CATALOGUING AND CLASSIFICATION IN THE ERA OF ARTIFICIAL INTELLIGENCE, BENEFITS, AND CHALLENGES FROM THE PERSPECTIVE OF CATALOGUING LIBRARIANS IN OYO STATE, NIGERIA

KATALOGIZACIJA I KLASIFIKACIJA U ERI UMJETNE INTELIGENCIJE, PREDNOSTI I IZAZOVI IZ PERSPEKTIVE KNJIŽNIČARA KATALOGIZATORA U DRŽAVI OYO, NIGERIJA

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Abstract

Goal: This study has examined cataloguing and classification in the era of artificial intelligence, benefits, and challenges from the perspective of cataloguing librarians in Oyo state, Nigeria.

Methodology: 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.

Findings/Results: 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.

Originality and Values: 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.

Keywords: Artificial Intelligence; Cataloguing; Classification; Cataloguing librarians; Nigeria

Sažetak

Cilj: Ova studija ispitala je katalogizaciju i klasifikaciju u eri umjetne inteligencije, prednosti i izazove iz perspektive katalogizatora u državi Oyo, Nigerija.

Metodologija: Studija je primijenila kvalitativnu metodu korištenjem intervjua za prikupljanje podataka. Ciljana populacija bili su katalogizatori i klasifikatori u akademskim knjižnicama u jugozapadnoj Nigeriji. Uzorak se sastojao od 21 knjižničara – katalogizatora i klasifikatora – koji rade u odjelu za katalogizaciju i klasifikaciju u 10 sveučilišnih knjižnica u jugozapadnoj Nigeriji. Postavljena su i četiri istraživačka pitanja na koja se nastojalo dobiti odgovore.

Nalazi/rezultati: Nalazi su otkrili da su knjižničari koji se bave katalogizacijom svjesni mogućnosti primjene umjetne inteligencije za katalogizaciju i klasifikaciju. Umjetna inteligencija poboljšava automatsko katalogiziranje i klasifikaciju korištenjem optičkog prepoznavanja znakova, pomaže u stresnom poslu koji ljudi obavljaju s teškoćom; obavlja zadatke brže od čovjeka i omogućuje knjižnicama pružanje preciznih usluga katalogizacije i klasifikacije s manje pogrešaka; štedi vrijeme i novac, pomaže knjižnicama u stvaranju metapodataka za digitalne izvore i dopušta katalogizaciji da poveća brzinu generiranja metapodataka. Izazovi povezani s primjenom umjetne inteligencije u praksi katalogizacije i klasifikacije iz perspektive katalogizatora i klasifikatora

jesu financiranje, neredovita opskrba električnom energijom i neodgovarajuće kvalificirano osoblje za rukovanje umjetnom inteligencijom. Trenutno ne postoji strateški plan za implementaciju umjetne inteligencije za katalogizaciju i klasifikaciju u akademskim knjižnicama u Nigeriji.

Originalnost/vrijednost: Na temelju nalaza ovom se studijom nudi teorijski okvir za postupno uvođenje umjetne inteligencije u sve akademske knjižnice u Nigeriji, za što je jedan od važnih preduvjeta uspostava strateškog plana kako bi se omogućila praksa korištenja umjetne inteligencije za katalogizaciju i klasifikaciju u svakodnevnom radu.

Ključne riječi: katalogizacija; katalogizatori; klasifikacija; umjetna inteligencija; Nigerija

1. INTRODUCTION

Cataloguing and classification play a pivotal role in successful library operations. This is because cataloguing and classification deal with organising and creating metadata for the library's collections. Library collections or the collections of information materials like books, journals, sound recordings, moving images, cartographic materials, computer files and electronic books in libraries all over the world are enormous. Hence, if they are not organised, the access to them by the users of the library may be practically impossible. In order to provide access to the information materials in the libraries, cataloguing and classification system are used. This makes accessing and locating information materials in libraries easy and quick. There have been various eras in cataloguing and classification systems in libraries. These eras include the manual cataloguing and classification system, automated cataloguing and classification system using MARC and copy-cataloguing, and now, the era of artificial intelligence (which is the focus of this study). The era of artificial intelligence has revolutionised the way we work and think (Gundakanal and Kaddipujar (2019).

