

**ARTIFICIAL INTELLIGENCE APPLICATIONS AND KNOWLEDGE
MANAGEMENT PRACTICES IN ACADEMIC LIBRARIES: AN EMPIRICAL
STUDY OF PLATEAU STATE POLYTECHNIC BARKIN LADI LIBRARY.**

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Abstract

This study examined the impact of Artificial Intelligence (AI) on knowledge management practices in Plateau State Polytechnic Barkin Ladi Library. The study investigated the extent of AI utilization in the library, identified AI tools used for knowledge management practices, examined the impact of AI on knowledge acquisition, storage, retrieval, and dissemination, identified challenges affecting AI implementation, and suggested strategies for improving AI adoption in the library. A descriptive survey research design was adopted for the study. The population of the study consisted of 165 respondents made up of 30 librarians, 20 ICT personnel, 25 library officers, and 90 registered library users of Plateau State Polytechnic Barkin Ladi Library. A sample size of 120 respondents was selected using purposive and simple random sampling techniques. Data were collected using a structured questionnaire titled “Artificial Intelligence and Knowledge Management Questionnaire (AIKMQ)” and analyzed using descriptive statistics such as frequency counts, percentages, and mean scores. The findings revealed that AI technologies are moderately utilized in the library and have positively improved cataloguing, information retrieval, digital preservation, and user services. The major AI tools identified include Online Public Access Catalogue (OPAC), institutional

repositories, automated cataloguing systems, digital databases, plagiarism detection software, and chatbots. The study also identified inadequate funding, poor ICT infrastructure, unstable power supply, poor internet connectivity, and shortage of skilled personnel as major challenges affecting AI implementation. The study concluded that Artificial Intelligence is an important tool for enhancing knowledge management practices in academic libraries. The study recommended increased funding for ICT infrastructure, regular staff training, policy support for digital transformation, and collaboration between libraries and technology organizations.

Keywords: Artificial Intelligence, Knowledge Management, Academic Libraries,

Introduction

Academic libraries play important roles in supporting teaching, learning, research, and community development in higher institutions. Traditionally, libraries focused mainly on the acquisition, organization, storage, and dissemination of printed information resources. However, the rapid growth of information resources and technological advancement have transformed libraries into digital knowledge centres that require innovative technologies for effective service delivery (Bawden & Robinson, 2018).

Artificial Intelligence (AI) refers to computer systems designed to perform tasks that normally require human intelligence such as learning, reasoning, problem-solving, decision-making, and language understanding (Russell & Norvig, 2021). AI technologies are increasingly being integrated into academic libraries because they support automated cataloguing, information retrieval, digital preservation, indexing, classification, and virtual reference services.

Knowledge management involves the process of acquiring, organizing, storing, sharing, retrieving, and utilizing knowledge resources within an organization to improve operational efficiency and productivity (Davenport & Prusak, 1998). In academic libraries, effective knowledge management ensures easy access to information resources, preservation of institutional memory, and improved academic productivity.

The integration of Artificial Intelligence into library operations has created opportunities for libraries to improve information services and enhance users' satisfaction. AI technologies such as machine learning, robotics, expert systems, natural language processing, recommendation systems, and chatbots are increasingly being used in academic libraries globally to support efficient library services (Zhang & Li, 2021).

In Nigeria, many academic libraries are gradually adopting digital technologies such as Online Public Access Catalogue (OPAC), institutional repositories, and electronic databases. Despite this progress, several challenges continue to affect effective AI implementation. These include inadequate funding, poor ICT infrastructure, unstable electricity supply, poor internet connectivity, and shortage of technical expertise (Yusuf & Iwu, 2022). The Plateau State Polytechnic Barkin Ladi Library provides information resources and digital services that support academic and research activities within the institution. The growing need for efficient knowledge management practices has made the adoption of AI technologies increasingly important in the library. This study therefore examined the impact of Artificial Intelligence on knowledge management practices in Plateau State Polytechnic Barkin Ladi Library.

Objectives of the Study

The specific objectives were to:

1. determine the extent of AI utilisation in Plateau State Polytechnic Barkin Ladi Library;
2. identify the AI tools used for knowledge management practices in Plateau State Polytechnic Barkin Ladi Library;
3. examine the impact of AI on knowledge acquisition, storage, retrieval, and dissemination in Plateau State Polytechnic Barkin Ladi Library;
4. identify challenges affecting AI implementation in Plateau State Polytechnic Barkin Ladi Library; and
5. suggest strategies for improving AI adoption in Plateau State Polytechnic Barkin Ladi Library.

Research Questions

The study answered to the following questions:

1. To what extent is AI utilised in Plateau State Polytechnic Barkin Ladi Library?
2. What AI tools are used in Plateau State Polytechnic Barkin Ladi Library?
3. What impact does AI have on knowledge management practices in Plateau State Polytechnic Barkin Ladi Library?
4. What challenges affect AI implementation in Plateau State Polytechnic Barkin Ladi Library?
5. What strategies can improve AI adoption in Plateau State Polytechnic Barkin Ladi Library?

