

Adoption of artificial intelligence by librarians for effective service delivery in academic libraries in Edo State

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Abstract

The adoption of Artificial Intelligence into library services is transforming the way librarians manage and deliver information. Artificial intelligence applications in libraries include automation of cataloging and inventory management which increases efficiency and accuracy by utilizing machine learning algorithms to classify and organize materials. Artificial intelligence offers instant support for user inquiries, facilitating better service and freeing up librarians to focus on more complex tasks. Additionally, Artificial intelligence enhances user engagement through personalized book recommendations based on analysis of borrowing patterns and preferences. The use of artificial intelligence in research assistance further supports academic endeavors by efficiently searching databases and summarizing relevant literature. Moreover, predictive analytics enabled by Artificial intelligence aids in collection development by forecasting future needs and trends. Despite its benefit, the implementation of Artificial intelligence requires careful consideration of data privacy and ethical concerns. This overview underscored the potential of Artificial intelligence to revolutionize library services while highlighting the importance of responsible application to maximize its advantages.

Keywords: Artificial intelligence, adoption, Librarians and service delivery

Introduction

University libraries play an important role in the academic life of a university, providing essential resources and services that support teaching, learning, and research. They are often central to the academic experience of students and faculty, and are an important part of the intellectual and cultural life of the university community. A university library is a specialized library that serves the students, faculty, and staff of a university or college. According to the International Federation of Library Associations and Institutions (IFLA), a university library is "a library which supports the teaching, research and administrative functions of a university or college, and which may also serve as a resource for the wider community" (IFLA, 2015). Libraries are the nerve centre of an educational institution and

a place where information is provided to serve all patrons irrespective of their ages, political and ethical background, religion, sex, etc. The transition of information materials from book collections to audiotape collections, video collections, database, digitization of information materials, library automation, and now the adoption of artificial intelligence in library operations (Vijayakumar & Vijan, 2011). This implies that one of the motives of adopting AI technologies in university libraries is to satisfy user needs. The integration of Artificial Intelligence (AI) into academic libraries has seen significant growth over the past decade. This adoption is driven by the increasing need to improve library services, streamline operations, enhance user experience, and provide more efficient management of library resources. Over the past decade, academic libraries in Edo State have made significant strides in the integration of technology. Institutions like UNIBEN and AAU have increasingly digitized their collections, offering students and faculty access to electronic journals, e-books, and databases such as JSTOR, Science Direct, and the Nigerian Digital Library. These digital platforms enable users to access scholarly materials remotely, contributing to more efficient research and learning environments (Ezeani & Nwalo, 2017). The adoption of Library Management Systems (LMS), such as Koha and Alma, has also streamlined library operations in Edo State's academic libraries. These systems automate cataloging, circulation, and acquisition processes, reducing the need for manual record-keeping and improving the overall efficiency of library management.

Objectives of the study

The primary purpose of this research is to examine the Adoption of Artificial Intelligence by Librarians for Effective Service Delivery in Academic Libraries in Edo State. The specific objectives are to;

- i .determine the state of adoption of Artificial Intelligence by Librarians for Effective Service Delivery in Academic Libraries in Edo State
- ii identify the challenges faced by librarians in the use of artificial intelligent by Librarians for Effective Service Delivery in academic libraries.
- iii determine the strategies for enhancing the use of artificial intelligent by librarians in Librarians for Effective Service Delivery academic libraries.

Concept of artificial intelligence

Artificial intelligence refers to the branch of computer science dedicated to creating systems capable of performing tasks that typically require human intelligence. These tasks include learning from experience, understanding natural language, recognizing patterns, solving complex problems, and making decisions. Artificial intelligence encompasses various subfields such as machine learning, which focuses on algorithms that enable systems to learn from data and improve over time without explicit programming. Another important area is natural language processing , which allows machines to understand and interact using human language (Russell & Norvig, 2020). This artificial intelligence can be categorized into two main types: narrow artificial intelligence and general artificial intelligence. Narrow artificial intelligence, also known as weak Artificial Intelligence is designed to handle a specific task, such as voice assistant or recommendation systems. However, general artificial intelligence, or strong artificial intelligence aims to perform any intellectual task that a human can do, though this level of artificial intelligence remains largely theoretical (Tegmark, 2017).