Artificial intelligence (AI) has permeated almost every area of endeavours, like industries, hospitals, banks, academic institutions, and others. Libraries all over the world, irrespective of their types, are trying to deploy artificial intelligence. The application of artificial intelligence in libraries was pointed out by Young et al. (2017) to include expert systems, natural language processing, deep learning, knowledge reasoning, and robotics, among others. This application of artificial intelligence is visible in libraries in some developed and developing countries. It was reported by Vysakh and Rajendra (2019) that artificial intelligence has advanced the library to the extent of placing robots instead of humans in various operations of the library. The robots such as "Bobbie", developed by the Temasek Polytechnic Library, can deliver materials like newspapers, magazines, and brochures, and can also direct users to different locations in the library. Similarly,

"Robbie", a robot developed for the same library can scan more than 32,000 books per day. Vysakh and Rajendra (2019) stated that in this era of artificial intelligence, the future of libraries is indeed promising, because of its benefits.

The benefits of artificial intelligence in the library seem to be enormous. This was buttressed by Mogali (2014) who stated that the benefits inherent in artificial intelligence include cataloguing and classification of libraries' collections, undertaking stressful and complex work that humans may struggle/cannot do; completing tasks faster than a human can most likely; fewer errors and defects, and has an infinite function. To derive benefits from the application of artificial intelligence, Vysakh and Rajendra (2019) reported that many libraries have deployed artificial intelligence and have found the deployment beneficial. The authors stated that some libraries in the developed and developing world that have not deployed artificial intelligence in their libraries have the deployment in their strategic plan while others do not. The authors suggested that the academic libraries that have artificial intelligence is in their strategic plans may have done so because of the perspective they have on its benefits, while others that have neither deployed nor have it in their strategic plans, may have done so because of its challenges.

While considering the challenges of artificial intelligence Mogali (2014) noted the following challenges associated with the application of artificial intelligence: lack of human touch, ability to replace human jobs, and can malfunction and do the opposite of what they are programmed to do. Nevertheless, Mogali (ibid.) stated that the practicability of artificial intelligence in cataloguing and classification appears to be improving and that before long, artificial intelligence will occupy the technical services.

However, Omame and Alex-Nmecha (2020) reported that despite sufficient awareness and the benefits of artificial intelligence among librarians, many academic libraries in India are facing internal issues in the application of artificial intelligence. The author stated further that cataloguing librarians are resisting the implementation of artificial intelligence in libraries. This may be due to the perspective they have on artificial intelligence in the cataloguing section of the libraries. Cataloguing librarians are the professionals responsible for creating and maintaining bibliographic and authority records in the library catalogue, the database of books, serials, sound recordings, moving images, cartographic materials, computer files, and e-resources among others, that are owned by a library.

Similarly, the challenge of artificial intelligence as reported by Young et al., 2017) is that it cannot be intelligent as a human, because it is a man-made machine, therefore, it needs a human touch to be operated. If the cataloguer fails to provide a human touch (or resist) the application of artificial intelligence, libraries may not benefit maximally in this technological era. Also, it is against this background that this study set out to investigate cataloguing and classification in the era of artificial intelligence, benefits and challenges from the perspective of cataloguing librarians

in Oyo State, Nigeria. It is hoped that this study would provide information on the perspectives of cataloguers on the awareness, benefits and challenges of artificial intelligence in academic libraries in Oyo State. This may be of immense benefit to library administrators and the government in their policy toward the application of artificial intelligence in libraries.

2. LITERATURE REVIEW

Academic libraries are focusing on enhancing access to their contents with the application of artificial intelligence to cataloguing and classification. Academic libraries procure, acquire, and process thousands of information materials. The information materials are classified and catalogued by cataloguing librarians. Cataloguing librarians create thousands of pieces of metadata to make it easy for users to search for acquired information materials in the libraries collections. The increasing pressure on libraries to deliver information in the stipulated time is tempting the libraries to turn to Artificial Intelligence (AI). Artificial intelligence may help libraries to maximize efficiency in services (cf. Gundakanal and Kaddipujar, 2019).

