

ARTIFICIAL INTELLIGENCE (AI) AND THE FUTURE OF ACADEMIC LIBRARY SERVICES: A STUDY OF LIBRARIANS AI SKILLS IN ACADEMIC LIBRARIES IN SOUTH - SOUTH NIGERIAN UNIVERSITIES

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Abstract

With an emphasis on the AI competencies of librarians in South-South Nigerian universities, this study investigates how artificial intelligence (AI) may influence academic library services in the future. Librarians must develop new skills in order to properly employ AI technologies as they are incorporated into library operations more and more. These technologies include automated cataloguing, digital resource management, AI-driven user help, and predictive analytics. The study evaluates librarians' present AI capability in South-South Nigerian institutions and pinpoints knowledge and training gaps. It also looks at the possible benefits and drawbacks of using AI in academic libraries, emphasizing the potential for better service delivery, better user experiences, and more effective resource management. The results underscore the need of ongoing

Keywords: Academic, Libraries, Librarians, Artificial, Intelligence, Services

Introduction

The Artificial Intelligence (AI) has impacted almost all industries, and the academic libraries are not an exception. The reorganization of functions, fast and efficient information search, and a focus on users' needs offer enormous potential for robotization, machine learning, and natural language processing in libraries, including the processes of library services. With the prospect of how AI may impact on academic library services in the future, this article highlights the competencies in AI among the librarians in South-South universities in Nigeria. AI can potentially contribute in the creation and management of the new form of record keeping which is called the digital archives. Even though through the help of Artificial intelligence it is possible to preserve an important academic work and also enrich the works done by students as well as academics through automation of the process of digitization and indexing of the works done (Hodges & German, 2020).

However, based on literature, the librarians link this proficiency often, to lack adequate technical skills to engage on AI (Raju, 2017). There could probably be many librarians who are not capable of being competent in assisting the users to search for resources with the help of AI, troubleshooting problems with the AI systems and often do not have any idea on how they can manage complex AI solutions. Hence, the need for professional development or training, so as to eliminate this skills deficit. Therefore, in order for these librarians to be in a position to be in touch with these new developments of AI and other related technologies, training and help will always be required perpetually (Jiménez 2019). In that case the gains that an AI has in store for academic libraries may not be unassailable since the librarians may not be fully prepared to exploit an AI to its optimum.

I have also been able to argue that through personalization, AI is also capable of improving users' satisfaction and interest. Consequently, virtual assistants and chatbot could help the user in real time answering questions about the library services in which the user is interested (Hodges & German, 2020). Thus, through adoption of and innovative technologies, the libraries have the opportunity of satisfying this need of books, journals, research and other learning resources within their communities. Facility that is worth noting is that out of all the libraries belonging to different universities, some of them have adapted the use of AI technologies in their library and the move has helped in enhancing the level of service delivery. For instance, there is Libby which is an AI chatbot used in addressing the users in library information and reference questions which was created recently by the University of Oklahoma Libraries (Hennig, 2017), According to Hennig, Libby was successful in positively enhancing an organization's customers as well as response time, a factor that made it evident that AI holds the potential of enhancing library services. Another example of application of AI is exhibited by the National Library of Norway where a large number of books and manuscripts were scanned and classified. Hodges & German (2020) pointed out to the fact that the new AI had a capability of identifying texts and indexing them, hence enhancing the efficiency in the process of information search. The examples described above reveal what information services AI can bring to academic libraries and why those applications are significant to the users and the workflow of the librarians. Again, AI has the potential to make library operations more efficient and support the students but can also cause chaos in the academic library environment, which leads to plagiarism and the spread of misinformation (Steiger, 2024).

Similarly, the University of Southern California Libraries has recently integrated an AI-chatbot known as Gillian to respond to several questions that are often posed by the researchers or the learners, referred to as Natural Language Processing (NLP) which uses language comprehension tools to answer questions concerning Library opening, books available and help in research among others. This chatbot is accessible at any time of the day and any day of the week since it is integrated with the library's cell phone application and an Internet site (Jackson, 2022).

