



# Enhancement and Application of Generative Artificial Intelligence Tools in Collection Development in Libraries in Nigeria

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## ABSTRACT

Integrating AI tools into collection development and other library services in Nigeria and around the world has brought about significant changes to libraries and the profession as a whole. Libraries now offer more dynamic, efficient, and user-centered services and resources to their communities. This paper focuses on the enhancement and application of generative AI tools in collection development within Nigerian libraries. It explores the concept of AI tools, their uses in collection development and other library services, as well as the challenges and solutions related to their implementation. The study reveals the importance of libraries embracing AI tools by educating both library staff and users, experimenting with AI tools such as ChatPDF, ChatGPT, and others, and identifying specific units within libraries that could benefit from these technologies. It also highlights the potential hurdles libraries may face when applying various AI tools, but offers solutions to address these challenges. The study underscores the necessity for libraries and their communities to accept and utilize AI tools in order to meet the evolving needs of library users and to sustain their relevance in a rapidly changing world.

**Keywords:** Artificial Intelligence, Collection Development, Library Services and Libraries

## INTRODUCTION

Artificial intelligence (AI) has become a pivotal tool embraced globally by various sectors such as health, education, agriculture, and government, to enable quick access to information and efficient services. Libraries are no exception, as AI is increasingly utilized to perform tasks that would traditionally require human intelligence. The ultimate aim of AI is to develop machines that can rival human intelligence, which has the potential to significantly enhance the field of librarianship. However, some librarians may not be fully familiar with AI applications such as robots that read books, virtual environments for immersive learning, and expert systems for reference services. Despite this, the integration of AI in libraries can greatly enhance operations and services, such as the development of collections with current and essential resources, thereby increasing the relevance of libraries in this technological age.

According to Maad (2015), artificial intelligence refers to machines that are created entirely by artificial means and exhibit behaviors akin to human intelligence without relying on any living entity. The formal establishment of AI dates back to 1955 when John McCarthy organized a conference on "Artificial Intelligence" at Dartmouth College in Hanover, marking the first use of the term, which soon gained popularity. Early AI systems were focused on logic theorems and chess. Charles Babbage, in 1884, was working on a mechanical machine that aimed to demonstrate intelligent behavior, although the project

was eventually halted due to unmet expectations. Over time, significant advancements have been made in AI, leading to the development of various intelligent machines. For example, Siri, the first widely-known virtual assistant, was released by Apple in 2011. Facebook developed two AI chatbots to interact with humans, allowing users to converse and learn from these interactions. Google's AlphaStar reached grandmaster level in the video game Starcraft 2, and OpenAI began testing GPT-3 in 2020, which became the first AI to generate content nearly indistinguishable from that created by humans.

AI has significantly improved the daily operations and services of numerous organizations, including libraries. It has the potential to completely transform the library profession, as libraries are often considered the heart of institutions due to their role in acquiring, classifying, cataloguing, preserving, and disseminating information within academic environments (Osaroluka & Okpokwasili, 2023). As Olubiyo (2023) points out, the core of a library's existence lies in its collection, with the primary mandate of stocking information materials to meet and satisfy the needs of library clients. Similarly, Hakeemat (2023) emphasizes that libraries build collections tailored to users' needs and goals, providing a variety of services to fulfill the diverse information needs of their clientele. These services are crucial for ensuring that library resources are fully utilized to meet the needs of their users (Bello & Abdulsalam, 2023).

The quality of the collection indicates the level of service delivery effectiveness in the academic world. Akinyemi (2023) enumerated the services offered by libraries as;

**a. Reference Service Unit:**

In academic libraries, reference services are a crucial aspect where reference librarians assist clients in locating the necessary information and research materials. The origins of reference services date back to the late nineteenth century, a period when public libraries began to proliferate and meet the diverse needs of their users (Ntui & Edam-Agbor, 2015). Initially, the primary challenge for reference services was how to make library resources accessible and respond to users' queries within the confines of the library building. Today, libraries have significantly expanded their reference services by embracing digital platforms. These include the use of the World Wide Web (WWW), electronic mail (email), two-way video conferencing, digital reference robots, and other modern technologies. As Uwuma (2022) explains, reference services can be categorized into two types: direct and indirect services. Direct reference service, also known as information delivery, involves face-to-face interactions where the reference librarian directly assists users in searching for and providing the information they need. On the other hand, indirect reference service, often referred to as document delivery, involves guiding and directing users to the appropriate resources that will satisfy their information needs.

