

**Library and Information Science
Professionals' Awareness,
Competencies, Institutional Support,
and Application of AI-Powered Tools in
Research Writing in South-South,
Nigerian Universities**

ABSTRACT

This study investigates Library and Information Science professionals' awareness, competencies, institutional support, and application of AI-powered tools in research writing in South-South Nigerian universities. Four research questions guide the investigation. The study adopted a mixed (two-step) approach, combining both quantitative and qualitative methods in a sequential exploration design. A 55-items researcher-developed structured questionnaire titled: Library and Information Science Professionals' Awareness, Competences, Institutional Support and Application of AI Powered Tools in Research Writing Questionnaire (LISPACIAAIPTRWQ) with a reliability index of .804 determined using Cronbach' reliability coefficient and semi-structured interview schedule were used for data collection. The questionnaire was designed using Google Doc platform and administered through major Nigerian Library Association (NLA) WhatsApp groups of the six states in South South zone of Nigeria – Akwa Ibom State, Bayelsa State, Cross River State, Delta State, Edo State and Rivers State. The interview was conducted through private WhatsApp calls to 20 respondents within the study area. A total of 133 targeted participants from twelve university libraries, one federal and one state university per state were involved in the study. The professional librarians considered in this study were those with at least LS/LIS degree and a year of work experience. This group of participants were purposively considered taking into account that they are professionals and expected to conduct cutting-edge research and publish findings in reputable journals for personal and professional growth. The collected data, analyzed descriptively using frequency counts, mean, and standard deviation were used to answer research questions. The interview responses were qualitatively analyzed using the narrative method in order to deeply understand the respondents' experiences with AI-powered tools and to also reduce the impact of individual bias. The findings revealed a low awareness level and a relatively high level of competencies of LIS professionals towards AI and its applicability to research writing. It also revealed low institutional support and high application index of AI-powered tools to mostly library services but not research writing by LIS professionals. The study recommended that the university administration should encourage more research on AI and formulate a workable policy to guide its applicability, among others.

Keywords: Awareness; competencies; institutional support; AI-powered tools; LIS professionals; research writing.

1. INTRODUCTION

The complexity and specialization of research writing whether quantitative or qualitative, pure or applied, lead to further development in any profession including librarianship. Library and Information Science (LIS) as a professional course requires a high level of specialist knowledge, creativity and innovation, and maintenance of ethical principles and standards of competence individually and across the professional groups. This could only be assured through quality research. The need to generate and share ideas with backed-up experiences from books, journals, the Internet, experts, etc., is crucial and utmost to ensure professional development in Library and Information Science. Undoubtedly, research writing is seen by many professionals as difficult, especially to librarians who seem to be crowded with enormous responsibilities [1]. These responsibilities could be tasking and most times result in work

pressure which negates research efficiency. Bhardwaj [2]; Ogbomo [3-5] also note that lack of research orientation, lack of research skills and other factors pose serious hindrances to research productivity among library professionals in developing countries including Nigeria.

Studies reveal that there is mounting pressure on LIS professionals to conduct edge-cutting research to enhance their personal visibility and citation index which are the major requirements for promotion; increased institutional visibility and ranking; as well as facilitating sharing and re-use of research findings; ensure compliance with funders and publishers' conditions; improve research integrity, among others [6,7]. The authors further clarified that apart from the aforementioned factors, technological revolution plays important roles in shaping the research productivity of library professionals. This revolution has caused a stir in the research landscape making it pleasurable, less tasking

and rewarding. The use of technological inventions in research is growing exponentially with artificial intelligence (AI) being the most noteworthy.

Consequently, the development of AI-powered tools has led to the use of computers and machines to perform diverse tasks as intelligent as human beings. AI-powered tools like ChatGPT, Research Rabbit, Semantic Scholar, Grammarly, Mendeley, Scholarcy, Quilbolt, and many others are meant to simplify research process giving more opportunities for knowledge update and publication of quality research papers. Academic librarians must consider the roles of AI-powered tools that are pertinent to research writing.

