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Assessing the influence of artificial intelligence (AI) on library services and users' experience in the university library

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Abstract

Artificial intelligence (AI) is one of the most recent digital innovations in this information age, and its *advent has transformed how libraries perform their operations worldwide. However, despite the growing adoption of Artificial intelligence to transform library operations, assessing its effect on library services and user experience in the university library is infrequent. This study, therefore, assesses the influence of artificial intelligence (AI) on library services and users' experiences in the university library. The study aims to know the extent of the influence of AI on library services in the university library and to investigate 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. Based on the findings, the study concludes that AI influences library services and users' experience in the university library. Therefore, the study recommends that all university libraries should be encouraged to integrate AI in their respective library to enhance effective library services and improve users' experiences.*

Keywords: Artificial Intelligence, Library Services, University Libraries, Library Staff, Users' Experience

Introduction

Globally, Artificial intelligence (AI) has revolutionised how information services are delivered in libraries. In the past, libraries and informational centres were viewed as storehouses of physical books and fountains of printed knowledge. Presently, libraries are becoming relevant in response to the digital revolution as they are advancing technologically to meet the changing needs of their patrons. AI-powered systems have renovated library processes by improving accuracy, productivity, and user engagement services. Artificial intelligence (AI) is fundamentally shifting the library landscape and transporting in a new age of proficiency and innovation. As regards this, Tella (2020), suggested that in this information age, academic libraries should leverage library services with AI to improve the services provided for their users.

Artificial intelligence (AI) is a disruptive force in the contemporary digital uprising that mimics human aptitude through programming. Jakhar, and Kaur, (2020), define AI as a part of computer science devoted to the development of structures doing tasks that naturally demand human intellect. Artificial intelligence (AI) is designed to carry out learning, problem-solving, perception, and decision-making tasks. Artificial intelligence (AI) provides answers to enduring problems and potentially transforms the way libraries function and engage with their communities. The access, distribution, organisation, and dissemination of information have all experienced extensive changes because of artificial intelligence. Artificial intelligence, according to Sridevi and Shanmugam (2017), is the cutting-edge technology that runs the digital library. AI in libraries is transmuting the existing by improving user experience, efficiency, and technological evolutions in library services.

According to ALA, (2019), large collections of information can be made available and organised in libraries with the help of artificial intelligence. Libraries that use AI tools can adjust to the ever-changing information landscape and offer users more resources and improved experiences. Artificial intelligence (AI) allows libraries to exhibit a dynamic fusion of traditional and innovative approaches as they can reinvent users' experiences, restructure services, change how people access and engage with information, and establish themselves as key players in the digital age. Arlitsch and Newell, (2017) stressed that AI is one of the most recent digital renovations that can be used in academic libraries more conveniently to provide services that satisfy patrons with changing library services.

The study aims to assess the extent of the influence of AI on library services and to investigate how AI affects users' experience in university libraries, providing valuable insights for librarians, administrators, and stakeholders. Despite the growing adoption of Artificial intelligence to transform library operations, assessing its effect on library services and user experience is infrequent. However, various scholarly investigations have been carried out on the adoption and challenges of AI in university libraries but there is a dearth of empirical studies assessing its influence on library services and user experience in Nigerian university libraries. Consequently, this study aims to assess the influence of Artificial Intelligence (AI) on library services and users' experience in the federal university library, in Ondo State, Nigeria.

Research Questions

1. What is the extent of the influence of AI on library services in the university library?
2. How does AI affect user experience in academic libraries?

Literature Review

Artificial Intelligence (AI) and Library Services

Artificial intelligence (AI) in libraries is experiencing an attractive revolution in how libraries function and provide services. AI in libraries is transforming the current by enhancing user experience, efficiency, and technological advancements in library services. Artificial intelligence is important for libraries because it can be used to organize and make large collections of information available (ALA, 2019). It was proved by Ali and Haider, (2016); Arlitsch and Newell, 2017) that technologically, library services are improving. Artificial Intelligence is automating routine tasks like circulation services, inventory management, and cataloguing and classification. This automation maintains consistency in resource organization and improves operational efficiency while also lowering costs for library systems. When AI is used for routine tasks, librarians' manual labour is reduced, freeing them to take on more strategic and interactive roles. According to Shohana (2016), expert systems and artificial intelligence will enhance library services, lower the incidence of human errors and defects, and most likely complete tasks more quickly than a human could do.

