Awareness and Adoption of Artificial Intelligence for Effective Service Delivery in Academic Libraries in Kwara State, Nigeria

[1]Abdulsalam A. Salman; [2]Yahaya Aliyu Ismaila; [3]Florence Olabisi Ajani
[1]University Librarian, Kwara State University Library; [2]Kwara State University Library, Head of E-Library; [3]Deputy University Librarian, Kwara State University Library

Abstract
Artificial intelligence (AI) is one of the important emerging trends in information technology and is slowly being implemented in academic libraries in Kwara state, Nigeria. The researchers presented a brief strengths, weaknesses, opportunities and challenges of the application of AI in libraries. This study also explored the different artificial intelligence (AI) applications used in academic libraries and the key factors and impediments related to their implementation. The author applied quantitative research methods in the form of a questionnaire, using both open and closed questions. A total of 100 valid questionnaires were received from academic librarians and university Librarians. The sample data were collected in the five selected libraries therefore, the data may only represent the views academic librarians on AI applications. The results of this study may not apply to librarians worldwide; however, they may provide a useful reference. The results revealed the top four AI applications that libraries would most likely implement in the near future.

Keywords: *Artificial Intelligence (AI), Academic Library, Robotics, Machine Learning (ML), Deep Learning (DL), Reinforcement Learning (RL), Information Technology (IT)*

Introduction
The term "artificial intelligence" (AI) was first used in 1956 at a conference in Dartmouth by John McCarthy, who defined it as "the science and engineering of making intelligent machines." In a sense, AI is a method of getting machines to function and behave like humans. The creation of machines and robots used in a variety of industries, such as healthcare, robotics, marketing, business analytic, and many more, has recently enabled AI to achieve this. However, many applications are not perceived as AI because user often tend to think of AI as robots doing our daily routine, but the truth is AI has found its way into our daily lives; it has become so general that user does not realize that they use it all the time. People often tend to think that AI, machine learning (ML), deep learning (DL) and reinforcement learning (RL) are the same concepts as they have common applications. Libraries are regarded as service oriented organizations and have been altered by advanced technologies in the era of modern day's Information Technologies (Pavel Hamet 2017). The growing demands of library users have compelled the librarians to improve in their service delivery mechanism. Hussain (2022) reported that these new technologies have changed teaching and learning attitudes; for this reason, the latest digital technology-driven service innovation promotes a new teaching and research paradigm (Walter and

Lankes, 2015). This has compelled librarians to seek new and innovative technologies to maintain the user experiences of their libraries. Librarians are change agents of modern and advanced technologies and have long been responding to current technologies that improve their services. Initially, library automation and digitization were just two components that expanded its workflows and library services (Hussain, 2022) The past two decades have shown tremendous changes in library services and in such advancement, the role of artificial intelligence (A1) remained remarkable. AI has become an indispensable tool for improving organizational efficiency and productivity. It is astounding that AI technologies have strongly influenced many libraries in the 21st century. AI in library services will provide access to accurate information in the age of information explosion and be a helpful tool for the organic integration of readers and libraries. Using AI in library services will give library practitioners and patrons momentum. Readers will interact on the same platform and gain access to humanized services at a reduced cost.

A few scholars, like Hussain (2020), observed that in developing countries, most librarians are still unaware of deploying AI in their libraries. Perhaps this might be because of a low awareness level or the heavy budget required for implementing AI in library services. Lack of research linking AI to librarianship is another reason why AI is not used in library services. Some libraries have implemented AI partially, like virtual reference chatbots that use machine learning as a subtype of AI. Through these services, a librarian can answer its patron regarding library queries (Arora et al., 2020). Similarly, Zimmett (2020) noted that some libraries use its partial application, like virtual assistance, which can be used to answer the patron. This paper will look into the awareness and adoption of AI in the selected academics libraries in kwara state and make recommendations for widespread acceptance of AI in Libraries. There is low awareness of AI in our libraries and thorough a critical analysis of the advantages of AI some of the selected libraries that does not adopt or unaware of the numerous value of AI will have to kick start it while those that have it in place will improve in the usage.