In another development, the University of Pretoria Library in South Africa has improved supply and acquisition of supplies through managing the supplies of resources and the growth of collections with the support of predictive analytics that is augmented with artificial intelligence. The consumption data assist the library to identify what new materials to purchase and the efficient ways of reallocating resources for future consumption predictions (Nkosi & Dube, 2020). University of Lagos Library also applies AI where it is used to create metadata and also categorize the different items on its own. This shows that new acquisitions are classified and identified through the use of machine learning algorithms therefore making them easily identifiable for consumers or users (Adebayo & Akinwale, 2019). Besides, software with artificial intelligence to check for cases of plagiarism has also been subscribed by the Makerere University Library to build on integrity among academics. The computer performs several testing's and through the machine learning technique, the computer is able to detect cases of plagiarism in the inputs from the students against a database of scientific works (Mwanguzi & Nakibuuka, 2020). In Tanzania, the University of Dar es Salaam has implemented the search and discovery technologies on the basis of artificial intelligence in the view of enhancing the opportunities provided to the users. These technologies improve the presentation of information in that once it employs the use of artificial intelligence and learning methodologies that defines the topical relevance as well as the possible results pertaining to the particular user (Mwakyusa, 2021).

Similarly, the use of artificial intelligence is also realized in Kenyatta University Library in form of a chatbot, which helps the user in answering simple questions or during use of facilities in the library. The chatbot responds correctly to the consumer enquires taken through the text analysis in Kamau (2021) hence offering full round the clock assistance. From the results, further new search and discovery facilities with Artificial Intelligence have integrated plugs into the University of Ghana Library to enhance the experience of the users. By enhancing the performing of

individualized search and also recommendations, it increases information replica search by utilizing the machine learning algorithms as supported by Mensah & Agyemang (2021). Further, the University Library, Ibadan has also embraced the use of an artificial intelligent chatbot to assist the users of the library answering basic questions as well as in assisting the library users in finding specific information in the library. This is an online conversational agent with NLP to address the user questions and it is always on – anytime (Afolabi, 2020). In Abu Main Catalog for Ahmadu Bello University Library the cataloging and embellishment of metadata is done by the assistance of AI. In the specific context of their article which focuses on the knowledge management in the university settings, Garba and Yusuf (2019) explain how the new acquisition is classified with the help of ML algorithms and how the latter tags the results with the purpose of making them easily findable for the users. This has been done in an attempt to fight cases of plagiarism with the usage of a plagiarism detection tool that is based on Artificial Intelligence and is currently available in the University of Lagos library. It is important to know that these tools use a feature called machine learning that compares students’ submissions with a database of academics works to identify potential cases of plagiarism (Ogunleye & Adeyemi, 2021).

Critical analysis of the above case studies offer explicate documentation on the various purposes and impact of the AI in the university libraries of West Africa. Today, the artificial intelligence technology has been integrated into the library services and improving users’ experiences in such as by the use of the chatbot and intelligent search. Other of its uses are for example used in cataloging of books, used in analysis and also used in the detection of plagiarism. However, such advancement comes with flaws which are as follows; some of which are privacy, and the frequent change of version. The following issues mentioned above could be implemented in West African academic libraries to increase service delivery and meet users’ expectation through the use of AI.

Research Questions

1. To what extent do the librarians in the South-South universities know and understand the AI technologies?
2. Which kinds of AI technologies are utilized in the academic libraries in South-South universities?
3. What is the decision-making process and perceived benefits/challenges of implementing AI in the academic library services as seen by the librarians?
4. What professional development librarians require to enable them to harness the application of AI technologies?

5. What opportunities and threats do librarians seem to embrace in relation to AI as a driver for the future of the academic library services?