Artificial Intelligence can be used by libraries to improve accessibility for different user groups. Echedom and Okuonghae, (2021) concluded in their study that information services could be improved by AI and a new level of efficiency could be provided as well. To guarantee equal access to information, voice-activated interfaces, AI-guided navigation for individuals with disabilities, and inclusive design principles will become essential elements of library services. The study conducted by Yusuf, Adebayo, Bello, and Kayode (2022) reveals that the adoption and use of AI in libraries will give room for better information processing, and better information search that will motivate both library staff and users, subsequently, allowing easy and fast access to information. Artificial Intelligence empowers libraries to provide tailored services according to user habits and inclinations. Likewise, the study by Thalaya and Puritat (2022) showed that using AI saves librarians' time in responding to users' queries and, consequently, increases students' satisfaction. Consequently, enhances the library services management. Asemi and Asemi (2018) opined that language barriers can be lessened by using natural language processing. The presence of Natural Language Processing systems in their libraries can help international students comprehend and translate language. For example, studying in China requires knowledge of Chinese. A more engaging and user-friendly experience is produced by virtual assistants and Chabot, which lead users through the library's resources, respond to questions, recommend pertinent materials, and provide personalized recommendations.

Moreover, artificial intelligence AI helps libraries gain insights into user behaviour, resource usage, and library performance through data analytics. Libraries can better allocate resources, provide services, and adapt to changing user needs by using data-driven decision-making. Arlitsch and Newell, (2017) stressed that AI is one of the most recent digital renovations that can be used in academic libraries more conveniently to provide services that satisfy patrons with changing library services. Hayani et al. (2021) also approved that when AI is appropriately used, it enhances the decision-making process in the library as well as enhances users' output, solving multifaceted problems and precisely accomplishing tedious routines. AI is currently assuming a crucial role in the preservation and conservation of rare and delicate materials through AI-driven methods. The longevity of priceless library collections can be ensured by automated systems with artificial intelligence that monitor environmental conditions, spot deterioration, and suggest preventive actions. Harisanty et al. (2023) examined using artificial intelligence in libraries and the results show that AI could easily be used for administration of

library services such as staffing, technical services (cataloguing and classification), and information services (reference and circulation). Libraries can use AI to predict user needs and trends in information consumption by using predictive analytics. Libraries can proactively curate collections that align with future demand, optimize resource allocation, and ensure relevance, diversity, and satisfaction by analysing data on borrowing patterns, user preferences, and emerging trends.

Artificial Intelligence (AI) and Users' Experience

Artificial intelligence in libraries significantly improves users' experience by increasing the accessibility, effectiveness, and user-friendliness of library services. Faster and more precise information retrieval as well as smoother interactions with virtual assistants are advantages for users. According to Chandwani (2018), 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. Adetayo (2023) opined that artificial intelligence tools have become essential tools for academic libraries as they offer quick and accurate responses to user investigations, offering accessibility to library resources outside the library wall. Likewise, Johnson, (2018) affirmed that artificial intelligence offers quick answers to users' questions and saves users' time in the library to do their research These enhancements create a more enjoyable and engaging library experience, which increases patron satisfaction and loyalty. Search engines and recommendation systems driven by artificial intelligence have completely changed how people find and access information. AI tools improve the effectiveness of access to information and the overall search experience. Users' preferences, search patterns, and content relevance are analysed to provide more precise and personalized search results. According to Adetoun (2021), AI can help students summarise large amounts of text like long articles, research papers, or social media ideas and make them understand without having to read through.

