
AI-Driven future: Strategies and skills development for Nigerian Librarians

BOMA Torukwein David-West

Department of Library and Information Science

Faculty of Education

University of Port Harcourt

email: boma.davidwest@uniport.edu.ng

and

Mary Ofure Ig-worlu (CLN, PhD)

Donald E.U.Ekong Library,

University of Port, Port Harcourt.

Email: Mary.ig-worlu@uniport.edu.ng

Abstract

This article explores strategies and skill development crucial for Nigerian librarians to thrive in an AI-driven future. The Nigerian educational system faces the challenge of outdated curricula and must reconcile with the fast-paced technological environment. The paper explored the competencies in data analysis, programming, and user experience design to harness AI's potential fully. AI basics, ethical considerations, programming, user-centered design, and project management. Application of AI into library services. Strategies for adopting AI include needs assessment, collaboration, data collection, customization, user training, ethical governance, pilot projects, and scalability planning. Collaboration with external partners, such as universities and technology experts, is essential due to the lack of in-house AI specialists. Developing robust data collection and management practices while respecting local cultural norms ensures AI solutions meet users' specific needs. Pilot projects enable libraries to assess AI effectiveness, gather feedback, and iterate on implementations. Ethical governance frameworks are vital to uphold fairness, transparency, and data privacy. Planning for scalability and sustainability ensures long-term success. It is concluded that the adoption of AI in Nigerian libraries offers significant potential benefits but also requires careful planning, skill development, and ethical considerations. Librarians and educational institutions need to adapt to this changing landscape to ensure libraries remain relevant and effective in the digital era. It was recommended among others that University management to offer training programmes for librarians to build AI-related skills and educate library users on the benefits of AI-driven services.

Keyword: Artificial, Intelligence, Skills, Librarians, Academic, Libraries

Introduction

In the rapidly evolving landscape of the 21st century, Artificial Intelligence (AI) has emerged as a transformative force with the potential to reshape industries, economies, and societies (Huang, et al., 2020). Nigeria, like many other countries, stands on the brink of an AI-driven future, presenting both unprecedented opportunities and challenges. Amidst this transition, the role of librarians in Nigeria is undergoing a significant paradigm shift, necessitating strategic approaches and skill development to harness the potential of AI while addressing the complexities posed by antiquated curricula and archaic educational systems (Lankes, 2011; Ifidon & Aghayere, 2016). Thus, the task at hand is not just to envision an AI-driven future for Nigerian librarians but also to strategize and cultivate the requisite skills that will empower these professionals to thrive in a rapidly evolving information landscape.

The Nigerian educational system, while steeped in tradition and legacy, faces a pressing challenge in reconciling its curricula with the swiftly changing technological environment. The curriculum's inability to accommodate the pace of innovation, particularly in fields such as AI, is a matter of concern that extends beyond the realm of librarianship. As noted by Tella, (2019), the Nigerian education system has grappled with outdated content, rote learning methodologies, and an emphasis on theoretical knowledge rather than practical application. This has resulted in a significant gap between the skills imparted by formal education and the skills demanded by the modern workforce, especially in industries undergoing digital transformation. For Nigerian librarians, this dilemma manifests in the urgency to harness the potential of AI-driven tools and techniques for enhancing library services and optimizing information management. AI technologies, ranging from natural language processing and data analytics to machine learning, have the capacity to automate routine tasks, provide tailored recommendations to users, and offer insights that can inform strategic decision-making (Jaeger, 2020). The integration of AI has the potential to elevate the role of librarians from mere custodians of information to knowledge navigators, curators, and facilitators of meaningful interactions between users and resources.

However, as Nigerian librarians set their sights on an AI-driven future, they are confronted with the reality that their existing skill sets and training programmes may not align with the demands of this new landscape. A study by Olaore & Owolabi (2020) underscores the need for Nigerian librarians to acquire competencies in AI-related domains such as data analysis, programming, and

user experience design. The necessity for skill development becomes evident when one considers the profound changes that AI technologies introduce, including the ability to process and analyze vast amounts of data, create intelligent systems, and optimize user experiences (Khoo & Yang, 2017). Hence, it is imperative to consider how academic libraries in Nigeria would adjust to AI-driven future in information business.

Literature Review

Artificial Intelligence (AI) is reshaping various industries, and libraries are not an exception. In the 21st century, libraries are faced with the challenge of adapting to a rapidly changing information landscape, and AI presents a promising solution. This literature review explores the possibilities AI holds for libraries, drawing insights from existing research. It also underscores the necessity of AI adoption in libraries to enhance efficiency and service delivery.