**b. Readers' Services Unit**

The Reader Services Unit plays a crucial role in assisting library clients by ensuring effective, efficient, and easy access to and retrieval of library materials. This unit is responsible for providing both circulation and periodical services. The librarians' duties in this unit include handling general bibliographic inquiries through the Online Public Access Catalog (OPAC), managing lending services, facilitating interlibrary loans, and overseeing the ordering, checking-in, claiming, and binding of periodical literature. These services are delivered directly by the librarians, who are actively involved in serving the library's clientele.

**c. Circulation Services Unit**

The circulation function in the library involves every use of library material and the successful performance of these functions is a measure of effectiveness of all other duties. The circulation involves lending, renewal, maintenance of books, maintenance of statistics and survey of user's needs. The Librarians and Library staff are responsible for this function, assisted by student library assistants.

**D. E- Library/ E-Resources Services Unit**

Electronic Resources (e-resources) refer to information materials that need computer access, through the use of a personal computer or a smart phone they may either be accessed remotely through the University Library's webpage or at the E-Library Section. Reference resources are from authorized databases acquired in order to provide students with access to authoritative databases. This is free of charge.

### **E. Technical Services Unit**

Technical Services are the behind-the-scenes activities that a library undertakes to process library materials before they are loaned to clientele. These activities include acquiring, classifying and cataloguing, preparing materials for the library shelves, inventory, and weeding. Other technical services include the activities related to acquiring donated materials, repairing and preservation of library materials.

Effective collection development is fundamental to enhancing the quality and effectiveness of the services provided by libraries. As a critical process, collection development underpins the essential steps in building and maintaining a library's collection (Rajat, 2017). Nwosu and Udo-Anyanwu (2015) describe collection development as encompassing a broad range of activities, including the selection of resources, acquisition of selected materials, development of resource-sharing plans between libraries, maintenance of acquired resources, weeding, and evaluation. Without proper collection development, a library risks losing its value and usefulness. The process begins with librarians acquiring resources that meet the needs of users and the larger community, followed by the weeding of seldom-used materials, and finally, evaluating the entire collection to ensure it remains dynamic and essential, supporting the library's mission and services. Nwosu and Udo-Anyanwu (2015) further emphasize that most libraries are guided in this process by a collection development policy. The importance of having a clear and objective collection development policy cannot be overstated. Such a policy is crucial for maintaining a balanced and robust collection, as it outlines the scope of the collection, authority for selection, criteria for fund allocation and material selection, priorities in selection, and criteria for weeding (Olubiyo, 2023).

#### **Purpose of the Study**

The main purpose of the study is to identify generative artificial intelligence (AI) tools that could be applied in collection development in libraries in Nigeria. The specific objectives of this study include the following:

1. Determine how to integrate and use AI in the development of library collections.
2. Identify the artificial intelligence (AI) tools used in the library, their websites, and the library's units/sections.
3. Discuss the challenges and the solutions associated with the integration and utilization of AI in libraries.

#### **Ways AI could be Integrated and Used in Developing Libraries Collections**

Integrating AI into collection development allows libraries to enhance user satisfaction, streamline operations, and ensure that their collections remain relevant in the rapidly evolving information landscape. While the process of discovering, accessing, reading, and utilizing scholarly resources is a longstanding function of libraries, the integration of AI offers a transformative approach. Librarians, adept at connecting various resources, recognize that despite the proliferation of online materials, print collections still constitute a significant portion of library holdings. Even with the widespread attention given to open access resources, librarians continue to curate digital collections from a broad array of sources, including university, commercial, and society presses. In this new information era, the influx of new authors generating scholarly content presents both challenges and opportunities. Librarians play a crucial role in assessing and evaluating this vast amount of information to identify valuable content for their collections. Okpokwasili (2019) notes that intelligent library systems utilize AI tools to deliver knowledge-based services to both clients and staff. The application of AI in libraries can be viewed as the integration of technology that enables machines to recognize, understand, act, learn, and perform administrative functions. Increasingly, AI is being employed in collection development to boost efficiency, relevance, and user satisfaction within libraries.