Artificial intelligence is used in various applications across different fields. For instance, in healthcare, artificial intelligence algorithms assist in diagnosing diseases by analyzing medical images and patient data (Esteva et al., 2019). In the finance sector, artificial intelligence systems help in fraud detection and managing investment portfolios (Jiang et al., 2020). The rapid advancement of artificial intelligence raises important ethical and societal questions, including concerns about privacy, bias, and the impact on employment. Artificial intelligence is increasingly becoming a transformative force in various fields, including library and information science. For librarians, artificial intelligence presents both opportunities and challenges as it reshapes traditional library services and introduces new methods for managing and delivering information. Moreover, artificial intelligence technologies are being integrated into libraries to enhance and automate various services, making them more efficient and user-centric. Artificial intelligence is making so many impacts in various areas like; information retrieval and discovery, Artificial intelligence-powered search systems, and recommendation engines are improving the way users discover and access information. Moreover, Machine learning algorithms analyze user behavior and preferences to provide personalized search results and recommendations, thereby enhancing the user experience (Choi et al., 2016).

Moreover, AI systems can analyze past search queries and interactions to suggest relevant resources or new titles (Smith & Watson, 2022). Cataloging and metadata management Artificial intelligence can automate the cataloging process by generating metadata and classifying resources with high accuracy. Natural language processing techniques are used to extract and organize information from documents, reducing the manual effort required for cataloging (Baker et al., 2020). Artificial intelligence tools can also improve the consistency and quality of metadata across digital collections (Gorman, 2019). Artificial intelligence driven virtual assistants and chatbots are being used to provide real-time assistance to library users. These tools handle routine queries, guide users in navigating library resources, and provide information on library services (Fitzgerald & Rea, 2021). In addition, Chatbots operate 24/7, offering support outside regular library hours and enhanced user engagement. Artificial intelligence systems analyse user data to predict future behaviour and trends. This capability allows libraries to proactively address user needs and preferences, such as identifying popular books or anticipating future research trends (Davenport & Ronanki, 2018). Predictive analytics may also assist in resource allocation and strategic planning (Jansen et al., 2020).

Edo State, is located in southern Nigeria, is home to several notable academic institutions, including **University of Benin (UNIBEN)**, **Ambrose Alli University (AAU)**, and **Edo University Iyamho**. These universities have established libraries that serve as critical resources for their academic communities. The libraries in these institutions are tasked with providing access to a wide range of print and electronic resources, promoting information literacy, supporting research activities, and enhancing students' academic success (Oladejo, 2019). Also, Academic libraries in Edo State serve as hubs for knowledge dissemination, offering access to local, national, and international scholarly resources. The increasing reliance on digital technologies and the growing demand for online learning, particularly during the COVID-19 pandemic, have made it essential for these libraries to integrate Information and Communication Technology (ICT) into their services. In addition, academic libraries in Edo State have made significant strides in the integration of technology. Institutions like UNIBEN and AAU have increasingly digitized their collections, offering students and faculty access to electronic journals, e-books, and databases such as JSTOR, Science Direct, and the Nigerian Digital Library. These digital platforms enable users to access scholarly materials remotely, contributing to more efficient research and learning environments (Ezeani & Nwalo, 2017). In addition, the adoption of Library Management Systems (LMS), such as Koha and Alma, has also streamlined library operations in Edo State's academic

libraries. These systems automate cataloging, circulation, and acquisition processes, reducing the need for manual record-keeping and improving the overall efficiency of library management.