Method and Procedures

The study adopts the descriptive research design to establish AI skills possessed by librarians in academic libraries in higher learning institutions in South-South Nigeria. The target population of the study encompasses 6,237 librarians drawn from higher institutions in South-South Nigeria. A total of 368 respondents is selected using Krejcie and Morgan sample size table (Krejcie & Morgan, 1970) in order to make statistically significant conclusions possible in addition to being practically achievable in terms of data collection and analysis. In this study, the researcher employs multistage sampling to make sure that there are a large number of representative samples. This approach is particularly helpful as it allows not only for an overview of the current levels of the skill within the workforce, but it also outlines patterns, trends and issues that need to be resolved (Kothari, 2004). Data is collected through google forms shared on various social groups used by Nigerian librarians. The interviews results are presented using descriptive analysis components, which include percentage, frequency, and mean. The findings of the research are presented in tabular form and pie charts so as to determine the relative importance of various factors in contributing to the inputs.

Data Analysis and Discussions of Results

Table 1: Age of the Respondents

Age	Freq.	%
20 – 30 years	17	5
31 – 40 years	98	30
41 – 50 years	98	30
51 years and above	114	35
N	327	100

As shown in Table 1, 114(35%) of the respondents are within the age range of 51 years and above, 98(30%) of the respondents are within the age range of 31-40 and 41 – 50 years respectively, while 17(5%) of the respondents are within the age range of 20 – 30 years. The decision was reached that the majority of the respondents that participated in this study are within the age range of 51 years and above.

Table 2: Gender of the Respondents

Gender	Freq.	%
Male	170	52
Female	157	48
N	327	100

Table 2 reveals that 170(52%) of the respondents are male, while 157(48%) of the respondents are female. Thus, the majority of the respondents who participated in this study are males.

Table 3: Highest Level of Education of the Respondents

Level of Education	Freq.	%
Bachelor Degree	45	14
Master Degree	141	43
Ph.D. Degree	141	43
N	327	100

Data presented in Table 3 shows that 141(43%) of the respondents are Master's and PhD degree holders respectively, while 45(14%) of the respondents are Bachelor's degree holders. Therefore, the decision was reached that most of the respondents who participated in this study are Masters and Ph.D. degree holders respectively.

Table 4: Work Experience of the Respondents

Experience	Freq.	%
Less than 1 year	-	-
1 – 3 years	33	10
4 – 6 years	33	10
7 – 10 years	33	10
More than 10 years	228	70
N	327	100

Table 4 shows that 228(70%) of the respondents have work experience of more than 10 years, 33(10%) of the respondents have work experience of 1-3, 4-6, and 7-10 years, while none has the work experience of less than 1 year. The conclusion was reached that the majority of the respondents who participated in this study have work experience of more than 10 years.

