# THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) ON PROFESSIONAL LIBRARIANS' SERVICE DELIVERY IN TERTIARY INSTITUTIONS OF YOBE STATE

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**Abstract**

*The study examines the roles of artificial intelligence (AI) on professional librarians' service delivery in tertiary institutions of Yobe State. The study was guided by three (3) objectives and three (3) research questions. A survey research design was used for the study targeting a population of sixty-four (64) professional librarians of tertiary institutions in Yobe State. Total enumeration sampling technique was employed to ascertain the target respondents. Questionnaire was the main instrument used for the study. Sixty-four (64) copies of the questionnaire were administered to the respondents, sixty-one (61) copies were retrieved and found usable for analysis. This represents 95% of the response rate. Data were gathered through self-designed questionnaire and were analyzed using descriptive statistics of frequency count, percentages and mean score. The analyses revealed a grand mean of 2.45 indicating that respondents agreed artificial intelligence plays a vital roles in reference services in academic libraries, and the result reports a grand mean of 2.75 indicating lack of sufficient infrastructure to adopt AI in tertiary institution libraries, erratic power supply and low awareness level by librarians on how to apply AI for their service needs indicated severe challenges militating against the adoption of artificial intelligence in academic libraries.*

**Keywords:** Roles, Artificial Intelligence, Professional Librarians', Service Delivery and Tertiary Institution

## Introduction

The emergence of Artificial Intelligence (AI) in recent years has had a significant collision on many industries, from the healthcare and financial sectors to education and the entertainment industry. Libraries are no exception, as they have long been a vital source of knowledge and resources to communities, students, researchers as well as for faculty members. However, with the emergence of AI, many libraries are now looking for new ways to improve their services, enhance library activities and meet the changing needs of their patrons.

Integrating AI into library operations significantly transforms how libraries operate and interact with patrons (Abbas, Khan, & Khan, 2020). As libraries work to stay relevant and evolve with the times, AI can help streamline resource management, make information more discoverable and engage with users in new ways. But, like any technology, implementing AI in a library requires careful planning, cooperation and a dedication to preserving the

fundamental principles of accessibility, fairness and intellectual liberty that have defined library services for centuries (Hasan, Saifullah, & Hashmi, 2024).

Artificial Intelligence (AI) can be defined as a human-designed software and hardware system that, in the context of library objectives is to, performs digital circulation, cataloguing, acquisition, indexing and reference operations by perceiving its environment through the acquisition of data, interpreting the data collected, whether structured or non-structured, reasoning on that knowledge, processing the information derived from that data and deciding on the most appropriate action to take to accomplish that objective. AI systems can use symbolic rules, or learn a numerical model. They can also change their behavior by examining how the environment reacts to their previous actions and immediately modify for improvement (Adewojo, & Dunmade, 2024).

Service delivery are those library services (reference, cataloguing and acquisition services) provided to library user in order to support teaching and learning processes. These services will also attract or increase library patronage if effectively discharge by professional librarians. Service delivery can be assessed in terms of both inputs (such as collections, physical environment, staff knowledge and skill) and outputs (efficiency and effectiveness). Khan (2021) stated that the availability of reference, cataloguing and acquisition services in the library will promote and enhance effective service delivery. The rate of quality, user friendly, effectiveness, reliability and regularity of library services can also improve the utilization of these services frequently. To take advantage of the potentials provided by artificial intelligence in improving librarians' service delivery, contemporary librarians have to keep abreast the development in ICT and acquire necessary skills that will enable them make existing information resources more readily available and useful to the users.

Reference services is the process of attending, guiding and directing library users to a particular relevant information resources. Artificial intelligence is playing a significant role in reference services. It is changing the way libraries serve users with information and support them with necessary resources that relate to their choice of interest. AI-powered virtual assistants and Chatbots are increasingly being used to help library users in real-time.

These virtual assistants can answer commonly asked questions; locate resources and direct users to the appropriate library services or resources. Natural Language Processing (NLP) technologies allow libraries to offer more sophisticated search capabilities and to interact with users more in a conversational way (Alam, 2025). NLP technologies can be used to create Chatbots, perform voice-activated searches and analyze the sentiment of user questions and answers. AI-driven question-answering systems, including those based on machine learning or deep learning, can answer complex user queries in more detail. This makes it easier for users to find relevant materials (Hasan, Saifullah, & Hashmi, 2024).

Recognizing the significance of integrating cutting-edge technologies like AI into academic libraries, scholars have emphasized its potential to enhance service accessibility, both on site and online, and optimize operational efficiency, leading to increased engagement among staff and patrons (Pierce, 2022). However, despite the acknowledged necessity and potential advantages, a gap in the realization of AI in libraries persists, calling for urgent measures to promote wider implementation (Farag et al. 2021).

