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Perceived Impact of Artificial Intelligence (AI) Usage on Library Services in Secondary Schools in Calabar, Cross River State, Nigeria

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Abstract
The main purpose of the study was to investigate perceived impact of Artificial Intelligence (AI) usage on library services in secondary schools in Calabar, Cross River State, Nigeria. Two null hypotheses were formulated to achieve the purpose of this study. Descriptive survey design was adopted for the study. A sample of 250 librarians and students from 25 secondary schools in Calabar, Cross River State, Nigeria was drawn for the study. A duly vetted structured questionnaire instrument was used for data collection. Data generated were subjected to statistical analysis using independent t-test at 0.05 level of significance. The result obtained from the analysis revealed that there is a significant impact of user experience and library management efficiency on artificial intelligence (AI) in library services in the study area. Based on the findings of this study, conclusion was drawn. It was recommended that: school management should prioritize AI tools that enhance user experience, such as personalized recommendation systems, voice assistants, or automated reference services to boost student engagement and satisfaction; the management should implement AI-powered management platforms to automate cataloguing, track usage patterns, and optimize resource allocation. This will not only improve efficiency but also create a data-driven environment for future innovations.

Keywords: Perceived impact, Artificial Intelligence (AI) usage, Library services, User experience, Library management efficiency

Introduction

The incorporation of Artificial Intelligence (AI) in various sectors has transformed the way services are delivered, and education is no exception. Libraries, being an integral part of educational institutions, are also experiencing a paradigm shift with the incorporation of AI technologies. Secondary school libraries, in particular, play a crucial role in fostering a culture of reading, research, and learning among students. The advent of AI is transforming the traditional library services, offering new opportunities and challenges. The use of AI in libraries is not a new phenomenon, but its application in secondary school libraries is gaining momentum (Bawden & Robinson, 2017). AI-powered tools and systems are being employed to enhance library services, including cataloging and classification, information retrieval, and reader's advisory services (Chowdhury, 2023). AI can also help librarians in secondary schools to personalize recommendations, provide real-time assistance, and improve the overall user experience (Kim & Lee, 2019).

Globally, libraries are experimenting with various AI applications to create smarter, more responsive systems. For instance, AI can facilitate more effective information retrieval through natural language processing (NLP), allowing users to search for information using conversational queries rather than keyword-based searches. This not only improves user satisfaction but also makes information more accessible to those who may not be familiar with specific terminology. Moreover, AI's ability to learn and adapt over time means that library systems can continuously improve, providing ever-more accurate and relevant results to users (Ali, Naeem & Bhatti, 2020; Collins, Dennehy, Conboy & Mikalef, 2021).

In Nigeria's academic libraries, the integration of Information and Communication Technologies (ICTs) has sparked significant growth and development. These libraries have

successfully adopted various technologies, including computers, barcode readers, online databases, Online Public Access Catalogues (OPAC), and social media, to streamline operations and enhance services (Afolabi, 2018). However, the adoption of cutting-edge technologies like the Internet of Things (IoT), big data, cloud computing, blockchain, virtual/augmented reality, and artificial intelligence (AI) remains limited (Okonedo, 2022). As a result, AI applications in Nigerian academic libraries are still in their infancy.

Nigerian academic librarians require ongoing training and professional development to acquire the necessary technological skills and competencies (Ilesanmi, 2023). The evolving roles of librarian demand expertise in emerging technologies, machine learning and AI (Banerjee, 2022). As noted by Oyetola (2023), librarians must adapt to new challenges and opportunities, leveraging technologies like AI to transform library operations and services. By embracing these changes, academic librarians can deliver seamless, effective, and creative services that meet the dynamic needs of tech-savvy users (Koizumi, 2020).