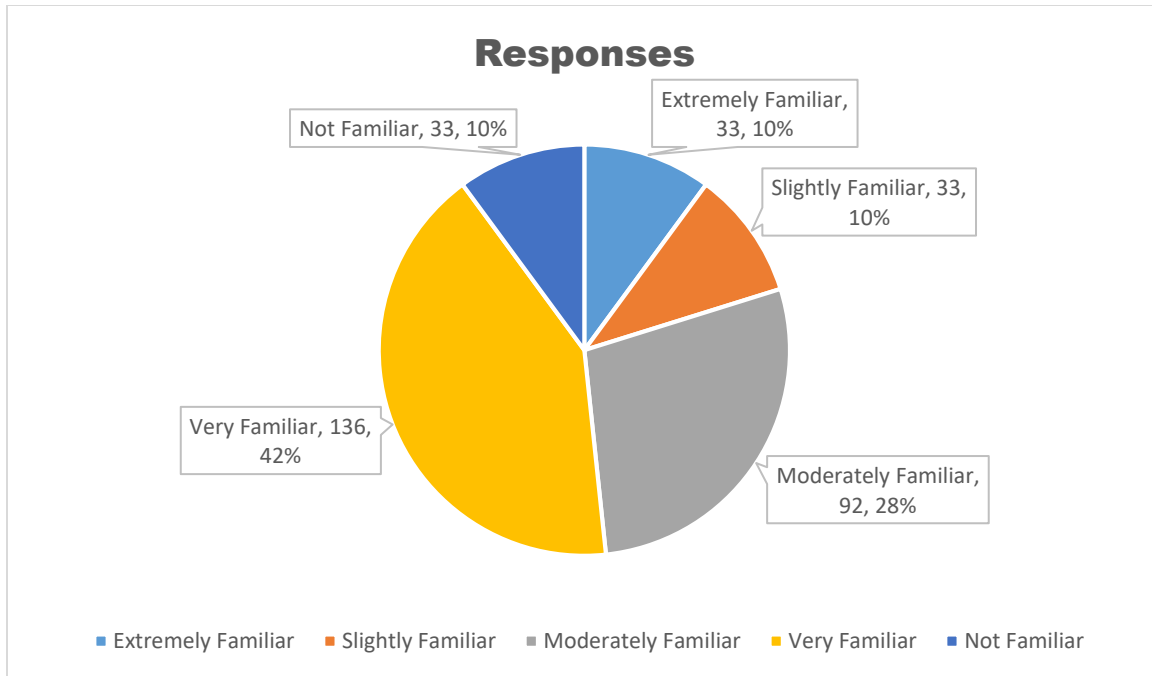


Figure 1: Level of Familiarity with AI Technologies

Data presented in Figure 1 shows that 136(42%) respondents are very familiar with AI technologies, and 92(28%) respondents are moderately familiar with AI technologies. In comparison, 33(10%) respondents are not familiar, extremely familiar and slightly familiar with AI technologies. The decision was reached that most of the respondents who participated in this study are very familiar with AI technologies.

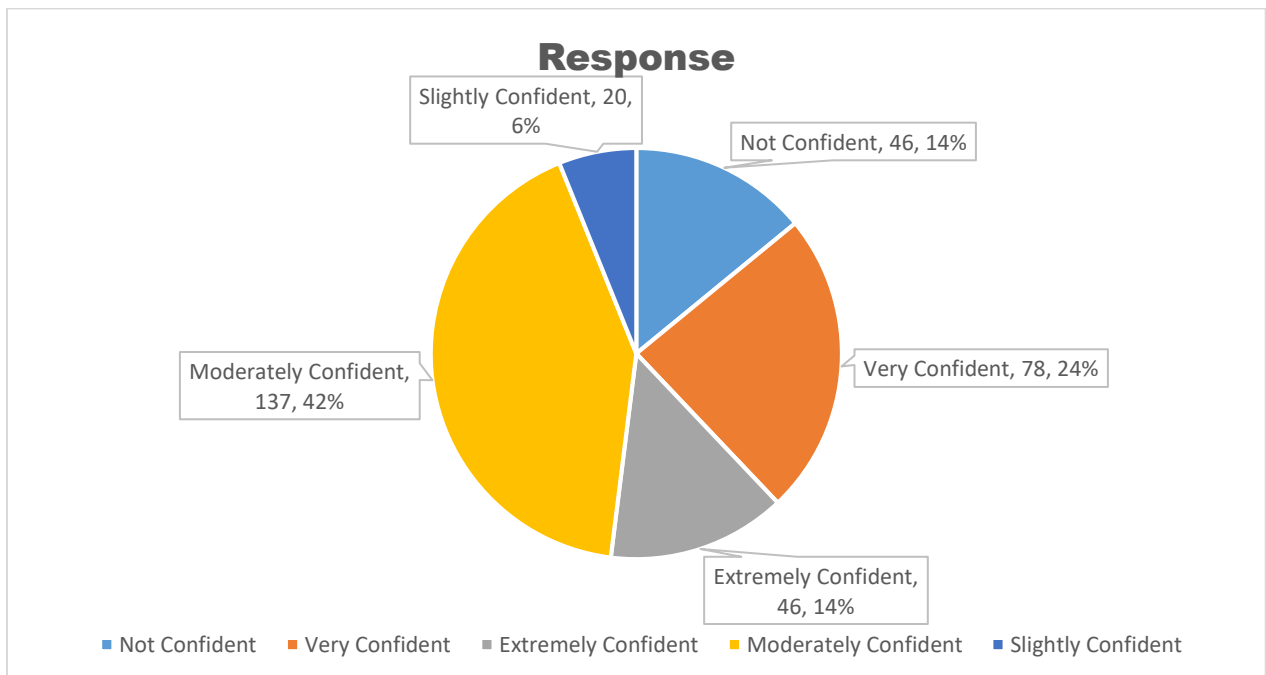


Figure 2: Level of Confidence in the Use of AI Technologies for Daily Routine Work