AI adoption in academic libraries in Nigeria is driven by the need for more efficient information management, enhanced user experience, and support for research activities. While many Nigerian universities have made strides in digitizing their resources, AI offers advanced capabilities, such as automation, personalized recommendations, natural language processing (NLP), and predictive analytics, which can significantly enhance library operations and services (Adebayo, 2020). More key academic libraries in Nigeria, including those at the University of Lagos (UNILAG), University of Ibadan (UI), and Ahmadu Bello University (ABU), have begun to explore AI technologies to support research, learning, and administration. For example, some libraries are experimenting with AI-powered chatbots to provide user support and improve access to library resources (Ogunmodede, 2021).

Challenges of adopting artificial intelligent in academic libraries in Edo State

Despite the increasing interest, the widespread adoption of AI is hindered by several factors, including limited funding, infrastructural challenges, the need for specialized skills among library staff (Adebayo & Aina, 2019) etc.

Inadequate Funding: One of the most significant challenges is the lack of sufficient funding. Academic libraries in Edo State, like many others in Nigeria, often face budget cuts, limiting their ability to acquire new resources, upgrade technological infrastructure, or employ skilled personnel. The reliance on government funding and the sometimes inconsistent disbursement of funds can impede the libraries' ability to meet the growing demands of users (Okafor & Adebayo, 2019). Inadequate funding is a major problem in adopting artificial intelligent in academic libraries in Edo State.

Limited ICT Infrastructure: While some academic libraries in Edo State have adopted digital technologies, the infrastructure required to support comprehensive digital services is often inadequate. Poor internet connectivity, unreliable power supply, and limited access to modern computer hardware are common issues faced by many libraries. This limits the full integration of digital resources and hampers the effectiveness of online learning tools (Amuta, 2021).

Staff Capacity and Training: Another challenge is the insufficient training and professional development opportunities for library staff. Many academic libraries in Edo State face staffing shortages and lack the necessary technical expertise to manage emerging technologies effectively. Professional development programs, particularly in areas like digital librarianship, are essential for equipping staff to meet the demands of modern library services (Adetoro & Olatokun, 2020).

Lack of User Awareness: While libraries offer a wealth of resources, there is often a lack of awareness among students and faculty about the full range of services available. This lack of awareness can hinder effective use of library resources, including online databases, e-journals, and other digital content. Promoting information literacy and encouraging greater engagement with library resources remain ongoing challenges (Oladejo, 2019).

Lack of Skilled Personnel: There is a shortage of librarians with the necessary technical expertise to manage and implement AI technologies in Nigerian academic libraries. Most library staff members are trained in traditional library practices, and there is a pressing need for professional development programs that focus on AI, machine learning, and data science (Adebayo & Aina, 2019). Without these skills, libraries may struggle to make the most of AI's potential.

Awareness and User Engagement: Many library users in Nigeria are not yet fully aware of the benefits of AI-powered systems. Academic libraries in Nigeria must invest in awareness campaigns and user training programs to help students, faculty, and staff understand how to leverage AI tools to enhance their research and learning (Ogunmodede, 2021). Without such initiatives, AI adoption may face resistance from users who are unfamiliar with these technologies.

Resistance to Change

Resistance to change, both from library staff and users, is a common barrier to AI adoption in academic libraries. Many librarians may be reluctant to adopt AI due to fear of job displacement, unfamiliarity with the technology, or concerns about the reliability of AI systems. Staffs who have spent years working with traditional systems may find it challenging to adapt to new AI tools and technologies. This reluctance can slow down the adoption process and create a barrier to the effective use of AI in library operations (Adebayo & Aina, 2019). However, Library users, including students, may be unfamiliar with AI-powered systems and may resist using them. Some may prefer to stick with familiar search methods or traditional library services, especially if they are not aware of the benefits that AI can bring in terms of efficiency and user experience.

Data Privacy and Ethical Concerns

AI systems rely on data, and the adoption of AI in academic libraries raises concerns regarding data privacy and ethics. AI algorithms often need access to large datasets, which may include personal information about users (such as search history, borrowing patterns, and academic interests). This raises ethical questions regarding user privacy, data security, and how libraries handle sensitive information (Adebayo, 2020).