Ways AI could be utilized are:

- i. *Content Curation*: AI algorithms can analyze user borrowing patterns, reading habits, and preferences to suggest new acquisitions. AI algorithm relieve the librarians from managing the overwhelming vast

digital content and help libraries modify their collections to better meet the needs and interests of their clients. Manik, (2024) agreed that with the aid of AI algorithms, librarians are able to allocate more of their time to more strategic projects like user engagement and collection development.

ii. *Predictive Analytics*: AI can forecast future demand for specific types of materials by examining previous circulation data along with other relevant criteria. This helps libraries make knowledgeable judgments about what to buy and how many copies to buy. In a variety of application domains, the application of AI to predictive analysis can enhance decision-making, yield insightful results, and increase operational efficiency. To guarantee that the application of AI in predictive analysis complies with moral standards and regulatory requirements, it is critical to take ethical issues like data privacy, transparency and justice into account (Velibor, 2023). The use of python, IBM SPSS, Google cloud and many more predictive analytics app prevents error and determine users' behavior of how frequently library resources is utilized.

iii. *Text Analysis and Recommendation Systems*: Natural Language Processing (NLP) techniques enable AI to analyze book summaries, reviews, and user feedback to recommend similar books or materials. This enhances discoverability and helps users find relevant content more easily. Processing of Natural Language (NLP) Computers can now comprehend human language through the use of NLP technology, thereby rendering it possible to develop user interfaces that can react to queries or commands in natural language. This might be especially helpful for weaker users who might find it problematic to navigate complex user interfaces (Velibor, 2023).

iv. *Evaluation of Collections*: AI can help assess and evaluate the caliber and applicability of current collections by examining usage information, citation trends, and user reviews. This is beneficial in the selection of resources that librarians should update, weed, or continue to use.

v. *Metadata Enhancement*: AI can generate or improve metadata automatically for library materials, making it easier for users to search and find what they need. This includes tagging, categorization, and keyword extraction. Artificial intelligence techniques, like natural language processing Aria, GPT and Bard which would elude crucial information from documents and generate metadata entries automatically (Kolawole, 2021).

vi. *Digital Preservation*: AI algorithms aid in managing online or electronic collections by recognizing and prioritizing necessary resources for maintenance, based on factors like age, frequent utilization and format desuetude.

vii. *Personalization*: AI-powered systems can personalize recommendations and services based on personal user attitude, demographics and preferences. This facilitates user experience and complete engagement with the library's collection which in turns brings satisfaction.

viii. *Budget Optimization*: AI can assist in optimizing budget allocation by providing insights into cost-effective acquisition strategies and identifying potential cost savings through analysis of pricing trends and usage patterns. For instance; Robotic Process Automation aids in invoice processing of repetitive job, thereby reducing operating cost.

### **Artificial Intelligence (AI) Tools Use in The Library, Their Websites and Units/ Sections of the Library Used**

The use of artificial intelligence (AI) tools in libraries has significantly eased the workload of librarians, allowing them to perform tasks more efficiently and productively than they could have done manually or in the past. According to Omema and Alex-Nmecha (2020), AI applications in library systems encompass various functions such as collection development, descriptive cataloging, technical services, subject indexing, reference services, information retrieval systems, and shelf reading, among others. One practical application of AI tools is in the selection of vendors or book dealers for acquiring library materials. Based on previous successful transactions involving specific types of publications, an intelligent system can be designed to identify the most suitable vendor or book dealer. These technologies are particularly useful for acquiring less common information resources such as conference proceedings, publications in foreign languages, and specialized technical reports.

Additionally, AI technologies have been developed specifically for the field of librarianship to assist with the selection process. One example is the Monograph Selection Advisor, an innovative system that models the decision-making process used by subject bibliographers when selecting monographic materials. As noted by Balvant (2024), AI tools commonly used in libraries today include Research Rabbit, Perplexity, Scite, ChatGPT, Consensus, EndNote, Semantic Scholar, Elicit, and QuillBot. These tools enhance the ability of librarians to efficiently manage and develop their collections, while also improving overall library services.