**Statement of the Problem**

The situational analysis on the role of artificial intelligence (AI) on professional librarians' service delivery in tertiary institutions of Yobe State shows that, professional librarians' seems not to utilize AI for reference services. They mostly support the process of traditional methods and rendering services to users'. In other words, lack of proper utilization of artificial intelligence among professional librarians may lead to low service delivery. With the observed situational analysis, it seems the professional librarians' do not understand the role of artificial intelligence on library service delivery and it is what led the researcher to embark on the study titled; the role of artificial intelligence (AI) on professional librarians' service delivery in tertiary institutions of Yobe State.

The preliminary observation on the role of artificial intelligence (AI) on professional librarians' service delivery in tertiary institutions of Yobe State shows that, professional librarians' do not utilize AI effectively for reference services. They mostly share ideas when it comes to traditional methods of rendering services to users'. In other words, lack of mutual teamwork on artificial intelligence among professional librarians demoralized the effective utilization of AI in academic libraries. With the observed situational analysis, it seems the professional librarians' do not understand the role of artificial intelligence and teamwork on library service delivery and it is what led the researcher to embark on the study titled; the roles of artificial intelligence (AI) on professional librarians' service delivery in tertiary institutions of Yobe State.

**Objectives of the Study**

The objectives of the study were to determined:

i. the role of artificial intelligence to reference services in academic libraries in tertiary institutions of Yobe State

ii. the challenges militating against the adoption of artificial intelligence in academic libraries tertiary institutions of Yobe State

**Literature Review**

Study conducted by Wang and Xu (2024) on Application and Frontier Issues of Artificial Intelligence in Library and Information Science revealed that, content analysis was adopted for the study. Interview and secondary sources of information was used as instrument of the study. With the rapid development of information technology, AI has become an important force in driving technological progress, especially in the field of library and information science. The application of AI technology has not only improved work efficiency but also enhanced the intelligence and personalization of information services. The article analyzes topics of AI research in the field of library and information science in China and abroad through content analysis, including information retrieval and recommendation systems, smart library construction, information security and privacy protection, and open science and research data management. These research hotspots reflect the extensive application of AI technology in the field of library and information science and reflect the academic community's pursuit of improving the quality and efficiency of information services.

AI can improve search functionality by understanding user queries and providing search results that are more contextually relevant. AI can improve precision and recall when searching for information. AI can create concise summaries of long documents or articles, so users do

not have to read the whole thing. It can help create citations and bibliographies in different citation styles (such as APA and MLA). AI can extract and format information from sources, making it easier for users to access information. AI-powered content analysis tools can help users assess online information source quality, relevance and reliability. AI-driven services empower libraries to provide more efficient, personalized and easily accessible support to users. This improves the overall user experience and ensures that users have access to the information they need efficiently. However, AI-driven services must be balanced with human expertise to deliver a comprehensive, user-oriented reference experience (Hasan, Saifullah, & Hashmi, 2024).

Study conducted by Tella, Odunola and Lawal (2023) on cataloguing and classification in the era of artificial intelligence, benefits, and challenges from the perspective of cataloguing librarians in Oyo state, Nigeria. The study adopted a purely qualitative method using interviews for data collection. The target population was the cataloguing and classification librarians in academic libraries in Southwest Nigeria. The sample comprised 21 cataloguing and classification librarians working in the cataloguing and classification section of 10 university libraries in Southwest Nigeria. Four research questions were developed and answered. The findings revealed that cataloguing librarians are aware of the application of artificial intelligence for cataloguing and classification.

Artificial intelligence enhances automatic cataloguing and classification using optical character recognition, assists in undertaking stressful work that humans may struggle to do; completes tasks faster than a human being and enables libraries to provide accurate cataloguing and classification services with fewer errors; saving time and money, assisting libraries to create metadata for digital resources and allowing cataloguing to increase the speed of metadata generation. The challenges associated with the application of AI to cataloguing and classification practices from the perspective of cataloguing and classification librarians are funding, irregular power supply and inadequate skilled personnel to handle AI. Currently, there is no strategic plan in place for the implementation of AI for cataloguing and classification in academic libraries in Nigeria. Based on the findings, the study recommends that a strategic plan should be initiated in all academic libraries in Nigeria to allow the real-life practice of using AI for cataloguing and classification.

