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**ADOPTION OF ARTIFICIAL INTELLIGENCE FOR EFFECTIVE LIBRARY
SERVICE DELIVERY IN ACADEMIC LIBRARIES IN NIGERIA.**

BY

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Abstract

Due to the growing presence of artificial intelligence (AI) in developed countries, this paper looks at the adoption of artificial intelligence for effective library services in academic libraries in Nigeria. The paper describes the concept of artificial intelligence while tracing its origin. It further established the advantage of adopting artificial intelligence in academic libraries which include user-friendly, infinite functions, ability to take complex work among others; and the challenges faced by library management towards the adoption of artificial intelligence which include financial uncertainty, job loss, technological disadvantages among others. The paper concluded that the adoption of AI in academic libraries is setting a new level of efficient and effective library service delivery but the adoption in developing countries such as Nigeria is low due to some of the identified challenges. The paper recommended that government and library management must come together to proffer the way forward for academic libraries in terms of meeting up with the latest standard of the use of AI in libraries; Library staff should be exposed to training and retraining in the use of artificial intelligence in delivering of libraries' services; among others.

Keywords: Artificial intelligence, Academic libraries, library services, adoption

Introduction

Artificial intelligence (AI) technologies have become globally recognized as indispensable tools for improving organizational efficiency and productivity. Suffice therefore to say that AI technologies have strongly influenced the world of work in the 21st century. In the library setting, the adoption of AI can improve library services and provides access to accurate information that can drive growth and development in this information age. Artificial intelligence technologies are now being used in libraries to achieve the organic integration of readers and libraries. With this, readers interact on the same platform, track and acquire the personalized needs and information of users so that users can access information accurately, and humanized services, at a reduced cost to rationally utilize library resources. Tella (2020) stressed that libraries in the developed countries have accepted and use AI technologies virtually in all spheres of life whereas those in developing countries are still struggling to find their feet.

In higher institutions of learning, the four major infrastructures are laboratories, equipment, teachers/classrooms and libraries that contain rich and balanced information resources that can support teaching; learning and research work (Tiemo & Ateboh, 2016). Libraries are the nerve centre of an educational institution and a place where information is provided to serve all patrons irrespective of their ages, political and ethical background, religion, sex, etc. The transition of information materials from book collections to audiotape collections, video collections, database, digitization of information materials, library automation, and now the adoption of artificial intelligence in library operations (Vijayakumar & Vijan, 2011). This implies that one of the motives of adopting AI technologies in university libraries is to satisfy user needs.

AI is a broad complex area of study, which can be difficult for non-specialists to understand. Yet, its ultimate goal is to create computer systems that rival human intelligence, and this clearly has major implications for librarianship (Asemi & Asemi, 2018). There are different AI applications in library system such as: descriptive cataloguing, technical services, and collection development; subject indexing, reference services, database searching, and document delivery. Some papers deal with the underlying design issues of knowledge representation and natural language processing. Many authors have previously provided in-depth overviews of AI technologies.

Sivarajah et al. (2017) noted that using AI in academic libraries allows for better analysis of datasets, especially large datasets used for analysis across multiple datasets. It also helps to eliminate repetitive and tedious tasks. The implication of this is that applying AI in library operations helps libraries develop capabilities that can exceed the human mind. Libraries, including university libraries in developing countries, such as Nigeria, have failed to adopt digital technologies, and they also show resistance to change in the use of technologies in various library operations (Wheatley & Hervieux, 2019).