Literature Review

As computer science and digital technology advance, we will eventually live in a technological world where machines are increasingly built to satisfy human requirements while also getting smarter. (Moreno-Guerrero et al., 2020) One of them is artificial intelligence (AI). According to Kaplan and Haenlein (2018), AI is the ability for a system to read and correct external input, learn from it, and utilize it to do certain tasks and duties through flexible adaptation. The rapid advancement of AI in recent years (Ma et al., 2019) suggests that it will likely rank among the most valuable technologies in the years to come (Chai et al., 2020). AI has substantially advanced library services since 1871, significantly impacting society's developmental activities (Majumdar and Chattopadhyay, 2020). As a leading disruptive technology, AI has penetrated various sectors, including medical science, education, finance, agriculture,

industry, and security (Jha et al., 2019). Understanding AI techniques and applications can help management reduce decision-making time and accomplish a wide range of tasks. AI's potential for organizational benefit is significant (Brynjolfsson et al. 2019) AI talk about a programmed system's ability to execute responsibilities generally linked with human beings, like the capacity to reason, realise the meaning, take an all-encompassing view or learn from previous experience (Van Dyk and Van Belle, 2019). Di Vaio et al. (2020) observe that AI technologies in the food industry can gather and process data from hundreds of different ingredients as they transfer on a conveyor belt. This action helps to reduce labour, costs and food waste. The reduction in the production process helps conserve food, increase the cleanness of production sites, and freshen up more processing tools fast. AI has shown abundant prospects to transform the manufacturing field through innovative analytic tools for processing the enormous volumes of manufacturing data produced. For instance, AI has been used to forecast material properties and experimental outcomes in a bit of time spent through conventional approaches (Ulas, 2019; Arinez et al., 2020).

Several studies have been conducted on AI in libraries, including empirical research, conceptual papers and literature review papers. Papers were collected from the Scopus database, Web of Science and Google Scholar in 2020 using the keywords "Artificial Intelligence and Library."

Data Presentation and Analysis

Introduction

This research looked into the awareness and adoption of Artificial Intelligence for effective service delivery in selected academic libraries in Kwara state. Thus, the data collected is analyzed using simple percentage method with a total of one hundred and six (106) Questionnaires that was gathered. The simple percentage method was used in analyzing the personal data.

This would make the result clear and precise in each table represents an aspect of the result obtained from the questionnaire received. The data will be presented and analyzed as follows

Table 1. Gender

Gender	Frequency	Percentage
Male	91	85.8
Female	15	14.2
Total	106	100%

Table 2

Age variations of the respondents

Age	Frequency	Percentage
21-30	24	22.7
31-40	48	45.3

40-50	20	18.7
50 and above	14	13.3
Total	106	100%

Table 3: Level of Education

Education	Frequency	Percentage
BLS/BLIS	60	56.6
MLS/MLIS	12	21.7
PHD	19	17.9
Others	4	3.8
Total	106	100%

Table 4: Institutions of the respondents

Institutions	Frequency	Percentage
Kwara State University	48	45.2
University of Ilorin	10	9.4
Al-Hikmah University	26	24.5
Summit University	11	10.4
Landmark University	11	10.4
Total	106	100%

Table 5: Positions/Status

Positions	Frequency	Percentage
University Librarian	1	0.9
Deputy University Librarian	2	1.9
Principal librarian	4	3.8
Senior Librarian	30	28.3
Librarian I	25	23.6
Librarian II	22	20.7
Assistant librarian	16	15

Table 6: How do you understand the concept of AI in the library?