**Research Methodology**

Survey research design was used for the study. The target population for this study was sixty-four (64) professional librarians of the three tertiary institutions under study; the institutions are Federal University Gashua, Federal Polytechnic Damaturu and Federal College of Education (Technical) Potiskum. Total enumeration sampling technique was employed to ascertain the target respondents. According to Etikan, Musa and Alkassim (2016) total enumeration sampling is a technique where the entire population that meet the criteria (e.g. specific skill set, experience, etc.) are included in the research being conducted. Total enumeration Sampling is more commonly used where the number of cases being investigated is relatively small and manageable. Therefore, the target population of the study was 64 professional librarians'. The researcher used self-designed questionnaire as the instrument for collecting data. The data collected were analyzed using descriptive statistics of frequency counts, percentages and mean score.

**Data Analysis and Interpretation**

Sixty-four (64) copies of the questionnaire were administered to the respondents, sixty-one (61) copies were retrieved and found usable for analysis. This represents 95% of the response rate.

**Table 1: The Role of Artificial Intelligence for Reference Services in Academic Libraries**

| S/N | Statement | SA | A | D | SD | Mean |
|---|---|---|---|---|---|---|
| **1** | AI improve search functionality by understanding user queries and providing search results that are more contextually relevant using Chatbot | 2 (3%) | 37 (61%) | 17 (28%) | 5 (8%) | 2.59 |
| **2** | AI can create concise summaries of long documents or articles, so users do not have to read the whole thing | 4 (7%) | 28 (46%) | 21 (34%) | 8 (13%) | 2.45 |
| **3** | AI can improve precision and recall when searching for information | 11 (18%) | 13 (21%) | 26 (43%) | 11 (18%) | 2.39 |
| **4** | AI can extract and format information from sources, making it easier for users to access information | 8 (13%) | 17 (28%) | 29 (48%) | 7 (11%) | 2.42 |
| **5** | AI-powered content analysis tools can help users assess online information source quality, relevance and reliability | 2 (3%) | 5 (8%) | 37 (61%) | 17 (28%) | 1.86 |
| **6** | It can provide alternative formats of texts (such as audio versions) and improve user interfaces for people with disabilities | 6 (10%) | 26 (43%) | 19 (31%) | 10 (16%) | 2.45 |
| **7** | AI-driven services empower libraries to provide more efficient, personalized and easily accessible support to users | 16 (26%) | 33 (54%) | 8 (13%) | 4 (7%) | 3.0 |
| | **Total** | **49** | **159** | **157** | **62** | **Grand Mean** 2.45 |
| | **Average** | **7 (11%)** | **23 (38%)** | **22 (36%)** | **9 (15%)** | |

**Keys:** Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD)

Table 1: shows the role of artificial intelligence for reference services in academic libraries. The result shows that respondents agreed AI improve search functionality by understanding user queries and providing search results that are more contextually relevant using Chatbot (with mean score of 2.59), AI can create concise summaries of long documents or articles, so users do not have to read the whole thing (with a mean score of 2.45), it can provide alternative formats of texts (such as audio versions) and improve user interfaces for people with disabilities (with a mean score of 2.45) and AI-driven services empower libraries to provide more efficient, personalized and easily accessible support to users (with a mean score of 3.0). While respondents disagreed AI can improve precision and recall when searching for information (with a mean score of 2.39), AI can extract and format information from sources, making it easier for users to access information (with a mean score of 2.42) and AI-powered content analysis tools can help users assess online information source quality, relevance and reliability (with a mean score of 1.86). The result reports a grand mean of 2.45 indicating that respondents agreed artificial intelligence plays a vital role in reference services in academic libraries. The result therefore revealed that respondents agreed AI improve search functionality by understanding user queries and providing search results that are more contextually relevant using Chatbot, AI can create concise summaries of long documents or articles, so users do not have to read the whole thing, it can provide alternative formats of texts (such as audio versions) and improve user interfaces for people with disabilities and AI-driven

services empower libraries to provide more efficient, personalized and easily accessible support to users with the highest average of 23(38%).

**Table 3: Challenges Militating against the Adoption of Artificial Intelligence in Academic Libraries**

| S/N | Statement | Not-a-challenge | Minor | Moderate | Severe | Mean |
|---|---|---|---|---|---|---|
| **1** | Lack of sufficient infrastructure to adopt AI in tertiary institution libraries | 11 (18%) | 11 (18%) | 13 (21%) | 26 (43%) | 2.88 |
| **2** | Erratic Power Supply | 2 (3%) | 3 (5%) | 19 (31%) | 37 (61%) | 3.49 |
| **3** | Lack of skills and the need for training before the adoption of AI in tertiary institution libraries | 7 (11%) | 9 (15%) | 24 (39%) | 21 (34%) | 2.96 |
| **4** | The issue of high privacy intrusion by Chatbots | 18 (29%) | 26 (43%) | 11 (18%) | 6 (10%) | 2.08 |
| **5** | Low awareness level by librarians on how to apply AI for their service needs | 4 (7%) | 9 (15%) | 20 (32%) | 28 (46%) | 3.18 |
| **6** | AI is perceived as a threat to the job of Librarians | 10 (16%) | 24 (39%) | 19 (31%) | 8 (13%) | 2.40 |
| **7** | Technical issues can affect the full adoption of AI in tertiary institution libraries | 8 (13%) | 29 (47%) | 21 (34%) | 3 (5%) | 2.31 |
| | **Total** | **60** | **111** | **127** | **129** | **Grand Mean** 2.75 |
| | **Average** | **9 (15%)** | **16 (26%)** | **18 (29%)** | **18 (29%)** | |