Frankenfield (2020) defined artificial intelligence as a simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. Similarly, Merriam-Webster defined artificial intelligence as a branch of Computer Science dealing with the simulation of intelligent behaviour in computers; and the capability of a machine to imitate intelligent human behaviour. Also, ALA (2020) defined artificial intelligence as machines that work, react more like humans, and rely on deep learning, machine learning, and natural language processing that help computers accomplish specific tasks by processing large amounts of training data to help the system recognize patterns, input data to drive predictions, and feedback data for improving accuracy over time.

Similarly, Dinesh and Kashmira (2019) defined artificial intelligence as the science and engineering of making machines to demonstrate intelligence especially visual perception, speech recognition, decision-making, and translation between languages like human beings. From the above definition, it can be deduced that artificial intelligence is the use of a machine programmed to mimic human intelligence in the performance of routine tasks. There are different areas of artificial intelligence in libraries and other organisations or institutions. Mogali (2014) reported the different areas of artificial intelligence in libraries and that the application of artificial intelligence in libraries include expert system, natural language processing, pattern recognition, and robotics to simulate human intelligence with computers.

Furthermore, Vysakh and Rajendra (2019) also reported different areas of artificial intelligence as expert systems, artificial neural networks, fuzzy logic, image

processing, natural language processing, speech recognition and robotics. The era of artificial intelligence has impacted every organisation/institution in many ways. Academic libraries were not an exception. Gundakanal and Kaddipujar (2019) reported that the era of Artificial Intelligence enables libraries to provide valuable services in the libraries and also, to their users. While alluding to the era of artificial intelligence, Mogali (2014) noted that the present generation will experience the impact and utility of artificial intelligence in offices, factories, libraries and homes. There have been various applications of artificial intelligence in libraries.

Fernandez (2016) examined a study further through the looking glass: envisioning new library technologies understanding artificial intelligence. The study employed the method of literature review. The author reported that there was an increasing demand for flexible operating systems that can automatically respond to emerging challenges. Similarly, the author stated that the concept of AI was, therefore, increasingly integral to many of the most exciting technological developments occurring now. Also, Johnson (2018) reported that AI becoms better and better at understanding the information needs and delivering relevant answers, the author stated that it seemed it might be likely relied on even more. The author also stated that libraries may certainly be changed by the AI revolution in ways which we cannot imagine and that university libraries may have a critical role to play in the AI revolution.

Okpokwasili (2019) examined artificial Intelligence in libraries and users satisfaction in higher institutions in Nigeria. The study covered six higher institutions with twelve Departments in Nigeria. The population of the study comprises of 300 lecturers and 3, 200 students from twelve Departments of different levels. A random sampling technique was adopted and Krejcie and Morgan method was used to determine the sample size of 346. A questionnaire was used with a four point scale. The findings of the study revealed that there were high level of roles played by artificial intelligence in the delivering of library services and high level of satisfaction by the users of artificial intelligence in the libraries of higher institutions in Nigeria. The study recommended that university libraries intensified efforts in adopting artificial intelligence in the delivery of libraries services for library users to gain very high level of satisfaction.

Vysakh and Rajendra (2019) reported that the era of artificially intelligent has penetrated almost all the fields of life including libraries and that it can do things that human is incapable of with higher efficiency. They noted that artificial intelligence can be effectively adopted in libraries. The authors also reported many libraries that have the application of artificial intelligence in the libraries. These libraries are the NY Public Library, Temasek Polytechnic Library, UMKC Library, University of Chicago Library and Shanghai Library, and these libraries have found the deployment of artificial intelligence beneficial for cataloguing and

classification as well as a variety of operations within the library like book arrangement, sorting, retrieval, material handling and inventory.