Figure 2 shows that 137(42%) of the respondents are moderately confident in the use of AI technologies, 78(24%) of the respondents are very confident in the use of AI technologies, 46(14%) of the respondents are not confident and extremely confident in the use of AI technologies, while 20(6%) of the respondents are slightly confident in the use of AI technologies. Thus, it was concluded that most of the respondents used for this study are moderately confident in the use of AI technologies for their daily routine work in the library.

Table 5: Level of Competencies of Librarians of AI Technologies

AI Technologies	Skill					\bar{X}
	Expert	Proficient	Moderate	Small	No	
Machine Learning	-	46	95	124	62	2.38
Natural Language Processing	-	79	62	124	62	2.49
Data Analytics	-	46	78	111	92	2.24
Programing (e.g., Python, R)	-	16	46	62	203	1.62
Using AI-based library management systems	-	62	108	108	49	2.56
N 327 Criterion Mean 3.00 Aggregate Mean 2.26						

The data presented in Table 5 assesses the level of competencies of librarians in various AI technologies. For machine learning, the average skill level is moderate to small, with a mean score of 2.38, as most respondents (124) rated their skills as small, followed by 95 with moderate skills. In natural language processing, librarians' competencies are slightly higher but still below proficient, with a mean score of 2.49, as 124 respondents rated their skills as small and 79 as proficient. Data analytics shows similar trends, with most respondents (111) indicating small competency, leading to a mean score of 2.24. Competency in programming languages like Python and R is notably low, with the highest number of respondents (203) having no skill, resulting in a mean score of 1.62. However, using AI-based library management systems has a relatively higher competency level, with a mean score of 2.56, as 108 respondents rated their skills as both moderate and small. The aggregate mean score of 2.26, which is below the criterion mean of 3.00, indicates that overall, librarian's feel their competencies in AI technologies are below the desired level.