Literature Review

Concept of Artificial Intelligence

Artificial Intelligence refers to the ability of computer systems to perform tasks that normally require human intelligence. Such tasks include reasoning, learning, problem-solving, language understanding, and decision-making. AI technologies enable systems to process large amounts of data, recognize patterns, and provide intelligent solutions. According to Russell and Norvig (2021), AI involves the development of intelligent agents capable of perceiving their environment and taking actions to maximize specific goals. AI technologies have gained relevance in different sectors including education, healthcare, banking, communication, and library services. In libraries, AI technologies are used for automated cataloguing, information retrieval, recommendation services, indexing, digital reference services, and collection management.

Concept of Knowledge Management

Knowledge management refers to the systematic process of creating, organizing, storing, sharing, and utilizing knowledge within an organization. It involves strategies and technologies that facilitate efficient information handling and knowledge sharing. Davenport & Prusak (1998) defined knowledge management as the process of capturing, distributing, and effectively using organizational knowledge. In academic libraries, knowledge management enhances access to information resources, institutional memory preservation, and collaboration among library users and staff. Knowledge management practices in

libraries include: knowledge acquisition; knowledge organization; knowledge storage; knowledge retrieval; knowledge sharing; and knowledge dissemination (Davenport & Prusak 1998).

Artificial Intelligence in Academic Libraries

Academic libraries across the world are increasingly integrating Artificial Intelligence into their operations in order to improve efficiency and service delivery. AI technologies support librarians in managing large volumes of information resources while simultaneously improving accessibility and users' satisfaction. The application of AI in libraries covers a wide range of activities including cataloguing, indexing, information retrieval, digital preservation, collection development, circulation services, plagiarism detection, and institutional repository management. AI technologies also support decision-making processes through data analytics and predictive systems. Libraries in technologically advanced countries have successfully implemented robotics for shelving and retrieval of books, intelligent recommendation systems for readers, and virtual assistants for digital reference services. In developing countries such as Nigeria, academic libraries are gradually adopting AI technologies despite infrastructural and financial challenges. The growing dependence on electronic resources and online learning platforms has further increased the need for AI integration in academic libraries. During the COVID-19 pandemic, many university libraries relied heavily on digital technologies and AI-supported systems to provide remote access to information resources. The relevance of AI in academic libraries includes: improvement in information retrieval; enhancement of digital library services; reduction of repetitive manual operations; improved preservation of institutional knowledge; increased efficiency in cataloguing and indexing; enhancement of users' satisfaction; and support for research and academic productivity.

Some common AI applications in academic libraries include:

Chatbots and Virtual Assistants: Chatbots provide automated responses to users' inquiries and assist in information retrieval. They support twenty-four-hour reference services and reduce the workload of librarians.

Automated Cataloguing Systems: AI-based cataloguing systems improve metadata generation, indexing, and classification of information resources.

Recommendation Systems: Recommendation systems analyze users' preferences and suggest relevant information resources.

Institutional Repositories: Institutional repositories preserve and provide access to scholarly works such as theses, dissertations, research articles, and conference papers.

Digital Reference Services: AI enhances digital reference services by enabling quick responses to users' information needs through intelligent systems.

The major impacts of AI on knowledge management include: improved information retrieval; faster access to digital resources; efficient cataloguing and indexing; enhanced knowledge sharing; improved user satisfaction; reduction in repetitive manual tasks; improved preservation of digital resources; and support for research and academic activities.

Methodology

The study adopted a descriptive survey research design. The population of the study consisted of 165 respondents made up of 30 librarians, 20 ICT personnel, 25 library officers, and 90 registered library users of Plateau State Polytechnic Barkin Ladi Library. A sample size of 120 respondents was selected using purposive and simple random sampling techniques. The instrument used for data collection was a structured questionnaire which consist of the following options Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. The data collected were analyzed using descriptive statistics such as frequency counts, percentages, and mean scores.

Results

Research Question 1: Extent of AI Utilization in the Plateau State Polytechnic Barkin Ladi Library

Table 1: AI Utilisation in Library Operations

Statement	Mean	Decision
AI tools are used for cataloguing	3.45	Strongly Agree
AI supports information retrieval	3.62	Strongly Agree
Digital repositories are available	3.58	Strongly Agree
Automated circulation systems are functional	3.40	Strongly Agree
AI enhances digital reference services	3.55	Strongly Agree

Table 1 above shows AI utilisation of library operations and it reveals that AI is highly utilised in the library, as all items recorded a strongly agree mean scores of 3.40 to 3.62. This means that, AI supports cataloguing, information retrieval, circulation, and digital reference services in the library. On this note, AI has improved library operations and service delivery.