To thrive in today's digital landscape, The Nigerian Library Association (NLA) is advocating for libraries to adopt hybrid platforms combining physical and virtual services to meet modern users' needs. NLA President Dr. Dominic Omokaro emphasized the need for a human-technology balance, promoting empathy, ethics, and personalized services. Omokaro called on the federal and state governments as well as education stakeholders to prioritize upskilling librarians in digital literacy, AI and emerging technologies; integrate 5IR-responsive courses in Library and Information Science Education; adopt technologies like virtual reality (VR), machine learning, and IoT to bridge the digital divide; reviewing National Library Policy to reflect digital realities; and allocate resources to modernize library infrastructure and services. Nonetheless, The NLA aims to promote inclusive access, relevance and sustainable development through education and research (The Whistler Newspaper, 2025).

The adoption of artificial intelligence (AI) in library management according to Koizumi, (2020) transcends mere automation of routine tasks, instead, it revolutionizes libraries into vibrant knowledge hubs and innovation centers. By harnessing AI's potential, libraries can transform every facet of their operations, including cataloging, search functionality, user support, and resource allocation. Koizumi noted that AI technology advances, libraries can anticipate even more groundbreaking applications. Furthermore, with users increasingly expecting personalized and streamlined access to information, akin to their experiences with online platforms and search engines, AI-powered library management systems can effectively address these demands by automating tasks, enhancing discovery capabilities, and delivering tailored services.

The impact of AI usage on library services in secondary schools is a subject of growing interest. As AI technologies continue to evolve, it is essential to understand how they can be leveraged to improve library services, enhance student learning outcomes, and support teachers in their instructional endeavors (Trust, 2018). This study aims to explore the perceived impact of AI usage on library services in secondary schools, highlighting the user experience, library management efficiency and potential future directions.

Purpose of the study

The main purpose of the study is to investigate perceived impact of Artificial Intelligence (AI) usage on library services in secondary schools in Calabar, Cross River State, Nigeria. Specifically, the study sought to:

1. Determine whether user experience impacts AI usage in library services in secondary schools in Calabar.
2. Assess whether the efficiency of library management impacts AI usage in library services in secondary schools in Calabar.

Research questions

1. To what extent does user experience impact AI usage in library services in secondary schools in Calabar?
2. How does the efficiency of library management impact AI usage in secondary school libraries in Calabar?

Statement of hypotheses

1. There is no significant impact of user experience on AI usage in library services in secondary schools in Calabar.
2. There is no significant impact of library management efficiency on AI usage in library services in secondary schools in Calabar.

Literature review

User experience and artificial intelligence (AI) usage in library services

Libraries have embraced AI technologies to streamline operations, improve user experience, and optimize resource management. Libraries serve as the hub of a school or institution of learning and a place where information is made available to all clients, regardless of their ages, political and ethical perspectives, religion, sex among others. Moving information resources from book collections to audiotape collections, video collections, databases, digitized information resources, automating libraries, and now implementing artificial intelligence in library operations (Vijayakumar & Vijan, 2021). This implies that one of the motives of adopting AI technologies in secondary school libraries is to satisfy user needs.

According to Sivarajah, Kamal, Irani and Weerakkody (2017), it has been observed that employing AI in academic libraries enables improved dataset analysis, particularly for huge datasets utilized for analysis across many datasets. It also facilitates the removal of tiresome and repeated chores. The implication of this is that integrating AI into library operations enables libraries to develop powers that go beyond the limits of the human intellect. However, Wheatley and Hervieux (2019) pointed that libraries, notably secondary schools and university libraries in nations like Nigeria, have struggled to accept digital technology and exhibit reluctance to change in the use of technologies across the board.

AI helps library users to send their queries to library management round the clock, and access resources from anywhere in the world without visiting a physical library (Chandwani, 2018). Likewise, Johnson, (2018) affirmed that artificial intelligence enhances information access by providing quick answers, saving users' time, and creating a more enjoyable experience. AI-driven tools improve search effectiveness and personalization, analyzing user preferences and search patterns to deliver precise results, ultimately transforming how people find and access information. According to Adetoun (2021), AI can help students summarize large amounts of text like long articles, research papers, or social media ideas and make them understand without having to read through.