There are limited studies available that focus on cataloguing and classification in the era of artificial intelligence in academic libraries. One is the research carried out by Mogali (2014), who traced cataloguing and classification in the era of artificial intelligence in academic libraries. The author focused on descriptive cataloguing because it is considered rule-based, that is, Anglo American Cataloguing Rule, Second Edition (AACR2). With this, the application of artificial intelligence to cataloguing is informed by a human-machine interface, where the intellectual effort is divided between the intermediary and the support system. Also, an Expert System which is a subset of artificial intelligence has full cataloguing capability linked to an electronic publishing system, so that as a text is generated online, it can be passed through knowledge-based systems and the cataloguing process is done without any intellectual input from an intermediary.

The application of Expert Systems to the classification of information materials in the libraries includes but is not limited to the following:

1. BIOSIS: This uses a knowledge base system that includes a significant amount of procedural knowledge, to assign documents to categories automatically. BIOSIS classifies documents as would be assigned by a human. This is said to be of immense benefit in the classification of information materials in libraries.
2. Coal SORT: This is a conceptual browser designed to serve either as a search or as an indexing tool. Coal SORT consists primarily of a frame-based semantic network and the software needed to allow users to display portions of it and to move around in the conceptual structure. The expert knowledge in the system is embodied almost entirely in the semantic network. There is no procedural knowledge in the system.
3. EP-X: The Environmental Pollution Expert (EP-X) has certain things in common with Coal SORT in that both are concentrating on enhancing interface using a Knowledge-Based approach. The knowledge base of EP-X consists of a hierarchical frame-based semantic network of concepts and a set of templates that express the patterns called the pragmatic relationship among concepts (Mogali, 2014). This era of artificial intelligence is proposed to be beneficial to cataloguing and classification systems in libraries.

Some of the benefits accrue to cataloguing and classification in this era of artificial intelligence include: the ability to undertake stressful and complex work that humans may struggle/cannot do; the ability to complete tasks faster than a human can most likely to; and ability to perform tasks with fewer errors and defects. Omame and Alex-Nmecha (2020) noted that the benefits of artificial intelligence

in cataloguing and classification sections in libraries are that it saves time and money. Also, Gundakanal and Kaddipujar (2019) noted that the benefits of artificial intelligence are that; it helps modern libraries to reach their potential in the digital era, it enables libraries to provide accurate services, it assists libraries to create metadata for digital resources and it allows cataloguing not only to increase the speed of metadata generation but also to expand the depth and breadth of subject terms. Many academic libraries are deploying artificial intelligence while some have it in their strategic plan to maximize its benefits (Gundakanal & Kaddipujar, 2019).

Also, Schreur (2020) reported that library technical services have benefited from numerous stimuli. Although initially looked at with suspicion, the transitions such as the move from catalogue cards to the MARC formats have proven enormously helpful to libraries and their patrons. Linked data and artificial intelligence (AI) hold the same promise. Through the conversion of metadata surrogates (cataloguing) to linked open data, libraries can represent their resources on the Semantic Web. However, in order to provide some form of controlled access to unstructured data, libraries must reach beyond traditional cataloguing to new tools such as AI to provide consistent access to a growing world of full-text resources.

Amanda and Sandy (2020) examined artificial intelligence in academic libraries. The study adopted the method of environmental scan on academic libraries' engagement with artificial intelligence and also reviewed scholarly articles, university libraries' strategic plans, and library programming to determine if any reference to artificial intelligence was being made and in what context. The top research universities in the United States and Canada were considered to discover the perspective of librarians in the era of artificial intelligence well as how libraries are responding to it. The findings of the study revealed a lack of awareness of the application of artificial intelligence by the librarians in the institutions. Similarly, the findings of the study also revealed that the majority of the institutions had a strategic plan for the application of artificial intelligence in their libraries while some neither deployed nor have a strategic plan for artificial intelligence in their libraries. Also, Tella and Ajani (2022) stated that many African countries do not have the necessary policy and facilities needed for the application of artificial intelligence in academic libraries despite the huge benefits that the application of artificial intelligence could offer in academic libraries.