Basically, literature [8,9] has it that AI-powered tools are continuously becoming more sophisticated research tools to enhance and speedup academic research works. AI-powered tools have also become reliable instruments for better and improved quality of research works, with inherent potential to accelerate the career progression of LIS professionals. Hence, this paper highlights the concept of AI and its categorizations, different types of AI-powered tools, and the role of AI-powered tools in research. Empirically, this present study seeks to establish the LIS professionals' awareness level of AI-powered tools for research writing; determine their competencies in using AI-powered tools for research writing; assess the areas of institutional support towards the use of AI-powered tools for research writing; identify the extent of application of AI-powered tools in research writing process by LIS professionals. The study covers LIS professionals working in public university libraries in South-South zone of Nigeria.

1.1 Statement of the Problem

The concern for quality research among the academics including LIS professionals is widely discussed in the world today. This is understandable due to several demands cushioned by changes in information landscape, sophisticated information needs and expectations of users, competition in the information world, need to stay relevant, access to grants, career and personal growth, among others. These factors necessitate the involvement of LIS professionals in research writing. They are expected to conduct quality research and make findings that will provide dependable solutions to problems and generate new knowledge in a bid to address the above-mentioned factors. The emerging technologies

today are making a hitherto tedious exercise, simple and enjoyable as widely acclaimed among researchers, scholars, and professionals. Particularly, the application of AI-powered tools has received much attention and many studies [10,11,9] have emphasized the importance of these tools in research writing. Regrettably, despite the widely acclaimed effectiveness of AI-powered tools in research writing, evidence has it that the research quality and output of LIS professionals are low and disappointing [6,2,12]. This could be attributed to many factors including lack of awareness of the tools; low competency on how to use the tools; etc. Based on this background, this study sets out to empirically investigate the LIS professionals' awareness, competencies, institutional support, and application of AI-powered tools in research writing in South-South public universities in Nigeria.

1.2 Research Objectives

The purpose of this study investigate the LIS professionals' awareness, competencies, institutional support, and application of AI-powered tools in research writing in South-South public universities in Nigeria. Specifically, the objectives are as follows:

OBJ 1: To determine the LIS professionals' awareness level of AI-powered tools for research writing.

OBJ 2: To examine the LIS professionals' competencies in using AI-powered tools for research writing.

OBJ 3: To identify the areas of institutional support towards the use of AI-powered tools for research writing.

OBJ 4: To assess the extent of the application of AI-powered tools in research writing by LIS professionals.

1.3 Research Questions

To achieve the objectives of this study, four research questions were formulated as a guide.

RQ1: What is the LIS professionals' awareness level of AI-powered tools for research writing?

RQ2: What are the LIS professionals' competencies in using AI-powered tools for research writing?

RQ3: What are the areas of institutional support towards the use of AI-powered tools for research writing?

RQ4: What is the extent of application of AI-powered tools in research writing by LIS professionals?

2. REVIEW OF RELATED LITERATURE

The literature reviewed covered conceptual clarifications on Artificial Intelligence (AI) and its categorizations and common types of AI-powered tools for research writing. The study also reviewed some empirical studies on the use of AI-powered tools for research writing by LIS professionals.

2.1 Artificial Intelligence (AI) and its Categorizations

The term "artificial intelligence" is one of the most revolutionary technologies of the 21st century which has created significant transformation in various sectors of society such as education, healthcare, the automotive industry, finance, customer service, transportation, security, real-life, and many others. Artificial Intelligence (AI) also known as machine intelligence is the ability of machines or computer systems to perform tasks that would normally require human intelligence such as reasoning, learning, and problem-solving [13,14]. AI is often used to describe machines that think and act like humans. These machines are powered by algorithms, using techniques such as machine learning, deep learning, and rules to be able to learn, understand, reason, and solve problems relating to almost every sector of society. Although, AI has the potential to imitate human cognitive processes, Escott [10] notes that it lacks human-like consciousness, emotional intelligence, and adaptability to fully replace humans now and not anytime soon.

The categorization of AI is based on how they learn or mimic humans, the technology used, how they can apply their knowledge to real-world situations, and the theory of mind [10]. Basically, AI is classified into three types: Narrow AI, General AI, and Super AI. Banafa [15] explains that the narrow AI, also referred to as weak AI is an intelligent machine programmed to perform a specific task or limited range of tasks such as facial recognition, speech recognition, image recognition, internet search, natural language processing, self-driving, and recommendation systems. The General AI, also known as Generative AI (GenAI) or strong/deep AI is a machine with general intelligence designed to perform any intellectual task that humans can do. It can reason, learn, and understand complex

concepts, just like humans. In other words, General AI can apply its intelligence to understand language, solve problems, make decisions, discern needs, and even exhibit emotions. Examples of General AI include ChatGPT, Siri, AlphaGo, QuillBot, among others. The Super AI, otherwise known as artificial superintelligence, is the hypothetical AI machine meant to operate beyond human intelligence and even outsmart humans.