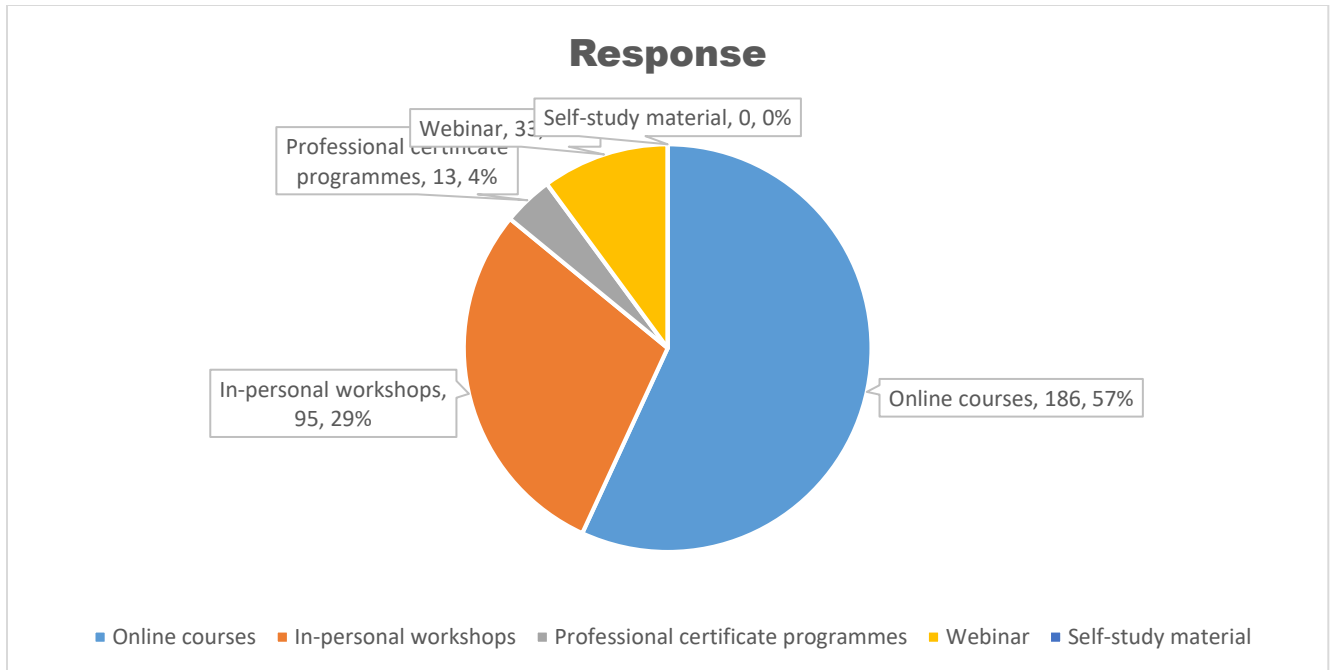


Figure 3: Types of Training to Effectively Use AI Technologies

The types of training necessary for librarians to effectively use AI technologies are revealed in Figure 3. As revealed in the Figure, online training courses (186, 57%), in-person workshops (95, 29%), and professional certificate programmes (13, 4%). Therefore, it was concluded that the majority of the respondents indicated that online courses (186, 57%) are the preferred type of training that will enable librarians to effectively use AI technologies in academic libraries.

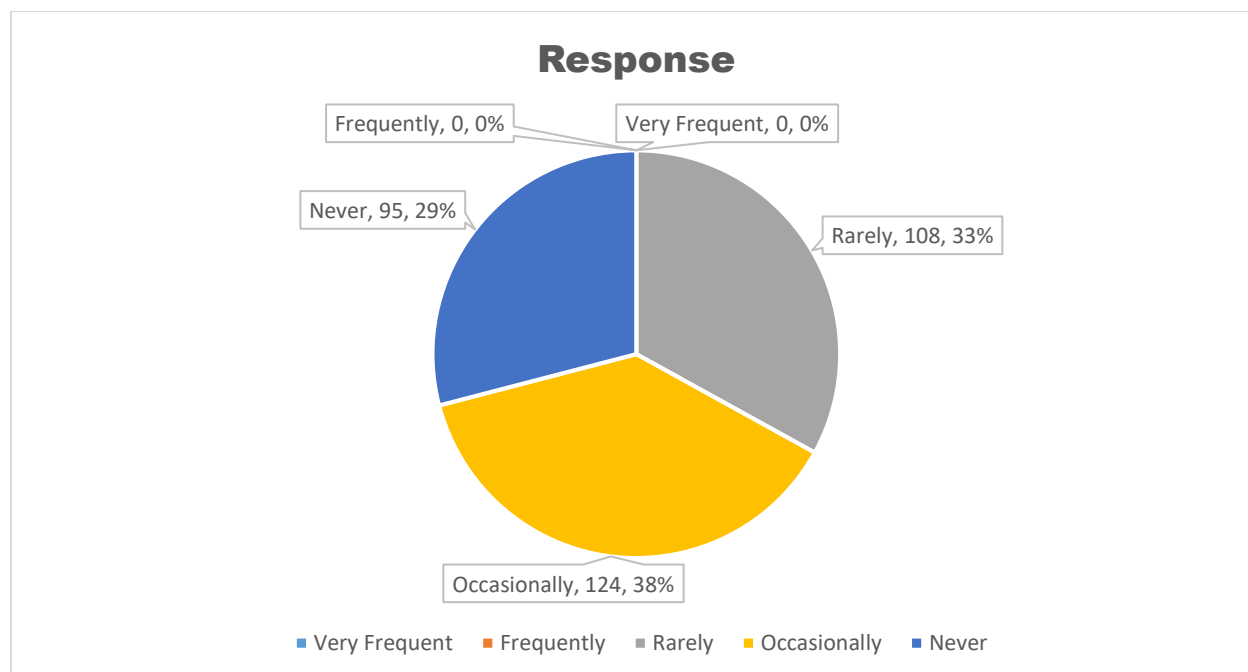


Figure 4: Frequently of AI-related training for library staff

Figure 4 shows information on the frequency of AI-related training organized for library staff. As the table shows, AI-related training for library staff is organized occasionally (124, 38%), rarely (108, 33%), never (95, 29), frequently and very often (0, 0%). Thus, it was concluded that the majority of the respondents indicated that AI-related training is occasionally organised for library staff.