The origin of Artificial Intelligence (AI) can be traced to John McCarthy's research in 1955, with the assumption that every aspect of learning and other forms of intelligence can be stimulated through the use of a machine (Wang, 2018). Scholars have defined the concept of Artificial Intelligence (AI). According to Benhamou and Janin (2018), AI involves a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. Merriam-Webster English Dictionary (2018) stated that artificial intelligence is "a part of computer science that deals with giving ability to the machines to look as if they have natural human intelligence." These human capabilities of AI are improved through learning from

experience and adaption over time. As an aspect of computer science, AI comprises an expert system, fuzzy logic, artificial neural network, evolutionary algorithms, case-based reasoning, image processing, natural language processing, speech recognition, and robotic (Koushal et al., 2012). Tredinnick (2017) described AI as a cluster of technologies, and various computing science approaches to make flexible rational decisions that align with unpredictable environmental conditions. However, this trend can be linked to process automation, the Internet of things, data processing, tangible robotic, conversational interactions and decision support.

In the library also, AI can be used to develop programs for effective reference services, good scanning of textbooks, and the identification of appropriate subject categories. Furthermore, AI technologies can assist library users on how they can locate library materials through intelligent tutoring system and automated library services. Therefore, AI adoption and use in libraries will allow for better information processing, and at the same time, better information search that will excite both library personnel and users since there will be easier and faster access to information.

Presently, University of Lagos is the only institution in Nigeria that has introduced the use of AI to some of the library services and operations. The level of awareness among library professional on the use of AI for library services and operations is low, therefore the study tends to look at the adoption of AI for effective library services delivery in academic libraries in Nigeria.

Advantages of Adopting AI for Effective Library services in Academic Libraries

Artificial intelligence (AI) has made it possible to provide solutions to pressing challenges facing libraries, such as shelving of books and other library materials, cataloguing and

acquisition of library materials, among others. Consequently, library services can be done in more effective and efficient ways for improved user satisfaction. Therefore, library users can access timely and accurate information quickly and promptly.

Fernandez (2016) noted that using AI in academic libraries will help to analyze big data, create metadata, and improve search translation. This means that using AI in academic libraries will make library materials more accessible and available, and allow the staff to answer users' queries on AI use. Tella (2020) stressed the need for academic libraries to re-position themselves to take relative advantage of artificial intelligence's potentials by refining the quality of library services in this era of the information age. Talley (2016) also emphasized the need for university librarians to embrace AI technologies to provide better services to researchers and other library users. Grant and Camp (2018) observed that many academic libraries particularly in developed countries have adopted AI for various library operations, such as circulation and reference services.

Sagarjit et al. (2001) maintained that the adoption and use of AI have improved user engagement in many developed countries in the world. Access to timely information can only occur in a situation where AI is being used to guide and support, and at the same time user-friendly, particularly in information search. For instance, a friendly AI technology will help users search for information with ease, help retrieve information across various collections, and help with users' queries.

Similarly, Asefeh and Asemi (2018) list various ways in which AI technologies can be used to improve library services to include the followings: circulation services, shelving of books, cataloguing of library materials, among others. AI technology can also be used to assign metadata and to assist in the non-textual search. Fernandez (2016) notes the potential

opportunities of AI in library operations, particularly in analyzing big data, creating metadata, translating search items, and integrating search items across contents.

Divayana et al. (2015) identified some of AI's advantages in library operations to include but not limited to the ability to perform library duties efficiently. With AI operation, libraries can carry out tasks very fast, compared to when being done by human beings. AI is handy in discovering unexplored concepts, such as outer space and reduces human errors in library operations. Liu (2011) argued that academic libraries can develop artificial intelligence in libraries using expert systems in the reference section to recommend to users the library materials to meet their queries.

Mogali (2015) also identified some advantages of AI to include>

- a) Can take on stressful and complex work that humans may struggle /cannot do
- b) Complete task faster than a human being can
- c) To discover unexplored things i.e. outer space;
- d) Less errors and defects;
- e) Can assist in accessing research jobs in any part of the world with ease
- f) Function is infinite

Challenges of Adopting AI in academic libraries

Despite all AI potentials in libraries, academic libraries in Nigeria are yet to adopt and implement AI. Perhaps, this might be due to low level of awareness and adoption of AI's relevance in libraries, as research connecting artificial intelligence (AI) to librarianship remains relatively low. While the use of AI has been increasing exponentially in other fields, this has not been the case in library and information science. The challenges, faced by libraries today, pose a tangible risk to the traditional role of libraries. Libraries are now struggling with operational

inefficiency, technological disadvantage, difficulty in maintaining current audiences and engaging new ones, and an inability to demonstrate value and benefits to all stakeholders.