Kanade [16] explains that machines with superintelligence go beyond mere understanding and replicating multi-faceted human behaviours and experiences to display the ability of self-awareness, evoke emotions, beliefs, and desires of their own, similar and even beyond humans. The author considers Super AI as the most advanced, powerful, and intelligent type of AI that transcends the intelligence of some of the brightest minds, such as Albert Einstein. This type of AI, according to Banafa [16], Anirudh [17], and Escott [10], is still a theoretical possibility rather than a practical reality. Barney & Wigmore [18] in assertion state that Super AI has not been achieved in its entirety as the AI scenarios so far is far from superintelligent. Apple Siri and Amazon Alexa could be considered as examples of future Super AI systems.

2.2 Current AI-powered Tools for Research Writing

AI-powered tools are software applications or platforms that make use of artificial intelligence to perform specific tasks or solve particular problems [19]. Most of these tools can be accessed through free plan and or paid plan. The free plan is for trial or first time users who will need to pay for continuous usage. However, few tools are outright free. There are hundreds of AI-powered tools, mostly within Narrow AI and General AI categories, that have created plausible impacts on the information landscape which contribute in a large measure to personal and professional development and sustainability [20]. The common AI-powered tools for research and academic writing, according to the author is presented in.

In addition to the above list, Kenchakkanavar [14] identifies HyperWrite, Lateral, Typeset.io, Elink.io, EvidenceHunt, Copyscape, otter.ai, Knowji, Tutor.AI, and OpenRead as other AI-powered tools for research writing. Bankar & Lihitkar [21] add Humata AI to the list.

Table 1. Common AI-powered Tools for Research and Academic Writing

AI-powered Tool/Website	Functions	Status
Semantic Scholar https://www.semanticscholar.org/	Semantic Scholar provides brief summaries of the main results of papers. It is a search engine for scholarly publications.	Free
SciSpace Copilot https://scispace.com/	SciSpace allows users to access, decode, and understand scientific literature effortlessly. It provides simple explanations and instant answers from AI services for better understanding of the research paper.	Free/trial Premium/paid
Paperpal https://paperpal.com/	Paperpal is a writing assistant with strong grammar check ability. It checks grammatical mistakes, spellings, punctuations, and writing styles and suggests ways to improve clarity, readability, and flow.	Premium/paid
Scholarcy https://www.scholarcy.com/	Scholarcy is a reading assistant that help researchers to read and summarize uploaded research papers, books, and videos for more insights to the content.	Free/trial Premium/paid
Jenni AI https://jenni.ai/	Jenni AI is a personal writing assistant and citation tool which helps users to enhance their research and writing ability. It assists users to write, cite, paraphrase, and edit without stress.	Free/trial Premium/paid
ChatPDF https://www.chatpdf.com/	ChatPDF is a tool that allows users to interact with PDF documents online. It analyses documents to provide a summary or extracts from documents and allows users to share direct links with anyone.	Free/trial Premium/paid
Grammarly https://www.grammarly.com	Grammarly is a writing assistant that scans documents for common grammatical mistakes and ensure that punctuations and spellings are correct. It allows users to paraphrase without plagiarizing.	Free/trial Premium/paid
ChatGPT https://chat.openai.com	ChatGPT is a writing tool that is used for language processing tasks such as text generation, language translation, code editing, emotion analysis, and vulnerability finding.	.Free/trial Premium/paid
Research Rabbit https://www.researchrabbit.ai	Research Rabbit is a citation-based mapping tool that connects researchers to papers and authors similar to their research interests.	Free/trial Premium/paid
Scite.ai https://scite.ai/	Scite.ai is designed to assist users to discover and understand published research articles. It can extract key information	Premium/paid
Elicit https://elicit.org/	Elicit finds papers relevant to your topic by searching through papers and citations, organizing key information and saving them for easy access later. It allows multiple users to work on the same research project simultaneously.	Free trial
Quillbot https://quillbot.com/	Quillbot is designed to help users improve the quality and clarity of their research work.	Free/trial Premium/paid