Table 6: Perceived Impact of AI on Future Academic Library Services

Statement	SA	A	D	SD	\bar{x}
AI will significantly improve library services.	265	62	-	-	3.81
AI poses a threat to librarian job security.	-	170	140	17	2.47
The benefits of AI outweigh its potential risks.	157	144	13	13	3.36
My institution supports the integration of AI in library services.	33	219	62	13	2.83
I feel prepared to adapt to changes brought by AI in libraries.	186	141	-	-	3.57
N 327 Criterion Mean 2.50 Aggregate Mean 3.21					

Data in Table 6 illustrates the perceived impact of AI on future academic library services. As shown in the Table, the aggregate mean score of 3.21, surpassing the criterion mean of 2.50, suggests an overall positive perception of AI's impact on future academic library services among the respondents.

Table 7: Support Needed for Effective Integration of Ai

Statements	A		D	
	Freq.	%	Freq.	%
Access to training programmes	265	81	62	19
Financial support for AI initiatives	249	76	78	24
Upgraded technical infrastructure	265	81	62	19
Access to AI tools and software	249	76	78	24
Collaboration with IT professionals	249	76	78	24

Table 7 reveals that access to training programmes and upgraded technical infrastructure (265, 81%) respectively, as well as financial support, access to AI tools and collaboration with IT professionals are the support and resources needed by librarians to effectively integrate AI in academic libraries.

Table 8: Barriers to the Adoption of AI in Academic Libraries

Statements	A		D	
	Freq.	%	Freq.	%
Lack of funding	219	67	108	33
Lack of technical infrastructure	310	95	17	5
Insufficient training and skills	232	71	95	29
Data privacy and security concerns	170	52	157	48
Resistance to change	219	67	108	33

As shown in Table 8, the barriers to the adoption of AI technologies in academic libraries include lack of technical infrastructure, (310, 95%), insufficient training and skills (232, 71%), lack of funding and resistance to change (219, 67%) respectively, as well as data privacy and security concerns (170, 52%).

Table 9: Evolving Roles of Librarians in the Use of AI

Statements	A		D	
	Freq.	%	Freq.	%
AI will replace many traditional librarian tasks	186	57	141	43
Librarians will become more focused on managing AI systems	219	67	108	33
Librarians will need to develop new skills and competencies	294	90	33	10
The role of librarians will remain largely unchanged	108	33	219	67

Data presented in Table 9 revealed that the majority of the respondents foreseen that librarians will need to develop new skills and competencies (294, 90%), become more focused on

managing AI systems (219, 67%), and AI will replace many traditional librarians’ tasks (186, 57%) in the nearest future if there are increased adoption of AI technologies in academic libraries.

Table 10: AI Applications most Beneficial to Academic Libraries

Statements	A		D	
	Freq.	%	Freq.	%
Enhanced information retrieval systems	294	90	33	10
Automated reference services	249	76	78	24
Advanced data analytics for research support	203	62	124	38
Improved digital archiving and preservation	219	67	108	33
Personalized user experiences	46	14	281	86

As shown in Table 10, the AI applications most beneficial to academic libraries are enhanced information retrieval systems and automated reference services (294, 90%) respectively, improved digital archiving and preservation (219, 67%), and advanced data analytics for research support (203, 62%).

Conclusion and Recommendations

Arising from the findings of the study artificial intelligence and the future of academic library services that focuses on librarian’s skills in academic libraries in South - South Universities. Bulk of respondents who took part in this survey were determined to be highly knowledgeable about AI technology. As a result, most of the study's respondents had a modest level of confidence in their ability to employ AI technology for their regular, everyday job in libraries. Furthermore, the findings also revealed that librarians generally believe their AI technology capabilities fall short of what is ideal and established that librarians are the preferred type of training that will enable librarians to effectively use AI technologies in academic libraries. Even though it was determined that the majority of respondents that library personnel occasionally attends AI-related training sessions.