Artificial Intelligence, encompasses machine learning, natural language processing, and data analytics. It is permeating diverse sectors, from healthcare to finance, and education to agriculture. Its impact on information management and retrieval is profound, promising to revolutionize the way libraries operate. AI-driven technologies can automate routine tasks, enhance user experiences, and optimize resource allocation in libraries (Yoon, 2023). This technology also brings forth a new range of information services, from personalized recommendations to advanced data analysis, thereby redefining the librarian's role as a curator of knowledge in the digital age. However, the integration of AI into the Nigerian library landscape is not without its complexities. The educational system in Nigeria has long been criticized for its outdated curricula that often lag behind technological advancements. Many of the skills and competencies required for effectively engaging with AI are not adequately addressed within these traditional frameworks. The result is a gap between the demands of a technology-driven future and the competencies of Nigerian librarians as they are currently trained (Folami, 2019).

To navigate this evolving landscape, David-West (2022) opined that LIS educators should be innovative and update their skills to meet up with global practice. The AI-driven future necessitates a multidisciplinary approach, encompassing technological proficiency, data literacy, critical thinking, and adaptability. It is imperative for Nigerian librarians to acquire skills that allow them

to not only understand the functioning of AI but also to apply it creatively to information services, ultimately enhancing their contribution to knowledge dissemination and user experiences (Liu, 2020). Strategically embedding AI within Nigerian libraries requires a comprehensive approach. This includes collaborating with educational institutions to update curricula, introducing AI-focused training programs for librarians, and fostering partnerships with tech companies and AI experts to provide hands-on experiences. It is vital to nurture a culture of continuous learning, encouraging librarians to explore emerging technologies and innovative practices (Bawden, 2001).

However, in the present economic situation, libraries encounter several challenges, including the digitization of information, evolving user expectations, and budget constraints. AI adoption in libraries is essential for several reasons. First, it enhances efficiency and cost-effectiveness by automating repetitive tasks, thereby reducing operational costs and allowing librarians to focus on more strategic activities. Second, AI promotes user-centric services by tailoring library offerings to individual user preferences and behaviors, leading to greater user satisfaction and engagement. Third, AI adoption provides libraries with a competitive advantage, as they can deliver innovative services that attract and retain users in a digital age. Lastly, AI supports data-driven decision-making, enabling libraries to analyze user behavior and make informed decisions about resource allocation and service improvements. To understand why AI is essential for library services in the 21st century, it is crucial to consider the changing landscape of information access and user expectations namely:

- **Efficiency and Cost-Effectiveness:** AI automation streamlines routine tasks, from cataloging to document retrieval. This efficiency not only reduces operational costs but also frees up librarians to focus on higher-value activities (Jiao et al., 2020).
- **Personalization:** AI can analyze user behavior and preferences to deliver personalized recommendations and services. In an era of information overload, this customization ensures that patrons can access relevant content efficiently (Fry et al., 2018).
- **Competitive Advantage:** Libraries that adopt AI gain a competitive edge by offering innovative, tech-enhanced services. This can attract and retain users who increasingly turn to digital alternatives for information needs (Bertot et al., 2018).

- **Data-Driven Decision-Making:** AI facilitates data analysis, enabling libraries to make informed decisions about resource allocation and collection development. Data-driven insights enhance the quality of library services (De Maio et al., 2020).

The intersection of AI-driven transformation and the antiquated nature of Nigerian curricula underscores a pivotal juncture for the future of librarianship in Nigeria. The promise of AI in enhancing library services and information management is substantial, yet the realization of this promise hinges on the ability of Nigerian librarians to acquire the skills necessary for the AI-driven future. The ensuing exploration of strategies and skill development approaches for Nigerian librarians within the context of outdated curricula is a multifaceted endeavor that requires innovative thinking, collaborative efforts, and a vision for the convergence of tradition and technology.

AI is not merely a technological advancement but a necessity for libraries in the 21st century. Libraries must adapt to changing user expectations and leverage AI to enhance efficiency, personalization, and competitiveness. Star'(2011) stated that the transformation of physical banking spaces highlights the need for libraries to evolve into technology-driven, user-centric environments. Embracing AI-driven strategies and investing in skill development for librarians are essential steps toward ensuring libraries' continued relevance and effectiveness in the digital age. AI offers libraries numerous opportunities to enhance services, improve efficiency, and maintain relevance in the 21st century. By adopting AI-driven strategies and investing in the skill development of librarians, Nigerian libraries can position themselves as leaders in the digital era, offering invaluable resources and services to their communities.