Table 3: shows the challenges militating against the adoption of artificial intelligence in academic libraries. The result shows that respondents revealed severe challenges as lack of sufficient infrastructure to adopt AI in tertiary institution libraries (with mean score of 2.88), erratic power supply (with mean score of 3.49) and low awareness level by librarians on how to apply AI for their service needs (with mean score of 3.18). While respondents' revealed moderate challenges with lack of skills and the need for training before the adoption of AI in tertiary institution libraries (with a mean score of 2.96). Respondents revealed minor challenges with The issue of high privacy intrusion by Chatbots (with a mean score of 2.08), AI is perceived as a threat to the job of Librarians (with a mean score of 2.40) and technical issues can affect the full adoption of AI in tertiary institution libraries (with a mean score of 3.31). The result reports a grand mean of 2.75 indicating severe challenges militating against the adoption of artificial intelligence in academic libraries. The result therefore revealed severe challenges as lack of sufficient infrastructure to adopt AI in tertiary institution libraries, erratic power supply and low awareness level by librarians on how to apply AI for their service needs with the highest total of 129 and average of 18(29%).

**Discussion**

Based on data analysis in research question one, result reports a grand mean of 2.45 indicating that respondents agreed artificial intelligence plays a vital role in reference services in academic libraries. However, the result therefore revealed that respondents agreed AI improve search functionality by understanding user queries and providing search results that are more contextually relevant using Chatbot, AI can create concise summaries of long documents or articles, so users do not have to read the whole thing, it can provide alternative formats of texts (such as audio versions) and improve user interfaces for people with disabilities and AI-driven services empower libraries to provide more efficient, personalized and easily accessible support to users.

The finding of this research question is in agreement with Hotsonyame (2023) and Hasan, Saifullah, & Hashmi (2024) in their separate study who agreed AI-driven virtual assistants and chatbots to provide instant support to users, answer reference inquiries, assist with circulation services, and offer personalized recommendations based on user preferences. The application of AI technology has not only improved work efficiency but also enhanced the intelligence and personalization of information services.

The result of the analysis for research question five shows that a grand mean of 2.75 indicating severe challenges militating against the adoption of artificial intelligence in academic libraries. However, lack of sufficient infrastructure to adopt AI in tertiary institution libraries, erratic power supply and low awareness level by librarians on how to apply AI for their service needs indicated severe challenges militating against the adoption of artificial intelligence in academic libraries.

The finding of this research question is in agreement with Bhui (2024) who reveals that, the implementation of AI in libraries offers numerous benefits, but it also comes with several challenges that need to be addressed for a successful integration. Here are some key challenges libraries may face when implementing AI: Cost considerations, privacy and data security, staff training and expertise, integration with existing systems, data quality and availability, user acceptance, maintenance and updates, limited resources, evaluation and assessment, vendor dependence and resistance to change.

**Conclusion**

The research findings revealed that respondents agreed artificial intelligence plays a vital role in reference services in academic libraries. It can be concluded that librarians understand the impact of artificial intelligence on reference service but fail to adopt it for service delivery. It can also be concluded that they lack knowledge about artificial intelligence for reference services in academic libraries. The result on extent of artificial intelligence utilization for cataloguing and classification of library resources in academic libraries could be concluded that, professional librarians require more training on how to utilize AI for cataloguing and classification so as to promote service delivery in the libraries. There should be sufficient infrastructure to adopt AI in tertiary institution libraries, erratic power supply and more awareness is need on how to apply AI for effective service delivery.

**Recommendations**

Based on the findings of the study, the following recommendations were made for improvement:

1. Professional librarians should be encouraged to use AI chatbots of digital libraries for reference services such as project Gutenberg, digital public library of America, library of congress, world digital library and many more chatbots for service delivery

2. Tertiary institutions' managements in partnership with their regulatory bodies should provide more sufficient infrastructure to adopt AI in tertiary institution libraries, erratic power supply and awareness to librarians on how to apply AI for their service needs.

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