Conclusively, if artificial technologies are adopted more widely in academic libraries, in the near future, Library activities and functions are still performed by conventional librarians will be replaced by AI.

Recommendations

Based on the findings from the study, the following recommendations are made:

1. Despite the fact that the vast majority of survey participants were informed on artificial intelligence. As AI technologies advance, the parent institutions should keep developing the platforms that librarians need to become more knowledgeable.
2. Since librarian's feel that their competencies in AI technologies are below the desired level, the institution and government should step up their AI skills for rendering library services through in-service training.
3. Librarians are advised start the acquisition and installation of AI technologies since AI is likely to replace many traditional librarians' tasks in the nearest future if there are increased adoption of AI technologies in academic libraries.

REFERENCES

- Adebayo, T., & Akinwale, O. (2019). AI in Academic Libraries: Automated Cataloging and Metadata Generation at the University of Lagos Library. *Nigerian Libraries*, 52(1), 23-35.
- Afolabi, M. (2020). Enhancing User Support with AI-Powered Chatbots: The University of Ibadan Library Experience. **Nigerian Library Journal**, 25(2), 78-89.
- Garba, A., & Yusuf, H. (2019). AI in Academic Libraries: Automated Cataloging and Metadata Generation at Ahmadu Bello University Library. *Library Philosophy and Practice*, 2019(3), 234-245.
- Hennig, N. (2017). Chatbots in libraries. *Library Technology Reports*, 53(8), 1-33.
- Hodges, T., & German, E. (2020). Implementing AI in libraries: Case studies and practical perspectives. *Information Technology and Libraries*, 39 (1), 26-42.
<https://doi.org/10.6017/ital.v39i1.11748>
- Jackson, M. (2022). Implementation of AI-Powered Chatbots in Academic Libraries: A Case Study of USC Libraries. *Journal of Academic Librarianship*, 48(3), 123-134.
- Kamau, R. (2021). Enhancing User Support with AI-Powered Chatbots: The Kenyatta University Library Experience. *International Journal of Library and Information Science*, 13(4), 67-78.
- Kothari, C, R. (2004). *Research methodology: Method and Techniques*. New Age International (P) Ltd. New Delhi.

- Morgan, K. (1970). Sample size determination using Krejcie and Morgan table. Kenya Projects Organization (KENPRO), 38, 607-610.
- Mensah, K., & Agyemang, E. (2021). Enhancing Information Retrieval with AI: The Case of University of Ghana Library. *Journal of Academic Librarianship in Ghana*, 30(1), 45-58.
- Muwanguzi, J., & Nakibuuka, L. (2020). Promoting Academic Integrity through AI: Plagiarism Detection at Makerere University Library. *Uganda Journal of Education and Technology*, 17(2), 90-102.
- Mwakyusa, A. (2021). Enhancing Information Retrieval with AI: The Case of the University of Dar es Salaam Library. *Tanzania Library Journal*, 36(3), 112-125.
- Nkosi, T., & Dube, L. (2020). Leveraging Predictive Analytics for Resource Management in Academic Libraries: A Case Study of the University of Pretoria Library. *South African Journal of Libraries and Information Science*, 86(2), 45-58.
- Ogunleye, B., & Adeyemi, S. (2021). Promoting Academic Integrity through AI: Plagiarism Detection at University of Lagos Library. *Nigerian Journal of Library and Information Science*, 10(1), 87-99.
- Raju, J. (2017). Information literacy training for teachers in higher education institutions in Africa. *The Journal of Academic Librarianship*, 43(4), 339-346.
<https://doi.org/10.1016/j.acalib.2017.06.005>
- Steiger, K. (2024), Artificial Intelligence in Higher Education and Academic Libraries: A Literature Review. *The Journal of the New Members Round Table*. Published by the American Library Association. Volume 12, Issue 1, 2024 pp. 25–36