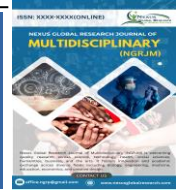




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## Research Article

### Perception and Utilization of Artificial Intelligence (AI) For Effective Service Delivery in University Libraries in Gombe State

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#### ABSTRACT

*The invention of Artificial Intelligence (AI) has greatly enhanced the potential of academic libraries' services. Purpose: This study explores the awareness and perceptions and utilization of AI among librarians in university libraries in Gombe State, Nigeria. Method: It adopted descriptive survey method. The population of this study are 37 professional librarians in university libraries. Census enumeration sampling technique was used to select the respondents. Questionnaire was used to collect data from the respondents, with the support of two research assistants. Data collected was analyzed and presented in frequency, simple percentages and mean (x). Result: Findings revealed that Chatbots and Dynamed are the AI the respondents were aware of. The respondents have the perceptions that AI technologies can be adopted in university libraries, capable of replacing human librarians in future and AI is a positive development for librarians. Findings further indicated that the respondents perceived that AI is beneficial in university libraries because it provides patron-tailored recommendations to items, can reduce manual and repetitive tasks performed by librarians and facilitates the discovery of new knowledge. But the major factors affecting the adoption of AI include poor internet connectivity and lack of expertise among librarians. Conclusion: This study concluded that librarians' awareness of AI influences their perceptions of it. It recommends among others that management of university libraries in Gombe State should train their librarians on AI.*

**Keywords:** Perception; Artificial Intelligence; Gombe State; Perceptions; University libraries.

#### INTRODUCTION

Technological advancements have ushered a pulsating paradigm shift in all dimensions of the daily activities of human endeavor and libraries were not left behind. This can be attested to the fact that libraries of any type are being challenged to be striving towards responding to the trending practices of the century. Today, institutions established for the propagation of access to and dissemination of information in the contemporary times, have been riddled with the tasks of providing enabling

technologies to support research, teaching and learning. The submission above aligns with the claim of Hervieux and Wheatley (2021) that librarians and information practitioners have historically responded to new technological advancements that provide advances in their profession. One of the technological tools that have caused a significant disruption to the operations and services of academic libraries is artificial intelligence (AI). Utilization is the process of making judicious use of something in order to

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satisfy wants or desire. Utilization is important because it directly impacts an organization's productivity, costs, and profitability. Efficiently utilizing resources ensures that the organization gets the maximum output from its investments in personnel, equipment, and materials. This can lead to cost savings and higher profits. On the other hand, under-utilization can indicate wasted resources, while over-utilization can lead to burnout or accelerated wear and tear on equipment. Utilization of AI refers to how efficiently the tools are being used in terms of capacity or time. This process is carried out by librarians and ICT staff (Mosiatic, 2024). Utilization of web-based information management tools in university libraries are the determinant of effective service delivery. Utilization simply means the extent to which people are making use of whatever resources that is already available in the community or an organization. Uzuegbu,

Artificial intelligence (AI) is the progression of computer systems that are capable of executing tasks that normally require human intelligence, such as decision making, object detection, solving complex problems and so on (Mamela, 2023). AI is characterized as the technology that enables machines to be able to have the abilities to plan, learn, reason, solve problems, move and be creative to some extent (Mamela, 2023; Subaveerapandiyam, Sunanthini & Amees, 2023). AI is capable of positively changing the user experience in academic libraries. Hence, academic libraries should consider integrating AI to their services. AI has enormous potential to greatly improve a library's productivity. Memela (2023) argued that academic libraries have been trying to find ways to offer automated services to their users over the years. From the card system to computers, to digitization, to e-books and databases, and even RFID. AI is a rapidly evolving field, changing how librarians interact with technology. It involves the

development of intelligent computers that can perceive, think and behave like humans (Goralski and Tan 2020); Hassani, Silva and Unger (2020); Popenici and Kerr (2017). The four types of AI are reactive AI, limited memory AI, theory of mind AI, and self-aware AI. AI technology in academic libraries has raised the bar for the effectiveness and efficiency of library service delivery, enabling libraries to enhance and offer dynamic services for library users