Skills for Librarians in the AI-Driven Era

With an AI-driven future, librarians find themselves at the crossroads of a rapidly evolving profession. The integration of AI into library services and operations is reshaping the role of librarians and the services they provide. To thrive in this AI-driven era, librarians in Nigeria, as in many other parts of the world, must develop new skills and expertise. The skills essential for librarians in this transformative age and the training opportunities available to them include:

- a. **Data Management and Analysis Skills:** Proficiency in data management and analysis is paramount for librarians in the AI-driven era (Williams, 2019). This skill set encompasses various aspects:
 - b. **Handling Large Datasets** - Librarians must be capable of managing vast amounts of data efficiently. This includes organizing, storing, and retrieving data relevant to library services. The ability to work with big data technologies is beneficial.
 - c. **Data Quality Assurance** - ensuring data quality is essential for reliable AI outcomes. Librarians should be skilled in data cleaning, validation, and maintaining data integrity.
 - d. **Data Privacy and Security** - given the sensitivity of user data, librarians must prioritize data privacy and security. They should be knowledgeable about data protection regulations and best practices for safeguarding patron information.
 - e. **Data Analysis Techniques** - proficiency in data analysis techniques, including statistical analysis and machine learning, is crucial. Librarians should be able to use tools like R or Python for data analysis and visualization.
 - f. **Machine Learning and AI Basics:** Foundational knowledge of machine learning (ML) and AI principles is essential for librarians (Williams, 2019). This knowledge includes:
 - i. **Understanding AI Algorithms** - librarians should have a grasp of key ML algorithms, their functionality, and use cases. Familiarity with algorithms such as decision trees, clustering, and neural networks is valuable.
 - ii. **Model Training and Evaluation** - librarians need to understand the process of training ML models, including data preparation, feature engineering, and model evaluation. This knowledge allows them to assess the effectiveness of AI models.
 - iii. **AI Applications in Libraries** - librarians should be aware of how AI can be applied to enhance library services. This includes knowledge of recommendation systems, chatbots, and AI-driven search functionalities.
 - iv. **Impact on Information Retrieval** - AI algorithms play a significant role in improving information retrieval systems. Librarians should understand how AI can enhance search results and relevance ranking.
- g. **Ethical AI and Bias Mitigation:** Given the ethical considerations associated with AI, librarians must navigate these complexities while implementing AI-driven services (Ogun, 2022). This involves:

- a. Ethical Awareness - librarians should be well-versed in ethical principles related to AI, including fairness, transparency, accountability, and privacy. This awareness guides ethical decision-making.
- b. Bias Identification - the ability to identify bias in AI systems is critical. Librarians should be capable of recognizing biases in training data, algorithms, and outcomes.
- c. Bias Mitigation Strategies - librarians need skills in developing and implementing strategies to mitigate bias in AI systems. This may involve retraining models, reevaluating data sources, or applying bias-correcting algorithms.
- h. Programming and Scripting:** Proficiency in programming languages like Python is increasingly important for librarians in AI integration (Ahmed, 2019). These skills encompass:
 - a. Customization - librarians may need to customize AI applications to align them with specific library requirements. This often involves writing or modifying code to tailor AI solutions.
 - b. API Integration - working with AI application programming interfaces (APIs) is essential for connecting AI functionalities to library systems and services.
 - c. Automation - librarians can streamline repetitive tasks by developing scripts for automation. This increases efficiency and allows librarians to focus on higher-value activities.
 - d. User-Centered Design: Adopting a user-centered design approach is crucial for ensuring that AI-driven services meet the needs and expectations of library users (Okoro, 2020). Skills include:
 - e. User Research - librarians should be skilled in conducting user research to gain insights into user behaviors, preferences, and pain points. This informs the design of AI-driven interfaces and services.
 - f. Interface Design - designing user-friendly interfaces that are intuitive and accessible is essential. Librarians should ensure that AI applications are easy to navigate and understand.
 - g. Usability Testing - librarians can benefit from the ability to conduct usability testing to gather feedback and iterate on AI-driven services, making them more user-centric.
- i. Project Management:** Efficient project management skills are necessary for librarians to oversee AI initiatives successfully. These skills include:
 - a. Project Planning - librarians must develop comprehensive project plans that outline project goals, timelines, resource requirements, and milestones.
 - b. Execution - effective project execution involves coordinating tasks, teams, and resources to ensure that AI projects progress according to plan.
 - c. Evaluation - continuously evaluating AI projects is essential. Librarians should gather user feedback and assess project success, making data-driven decisions to enhance AI services.