2.3 Empirical Review on Application of AI-powered Tools in Research Writing

From the consulted literature, it is clear that there is dearth of empirical literature on the application of AI-powered tools in research writing by LIS professionals in Nigeria, despite the widely proclaimed potentials of the tools in transforming education and research. Generally, some studies by Oyovwe-Tinuoye et al. [22]; Udo-Anyanwu [23]; Aina et al. [24]; Akwang [25] and many others revealed a low level of application of emerging technologies among LIS professionals in Nigeria. However, few recent empirical studies about AI-powered tools applications for research writing and professional purposes were reviewed.

Khalifa & Albadawy [8] conducted a systematic review to evaluate the role of artificial intelligence in enhancing academic writing and research using a four-step methodology. Firstly, the study uses a comprehensive search across databases to identify peer-reviewed articles, review papers, and empirical studies to explore AI applications in academic writing. Secondly, the study applied inclusion and exclusion criteria to refine search. Thirdly, data extraction and synthesis were adopted. Fourthly, a detailed analysis of extracted information on the study variables was applied. However, the study revealed 24 studies through which six core domains were identified. The study recommended broader integration of AI tools in research workflow; provision of training for researchers; emphasis on ethical and transparent use, among others.

Isiaka et al. [26] investigated the perceived awareness and usefulness of artificial intelligence technology for library operations in Kwara state academic libraries. The study adopted a descriptive survey design, with a population of 108 librarians and paraprofessionals from six (6) university libraries in Kwara State. The study employed the total enumeration sampling technique, while data were collected using a questionnaire. The study revealed that the librarians were highly aware of AI Robots, AI chatbots, face recognition technology, virtual references, Humanoids, Dynamed and AI expert systems. It showed that AI technologies were useful in reference services, cataloguing and classification of library materials, library security, information search, and automating library routines. The study identified potential loss of job, high risk of maintenance, inadequate internet service, epileptic electricity and inadequate ICT facilities

as major challenges of artificial intelligence technology integration. It recommended that AI technologies such as robots, chatbots, and expert systems should be integrated to libraries in order to provide top-notch services to their users.

Emiri [11] investigated how librarians in university libraries in southern Nigeria adopted and used artificial intelligence using survey design. The study raised four research objectives and four research questions to guide the study. A structured questionnaire was used to sample opinion of 704 librarians within the study area and the data generated were analysed descriptively. The analysis reveals that the librarians are knowledgeable about the many ways AI may be applied to provide services. The results also indicated a lack of suitable infrastructure, lack of relevant skills, and erratic power supply as hurdles encountered by librarians. The study recommended training of librarians, commitment of library management, and supporting infrastructure, among others.

Bassey & Owushi [27] examined the adoption of artificial intelligence in library and information science in the 21st century using 100 librarians from Akwa Ibom State and Rivers State. A structured questionnaire with a reliability index of 0.83 was used for data collection. Two research objectives and two questions were met and answered consecutively using descriptive statistics. The study revealed that cataloguing and classification were rated highest among the impact of artificial intelligence in library while expertise and resources were rated as the highest challenge faced in the adoption of artificial intelligence. The researchers recommend among others that libraries in Nigeria should fully implement artificial intelligence technology, such as Chatbots, RFID, and robotics.

Abba [9] examined the level of adoption of artificial intelligence to support library service delivery in university libraries in Africa. The study adopted a qualitative research method, from 102 university libraries in English-speaking countries in Africa. The study collected data using online platforms. Content analysis was used to analyze the responses, which revealed that only a few university libraries in Africa have adopted AI technologies such as Chatbot, ChatGPT, LibKey from ThirdIron, robots, RFID technology and Grammarly. It further revealed that these AI technologies are used to render different library services like answering of directional and ready

reference questions, serving as a knowledge base for cataloguing, and used as a marketing and research tool, among others. The study identified lack of funds to acquire AI tools, inadequate training of librarians and lack of full knowledge of AI as challenges associated with the adoption of AI in the libraries. The study recommended formulation of policy to guide the adoption of new technologies such as AI, and training and re-training for librarians through workshops in order to equip librarians with skills needed to effectively use the AI technologies.