### **Statement of the Problem:**

The integration of Artificial Intelligence (AI) in academic libraries has gained significant attention due to its potential to enhance service delivery, improve information management, and streamline library operations. However, despite the growing adoption of AI technologies in various sectors, academic libraries face challenges in maximizing their potential for improving services. The perception of AI, particularly among library staff and users, and the extent to which AI tools are being effectively utilized, remain areas of concern. Library professionals and academic institutions are often uncertain about the capabilities of AI, with some perceiving it as a complex or threatening technology, while others may be unaware of the potential applications of AI in library settings. Furthermore, the level of investment in AI tools and systems varies, and there are concerns regarding the integration of AI with existing library management systems, training needs, and the adaptation of staff to new technologies. These factors highlight the need to explore the perceptions of library staff and users towards AI and how these perceptions influence the effective utilization of AI technologies.

Understanding these perceptions, along with identifying barriers to the implementation and use of AI, is crucial for improving service delivery

in academic libraries. There is also a need to investigate how AI can be better utilized to streamline operations, personalize services, enhance resource discovery, and improve user satisfaction in academic libraries. Therefore, this study aims to assess the perceptions and level of utilization of AI in academic libraries and to explore the challenges and opportunities for the effective integration of AI in service delivery. This will provide insights into how AI can be leveraged to meet the evolving needs of academic library users and improve the overall service experience.

#### **Objectives of the research are to:**

1. determine the current level of awareness and understanding of AI among university librarians Gombe state
2. determine the extent to which AI is being utilized in academic libraries for service delivery in Gombe state
3. assess the relationship between AI and quality and effective service delivery in university libraries in Gombe state.
4. identify the barriers associated with the adoption of AI in university libraries in Gombe state

#### **RESEARCH QUESTION**

- i. What is the level of awareness and understanding of AI among university librarians Gombe state?
- ii. To what extent does AI is being utilized by libraries for service delivery in Gombe state?
- iii. What is the relationship between AI and effective service delivery in university libraries in Gombe state?
- iv. What are the barriers associated with the adoption of AI in university libraries in Gombe state?

#### **HYPOTHESIS**

**H<sub>01</sub>:** There is no significant relationship between AI and quality and effective service delivery in university libraries in Gombe state.

**H<sub>02</sub>:** There is no significant relationship between AI and effective service delivery

#### **Significance**

The outcome of this study is expected to bring to the attention of library management and the entire university community on the relevance of AI in academic libraries. The study will also reveal the level of access and utilization of AI in academic libraries in university libraries in Gombe State. It will go a long way in the assessment of such initiatives with a view to strengthening its capabilities for better service delivery. It is also significant in the sense that it will supply useful information for planning and strategy on the management of electronic resources and services in libraries in Nigeria. More so, it will contribute to the depth of literature on electronic resources and services and will also serve as a reference material for further studies on electronic resources and services use by libraries.

#### **LITERATURE REVIEW**

The level of awareness of AI in academic libraries is currently the subject of much empirical research in the literature. Yusuf et al. (2020) evaluated the application of artificial intelligence for effectiveness in providing library services in a study of university libraries in Nigeria. The study unequivocally showed that the adoption of AI by librarians in university libraries were aware to a high extent and have adopted and utilized artificial intelligence (AI) for effective service delivery in university library. However, as observed by Grant and Camp (2018) that due to the impact of awareness of AI, many academic libraries, mainly in developed nations, have embraced AI to suit their customers' diverse reader service needs, such as circulation, serials, and reference services. Ajani et al. analyzed librarians' desire and knowledge to embrace AI for services and procedures in academic libraries in Nigeria, notably in Gombe State, in 2022. Due to their conflicting feelings, the results

show that librarians are not yet ready to use AI in their academic libraries.

In a study conducted by Okunlaya et al. (2022) to evaluate the uniqueness of AI framework for library operations in preparation for the digital revolution of higher education to determine the extent to which AI can be used in the libraries for researches. The study found that university libraries have a low acceptance rate for using AI to provide innovative alternatives to the services they currently provide. According to Olayode (2022) contrary to the above submission, technology is being used, and Nigeria is not being left behind because the acceptance and application of technology in Nigeria is not a modern concept. Manjunatha and Patel (2021) looked at the use of AI technology in the libraries of the College of Engineering in Karnataka (2020). Data shows that most engineering university libraries are already familiar with AI technologies and have adopted block chain, augmented reality, artificial intelligence, and other advanced systems for use to a very high extent.