Research Question 2: AI Tools Used in the Library

Table 2: AI Tools Used

Statement	Mean	Decision
Online Public Access Catalogue (OPAC)	3.62	Strongly Agree
Institutional Repositories	3.55	Strongly Agree
Digital Databases	3.71	Strongly Agree
Automated Cataloguing Systems	3.49	Strongly Agree
Plagiarism Detection Software	3.42	Strongly Agree
Chatbots and Virtual Assistance Tools	3.36	Strongly Agree

Statement	Mean	Decision
Library Management Software.	3.64	Strongly Agree

Table 2 above indicates that OPAC, Institutional Repositories, Digital Databases, Automated Cataloguing Systems, Plagiarism Detection Software, Chatbots and Virtual Assistance Tools and Library Management Software are commonly highly used in the library. All the items were strongly agreed upon by respondents with the mean of 3.36 above. This implies that the library uses modern digital tools for information management.

Research Question 3: Impact of AI on Knowledge Management Practices

Table 3: Impact of AI on Knowledge Management

Statement	Mean	Decision
AI improves information retrieval	3.70	Strongly Agree
AI enhances users' satisfaction	3.60	Strongly Agree
AI supports knowledge sharing	3.48	Strongly Agree
AI improves digital preservation	3.52	Strongly Agree
AI reduces repetitive manual tasks	3.66	Strongly Agree

The findings of table 3 revealed that respondents strongly agreed that AI positively impacts knowledge management practices. This is shown by the mean range of 3.48 to 3.70. This means that, AI improves information retrieval, enhances users' satisfaction, supports knowledge sharing, improves digital preservation, and reduces repetitive manual tasks. Overall, the results show that AI enhances efficiency in library operations and knowledge management.

Research Question 4: Challenges of AI Implementation

Table 4: Challenges Affecting AI Implementation

Statement	Mean	Decision
Inadequate funding affects AI implementation	3.75	Strongly Agree
Poor ICT infrastructure is a major challenge	3.68	Strongly Agree
Lack of skilled personnel affects AI usage	3.55	Strongly Agree
Resistance to change hinders AI adoption	3.32	Strongly Agree
Inadequate electricity supply affects operations	3.71	Strongly Agree

Table 4 revealed that libraries highly face challenges in adopting AI technologies. The respondents' indication of strongly agreeing with the mean range of 3.32 to 3.75 shows that, Poor funding and inadequate infrastructure were major challenges identified. Lack of

technical skills among staff also affects AI implementation. Respondents strongly agreed that these challenges hinder effective AI utilization. Overall, the challenges limit the full adoption of AI in libraries.

Research Question 5: Strategies for Improving AI Adoption

Table 5: Strategies

Statement	Mean	Decision
Increased funding for library automation	3.78	Strongly Agree
Continuous staff training and retraining	3.72	Strongly Agree
Provision of adequate ICT infrastructure	3.69	Strongly Agree
Stable electricity supply	3.74	Strongly Agree
Improved internet connectivity	3.66	Strongly Agree
Government support for technological advancement	3.61	Strongly Agree
Collaboration with ICT organizations	3.58	Strongly Agree

Table 5 above revealed that respondents strongly agreed on strategies for improving AI adoption with the mean score of 3.58 – 3.78. Increased funding for library automation, continuous staff training and retraining, among others are very essential as ways or strategies to improving AI adoption. The respondents believed these strategies would enhance AI utilisation. Overall, the strategies would improve effective library service delivery.

Discussion of Findings

The study revealed that Artificial Intelligence technologies are increasingly influencing knowledge management practices in Plateau State Polytechnic Barkin Ladi Library. The findings showed that AI tools such as OPAC, institutional repositories, and automated cataloguing systems are actively utilised in library operations.

The study established that AI improves information retrieval and enhances users' access to information resources. This finding agrees with Sharma and Gupta (2020), who reported that AI technologies improve users' experiences and digital information services in academic libraries.

The study also revealed that AI contributes significantly to knowledge sharing and digital preservation. Automated systems simplify cataloguing, circulation, indexing, and classification processes, thereby reducing repetitive manual tasks.

However, the study identified inadequate funding, poor ICT infrastructure, unstable electricity supply, and lack of technical expertise as major challenges affecting AI implementation. The implication of these findings is that academic libraries must embrace technological innovations in order to remain relevant in the digital information environment.

Conclusion

The study examined the impact of Artificial Intelligence on knowledge management practices in Plateau State Polytechnic Barkin Ladi Library. The findings revealed that AI technologies contribute significantly to efficient information retrieval, digital preservation, cataloguing, and knowledge sharing. Despite the positive impact of AI, challenges such as inadequate funding, poor infrastructure, unstable electricity supply, and shortage of skilled personnel continue to hinder effective implementation. The study therefore concluded that Artificial Intelligence has become an essential component of modern academic library operations and knowledge management practices.

Recommendations

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

1. The library management should increase investment in ICT infrastructure and AI technologies.
2. Librarians and ICT personnel should receive regular training on emerging technologies.
3. Government and educational stakeholders should provide adequate funding for library automation projects.
4. Stable electricity supply and improved internet connectivity should be provided.
5. Academic libraries should develop policies that support AI integration.

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