Options	Frequency	Percentage
AI has a positive effect on your life	38	35.8
AI has a positive effect on your work	26	24
Our job might be replaced by AI in the future	16	15
The implementation of AI could improve some work in your life	16	15
I often use AI technology in everyday life	10	9.4
Total	106	100%

Table 7: Which of the following AI application have you adopted in your library?

Options	Frequency	Percentage
Robots	-	-
Chabot's	35	33.2
Telepresence	17	16.2
Beebot	11	10.4
Cobots	17	16.2
Pepper	12	11
None of the above	14	13.2
Total	106	100%

Table 8: Which of the following AI applications that you have adopted in your library.

Options	Frequency	Percentage
Guide robot for the library	5	4.7
Automatic indexing and classification	12	11.3
Natural language processing	20	18.9
Intelligent data analysis	14	13. 1
Virtual reference librarians	35	33. 1
Facial recognition for checking	5	4.7
Intelligent applications	6	5.7
Book security detecting	9	8.5
Total	106	100%

Table 9: Impediments to promoting AI in academic libraries?

Options	Frequency	Percentage
Lack of technological resources	10	9.4
Lack of financial resources	31	29.2
Libraries are concerned about job loses	9	8.5
AI endangers data and date privacy	12	11.3
Unskilled library staff to operate	14	13.2
All of the above	30	28.3
Total	106	100%

Table 10. Does artificial intelligence influence library services?

Influence	Frequency	Percentage
Yes	106	100
No	-	-
Total	106	100%

Table 11: What are the influence of artificial intelligence on library service?

Options	Frequency	Percentage
Attending to library quarries	32	30.2
Handling references services in the library	10	9.4
Handling indexing and abstracting	7	6.6
Handling cataloguing and classification	18	16.9
Assist in monitoring theft in the library	15	14.2
All of the above	24	22.7
Total	106	100%

Table 12: Will you prefer your library to adopt artificial intelligence?

Preference	Frequency	Percentage
Yes	91	85.8
No	15	14.2
Total	106	100%

Table 13: If yes what is your level of readiness for the adoption?

Options	Frequency	Percentage
Beginning stage	38	40.3
About to start	-	-
Concluding stage	40	48.3
Not in plan	28	11.3
Total	106	100%

Table 14: What are they difficulties face in your libraries that could hinders the adoption of AI?

Options	Frequency	Percentage
Lack of financial resources	32	30.2
Human resource problem	19	17.9
Unskilled library staff	10	9.4
Internet	10	9.4
Electricity	13	12.3
All of the above	22	20.8
Total	106	100%

Discussion of Findings

The demographic distribution of the respondents for this study revealed that 91(85.8%) of the respondents are male while 15(14.2%) of the respondents are female. Therefore, the highest number of the respondents are males. The distribution of the respondents based on age showed that 22.7% of the respondents are within the age range of 21-30 years, 45.3%, 18.7% and 13.3% fell within the age ranges of 31-40 years, 40-50 years and 50 years and above respectively. Sixty respondents holds BLS/BLIS degree while 23(21.7%) and 19(17.9%) hold MLS/MLIS and PhD degrees.Therefore, the highest numbers of the respondents are BLS/BLIS holder.

The results further revealed that 48(45.2 %) of the respondents are from KWASU, while 10 (9.4%) of the respondents are from University of Ilorin, while 26(24.5%) are from Al- Hikmah, University. Also, 11(10.4%) are from Summit University and 11(10.4%) from Landmark University respectively. Therefore the highest numbers of respondent are from KWASU.

Table 5 shows that 1(0.9 %) of the respondents are University librarian, while 2 (1.9 %) of the respondents are deputy university librarian, while 4(3.8 %) are principal librarian, senior librarian are 30(28.3%), librarian I 25(23.6) while, librarian II 22((20.7), 16(15%) are Assistant Liberian, while library officer are 8(7.6%). The highest number of respondents are senior Librarian representing 30(28.3%).