To provide extremely customised user experiences, libraries can make use of machine learning algorithms. By analysing user interactions, reading habits, and preferences, AI can suggest resources that are specifically suited to each user, resulting in a more personalized approach to information access. According to Johnson (2018), when artificial intelligence can quickly answer a question, library patrons won't have to spend hours using the computers in the library to do their research. Furthermore, when artificial intelligence can provide a better

response in a shorter amount of time, customers would not visit a human librarian for information needs. Moreover, Romero (2018) opined that library users could discover new content they might not have otherwise discovered and search and retrieve new media more effectively and efficiently with the help of artificial intelligence. Users can get real-time help from chatbots and virtual assistants that are powered by AI. AI-powered smart assistants could make information access smoother and more user-friendly by offering real-time information, responding to questions, and directing users through library resources. AI tools improve users' interactions and increase accessibility to library services by offering personalised references, guiding users through library resources, and responding to questions. Chatbots can offer tailored references based on a user's search history and preferences. Also, libraries can allocate resources more efficiently based on user demand and trends by utilizing AI-driven analytics. This guarantees effective use of resources, improving the collection's relevance and accessibility within the library. More so, by analysing user interactions, reading habits, and preferences, AI can suggest resources that are specifically suited to each user, resulting in a more personalized approach to information access.

In addition, digital assistants and intelligent agents may work together in libraries to offer seamless services to users. Users can obtain information with ease when library resources are integrated with AI-powered personal assistants or smart speakers, obscuring the distinction between regular digital interactions and library services. Ex (2019) claims that artificial intelligence in libraries has the potential to increase research productivity among library users by making research more discoverable. AI-driven chatbots and virtual assistants offer help around the clock, eliminating schedule restrictions and guaranteeing that users can get information and support whenever they need it. This is affirmed by Suryakanth and Prashant (2023), that libraries can offer round-the-clock customer service by chatbots and assist patrons in swiftly and easily discovering the information they require. AI-powered natural language processing (NLP) improves the search experience by making it more intuitive and user-friendly. Asemi and Asemi (2018) opined that language barriers can be lessened by using natural language processing. The presence of Natural Language Processing systems in their libraries can help international students comprehend and translate language. For example, studying in China requires knowledge of Chinese.

Methodology

A descriptive survey research design was used for the study. The population for the study was 193 comprised of the library staff and library users in the Federal University of Technology, Akure, Ondo State, Nigeria. The library staff were 36 and the library users were (157). The library staff used were Librarians, Library officers, and Library Assistants. While the library users were registered university staff and postgraduate students. The entire population was used for the sample size. Two structural questionnaires were used to collect data for this study. The first questionnaire was administered to the library staff based on the extent of the influence of AI on library services in the university library. The second questionnaire was administered to the library users based on the effects of AI on user experience. The first questionnaire was measured on four Likert- Scale of measured on four Likert- Scale of measured on four Likert- Scale of Very High Extent, High Extent, Low Extent, and Very Low Extent. The second questionnaire was measured on four Likert- Scale of SA=Strongly Agree, A=Agree, D=Disagree, and SD=Strongly Disagree. One hundred and sixty-one (161) responses were retrieved out of 193 copies of the questionnaires administered. Thirty-four responses were from the library staff and 127 library users. Descriptive statistics tools were used to analyse the data using SPSS version 23.

Table 2:

Demographic Characteristics of the Respondents

	Frequency	Percentages
Gender:		
Female	54	33.54 %
Male	107	66.46%
Total	**161**	100
Library Staff:		
Librarians	8	4.98%
Library Officers	13	8.07%
Library Assistants	13	8.07%
Library Users:		
Academic Staff	26	16.15%
Non-Academic Staff	15	9.32%
PhD **Students**	27	16.77%
Master **Students**	39	24.22%
PGD **Students**	20	12.42%
Total	**161**	**100**

Table 2 reveals the demographic distribution of respondents. Responses on gender revealed that 107 (66.46%) were male, while 54 (33.54 %) were female. This shows that there were more male participants in the study than female participants. The Table also revealed the number of library staff who answered questions on the impact of AI on library services. Librarians were 8 (4.98%); while library officers and library assistants were 13 (8.07%) respectively. We also discovered from Table 2 the frequency of library users that answered the questions on the effect of AI on users' experience. Academic staff 26 (16.15%); Non-academic staff 15 (9.32%); PhD students 27 (16.77%); Master students 39 (24.22%); and PGD students 20 (12.42%). This shows that academic staff use the library more than non-academic staff. Also, among the postgraduate students that use the library, Masters' students take the largest proportion followed by PhD students.