In Nigerian academic libraries, there are often concerns about the lack of proper data protection mechanisms and legal frameworks to govern the use of AI. Libraries must ensure that AI systems comply with privacy regulations, such as the Nigerian Data Protection Regulation (NDPR) or global standards like the General Data Protection Regulation (GDPR), to protect users' data and prevent misuse.

Integration with Existing Systems

Integrating AI into existing library management systems is another significant challenge. Many academic libraries in Edo State still use legacy systems for cataloging, circulation, and resource management. These older systems may not be compatible with modern AI technologies, making integration difficult and time-consuming. The process of migrating from traditional systems to AI-powered platforms often requires substantial investment in time and resources. Additionally, there may be resistance from library staff who are accustomed to the older systems, which further complicates the adoption process. Without smooth integration, AI adoption may not yield the expected benefits in terms of operational efficiency or enhanced user experiences.

Limited Access to AI solutions and local context

Many AI tools and solutions are developed outside Nigeria and may not be tailored to the specific needs of Nigerian academic libraries. These tools may not account for local contexts, such as the types of resources commonly used in Nigerian universities, the challenges faced by students and faculty, or the unique cultural and linguistic characteristics of library users in Edo State (Adebayo & Aina, 2019). However, many AI solutions available in the market may be expensive, and acquiring them may not

always be feasible for libraries in Edo State, given the financial constraints. Libraries may need to rely on expensive international solutions or seek local developers to create custom AI applications, both of which pose their own set of challenges.

Strategies for improving the use of Artificial Intelligent by Librarians in academic libraries in Edo State

Collaboration with International and National Library Networks: Collaboration with national and international library organizations, such as the Nigerian Library Association (NLA) and the International Federation of Library Associations (IFLA), can help academic libraries in Edo State access resources, training, and funding opportunities. Partnerships with organizations like these could provide libraries with the tools and support needed to modernize their services (Ezeani & Nwalo, 2017). Moreso, there is a need for stronger governmental and institutional commitment to funding academic libraries. Allocating more resources to these libraries, including for infrastructure upgrades, can help address issues such as inadequate ICT infrastructure and staff training. Additionally, universities can seek external funding through grants and partnerships to support library development (Okafor & Adebayo, 2019).

Digital Literacy and User Education: Expanding efforts to promote digital literacy among students and staff is crucial for increasing the effective use of library resources. Libraries can provide training sessions and workshops on how to access and use digital resources, encouraging greater engagement with electronic collections and services (Amuta, 2021).

AI and Automation: Incorporating advanced technologies such as Artificial Intelligence (AI) and machine learning could help optimize library services. AI can assist in automating processes like cataloging and user recommendations, while machine learning can help with predictive analysis to manage resources more efficiently (Adetoro & Olatokun, 2020).

Awareness and User Engagement: Many library users in Nigeria are not yet fully aware of the benefits of AI-powered systems. Academic libraries in Nigeria must invest in awareness campaigns and user training programs to help students, faculty, and staff understand how to leverage AI tools to enhance their research and learning (Ogunmodede, 2021). Without such initiatives, AI adoption may face resistance from users who are unfamiliar with these technologies.

Library staff and users should be ready to embrace AI adoption in academic libraries.

Librarians should not be reluctant to the use of AI due to fear of job displacement, unfamiliarity with the technology, or concerns about the reliability of AI systems. Staffs who have spent years working with traditional systems should adjust to the new AI tools and technologies.

Libraries must ensure that AI systems comply with privacy regulations, such as the Nigerian Data Protection Regulation (NDPR) or global standards like the General Data Protection Regulation (GDPR), to protect users' data and prevent misuse.

Library heads should ensure that AI tools and solutions are developed in Nigeria so as to tailored the specific need of Nigerian academic libraries.

Conclusion

In conclusion, academic libraries in Edo State, Nigeria, have made significant progress in integrating technology and improving access to information resources. However, challenges related to funding, infrastructure, and staff training continues to hinder their full potential. To further enhance the role of academic libraries in supporting higher education, stakeholders must prioritize investment in technological infrastructure, staff development, and user education. With continued support and innovation, libraries in Edo State can play an even greater role in fostering academic success and research excellence.

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