Also, Gundakanal and Kaddipujar (2019) examined artificial intelligence in libraries using a survey method. The result of the findings revealed that fewer libraries have artificial intelligence-related operations in their libraries and fewer librarians were keen to adopt artificial intelligence in their libraries. The authors suggested that a lack of awareness of the benefits and cost-saving opportunities of artificial intelligence in libraries could hinder the libraries in the adoption of

the technology. Also, Harisanty et al. (2022) examined leaders, practitioners and scientists' awareness of artificial intelligence in libraries. The purpose of the study was to investigate the level of AI awareness among library leaders, practitioners and scientists of Indonesian academic libraries to elucidate the benefits of AI implementation and its necessary infrastructure and challenges. The purposive sampling technique was adopted to select the 38 respondents. The findings of the study revealed that there was awareness of AI among library stakeholders. Also, the findings of the study revealed that there was sufficient information to begin AI initiatives in Indonesian libraries as leaders, practitioners and scientists had a favorable, open and encouraging outlook on AI.

Similarly, Tait and Pierson (2022) reported that the use of AI and robots in library and information science was garnering attention due to early applications and their potential to contribute to the digital transformation of the information professions. The study assessed the challenges and opportunities for LIS education on the application of AI and robots. The study reviewed the curriculum, through subject descriptions, of five ALIA accredited LIS courses in Australia and the ALIA foundation knowledge documentation. Content analysis was employed to identify and assess the framing of AI and robotics. The finding of the study revealed that only one subject mentions AI to position subject content and none mention robotics. Also, the findings of the study revealed multiple areas for the inclusion of AI and robots ALIA accredited LIS courses in Australia and the ALIA foundation knowledge documentation.

Odeyemi (2019) indicated the challenge associated with the application of artificial intelligence in libraries in Nigeria as inadequate power supply. There is the possibility that the challenges associated with artificial intelligence could hinder the libraries and the librarians on its use. Various challenges of artificial intelligence are:

Building trust: Artificial intelligence is all about science, technology, and algorithms which most people are unaware of, which makes it difficult for them to trust.

AI human interface: Being a new technology, there is a huge shortage of working manpower having data analytics and data science skills; those, in turn, can be deputed to get maximum output from artificial intelligence. As the advancement of AI rises, businesses lack skilled professionals who can match the requirement and work with this technology. Libraries' owners need to train their professionals to be able to leverage the benefits of this technology.

Investment: AI is an expensive technology that not every business owner or manager can invest money into, as a large amount of computing power will be necessary and sometimes hardware acceleration with GPU, FPGA, or ASIC must exist to run machine learning models effectively. Though the adoption of AI is

surging high, it has not been integrated fully into a business's value chain at the scale that it should have. Moreover, enterprises of those who have incorporated are still in a nascent stage which has resulted in the slowdown in the lifting of the AI technology at scale and thus been deprived of cost-benefit of scale. After decades of speculation and justifiable anxiety about the social implications of intensifying and potentially de-stabilizing AI technology for humankind and the Black box problem, AI investors are a bit skeptical about parking their money in potential startups.

Software malfunction: With machines and algorithms controlling AI, decision-making ability is automatically ceded to the code-driven Black Box tools. Automation makes it difficult to identify the cause of mistakes and malfunctions. Moreover, due to the lack of ability of human beings to learn and understand how these tools work, they have little or no control over the system, which is further complicated as automated systems become more prevalent and complex.

Non-invincible: (Can replace only certain tasks) Like any other technology, AI also has its limitations; it simply cannot replace people in all tasks. However, it will result in emerging new job domains with different quality job profiles.

High expectations: Research in artificial intelligence is conducted by a large pool of technologists and scientists with varying objectives, motivation perspectives, and interests. The main focus of research is confined to understanding the underlying basis of cognition and intelligence with a heavy emphasis on unravelling the mysteries of human intelligence and thought processes. Not everyone understands the functioning of AI and some might also have very high expectations of how it functions.

Data security: Machine learning and decision-making capability of AI and AI applications are based on huge volumes of classified data, often sensitive and personal. This makes it vulnerable to serious issues like data breaches and identity theft. Mostly, companies and governments striving for profits and power, respectively, exploit the AI-based tools which are generally globally networked (Dinesh & Kashmira, 2019).