A comprehensive list of AI tools, their websites and uses and units used in the library are discussed below:

<b>S/N</b>	<b>Artificial Intelligence (AI) Tools</b>	<b>Websites</b>	<b>Uses in the library</b>	<b>Units/ Section of the library used</b>
1	Research Rabbit	<a href="https://researchrabbit.ai/">https://researchrabbit.ai/</a>	Research Rabbit could be used to obtain colossal and trending concept that would enable the librarians improve their resources and services for the clientele.	Technical Service and Reference Service.
2	ChatPDF	<a href="https://chatpdf.com">https://chatpdf.com</a>	ChatPDF aids librarians to efficiently manage, retrieve and make proper use of information from PDF documents, enhancing service delivery across several functions.	Reference Service and Technical Service.
3	Scite	<a href="https://scite.ai">https://scite.ai</a>	There is colossal support Scite offers to libraries by improving the collection development processes, offering more comprehensive reference services.	Reference service
4	ChatGPT	<a href="https://www.chat.openai.com">https://www.chat.openai.com</a>	ChatGPT assists librarians to easily identify articles to acquire, summarizes articles without reading the entire paper. Saving time of the librarians and patrons while providing relevant and concise information also improving users' experiences.	All units of the library
5	Consensus	<a href="https://www.consensus.app">https://www.consensus.app</a>	Consensus aids librarians to offer information backed by peer-reviewed research which is accurate and credible for the clientele's use. This would improve the services offered by the library as well as increased Patrons' confidence.	All units of the library
6	Endnote	<a href="https://endnote.com">https://endnote.com</a>	Endnote is a reference management software use for managing citations and bibliographies in various styles (APA, MLA etc) related to potential new acquisition, keeping track of crucial resources and remaining updated.	All units of the library
7	Semantic scholar	<a href="https://www.semanticscholar.org">https://www.semanticscholar.org</a>	Semantic Scholar is an AI powered tools use in assisting patrons in	Reference services and

			providing advance search capabilities, and recommendations. Improves resource discovery with more comprehensive assistance to patrons.	technical services
8	Elicit	<a href="https://elicit.com">https://elicit.com</a>	Elicit help librarians to search and synthesize research information swiftly to answer patron's questions.	Reference Service
9	Quillbot	<a href="https://quillbot.com">https://quillbot.com</a>	Quillbot aids reference librarians rephrase and summarize research materials in order for the library patron to comprehend complex information.	Reference Services
10	TensorFlow	<a href="https://www.tensorflow.org">https://www.tensorflow.org</a>	TensorFlow is an open -source machine used by library Information Technology (IT) staff to improve search algorithm and automate cataloguing.	Technical Services
11	Koha ILS	<a href="https://www.koha-community.org">https://www.koha-community.org</a>	Koha ILS, an integrated library system is used for managing catalog, circulation and all aspects of the library.	All library units
12	Grammarly	<a href="https://grammarly.com">https://grammarly.com</a>	Grammarly supports the libraries to enhance quality of written communication with polished and professional library produced materials.	All library units
13	Prowritingaid	<a href="https://eprowritingaid.com">https://eprowritingaid.com</a>	Librarians uses ProWritingAid to assist patrons to enhance their writing, reports on grammar, style and readability.	Reference services
14	Mindgrasp	<a href="https://mindgrasp.ai">https://mindgrasp.ai</a>	Mindsgrasp is a tool used by librarians to generate summaries of lengthy or complex articles in order for the patrons to easily understand the main pints.	Various library units
15	Kipper	<a href="https://kipper.ai">https://kipper.ai</a>	It is used for the management of data and automation tasks within the library.	Technical services
16	Mymap	<a href="https://mymap.ai">https://mymap.ai</a>	Mymap is used to create interactive maps, highlighting geographical aspects of special collections or historical archives.	Reference services
17	Cohesive	<a href="https://cohesive.so">https://cohesive.so</a>	Cohesive is an AI tool that helps librarians to provide detailed feedback on patron's written work.	Reference service
18	Botsonic	<a href="https://botsonic.com">https://botsonic.com</a>	Botsonic is use to Improve user interaction and automate responses for frequently asked questions.	Technical service
19	Voyant tools	<a href="https://voyant-tools.org">https://voyant-tools.org</a>	Voyant tool is use to assist patrons to perform textual analysis and extract meaningful insights from documents.	Circulation service
20	Clarifai	<a href="https://clarifai.com">https://clarifai.com</a>	Clarifai is use to develop AI-driven search and classification tools for library resources.	Technical services
21	Jenni.ai	<a href="https://jenni.ai">https://jenni.ai</a>	Jenni.ai provides AI- assisted writing suggestions and enhancement.	Reference services