The primary purpose of this study is to examine awareness and adoption of Artificial intelligence in service delivery in selected academic libraries in Kwara State. Table 6 shows that 38(35.8%) of the respondents agree that AI has positive effect on their life, while 26 (24%) of the respondents has it that AI has positive effect on their work, while 16(15%) agrees that their job might be replace in the future. Also, 16(15%) agreed that the implementation of AI could improve some work in their lifes while 10 (9.4%) agreed that they often use AI technology in their everyday lifes. The highest number of respondent representing 38(35.8%) agreed that AI has positive effect on their life.

The results of the study revealed that 35(33.2%) of the respondents uses Chabots, 17(16.2) adopted telepresence, 11(10.4%) uses Beebot, and 17(16.2) adopted Cobots. Therefore the highest number of respondents adopted Chabot's. Moreover, 5(4.7%) of the respondents adopted robot guide in their libraries, while 12(11.3%) of the respondents uses AI for automatic indexing and classification, 20(18.9%) use it for natural language processing,35(33.1%) adopted AI for virtual reference service, 14(13.1%) uses it for intelligent data analysis, 5(4.7%) applied it for facial recognition, 6(5.7%) uses it as an intelligent application, while 9(8.5%) of the respondents adopted it for book security. The highest number of the respondent representing 35(33.1%) adopted AI for virtual reference service delivery.

On the constraints to implementation of AI in libraries, the results showed that 10(9.4%) agreed of the respondents agreed that lack of technological resources is the major impediment to AI implementations, 31(29.2) selected lack of financial resources, 9(8.5%) are concerned about losing their jobs, 12(11.3%) are concerned about data privacy, 14(13.2%) are concerned about unskilled library staff operation problem. The highest number of the responded representing 31(29.2) agreed that lack of financial resources is the major challenge confronting AI implementation in their libraries. Meanwhile, 106(100 %) of the respondents agreed that artificial intelligence influence library services. Consequently, 32(30.2%) of the respondents agreed that AI helps in

attending to library queries, 10(9.4%) goes for handling references services, 7(6.6%) selected handling indexing and abstracting, 18(16.9%) selected handling cataloguing and classification, 15(14.2%) agree that it helps in monitoring theft in libraries, while 24(22.7%) of the respondents selected all of the above which carries highest number of respondents. Furthermore, 91(85.8%) of the respondents will prefer their libraries to adopt artificial intelligence, while 15(14.2%) of the respondents do not want their libraries to adopt artificial intelligence. Also, the results showed that 38(40.3%) of the respondents are at the beginning stage of AI usage, while 40(48.3%) of the respondents are at the skilled stage, and 28(11.3%) are not in readiness for the adoption of AI. The highest percentage representing 38(40.3%) of the respondents are at the beginning stage to adopt AI in their libraries.

Conclusion

The readiness of academic libraries in Kwara State, Nigeria towards the awareness and adoption of AI in their service delivery is nothing to write home about as many of the libraries selected has never implement AI in their various libraries. Many of the libraries were actually aware of AI and the role it plays in service delivery it is a clear indication that libraries in the country are not ready to adopt the use of this technology called AI despite the high benefits they have to offer in library operations. There is an urgent need to educate librarians in Nigeria on this present development that the adoption of AI in the library does not translate to job loss. This is necessary because many librarians believed that the adoption of AI may cost them their jobs. It is a clear indication that university libraries in the country are not ready to adopt the use of this technology despite the high benefits they have to offer in library operations. However, this research will be of relevance to the adoption of AI since many countries in the world have adopted the use of the technology, especially the developed ones. There is an urgent need to educate librarians in Nigeria that the adoption of AI in the library does not translate to job loss but it is a current trend in the library service delivery. This is necessary because many librarians believe that the adoption of technologies may cost them their jobs. Also, from the investigation in this research many libraries faces financial challenges as the major impediment to the implementation of AI in their Libraries. The researcher would want to advise government, University management to support Nigeria libraries to implement new technologies in there service delivery so as to meet with best global practice

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