Similarly, Owobabi et al. (2021) examined the readiness of academic librarians toward the use of robotic technologies in Southwestern Nigerian university libraries. The authors assessed the levels of readiness of university libraries in Nigeria towards robotic technologies, policy framework and human development for the adoption and use of robotics in the libraries and the awareness of the potential benefits of robotics in library operations. A survey research design was adopted and a questionnaire was used as a data collection instrument. A total of 100 academic librarians were purposively selected in ten universities. The findings of the study revealed that the readiness of university libraries in Nigeria towards the adoption and use of robotic technologies in Nigeria is not particularly widespread or enthusiastic.

Furthermore, Lund et al. (2020) investigated the perceptions toward artificial intelligence among academic library employees and alignment with the diffusion of innovations' adopter categories. The study described the results of a survey of practicing librarians regarding the adopter category with which they identify and the relationship of this identification with perceived knowledge and perceptions of AI technology within and outside the library environment. The findings of the study revealed that the majority of the respondents perceived that AI would jeopardize their employment status. Also, the findings revealed that the respondents perceived that AI would improve their lives and the library job.

Similarly, Smith (2021) examined automating intellectual freedom focusing on AI, bias, and the information landscape. The author reported that anxieties over automation and personal freedom are challenging libraries' role as havens of intellectual freedom. The introduction of artificial intelligence into the resource description process creates an opportunity to reshape the digital information landscape and loss of trust by library users. The resource description necessarily manipulates a library's presentation of information, which influences the ways users perceive and interact with that information. Human cataloguers inevitably introduce personal and cultural biases into their work, but artificial intelligence may perpetrate biases on a previously unseen scale. The automation of this process may be perceived as a greater threat than the manipulation produced by human operators. Librarians must understand the risks of artificial intelligence and consider what oversight and countermeasures are necessary to mitigate the harm to libraries and their users before ceding the resource description to artificial intelligence in place of the professional considerations.

Adejo and Misau (2021) examined the application of artificial intelligence in academic libraries in Nigeria Qualitative research method was adopted for the study. The research objective set as a guideline for the study was how the application of Artificial Intelligence could be used in Nigerian Academic Libraries. The findings from this study revealed that AI could be applied in Academic library services in Nigeria like expert systems in reference services, technical, indexing, acquisition as well as its application in natural language processing, pattern recognition and robotics in library activities. The study recommended that academic libraries in Nigeria embrace the use of Artificial Intelligence in the library operations and that library staff need to be trained on its use in the library services delivery.

A limited number of studies were found on the application of artificial intelligence in libraries, especially in Africa and Nigeria. From the above literature review, Gundakanal and Kaddipujar (2019) reported the benefits of artificial intelligence in cataloguing and classification sections and other library services. However, their studies did not look at the benefits of artificial intelligence from the perspective of cataloguing librarians in libraries. Similarly, Fernandez (2016), Johnson (2018), Schreur (2020), Lund et al. (2020), Smith (2021), Adejo and Mi-

sau (2021), and Harisanty et al. (2022) and Amanda and Sandy (2020) also examined the deployment, strategic plans and awareness of artificial intelligence in academic libraries in the United States of America and Canada, but to the best of the researcher's knowledge, no corresponding research was found in Nigeria, most especially academic libraries in Oyo State. It is hoped that this research will be a prelude to cataloguing and classification in the era of artificial intelligence, outlining the benefits and challenges from the perspective of academic librarians in Oyo State, Nigeria.

3. RESEARCH

3.1. The objectives of the Study

The main objective of the study is to examine cataloguing and classification in the era of artificial intelligence, benefits and challenges from the perspective of cataloguing librarians in Oyo State, Nigeria. The specific objectives were to:

1. determine the awareness of the application of artificial intelligence to cataloguing and classification by cataloguing librarians in academic libraries in Oyo State, Nigeria;
2. examine the benefits of the application of artificial intelligence cataloguing and classification from the perspectives of cataloguing librarians in academic libraries in Oyo State, Nigeria;
3. examine the strategic plan toward the application of artificial intelligence in academic libraries in Oyo State, Nigeria.
4. identify the challenges associated with the application of artificial intelligence in the cataloguing and classification section by cataloguing librarians in Oyo State, Nigeria;

3.2. Research Questions

1. What is the awareness of cataloguing librarians in academic libraries in Oyo State, Nigeria on the application of artificial intelligence for cataloguing and classification?
2. What are the benefits of artificial intelligence from the perspective of cataloguing librarians in academic libraries in Oyo State, Nigeria?
3. What are the challenges associated with the application of artificial intelligence for cataloguing and classification by cataloguing librarians in academic libraries in Oyo State, Nigeria?
4. What are the strategic plans for the application of artificial intelligence in academic libraries in Oyo State, Nigeria?