A study by Saidu (2023) on revolutionizing library operations with AI: Enhancing efficiency and user experience in academic libraries in Nigeria revealed that AI has become a game-changer in the world of libraries, transforming traditional operations and enhancing user experiences. Similarly, Hamza, Abdullahi and Mohammed (2025), in their study on role of artificial intelligence (AI) in enhancing user experience at Federal University of Education Library, Zaria using a mixed-methods research design, the study collected quantitative data through questionnaires and qualitative data through interviews with library users and staff. The findings reveal that AI has the potential to significantly enhance user experience by improving resource accessibility, personalizing services, and increasing operational efficiency. However, challenges such as high costs, lack of technical expertise, and concerns about data privacy hinder its implementation. The study recommends investing in AI technologies, providing staff training, and adopting a phased implementation approach.

A study conducted by Uduak, Babangida and Hawwau (2023) on artificial intelligence and user experience: An integrated review of benefits and challenges in academic libraries. The study highlights the growing significance of AI in academic libraries, emphasizing its potential to revolutionize user experiences while underscoring the critical importance of addressing ethical and user-centric concerns in its implementation. Samuel and Omolabake (2024) investigated how AI affects users' experience in the university library. The study used a descriptive survey research design. Two self-structure questionnaires were used to obtain data from library staff and library users in the Federal University of Technology, Akure, Ondo States, Nigeria. The findings reveal that the extent of the influence of AI on library services is very high. The findings also reveal that the effects of AI on users' experience are high. Tripathi and Tripathi (2024) found that attaching the potential of AI, libraries can improve user experience and increase the efficiency of library services. Nevertheless,

libraries must prioritize data privacy and ethical considerations to ensure the responsible use of AI technologies.

Library management efficiency and artificial intelligence (AI) usage on library services

Library management has undergone a remarkable evolution, from manual cataloging to digital solutions. The digital revolution brought databases and digital catalogs, and artificial intelligence (AI) has further accelerated progress. AI-powered systems now drive data collection, processing, and interpretation, ensuring accuracy and consistency. Librarians who grasp and apply the collection development policy can better align electronic resource management with the library's goals and objectives. This understanding enables informed decision-making regarding resource selection, acquisition, and management. Effective utilization of the policy also facilitates clear communication with stakeholders, including faculty, researchers, and students, fostering collaboration and optimizing resource utilization (Okogwu & Ekere, 2018; Ali, 2020).

The integration of information technology has fundamentally redefined the concept of library management, driving a shift towards virtual and digital platforms (Okunlaya SyedAbdullah & Alias, 2022). This digital transformation encompasses a range of services and resources, including digital libraries, e-resources, online learning platforms, and virtual reference services. The use of artificial intelligence (AI) in library management is a very nascent development, warranting a full understanding of its consequences. Library management is concerned with the systematic gathering, categorization, preservation, and retrieval of data. Within the realm of libraries, this entails the process of systematically organizing books, journals, and various other materials while also guaranteeing their convenient availability to users. The incorporation of artificial intelligence (AI) enables the automation and enhancement of certain operations, resulting in increased efficiency. AI enables libraries to leverage predictive analytics, anticipating user needs and informing resource allocation decisions. AI-powered content curation tools enhance material quality, relevance, and precision (Chemulwo & Sirorei, 2020). This AI-driven revolution has transformed information management, empowering libraries to deliver more efficient and effective services.

Previous research on the issues of managing electronic information resources at the libraries of Federal University in North West, Nigeria by Abdullahi, Abdullahi and Abdullahi (2018) found that there is inadequate management of electronic information resources due to a lack of staff who are knowledgeable about managing electronic and technical equipment, insufficient financing, a lack of policy guidelines, a lack of user education, and a lack of ongoing training. Devi and Devi (2018) in their study also found that the majority of libraries struggled with poor electronic information management as a result of preservation concerns, a lack of professional skills to handle the resources, limited funding, outdated technological equipment, and a lack of employee cooperation.