Korinek and Stiglitz (2017) maintained that advances in AI technologies could bring about job losses or job polarization. AI adoption has the potential for a high rise in inequality due to automation. World Bank (2016) maintained that developing countries may be more hindered at the adoption of AI because it will lead to a high job loss rate. The report further states that 69% of job loss will be experienced in India through AI adoption; 72% in Thailand; 77% in China and 85% in Ethiopia. All these studies indicate that AI can lead to job losses and the potential for gross job destruction.

International Labor Organization (2018) also stressed that with the current trend in technological change based on the adoption of artificial intelligence in different organizations that include libraries, AI adoption has created widespread fear of job losses and a high rise in inequality.

Other challenges posed by the adoption of AI in academic libraries include:

1. **Financial uncertainty:** When government funds are shrinking and political or economic changes are underway, cultural institutions are often the first to suffer cuts. In many ways, the struggle for institutional or government funding is much like the chicken and egg problem. Libraries are expected to show value for money and demonstrate cost-effective practices, but they can't do that without integrating new technologies to upgrade their physical spaces, offer new services, and improve the user experience for today's patrons – all of which requires additional funding (Tella, 2020). Thus, today's libraries often find themselves in a financial limbo - unable to show value without additional funding.

2. **Emerging skill gaps:** The digitalization of information has impacted both library operations and systems. Today, the digital realm is just as important as the physical one, making it essential for libraries to develop new skills not only to stay competent, but to better serve patrons in the digital age. These services require new competencies, such as: higher levels of digital fluency, the ability to provide the most relevant resources at a much faster pace, and supporting hands-on creative activities to maximize a patron's learning experiences.
3. **Competing with today's alternative sources of information:** According to a 2017 Horizon report, a survey found that 68% of college students start their research with Google and Wikipedia. These free providers of information, along with the emerging open access trend in scholarly publication methods, are daring libraries to rethink their distribution of high-quality information in to the context of maintaining a vital presence in the new information landscape.
4. **Attracting new and more diverse audiences:** For libraries to appeal to their existing audiences and engage new ones, they need to offer services that meet the expectations of the new generation of hyper-connected patrons. This includes rethinking the library's traditional physical space, moving from a quiet place filled with bookshelves for reflective reading and writing to something entirely different. For the library to remain relevant, it needs to become a vibrant space for collaboration and innovative activities, alongside a quiet space for reflective studying.

Conclusion

The adoption of AI technology in academic libraries is setting a new level of efficient and effective library services delivery. Also, the adoption affords libraries the opportunity to render

improved and dynamic services to library patrons. AI is being used to guide and support library activities, and at the same time user-friendly, particularly in information search are among the benefits derived from the adoption AI in libraries. However, despite the benefits associated with the adoption of AI in libraries, some challenges such as financial uncertainty, emerging skill gaps, job loss, lack of adequate infrastructure and erratic power supply still hinder the smooth adoption of AI in many academic libraries in Africa.

Recommendations

Some of the recommendations suggested include:

1. Government and library management must come together to proffer the way forward for academic libraries in terms of meeting up with the latest standard of the use of AI in libraries
2. Library staff should be exposed to training and retraining in the use of artificial intelligence in delivering of libraries' services in order to achieve improved operational efficiency in libraries where the technology is to be adopted or already adopted.
3. There must be proper policy formulation and implementation prior to, during and after the adoption of AI in African academic libraries.
4. Higher institutions libraries should intensify efforts in adopting artificial intelligence in the delivery of libraries' services for libraries users to gain very high level satisfaction.
5. Government and concerned agencies should provide adequate artificial intelligent hardware and software to aid in the delivery of libraries' services to users.

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