22	OpenRead	<a href="https://openread.io">https://openread.io</a>	OpenRead is a tool that is accessible to patrons providing academic contents that is well summarized and provides easy understanding.	Circulation service
23	Wisioapp	<a href="https://www.wisioapp.com">https://www.wisioapp.com</a>	Wisioapp aids librarians to offer in-depth personalized assistance to clients through video calls.	Reference services
24	Copyscape	<a href="https://www.copyscape.com">https://www.copyscape.com</a>	Copyscape is used to check for plagiarism in their written work and ensuring original and proper citation practices.	Reference service
25	Mem	<a href="https://www.mem.com">https://www.mem.com</a>	Mem is used by the librarians to organize and retrieve institutional knowledge and resources efficiently for proper documentation.	Circulation service and Reference services
26	Trinka	<a href="https://trinka.ai">https://trinka.ai</a>	Librarians uses Trinka to offer detailed feedback on client's writing, aiding to clarity and overall quality.	Reference service
27	Quickview	<a href="https://www.quickview.com">https://www.quickview.com</a>	Librarians provides a quick overview of library collections, making and informed decision for developing the library's collection.	Technical service
28	Looker	<a href="https://www.looker.com">https://www.looker.com</a>	Looker is used by librarians to provide insights into the operations in the library considering areas for improvement	Technical services
29	Lateral	<a href="https://www.lateral.io">https://www.lateral.io</a>	Lateral is used for topic discovery and to generate new concept in order to help clients expand their research scope and explore related ideas.	Reference and circulation service
30	Midjourney	<a href="https://midjourney.com">https://midjourney.com</a>	Midjourney is used to create visual and digital contents to foster library displays, online resources and marketing materials	All library units
31	Anyword	<a href="https://anyword.com">https://anyword.com</a>	Anyword tool assist in engaging contents for library newsletters, social media posts and promotional materials.	Circulation service
32	Dante	<a href="https://dante.global">https://dante.global</a>	With the use of Dante, librarians can provide resources for patrons pertaining Dante Alighieri's works about Italian literature	Reference service

Utilizing most of these various AI tools would help the library to continually remain relevant and useful in this technological epoch, supporting many needs of library clients and improving overall efficiency of their operation. However, there are some challenges libraries encounter when applying Artificial Intelligence (AI) in their libraries (Ajakaye, 2021) among them are;

**1. Financial hurdles/ unpredictability:**

Allocating adequate financial resources for the implementation and maintenance of Artificial Intelligence (AI) is still a huge challenge in most of the libraries in Nigeria. Bello and Abdusalem (2023) identifies

inadequate finances in acquiring AI tools both the hardware and software would create an enormous issue to the type of systems the library could develop.

**2. Staff Acceptance and Training on the Use of AI Tools:**

Welcoming the concept of applying AI tools and training library staff to be proficient when utilizing AI is a thing library needs to consider and ensure they are well trained to execute their task and take advantage of the global trends

**3. Total Reliance on Vendors:**

Getting help from vendors its essential for libraries. However, totally relying on vendors for technology, support and to remain updated might limit the flexibility and bring about increased cost. Vendor might not be able to meet the entire needs of libraries, hereby reducing the ability to control how AI is implemented.

**4. Data Privacy and Security:**

Maintaining confidentiality and protecting user's data is paramount for libraries to do. Hence, it could be targeted by cyberbullies leading to data breaches that compromises user's data. Libraries should use AI that complies with privacy laws and regulations such as CCPA which could be complex and challenging.