Results

RQ1: What is the extent of the influence of AI in library services in the university library?

Table 3:

Mean and Standard Deviation of the Extent of the Influence of Artificial Intelligence in Library Services in University Library

S/N	Library Services	Mean	Standard Deviation
1	Artificial intelligences are used to automate routine tasks in the library.	3.03	.810
2	Artificial intelligence helps libraries in advanced data analytics for decision-making.	2.97	1.055
3	Artificial intelligence empowers libraries to provide tailored services to users.	3.39	.871
4	Artificial intelligence makes the cataloguing and classification of books	3.22	.637
5	AI is used to predict user needs and trends in	2.33	1.042

	information consumption by using predictive analytics.		
6	Artificial intelligence in libraries facilitates global knowledge e-sharing by streamlining resource sharing,	3.11	1.036
7	Artificial intelligence tools are used by libraries to improve accessibility for different groups of users.	3.03	.810
8	Artificial intelligence in circulation service helps in charging and discharging of books	3.31	.856
9	Artificial intelligence in reference service helps to provide quick answers to users' equerries	2.97	.845
10	Artificial intelligence in the library made information available to a wider audience.	3.50	.697
	Grand Mean	**3.09**	
	Criterion Mean	**2.50**	

Table 3 revealed that the extent of the influence of AI on library services in the university library is very high ($\bar{x}$= 3.09) against the criterion mean ($\bar{x}$= 2.50). According to library staff responses, artificial intelligence in the library makes information available to a wider audience ($\bar{x}$= 3.50); artificial intelligence empowers libraries to provide tailored services to users ($\bar{x}$= 3.39); artificial intelligence in circulation service helps in charging and discharging of books ($\bar{x}$= 3.33); artificial intelligence made the cataloguing and classification of books easy ($\bar{x}$= 3.22); and artificial intelligence in libraries facilitates global knowledge e-sharing by streamlining resource sharing ($\bar{x}$= 3.11); artificial intelligence in reference service helps to provide quick answers to users' equerries, and artificial intelligence allows libraries in advanced data analytics for decision-making ($\bar{x}$= 2.97) respectively. The least was that AI is used to predict user needs and trends in information consumption by using predictive analytics ($\bar{x}$= 2.33).

RQ2: How does AI affect the users' experience in the library?

Table 4:

Mean and Standard Deviation of Artificial intelligence and users' experience in university library

S/N	Users' Experience	Mean	Standard Deviation
1	Artificial intelligence provides more precise and personalized search results	2.82	1.171
2	Artificial intelligence increases accessibility to library services by providing personalized recommendations	2.80	1.141
3	Artificial intelligence increases users' satisfaction.	2.87	1.115
4	New contents are discovered and retrieved more effectively and efficiently with the help of artificial intelligence	2.68	1.147
5	Artificial intelligence guides users through library resources	2.72	1.161
6	Artificial intelligence offers round-the-clock customer service	2.70	1.049
7	Artificial intelligence enhances the efficiency of information access and the overall search experience	2.76	1.006
8	Artificial intelligence provides an opportunity to access library resources anywhere without a library wall.	2.78	1.076
9	Artificial intelligence improved information retrieval by making research more discoverable.	2.94	.986
10	Artificial intelligence helps users to know the available resources in the library according to the subject area.	2.94	1.075
	Grand Mean	**2.80**	
	Criterion Mean	**2.50**	