In separate studies from Nguyen (2020); Saldeen (2020) and Igbinovia and Okuonghae (2021) all agreed that librarians have a comprehensive understanding of the many ways in which artificial intelligence can be used to provide better library services in university libraries because the weighted mean of 2.98 was greater than the mean of the criteria, which was 2.50. This is in line with the of Corrado research (2021) who noted that, majority of the research shows how AI can be used to improve a range of library services especially, the technical services in creating and assigning subject headings, categorizing data, and describing metadata can all benefit from the use of AI. The results support a study by Ajani et al. (2022), which found that, due to their comprehensiveness of AI, the feelings of academic librarians are very clear on the use AI in their libraries especially in linking the

right information to the right user. As a result, it was concluded that, academic libraries in Nigeria, notably in Benue State, have a very helps libraries in providing better library services to the teaming users.

In a paper titled Exploring the Implementation of Artificial Intelligence Applications among Academic Libraries in Taiwan by Xu (2023) where he explored on the different artificial intelligence (AI) applications used in academic libraries and the key factors and impediments related to their implementation. He found that librarians recognized that AI applications are inevitable, but indicated that the difficulties of in execution have hampered the adoption of AI. In Nigeria according to Yusuf, et al (2022), librarians are aware of the integration of AI systems in libraries globally, but they have mixed feelings about the readiness of academic libraries to adopt AI due inadequate knowledge on how to manipulate the technology. Another study by Harisanty, et al (2022) highlighted that library leaders, practitioners, and scientists in Indonesian academic libraries have a favorable outlook on AI and are ready to implement AI initiatives. Factors such as AI awareness, acceptance, value perception, application experience, leadership are some of the challenged faced in adopting AI in the library.

## METHODOLOGY

This study adopted descriptive survey method to gather opinions of librarians in university libraries in Gombe State on the subject understudied. Its population consists of 37 professional librarians in 2 selected university libraries in Gombe State. This comprises 23 librarians from Federal University Kashere libraries in Gombe state and 14 From Gombe State University library. Census enumeration sampling technique was adopted in order to allow all the targeted population in the study. A self-developed

questionnaire arranged into 2 major sections was used to collect data from the respondents. Data collected was analyzed using mean and standard deviation while t-test will be use to analyze hypotheses. In taking decision, any means score of 2.50 and above is accepted while anything below

2.50 is rejected. The null hypothesis is rejected when the calculated t- value is higher that the critical value of 0.05 set for the study.

## RESULTS

**Table 1:** Demographic Characteristics of the Respondents

Options		F	%
<b>Gender</b>	Male	25	67.6
	Female	12	32.4
	Total	37	100
<b>Academic Qualification</b>	BLIS	6	16.2
	MSc	20	54.1
	Ph.D.	11	29.7
	Total	37	100
<b>Work Experience</b>	1-5 years	10	27.0
	6-10 years	8	21.6
	11-15 years	7	18.9
	16-20 years	6	16.2
	21 years and above	6	16.2
	Total	37	100
<b>Job status</b>	Assistant Librarian	9	24.3
	Librarian 11	5	13.5
	Librarian 1	7	18.9
	Senior Librarian	6	16.2
	Principal Librarian	4	10.8
	Dep. Univ. Librarian	4	10.8
	University Librarian		5.4
	Total	37	100

Table 1 shows that 25 (67.6%) of the respondents were male, while 12 (32.4%) were female. 20

BSc/BLIS. Furthermore, 25 (68%) were had 1 – 5 years' work experience, 8 (21.6%) had 6 – 10 years' experience, 7 (18.9%) had 11 – 15 years' experience, while 6 (16.2%) respectively for 16 – 20 years and 21 years and above. Finally, majority 9 (24.3%) were Assistant Librarians, 7 (18.9%) were Librarian I, 6 (16.2%) were Senior Librarians, 5 (13.5%), 4 (10.8%) respectively were Principal Librarian and

Deputy University Librarian, while 2 (5.4%) were University Librarian.