A recent study by Tripathi and Tripathi (2024) explored the potential of Artificial Intelligence (AI) in transforming library services and information management. The research reveals that AI integration can enhance the organization and classification of materials, leading to improved effectiveness and user satisfaction. However, data privacy concerns pose significant challenges. The study highlights the importance of ongoing training for library personnel to effectively work with AI technologies and address user needs. It also emphasizes the need for libraries to develop guidelines and policies for the ethical use of AI, addressing issues like bias and transparency. Accordingly, Patra (2025) examined the most recent advancements in automation trends in libraries, as well as the effects AI is now having on library management. The study found that AI is rapidly transforming library operations by helping with user interaction, reading material discovery, classification, cataloguing, and staff problem-solving. It has the potential to enhance the library service system for both users and professionals through innovation and intelligent decision making. The effect of AI on library management and the future trends in library automation are crucial factors that will shape the future of libraries. AI adoption offers to move libraries towards adynamic and inclusive future of knowledge dissemination, even in the face of obstacles like ethical issues and budget restrictions.

Also, Palve and Arora (2025) conducted a study on the AI-powered library management system. The study revealed that this system leverages AI-driven algorithms to enhance book catalogue, user management, and resource tracking while ensuring a seamless experience for both librarians and patrons. It is an intelligent search engine that enables users to find books based on keywords, authors, or subject relevance. Similarly, Bagewadi, Mathapati, Gangur, Madiwalar and Patil (2025), elucidated the significant role of library management systems. Moreover, the study identifies critical challenges

that hinder the effective implementation of library management systems, including technical constraints, organizational resistance, and human-related factors, such as insufficient staff training. To mitigate these issues, the research advocates for strategic approaches that incorporate comprehensive needs assessments, continuous professional development initiatives, the selection of flexible technology solutions, adherence to user-centered design principles, robust data security measures, and ongoing evaluation processes.

Methodology

The research design adopted for the study was the descriptive survey design. This research design investigated the phenomena as it exists at the time of this investigation. The population of the study consisted of seventy-five (75) librarians and eight hundred and seventyeight (878) SS II students from twenty-five (25) secondary schools in the study area making it a total of nine hundred and fifty-three (953). The sample of the study consisted of two hundred and fifty (250) comprising both librarians and students from 25 secondary schools in Calabar, Cross River State, Nigeria.

Instrumentation

Perceived Impact of Artificial Intelligence (AI) Usage on Library Services Questionnaire (PIAIULSQ) was the instrument used for data collection. The questionnaire was divided into two sections. Section 'A' contained respondent's personal data of the while section "B" contained questions on the variable used for the study. Each question was measure using modified four-point Likert scale of Strongly Agree (SA) – 4points, Agree (A) – 3points, Disagree (D) – 2points and Strongly Disagree (SD) – 1point for positively worded items and reversed scoring for negatively worded items. It contained eighteen (18) items measuring the variables of the study. Items 1-5 measured user experience, items 6-10 measured library management efficiency, items 11-18 measured the dependent variable artificial intelligence (AI) Usage in library services.

Results and discussion

Hypothesis one

There is no significant impact of user experience on AI usage in library services in secondary schools in Calabar. The independent variable in this hypothesis is user experience while the dependent variable is AI usage in library services. Independent t-test analysis was used for data analysis. The result obtained is presented in table 1.

Table 1: Independent t-test analysis of the impact of user experience and artificial intelligence (AI) usage in library services in secondary schools in Calabar (N=250)

Variables			N	$\bar{X}$	S.D	t-value	r-value
User Experience			110	52.01	7.71		
	9.01	1.972					
AI usage in library services	140	51.92	7.11				

P<.05; t-value = 9.01; df = 248; r-value = 1.972

Analytical results as presented in Table 1 above shows that the calculated t-value of 9.01 is greater than the critical r-value of 1.972 at 0.05 level of significance with 248 degrees of freedom. On this basis, the null hypothesis was rejected while the alternate hypothesis was accepted. The implication of this is that there is a significant impact of user experience and artificial intelligence (AI) usage in library service, suggesting that AI integration in library services will improve user experience in secondary schools in Calabar, Cross River State, Nigeria.

Hypothesis two

There is no significant impact of library management efficiency and AI usage in library services in secondary schools in Calabar. The independent variable in this hypothesis is library management efficiency while the dependent variable is artificial intelligence (AI) usage in library services. Independent t-test analysis was used for data analysis. The result of this analysis is presented in table 2.