Table 4 reveals that the effects of artificial intelligence on users' experience in the library is high ($\bar{x}$= 2.80) which is higher than the criterion means ($\bar{x}$= 2.50). The greater effects according to users' responses are artificial intelligence helps users to know the available resources in the library according to the subject area and increases research productivity by making research more discoverable. ($\bar{x}$= 2.94) respectively; followed by artificial intelligence increases users'

satisfaction. ($\bar{x}$= 2.87); Artificial intelligence provides more precise and personalized search results ($\bar{x}$= 2.82); Artificial intelligence increases accessibility to library services by providing personalized recommendations ($\bar{x}$= 2.80); and Artificial intelligence provides an opportunity to access library resources anywhere without a library wall ($\bar{x}$= 2.78). New contents are discovered and retrieved more effectively and efficiently with the help of artificial intelligence had the least mean ($\bar{x}$= 2.68) and still higher than the criterion mean

Discussion of Findings

The responses from the library staff revealed that the extent of the influence of AI on library services was high. The findings of this study corroborate the studies of Ali and Haider, (2016), and Arlitsch and Newell, (2017) who affirmed that technology advances are improving library technical services and user services. This study is also in line with the submission of Sivarajah et al. (2017) that the use of AI in academic libraries gives room for improved dataset analysis as well as reduced repetitive and tedious tasks. Hayani et al. (2021) emphasised that when AI is appropriately used, it enhances the decision-making process in the library as well as enhances users' output, solving multifaceted problems and precisely accomplishing tedious routines.

The study equally revealed that AI in the library improved users' experience with a mean higher than the criterion means. The library users attested in their responses that artificial intelligence improved information retrieval by making research more discoverable; it enhances the efficiency of information access and the overall search experience, among others. This finding aligns with the submission of Romero (2018) that, library users could discover new content they might not have otherwise discovered and search and retrieve new media more effectively and efficiently with the help of artificial intelligence. Similarly, Yusuf, Adebayo, Bello and Kayode (2022) stressed that the use of AI in libraries would give room for better information processing and retrieval, consequently, motivating both library staff and users. Arlitsch and Newell, (2017) concluded in their study that in these digital renovations, AI is one of the most useful technologies that academic libraries can use more conveniently to deliver services that satisfy patrons.

Conclusion and Recommendations

The study assessed the influence of artificial intelligence (AI) on library services and users' experience in the university library. The study showed that the extent of the influence of AI on library services is high. The study highlighted different areas in which library services have been improved using AI. These include automation of routine tasks in the library, advanced data analytics for decision-making, availability of information to a wider audience, charging and discharging of books in circulation service, and so on. Furthermore, the study reported that the effect of AI on users' experience is high. It helps users to know the available resources in the library according to the subject area, it increases research productivity by making research more discoverable. The study concludes that AI influences library services and library users' experience. Based on the findings of the study, it is recommended that all university libraries should be encouraged to integrate AI in their respective library to enhance library services and improve users' experience.

References

Adetayo, A. J. (2023). Artificial intelligence chatbots in academic libraries: The rise of ChatGPT. *Library Hi Tech News,* 40(3), 18–21. https://doi.org/10.1108/LHTN-01- 2023-0007

Adetoun A. O. (2021). AI and Libraries: Trends and Projections. *Library Hi Tech News* 38 (10) 1–4, https://doi.org/10.1108/LHTN-10-2021-0079.

American Library Association (2019). Artificial Intelligence. Retrieved from: http://www.ala.org/tools/future/trends/artificialintelligence/

Ali MY, Haider K (2016) An analysis of digital reference services tools and usage in university libraries of Karachi. Pakistan Library & Information Science Journal 47(1): 20–29

Ali, M. Y., Naeem, S. Bin, & Bhatti, R. (2020). Artificial intelligence tools and perspectives of university librarians: An overview. *Business Information Review,* 37(3), 116–124. https://doi.org/10.1177/0266382120952016

Arlitsch, K., & Newell, B. (2017). Thriving in the Age of Accelerations: A Brief Look at the Societal Effects of Artificial Intelligence and the Opportunities for Libraries. *Journal of Library Administration.* 57(7), 789–798.