### Table 2.

Table 2 reveals that majority of the respondent 22(59.5%) are aware of Chatbots, followed by 20(54.1%) for Dynamic. However, 48.6% are not aware of Micromedex, 43.2% for virtual references and 62.2% were not aware of expert AI. This implies that Chatbots and Dynamic are

Options	YES (F)	(%)	NO (F)	(%)
I am aware of dynamic	20	54.1	17	45.9
I am aware of Micromedex	18	48.6	19	51.4
I am aware of expert AI	14	37.8	23	62.2
I am aware of virtual references	16	43.2	21	56.8
I am aware of chatbots	22	59.5	15	40.5

the AIs the respondents are aware of. The Perceptions of AI by Librarians in University Libraries in Gombe State

**Table 3:** Perceptions of AI by Librarians in University Libraries in Gombe State

Options	SA (F)	( % )	A (F)	(%)	D (F)	(%)	SD (F)	(%)
AI is a positive development for librarians	10	27	15	41	6	16	6	16
AI technologies can be adopted in university library	12	32	18	49	4	11	3	8
AI is capable of replacing human librarians in the future	12	32	16	43	5	14	4	11
Adoption of AI technologies will help to fasten library activities	9	24	13	35	8	22	7	19
Adoption of AI technologies will help to ease library stress	7	19	13	35	9	24	8	22

Table 3 shows that majority of the respondents perceived that AI technologies can be adopted in university libraries with ( $x = 1.42$ ), followed by AI is capable of replacing human librarians in future ( $x = 1.37$ ) and ( $x = 1.31$ ) for AI is a positive development for librarians. On the other hand, adoption of AI technologies will help to ease library stress has the lowest mean with ( $x = 1.14$ ). This

means that AI technologies can be adopted in university libraries, AI is capable of replacing human librarians in future and AI is a positive development for librarians are the perceptions of most of the respondents on AI in university libraries.

The Perceived Benefits of AI by Librarians in University Libraries in Gombe State

**Table 4:** Perceived Benefits of AI by Librarians in University Libraries in Gombe State

Options	SA (F)	(%)	A (F)	(%)	D (F)	(%)	SD (F)	(%)
AI reduces manual and repetitive task performed by librarians	11	30	9	24	10	27	7	19
AI-powered library search tools is better and faster	8	22	11	30	9	24	9	24
AI provides patron-tailored recommendations to items	13	35	10	27	8	22	6	16
AI facilitates the discovery of new knowledge in university libraries	10	27	14	38	6	16	7	19
AI saves time spent on generating information	9	22	10	24	9	11	10	16

Table 4 indicates that majority of the respondents ( $x = 1.36$ ) perceived AI provides patron-tailored recommendations to items as the main benefits of AI in university libraries, followed by AI can reduce manual and repetitive tasks performed by librarians ( $x = 1.31$ ) and AI facilitates the discovery of new knowledge in university libraries ( $x = 1.27$ ). However, AI saves time spent on generating

information ( $x = 1.14$ ). This means that AI provides patron-tailored recommendations to items, AI can reduce manual and repetitive tasks performed by librarians and AI facilitates the discovery of new knowledge in university libraries are the perceived benefits of AI by the respondents.

The Challenges Affecting the Adoption of AI by University Libraries in Gombe State

**Table 5:** Challenges Affecting the Adoption of AI by University Libraries in Gombe State

Options	SA (F)	(%)	A (F)	(%)	D (F)	(%)	SD (F)	(%)
The lack of expertise among librarians	4	10.81	8	21.62	10	27.03	15	40.52
The low level of awareness of AI among librarians	17	45.95	3	8.11	13	35.14	4	10.81
The cost of implementing AI systems	25	67.57	5	13.51	4	10.81	3	8.11
Resistance to change from librarians and library users	10	27.03	7	18.92	11	29.73	9	24.32
Low level of support from government and funding agencies	21	56.76	6	16.22	8	21.62	2	5.41
Epileptic power supply	27	72.97	3	8.11	2	5.41	5	13.51
Poor internet connectivity	30	81.08	3	8.11	3	8.11	1	2.27

Table 5 reveals that poor internet connectivity has the highest mean ( $x = 1.76$ ) out of the challenges affecting the adoption of AI by university libraries, followed by epileptic power supply ( $x = 1.69$ ), lack of expertise among librarians ( $x = 1.64$ ) and low level of support from government and funding agencies ( $x = 1.32$ ). On the other hand, low level of awareness of AI among librarians has the lowest mean with ( $x = 1.09$ ). This implies that poor internet connectivity, epileptic power supply, lack of expertise among librarians and low level of support from government and funding agencies are the major challenges to adopting AI in libraries of the respondents.