**5. Lifecycle Impact and Environmental Pollution:**

Not designing AI systems with sustainability in mind and unwillingness to adopt energy- efficient practices during the full lifecycle of AI technologies, from the era of Production, utilization and to disposal could have a negative impact on AI tools as well as the environment causing greenhouse gas emissions and pollution in the environment.

**6. Reliability and Accuracy:**

Users might be skeptical of AI recommendations, preferring librarians' aids due to AI systems exhibiting inconsistent or incomplete data quality, inaccurate or unfair results and not updating the AI tools.

**7. Accessibility:**

AI is not accessible to all users due to language barriers, AI should support multiple languages in order to be well utilized by all users and also those with disabilities, maintaining adherence to accessibility standard.

**8. Erratic Power Supply:**

Power interruptions can result to loss of data or corruption affecting how reliable AI outputs would be. This would cause dissuasion and make the users to discontinue visiting the library or utilizing the AI tools Available.

**9. Job Displacement**

AI performs task that was traditionally done by librarians, potentially leading to job displacement or reduction of staff. However, AI performs the tasks more efficiently and effectively making the library to meet the needs of the users. Howbeit, there is need for librarians to transition in their role that focuses on managing and working along sides AI systems which requires retraining and reskilling.

**Solutions To Improved Usage of AI In Libraries**

Enhancing the utilization of AI in libraries while reducing or drastically eliminating its negative effects could be possible if several strategies are implemented:

- 1. Public Awareness and Enlightenment:** Execute programmes that educate and inform the community (librarians and users) about AI and its implications to bring positive experience when utilizing AI systems and also keeping staff updated on the latest development in Artificial Intelligence (AI).
- 2. Continuous Improvement:** Continuous improvement on regular AI software and hardware updates brings about colossal performance of the systems. Getting feedbacks from librarians and library users either through suggestion boxes or survey and polls would make AI usage more interesting and easier to use, aiding librarians to meet the tailored needs of library clients.



3. **Green Data Centers:** Use data centers that are powered by renewable energy and are energy efficient, minimizing environmental impact through sustainable practices would improve the use of AI in libraries.
4. **Policy and Regulation:** Policy and Regulation are critical for any libraries using AI, it ensures ethical safety and proper utilization of AI, maintaining data privacy policies like seeking user's consent for data collection and processing, detecting bias and ensure transparency. It also ensures data security which would reduce potential risks and negative effects.
5. **Ethical Electronic Waste Recycling:** Executing appropriate recycling and disposal programmes for electronic waste to eliminate environmental damage and recover valuable materials is crucial.
6. **Cooperative Efforts:** Cooperating with other institution such as the government, libraries and other organizations would be ideal in order to develop and share best practices for sustaining AI tools and its usage.
7. **Lifecycle Evaluation of AI Tools:** Implement a comprehensive lifecycle evaluation of AI tools to understand their environmental impacts and make more informed decision while procuring hardware and software, designed to have long life duration and easy to upgrade.

## CONCLUSION

The integration of AI tools into library operations, including collection development and overall library services, has initiated significant transformation across the entire profession. When fully adopted by librarians, and with the challenges such as inadequate funding and erratic power supply addressed, these tools have the potential to revolutionize the way libraries function. AI tools expose both librarians and users to a broader array of resources, whether for procurement or other purposes, thereby meeting users' needs more effectively. This leads to increased productivity and efficiency, fosters user-centered services, reduces human errors, and saves users' time. With the continued enhancement of AI tools, libraries will be better equipped to provide their communities with optimal collections and highly satisfying services.

## RECOMMENDATIONS

1. It is crucial for government bodies, educational institutions, and library administrations to invest in the necessary infrastructure that supports the integration of AI tools in library operations. This includes reliable power supply, high-speed internet, and advanced computing resources.
2. Continuous professional development programs should be established to train librarians in the effective use of AI tools. By equipping library staff with the necessary skills and knowledge, libraries can optimize the use of AI tools, resulting in more efficient and user-centered services.
3. Libraries should develop and implement policies that incorporate AI tools into their collection development strategies. By integrating AI into policy frameworks, libraries can ensure a systematic and strategic approach to utilizing AI for enhancing their collections, thereby improving the quality and relevance of their offerings to meet user needs.

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