Garrel & Mayer [28] conducted a nationwide survey to analyse the use and possible characteristics of AI-based tools that are important in the learning process in universities in Germany. The study used quantitative analysis by means of an online questionnaire and choice-based conjoint experiment (CBC) to anonymously survey a total of 8802 respondents in order to determine the use and intensity of use of AI-based tools for studying. The findings revealed that majority of the respondents use AI-based tools for research and literature study to a very occasionally or rarely degree. A differentiated examination of the usage behaviour makes it clear that students use AI-based tools in a variety of ways, including clarifying questions of understanding and explaining subject-specific concepts. The study also revealed that some AI-based tools have characteristics of generating incorrect and faulty answers which could lead to unreliable information.

Yakubu et al. [29] further investigated librarians' intention to use artificial intelligence for effective library service delivery, using a partial least square-structural equation modelling-based approach. The study adopted a quantitative method of cross-sectional approach, with questionnaire as instrument for data collection. The population of the study was 242, comprising professionals and para-professional librarians from three (3) federal university libraries in the North-eastern zone Nigeria. Out of the study population, a sample size of 119 was selected using the proportionate stratified random sampling technique. The study revealed that Theory of Planned Behaviour (TPB's) variables were positively significant factors that influenced the librarians' intention to use Artificial Intelligence in their respective libraries. It also showed that the librarians indicated a high intention to use artificial intelligence in their libraries.

Akwang, Eyo, & Bassey [30] conducted a study on institutional preparedness and research data management practices in public university libraries in Akwa Ibom and Cross River States, Nigeria. The study employed survey research design, with a set of questionnaire as instrument for data collection. The study sampled the opinion of 110 librarians from UniUyo, AKSU, UNICAL, and CRUTECH (now UNICROSS) on the variables under study and the data collected were analyzed using descriptive analysis. The findings of the study revealed that the research data management practices is low across the public university libraries studied which is an indication that the institutions are not adequately supporting research data management practices. The study recommended among others, librarians sponsorship to conferences, workshops, and other training opportunities.

Ajani et al. [31] also evaluated readiness and knowledge of librarians to adopt artificial intelligence for services and procedures in academic libraries in Nigeria, and revealed that due to librarians' conflicted emotions, librarians are not yet prepared to use artificial intelligence in their academic library. This is also as Yusuf et al. [32] examined the application of artificial intelligence for efficacy in library service delivery in university libraries in Nigeria, and found that the level of application of artificial intelligence by librarians in university libraries in Nigeria is relatively low.

Although, the reviewed literature provides valuable insights into the application of AI-powered tools in mostly library operations but it also highlights their benefits to all researchers including LIS professionals. However, this present study exposes the current AI-powered tools vis-à-vis awareness, competencies, support, and application by LIS professionals in research writing in Nigerian university libraries with the aim to fill the research gap.

3. METHODOLOGY

A triangulation type of mixed method research design was adopted in this study. That is both quantitative and qualitative datasets derived from the online survey conducted to investigate the awareness, competencies, institutional support, and application in relation to AI-powered tools and research writing by academic librarians in Nigeria. A 55-items researcher-developed structured questionnaire titled: Library and Information Science Professionals' Awareness, Competences, Institutional Support and

Application of AI Powered Tools in Research Writing Questionnaire (LISPACIAAIPTRWQ) with a reliability index of .804 determined using Cronbach' reliability coefficient and semi-structured interview schedule were used for data collection. To ascertain the validity of the questionnaire items, four experts checked them thoroughly to ensure their appropriateness and measurability to the research objectives. The items were used to design the questionnaire using Google forms platform and administered through major Nigerian Library Association (NLA) WhatsApp groups of the six states in South-South zone of Nigeria – Akwa Ibom State, Bayelsa State, Cross River State, Delta State, Edo State and Rivers State. The interview was conducted through private WhatsApp calls to 20 University Librarians (ULs) and Deputy University Librarians (DULs) within the study area. A total of 188 targeted participants from twelve university libraries (2 university libraries per state) were selected using purposive sampling technique. Only professional librarians with at least LS/LIS degree and with more than a year work experience were considered for this study base on the assumption that they were more knowledgeable and expected to conduct cutting-edge research, publish findings in reputable journals and other publications for personal and professional growth. The data generated from the questionnaire responses were presented in frequency counts, mean, and standard deviation and used to answer research questions whereas the interview responses were transcribed and qualitatively analysed using narrative methods.