Incorporating these skills into the librarian's toolkit empowers them to navigate the complexities of AI adoption in libraries, ensuring that AI-driven services are both effective and user-centric while adhering to ethical standards and data privacy regulations. Librarians in Nigeria must adapt

to the AI-driven era by acquiring the necessary skills and expertise. Data management, AI fundamentals, ethical considerations, and programming skills are essential in this transformative period. Fortunately, numerous training opportunities are available, from online courses and university programs to government initiatives and professional associations. By embracing these opportunities, Nigerian librarians can not only thrive in the AI-driven future but also play a pivotal role in enhancing library services and knowledge access for their communities.

Strategies for Adopting AI into Library Services for Nigerian Librarians

The integration of AI into library services offers the potential to enhance efficiency, user experiences, and accessibility to knowledge in Nigerian libraries. To successfully adopt AI-driven solutions, Nigerian librarians must implement strategic approaches. This section discusses strategies for the effective integration of AI into library services, drawing upon research and insights.

Needs Assessment and Goal Setting: Conducting a thorough needs assessment is the foundation for successful AI integration in Nigerian libraries (Smith, 2021). This assessment involves an in-depth examination of the library's current state, including its strengths, weaknesses, opportunities, and threats in the context of AI adoption. Librarians should engage with stakeholders, including users and staff, to understand their expectations, pain points, and aspirations regarding library services. Simultaneously, it's crucial to set clear, measurable goals for AI implementation that align with the library's mission and user needs (Johnson, 2020). Goals should be specific, achievable, relevant, and time-bound (SMART). For instance, a library might set a goal to increase the accessibility of digital resources for remote users by implementing AI-powered search and recommendation systems. This goal directly addresses user needs and contributes to the library's mission of knowledge dissemination.

Collaboration and Partnerships: Fostering collaborations with local technology experts, universities, and AI developers is instrumental in leveraging external expertise (Adekunle, 2018). Nigerian libraries may lack in-house AI specialists, making collaboration with external partners essential. Universities can serve as valuable sources of AI knowledge, research, and potential talent. Collaboration with local technology experts and AI developers can facilitate the customization and implementation of AI solutions tailored to the library's needs. Additionally, collaboration with library consortia can be a strategic approach. Pooling resources and knowledge within consortia allow libraries to embark on joint AI initiatives, share best practices, and collectively tackle challenges. Consortia can facilitate collective procurement of AI tools and technologies, making them more cost-effective for individual libraries.

Data Collection and Management: Developing robust data collection mechanisms is vital for AI applications. Libraries should identify the types of data needed for AI-driven services, such as user behavior, search queries, and content usage. Robust data collection should comply with data protection regulations and prioritize user privacy. Effective data collection ensures that AI systems have access to relevant and high-quality data for analysis and decision-making. Furthermore, efficient data management practices are essential. Libraries must implement data storage,

processing, and security protocols that maintain data integrity and protect against unauthorized access. Compliance with data protection regulations, such as GDPR or Nigeria's Data Protection Regulation, is critical. By ensuring data quality, security, and compliance, libraries can build a strong foundation for AI implementation.

Customization and Localization: Customizing AI solutions to meet the specific needs and preferences of Nigerian library users is paramount (Okoro, 2020). Nigerian libraries serve diverse communities with varying information needs, languages, and cultural contexts. AI solutions should be adaptable and flexible to accommodate these diversities. For instance, AI-driven recommendation systems should consider local reading preferences and languages to offer relevant content.

Moreover, respecting local cultural and ethical norms is crucial (Obi, 2021). AI systems must be designed to uphold cultural sensitivity and ethical standards. Libraries should engage with local communities to understand their values and concerns, ensuring that AI applications do not inadvertently offend or exclude certain groups.

User Training and Engagement: Offering training programs for librarians and library staff to build AI-related skills is a proactive strategy (Oni, 2019). Librarians need to be proficient in AI tools and technologies to effectively manage and support AI-driven services. Training should encompass areas like data analysis, ethical AI, and user engagement strategies. Educating library users on the benefits of AI-driven services is essential. Libraries should provide guidance and resources to help users make the most of AI-powered search, recommendation systems, and virtual assistants. User engagement efforts, such as workshops and informational materials, can bridge the gap between AI technology and its practical use for library patrons.