Asemi, A., & Asemi, A. (2018). Artificial intelligence (AI) application in library systems in Iran: A taxonomy study. *Library Philosophy and Practice (e-journal).* http://digitalcommons.unl.edu/libphilprac/1840/

Chandwani, A. (2018). An overview of Digital Reference Services. eprints.rclis.org. http://eprints.rclis.org/14295/1/Digital_Reference_Services.pdf

Echedom, A. U., & Okuonghae, O. (2021). Transforming academic library operations in Africa with artificial intelligence: Opportunities and challenges: A review paper. *New Review of Academic Librarianship,* 27(2), 243–255. https://doi.org/10.1080/13614533.2021.1906715

Ex Libris. (2019). How AI can enhance the value of research libraries. : www.libraryjournal.com/?detailStory=how-ai-can-enhance the-value-of-research-libraries

Harisanty, D., Anna, N. E. V., Putri, T. E., Firdaus, A. A., & Noor Azizi, N. A. (2023). Is adopting artificial intelligence in libraries urgent or a buzzword? A systematic literature review. *Journal of Information Science,* 01655515221141034. https://doi.org/10.1177/01655515221141034

Hayani, A., Sari, E. A., & Sukiman. (2021). Artificial intelligence librarian as promotion of iain lhokseumawe library in the revolutionary Era 4.0. Journal of Robotics and Control (JRC), 2(2), 88–93. https://doi.org/10.18196/jrc.2258

Jakhar, D. & Kaur, I. (2020). Artificial intelligence, machine learning and deep learning: definitions and differences. *Clinical and Experimental Dermatology* 45: 131–132.

Johnson, B. (2018). Libraries in the age of artificial intelligence. Information Today, Inc. http://www.infotoday.com/cilmag/jan18/Johnson--Libraries-in-the-Age-of-Artificial-Intelligence. shtml

Romero, V. (2018). 4 ways libraries can improve with AI & big data. Tech Soup Canada. From: https://www.techsoupcanada.ca/en/community/blog/4-wayslibraries-can-improve-with-ai-big-data. (Retrieved 6th October, 2023).

Shohana. (2016). AI, Robot and Library: A new dimension in LIS. https://shohanasite.wordpress.com/2016/12/04/ai-robot-and-librarya-new-dimension-in-lis/

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of big data challenges and analytical methods. *Journal of Business Research,* 70, 263–286. https://doi.org/10.1016/j.jbusres.2016.08.001

Sridevi, P. C., & Shanmugam, A. P. (2017). Artificial intelligence and its applications in Libraries. In E-Resources Management. https:// www.researchgate.net/publication/327831852_Artificial_Intelligence_and_its_ applications_in_Libraries

Suryakanth H. & Prashant M. (2023). Use of Artificial Intelligence (AI) Technology Futures in Library; *International Journal of Research in Library Science (IJRLS)* 9 (2), P14-19, ISSN: 2455-104X DOI: 10.26761/IJRLS.9.2.2023.1642

Tella, A. (2020). Robots are coming to the libraries, are librarians ready to accommodate them? *Library Hi Tech News,* 37(8), 13–17. https://doi.org/10.1108/LHTN-05-2020-0047

Thalaya, N., & Puritat, K. (2022). BCNPYLIB CHATBOT *The artificial intelligence Chatbot for library services in the College of Nursing.* Joint International Conference on Digital Arts, Media and Technology with ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering (ECTI DAMT & NCON), 247–251. https://doi.org/10.1109/ECTIDAMTNCON53731.2022.9720367

Yusuf, T. I., Adebayo, O. A., Bello, L. A., & Kayode, Joseph O. (2022). Adoption of artificial intelligence for effective library service delivery in academic libraries in Nigeria. *Library Philosophy and Practice (e-journal).* 6804. https://digitalcommons.unl.edu/libphilprac/6804