4. RESULTS

The presentation focused on the distribution of the respondents across the institutions under investigation, answering of research questions, and transcription of telephonic interview based on the variables under study.

4.1 Distribution of Respondents across the Universities

Table 2 displays a total of 188 LIS professionals who were expected to respond to the on-line survey from the twelve universities under investigation. Out of this number, a total of 142 replied and completed the online questionnaire, giving the response rate of 75.59%, approximated to 76%.

4.2 Answering of Research Questions

RQ 1: What is the awareness level of AI-powered tools for research writing among LIS professionals?

The results on Table 3 above shows that LIS professionals' awareness level of AI-powered tools for research writing in Nigeria university libraries is low. This is indicated by a lower grand mean of 2.43 against the 2.50 criterion mean. The results specifically revealed that out of the 20 items of AI-powered tools, majority of the LIS professionals were only aware of 7, which include: Mendeley (3.25); Semantic Scholar (3.17); Grammarly (3.15); Connected papers (3.15); ChatPDF (3.12); Research Rabbit (3.01); and ChatGPT (2.96). This infers that majority of LIS professionals under study are not aware of many AI-powered tools for research writing.

RQ 2: What are the LIS professionals' competencies in using AI-powered tools for research writing?

Table 4 reveals the opinions on the respondents' competencies in using AI-powered tools for research writing as indicated by the mean scores and standard deviations. The results show a relatively high level of skills in using AI-powered tools among the LIS professionals, as confirmed by a higher grand mean of 2.72 against the 2.50 benchmark mean. It indicates that on the individual basis of the items investigated, majority of the respondents have competencies in storing data and information using AI-powered tools (3.20); retrieving information using AI-powered tools (3.18); operating laptop, desktop and phones without stress (3.11); using AI-powered tools in personal gadget (3.11); uninstalling AI-powered tools in personal gadgets (3.11); and sharing information with colleagues via AI-powered tools (2.74). This result shows that the majority of LIS professionals studied have the basic competence needed to use AI-powered tools.

RQ 3: What are the areas of institutional support towards the use of AI-powered tools for research writing?

The analysis on Table 5 reveals that the overall rate of institutional support received by LIS professionals to enhance their capability to use AI-powered tools for research writing is poor, which is indicated by a lower grand mean of 2.47, against the 2.50 criterion mean. However, the results specifically show that LIS professionals enjoy some forms of support from their institutions such as the provision of laptops, desktops and tablets for research purposes (3.39); organization of in-house trainings on AI-related issues and its applicability in research

writing (3.17); and establishment of functional reward systems for researchers (2.88). Hence, it infers that the support from institutions studied is not to the extent of encouraging the application of AI-powered tools for research writing by LIS professionals.

RQ 4: What is the extent of the application of AI-powered tools in research writing by LIS professionals?

Table 2. Respondents according to universities

Universities	Acronym	No. Expected	No. Received	%
University of Uyo	UNIUYO	24	17	9.04
Akwa Ibom State University	AKSU	26	23	12.23
Federal University, Otueke	FUO	12	8	4.26
Bayelsa Medical University	BMU	4	2	1.10
University of Calabar	UNICAL	32	25	13.30
University of Cross River State	UNICROSS	5	3	1.60
Nigeria Maritime University	NMU	9	5	2.66
Delta State University, Abraka	DELSU	16	13	6.91
University of Benin, Benin City	UNIBEN	17	14	7.45
Edo State University, Uzairue	EDSU	13	9	4.80
University of Port-Harcourt	UNIPORT	22	17	9.04
Ignatius Ajuru University of Education	IAUE	8	6	3.20
Total		188	142	75.59

Source: Online Field Survey, 2024

Table 3. Mean and Standard Deviation Responses of Awareness Level of AI-powered Tools for Research Writing among LIS Professionals (n = 142)