## DISCUSSION

This affirms the notion that chat bots is gaining prominence in Library and Information Science landscape. Since 2022 when chat bots was launched, it has become a veritable AI tool that enhances the provision of more efficient and effective services to library patrons, provides round-the-clock support, answer user queries, and significantly enhance customer service in libraries (Jones, 2019). Discovering that the respondents are aware of D y named, a not too common AI in Nigeria, indicates that the respondents are keeping themselves up-to-date with technological advancements that can help them in providing quality and reliable information to users.

Furthermore, this study revealed that the respondents have the perceptions that AI technologies can be adopted in university libraries, capable of replacing human librarians in future and is a positive development for librarians. The implications of the respondents' perceptions are that aside the possibility of adopting AI in university libraries, the respondents perceived that AI is a positive technological advancement that can be used to perform some tasks initially performed by librarians. This may make AI a replacement for librarians in the future.

The perceptions of the respondents make them believed that AI provides patron-tailored recommendations to items, can reduce manual and repetitive tasks performed by librarians and facilitates the discovery of new knowledge in university libraries. These perceived benefits of the respondents corroborate the points of Hervieux and Wheatley (2021) that America and Canadian librarians perceived AI to be technological tools that can be leveraged to perform repetitive tasks and

facilitates prompt discovery of knowledge among users of libraries.

Studies have established that AI has not been adopted in many libraries in different parts of the world because of series of factors. This study revealed poor internet connectivity, epileptic power supply, lack of expertise among librarians and low level of support from government and funding agencies as the major challenges of adopting AI in libraries of the respondents. This buttresses the claims of Obiano et al (2022); Moustapha and Yusuf (2023) that the adoption and implementation of AI in Nigerian libraries have been affected by inadequate funding of university libraries, poor internet bandwidth and inadequate ICT infrastructure.

## Recommendations

1. Academic libraries need to keep up with technological advancements and accept artificial intelligence (AI) as a vital tool for providing services that will ultimately improve the academic experience.
2. Libraries need to implement strict policies for protecting patron data and make sure that it is handled carefully.
3. To solve this issue, librarians and AI developers must collaborate while aiming for impartiality and fairness. Lastly, to provide efficient library services, library management should work to educate and train staff members to use AI.

## CONCLUSION

AI is an emerging technology transforming the operations and services of libraries. But its seamless and prudent adoption and implementation in libraries rest of many factors. This study reveals that chatbots and Dynamed are the major AI librarians in university libraries in Gombe State are aware of. It further established that librarians in university libraries in Gombe State have the perceptions that AI can be adopted in university libraries, it is capable of replacing human librarians in future and is a positive development for librarians. This makes the librarians perceived provision of patron-tailored recommendations to items, reduce manual and repetitive tasks performed by librarians and facilitates the discovery of new knowledge in university libraries. However, it is difficult to adopt AI in university libraries because of poor Internet

connectivity, epileptic power supply and lack of expertise among librarians.

Based on the research findings, several recommendations are proposed. Firstly, it is advised that the management of university libraries in Gombe State takes proactive measures to train their librarians in the field of Artificial Intelligence (AI). This training is essential for enhancing the librarians' expertise in AI, enabling them to effectively integrate AI into library services. Secondly, collaboration between the management of university libraries in Gombe State and internet service providers is crucial. Establishing a reliable and robust internet connectivity infrastructure will

facilitate the seamless adoption of AI in university libraries. Thirdly, there is a recommendation for increased support from government and funding agencies for university libraries. Adequate financial backing will empower university libraries to invest in the necessary infrastructure for the successful integration of AI. Lastly, the management of university libraries in Gombe State should prioritize ensuring a stable power supply. This is essential for guaranteeing the consistent availability of the power needed to support AI adoption in library operations. These recommendations collectively aim to pave the way for a more effective and technologically advanced environment within university libraries in Gombe State.

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