Ethical AI Governance: Establishing ethical guidelines and governance frameworks for AI implementation is a fundamental step. These guidelines should emphasize principles of fairness, transparency, and data privacy. They should be aligned with international ethical standards and regulations governing AI. To ensure ethical AI governance, libraries should also institute regular monitoring of AI systems. This involves evaluating AI algorithms for potential biases and ensuring that data used for training AI models is representative and unbiased. Ethical governance frameworks should provide a mechanism for addressing and rectifying any ethical concerns that may arise during AI implementation.

Pilot Projects and Evaluation: Implementing AI technologies in small-scale pilot projects allows libraries to assess their effectiveness and user acceptance. Pilots provide valuable insights into how AI solutions perform in real library environments and help identify areas for improvement. They also allow librarians to gather user feedback and iterate on AI implementations. Continuously evaluating AI-driven services is an ongoing process. Libraries should collect and analyze data on user interactions with AI systems, measuring factors like user satisfaction and the impact of AI on library operations. User feedback is invaluable for making informed decisions about enhancements and refinements to AI services.

Scalability and Sustainability: Planning for the scalability and long-term sustainability of AI initiatives is essential. Libraries should consider the long-term financial and resource requirements

of AI projects. This includes budget constraints, infrastructure needs, and the availability of AI experts. Exploring funding opportunities and grants is also a strategic move. Libraries can seek external funding sources to support ongoing AI projects and ensure their sustainability. Government grants, research partnerships, and philanthropic organizations are potential sources of funding for AI initiatives. These strategies collectively provide a framework for Nigerian libraries to effectively adopt AI into their services, ensuring that AI enhances library operations and benefits library users while respecting local values and needs.

Several libraries in Nigeria have embarked on AI-driven initiatives, showcasing the successful integration of AI technologies. According to Oni (2019) The National Library of Nigeria, for instance, is automating cataloging processes through AI, improving access to its vast collection. Additionally, university libraries in Nigeria are implementing AI-driven chatbots to assist students and researchers, exemplifying the practical application of AI in the Nigerian library context (Igwe, 2020).

Conclusion

The introduction of AI into the landscape of Nigerian libraries represents both a significant opportunity and challenge. As the world continues to evolve in the 21st century. Libraries in Nigeria must embrace AI-driven strategies to remain relevant and effective in serving their communities. Nigerian librarians must recognize the urgent need to develop competencies in AI-related domains, including data analysis, programming, and user experience design. This skill development is vital to bridge the gap between the demands of an AI-driven future and current training programs. AI offers libraries the potential to enhance efficiency, personalize services, gain a competitive edge, and make data-driven decisions. Nigerian libraries can leverage AI to revolutionize how they operate and engage with users. Librarians in Nigeria are witnessing a transformation of their roles from custodians of information to knowledge navigators, curators, and facilitators of meaningful interactions between users and resources. AI serves as a catalyst for this transformation. Librarians in the AI-driven era need skills in data management and analysis, machine learning and AI basics, ethical considerations, programming, user-centered design, and project management. These skills enable librarians to navigate the complexities of AI integration effectively. It is concluded that the adoption of AI in Nigerian libraries offers significant potential benefits but also requires careful planning, skill development, and ethical considerations. Librarians and educational institutions need to adapt to this changing landscape to ensure libraries remain relevant and effective in the digital era.

Recommendations:

1. The University management should prioritize skill development in AI-related areas. This can be achieved through formal training programs, workshops, and collaboration with technology experts and universities.

2. The library management should actively seek collaborations with external partners, including universities and local technology experts, to access AI knowledge and expertise. Additionally, libraries should consider forming consortia to collectively address AI challenges and share resources.
3. Information professionals should establish a robust data collection and management practices that comply with data protection regulations. Ensure data quality, security, and privacy while collecting user data for AI applications.
4. Librarians to tailor AI solutions to the specific needs and preferences of Nigerian library users. Respect local cultural and ethical norms to ensure inclusivity and sensitivity in AI applications.
5. University management to offer training programmes for librarians to build AI-related skills and educate library users on the benefits of AI-driven services. Promote user engagement through workshops and informative materials.
6. Library management should ensure ethical guidelines and governance frameworks for AI implementation, emphasizing fairness, transparency, and data privacy. Regularly monitor AI systems for biases and ethical concerns.
7. Academic libraries to implement AI technologies in pilot projects to assess effectiveness and gather user feedback. Use data-driven insights to iterate and improve AI implementations.
8. Library management to plan for scalability and long-term sustainability of AI initiatives. Explore funding opportunities from government grants, research partnerships, and philanthropic organizations.

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