3.3. Research Methodology

The study has adopted a purely qualitative method using interviews for data collection. The target population of the study were the cataloguing and classification librarians in academic libraries in Southwest Nigeria. The sample for the study comprised 21 cataloguing librarians working in the cataloguing and classification section of 10 university libraries. They were chosen because they are directly involved in cataloguing and classification operations in the libraries. The librarians spread across 10 university libraries in Oyo State, Nigeria. The university libraries are the University of Ibadan, Ibadan, Ladoke Akintola University of Technology Library, Ogbomoso, Lead City University Library Ibadan, Dominican University Library Ibadan, Ajayi Crowder University Library Oyo, Technical University Ibadan Library Ibadan, Kola Daisi University Library Oyo, Precious Cornerstone University Library Oyo, Atiba University Library and Dominion University Library Ibadan. All the 21 cataloguing librarians in the 10 university libraries listed above were enumerated in total as the sample size. This represents the sample for the study. The method of interview adopted for this study was structure interview. The interview consisted of 7 questions which were organised based on the objectives of the study. These 21 librarians were interviewed between 9th and 24th May, 2022. The informed consent was requested from each of the respondents and they indicated the interest to participate in the study. Thereafter, the interviews were conducted in English language which took an average of 15 minutes per participant. The interviews took place in each of the10 universities that participated in the study. This provided an opportunity to collect detailed information from the respondents. Each of the authors covered 5 university libraries within the period of 5 days. The respondents were interviewed based on the interview guide relating to the four specific objectives of the study. The interview responses were collated and analysed using content analysis thematically by the researchers.

3.4. Results and Discussion

The results and the discussion of the findings of this study based on the reflections from the interviews are presented as follows:

Research Question One: Awareness of cataloguing librarians on the application of artificial intelligence to cataloguing and classification by cataloguing librarians in academic libraries in Oyo State, Nigeria.

The respondents were asked whether they were aware of the application of artificial intelligence to cataloguing and classification practices in the library. All the respondents (100%) indicated that they were aware of the application of artificial intelligence in the cataloguing and classification section of the libraries. The respondents were further asked whether the application of artificial intelligence

was in their cataloguing section. All the respondents (100%) indicated no, that is, artificial intelligence has not been in use in their libraries. One respondent stated "I am aware of application of artificial intelligence in cataloguing and classification in libraries" Also, the respondents were asked how they got the awareness of the application of artificial intelligence in the cataloguing section of the libraries. The majority, 70% of the respondents indicated that they had read about the application of artificial intelligence in cataloguing and classification sections in journal articles and on websites of other universities in developed countries that have adopted artificial intelligence. One respondent stated "I only read about the application of artificial intelligence in cataloguing and classification in a journal article". The finding of this study disagreed with the findings of Gundakanal and Kaddipujar (2019) and Owobabi et al. (2021).

Research Question Two: What are the benefits of the application of artificial intelligence to cataloguing and classification in academic libraries from the perspectives of cataloguing librarians in academic libraries in Oyo State, Nigeria?

This research question sought to find out the perspectives of cataloguing librarians on the benefits inherent in artificial intelligence. The majority, 70% of the respondents' perspectives on the benefits of the application of artificial intelligence to cataloguing and classification operations revealed that artificial intelligence enhances automatic cataloguing and classification using optical character recognition, undertaking stressful work that humans may struggle to do; completing tasks faster than a human being and enables libraries to provide accurate services with fewer errors. Also, 80% of the respondents revealed that the benefits of artificial intelligence include saving time and money, assisting libraries to create metadata for digital resources and allowing cataloguing to increase the speed of metadata generation. One respondents reported "I like the application of artificial intelligence in cataloguing and classification because it allows libraries to provide accurate and timely services to library users". The findings of this study are corroborated with the results of studies by Adetayo (2023) who found that AI assists technical and reader services, including answering basic reference inquiries, navigating the library website, and also assisting with research, cataloguing, classification, and collection development.