Table 2: Independent t-test analysis of the impact of library management efficiency and artificial intelligence (AI) usage in library services in secondary schools in Calabar (N=250)

Variables	N	$\bar{X}$	S.D	t-value	r-value
Library management efficiency	121	53.00	7.91		
	7.91	1.972			
AI usage in library services	129	51.81	7.31		

P<.05; t-value = 7.91; df = 248; r-value = 1.972

Analytical results as presented in Table 2 above shows that the calculated t-value of 7.91 is greater than the critical r-value of 1.972 at 0.05 level of significance with 248 degrees of freedom. On this basis, the null hypothesis was rejected while the alternate hypothesis was upheld. The implication of this is that there is a significant impact between library management efficiency and artificial intelligence (AI) usage in library service. It will foster collaboration between librarians, students and AI developers to ensure that AI-powered library services meet user needs and expectations in secondary schools in Calabar, Cross River State, Nigeria.

Discussion of findings

The finding obtained from analysis of data and testing of hypothesis one in this study showed that the null hypothesis was rejected. The implication of this is that there is a significant impact of user experience and artificial intelligence (AI) usage in library service, suggesting that AI integration in library services will improve user experience in secondary schools in Calabar, Cross River State, Nigeria.

The finding of this study is in agreement with that of Saidu (2023) that AI has become a game-changer in the world of libraries, transforming traditional operations and enhancing user experiences. Adetoun (2021) also found that AI can help students summarize large amounts of text like long articles, research papers, or social media ideas and make them understand without having to read through. Uduak et al. (2023) supported by emphasizing that the growing significance of AI in academic libraries, is potential to revolutionize user experiences while underscoring the critical importance of addressing ethical and user-centric concerns in its implementation. Tripathi and Tripathi (2024) collaborated that attaching the potential of AI, libraries can improve user experience and increase the efficiency of library services.

The finding obtained from analysis of data and testing of hypothesis two in this study showed that the null hypothesis was rejected. This implied is that there is a significant impact between library management efficiency and artificial intelligence (AI) usage in library service. It will foster collaboration between librarians, students and AI developers to ensure that AIpowered library services meet user needs and expectations in secondary schools in Calabar, Cross River State, Nigeria.

The finding of this study is in agreement with that of Chemulwo and Sirorei (2020) noting that AI-driven revolution has transformed information management, empowering libraries to deliver more efficient and effective services. Also, in support of this, Patra (2025) pointed that AI is revolutionizing library operations by improving user interaction, material discovery, and staff problem-solving. AI has the potential to enhance library services, drive innovation, and support intelligent decision-making. Despite challenges like ethics and budget constraints, AI adoption can lead libraries towards a more dynamic and inclusive future. The finding also collaborated with that of Palve and Arora (2025) that AI-powered library management systems can enhance book cataloging, user management, and resource tracking, providing a seamless experience for librarians and patrons.

Conclusion

The study aimed to evaluate and present results perceived impact of artificial intelligence (AI) usage on library services in secondary schools in Calabar, Cross River State, Nigeria. The findings from analysis of data and testing of hypotheses in the study revealed that there was a significant impact of user experience and library management efficiency on artificial intelligence (AI) usage in library services in the study area. Though, the perceived impact of Artificial Intelligence (AI) usage on library services in secondary schools can be significant, potentially transforming the way libraries operate and provide services to students. AI can enhance service efficiency, provide personalized user

services, improve resource management, and offer 24/7 availability. Successful implementation will depend on careful planning, stakeholder engagement, and ongoing evaluation.

Recommendations

Based on the finding obtained from analysis of data and testing of hypothesis in the study, the following recommendations are made:

1. School management should prioritize AI tools that enhance user experience, such as personalized recommendation systems, voice assistants, or automated reference services to boost student engagement and satisfaction.
2. The management should implement AI-powered management platforms to automate cataloguing, track usage patterns, and optimize resource allocation. This will not only improve efficiency but also create a data-driven environment for future innovations.

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