of AI in academic libraries. *Library Hi Tech*, 35(3), 409-423.
- Subaveerapandiyam, A. (2023). Application of artificial intelligence (ai) in libraries and its impact on library operations review. *Library Philosophy and Practice (e-journal)*.
<https://digitalcommons.unl.edu/libphilprac/7828>
- Tella, A. (2020). Robots are coming to the libraries: are librarians ready to accommodate them?, *Library Hi Tech News*, 37(8), 13-17.
<https://doi.org/10.1108/LHTN-05-2020-0047>
- Tredinnick, L. (2017a). The role of AI in flexible decision-making. *AI and Society*, 32(3), 329-340.
- Tredinnick, L. (2017b). Artificial intelligence and professional roles. *Business Information Review*, 34(1), 37-41.
- Wikipedia (2024). Cataloguing (library science), [https://en.wikipedia.org/wiki/Cataloguing_\(library_science\)](https://en.wikipedia.org/wiki/Cataloguing_(library_science))