Research Question Three: What are the challenges associated with the application of artificial intelligence for cataloguing and classification by cataloguing librarians in academic libraries in Oyo State, Nigeria?

The respondents were asked to indicate the challenges associated with the application of artificial intelligence in the cataloguing and classification section of the libraries. The majority, that is 85% of the respondents indicated that funding was a major challenge associated with the application of artificial intelligence in the cataloguing and classification section of the library. They said that the fund provided by the government who is a major financier of the university was not

adequate. One of the respondents replied that the power outage was a major challenge. He even said that they have not fully enjoyed all the benefits of their library automation due to irregular power supply in the library. Another respondent indicated that lack of technical know-how was one of the challenges associated with the application of artificial intelligence in the library. He said that most of the library automation in their library was handled by the technical staff in the Information and Communication Technology Department of the university. In addition, one respondent stated that "part of the challenges we are having in the library is irregular power supply. This is a hindrance to the application of artificial intelligence in our library." Similarly, the majority, 76% of the respondents affirmed that the lack of the skilled professionals that can match the requirements of the application of artificial intelligence in the cataloguing and classification section was a challenge.

The findings of this study affirmed the findings of Owobabi et al. (2021) and Odeyemi (2019).

Research Question Four: What are the strategic plans for the application of artificial intelligence in academic libraries in Oyo State, Nigeria?

The respondents were asked to explain the strategic plans put in place for the application of artificial intelligence in their cataloguing and classification section of the libraries. The majority of the respondents (90%) indicated that there is no strategic plan put in place by their libraries. The respondents were further asked whether or not they would like to adopt artificial intelligence in their cataloguing section. The majority, that is, 85% of the respondents indicated that they would like to adopt artificial intelligence in their libraries, while 15% respondents indicated that they did not like the adoption of artificial intelligence due to irregular power and the possible tendency to lose their job. One respondent stated "We don't have any strategic planning for the application of artificial intelligence in our cataloguing section in our library". The result of this study corroborated the study of Owobabi, Okorie, Yemi-Peters, Oyetola and Oladokun (2021) and Tella and Ajani (2022). However, the finding of this study disagreed with the finding of Gundakanal and Kaddipujar (2019).

4. CONCLUSION

This study has examined cataloguing and classification in the era of artificial intelligence, benefits, and challenges from the perspective of cataloguing librarians in Oyo state, Nigeria. Based on the findings from the study, it is concluded 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; completing 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. In terms of challenges, the study concluded that funding was a major issue associated with the application of artificial intelligence in the cataloguing and classification, followed by the irregular power supply, and inadequately 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.

4.1. Recommendations

Based on the findings of this study, it is recommended that a strategic plan should be put in place in all academic libraries in Nigeria. This would allow the practice of using AI for cataloguing and classification. Currently, cataloguing librarians have not experienced this in a real-life situation. The information they provided in this study was based on their perception and what they read in literature or what they heard at conferences regarding the benefits of AI to cataloguing and classification. Experiencing it in real-life situations will bring a worthwhile improvement to cataloguing and classification services in academic libraries in Nigeria.

This study has demonstrated innumerable benefits of AI to cataloguing and classification, therefore, without any further delay, academic libraries in Nigeria should consider deploying AI and their parent body should as a matter of urgency make the necessary funds available for the procurement of AI technology in all academic libraries. This will enable them to compete favourably with their counterparts in the advanced countries that are currently benefiting and reaping the benefits of the deployment of AI in the services of their libraries.

As academic libraries in Nigeria are considering the deployment of AI for cataloguing and classification, the training of the cataloguing and classification librarians is highly recommended as this will improve their skills in the use and application of AI in their daily cataloguing and classification practices.

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