AI-powered Tools	VA	A	VU	SD	Mean	Std. Dev.	Decision
ChatGPT	49	49	34	10	2.96	0.933	Agreed
Quillbot	13	36	67	26	2.25	0.862	Disagreed
Grammarly	61	51	21	9	3.15	0.902	Agreed
Research Rabbit	37	79	16	10	3.01	0.812	Agreed
Bit AI	11	43	64	24	2.29	0.839	Disagreed
PDFgear Copilot	16	47	52	27	2.37	0.919	Disagreed
Connected Papers	53	66	15	8	3.15	0.828	Agreed
Semantic Scholar	59	53	25	5	3.17	0.842	Agreed
Mendeley	67	49	20	6	3.25	0.852	Agreed
Scholarcy	29	35	49	29	2.45	1.035	Disagreed
ChatPDF	59	51	22	10	3.12	0.919	Agreed
Paperpal	10	26	52	54	1.94	0.921	Disagreed
Scite	2	12	70	58	1.70	0.682	Disagreed
Elicit	9	24	47	62	1.86	0.919	Disagreed
Consensus	21	45	32	44	2.30	1.065	Disagreed
SciSpace	5	14	79	44	1.86	0.730	Disagreed
AlphaGo	11	15	56	60	1.84	0.904	Disagreed
Jenni	11	32	50	49	2.04	0.941	Disagreed
Amazon Alexa	14	18	53	57	1.92	0.951	Disagreed
Apple Siri	20	15	55	52	2.02	1.021	Disagreed
Grand Mean					2.43	0.894	Disagreed
Criterion Mean					2.50		

Keys: Very Aware (VA); Aware (A); Unaware (U); Very Unaware (VU)

Table 4. Mean and Standard Deviation Responses on the Competencies (n = 142)

Item Statements	VH	H	L	VL	Mean	Std.	Decision
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							Dev.	
My ability to operate laptop, desktop, phones without stress is ...	52	61	22	7	3.11	0.843	Agreed	
My ability to download AI-powered tools without anyone's support is ...	14	38	70	20	2.32	0.838	Disagreed	
My ability to install AI-powered tools in my gadget is	25	39	47	31	2.41	1.019	Disagreed	
My ability to uninstall AI-powered tools in my gadget is	50	50	23	19	2.92	1.025	Agreed	
My knowledge on how to use the AI-powered tools in my gadget is	44	74	20	4	3.11	0.745	Agreed	
My skill in storing data and information using AI-powered tools is ...	66	48	18	10	3.20	0.917	Agreed	
My skill in retrieving information using AI-powered tools is ...	55	65	15	7	3.18	0.813	Agreed	
My ability to troubleshoot issues related to AI-powered tools is ...	13	28	66	35	2.13	0.893	Disagreed	
My skill in sharing information with colleagues via AI-powered tools is...	29	61	38	14	2.74	0.897	Agreed	
My ability in integrating AI-powered tools into my research work is ...	10	32	55	45	2.05	0.910	Disagreed	
Grand Mean					2.72	0.809	Agreed	
Criterion Mean					2.50			

Keys: Very High(VH); High(H); Low(L); Very Low(VL)

Table 5. Mean and Standard Deviation Responses of the Institutional Support towards the Use of AI-powered Tools for Research Writing by LIS Professionals (n = 142)

Item Statements	SA	A	D	SD	Mean	Std. Dev.	Decision
My institution provides laptop, desktop, or tablets to LIS professionals for research purposes.	76	48	15	3	3.39	0.761	Agreed
My institution provides strong Internet access.	10	45	57	30	2.25	0.869	Disagreed
There is alternative source of power in the library.	7	20	80	35	1.99	0.767	Disagreed
My institution ensures prompt maintenance of equipment in the library.	7	20	67	48	1.90	0.819	Disagreed
My institution organizes in-house trainings on Artificial Intelligence and its applicability.	50	67	24	1	3.17	0.724	Agreed
My institution sponsors LIS professionals to workshops and conferences relating to AI.	14	19	75	34	2.09	0.874	Disagreed
LIS professionals enjoy research grants on AI from their institutions.	15	37	73	17	2.35	0.827	Disagreed
My institution has established a functional reward system for researchers.	38	58	37	9	2.88	0.879	Agreed
My institution has established a functional policy to regulate the use of AI-powered tools	13	39	54	36	2.20	0.927	Disagreed
Grand Mean					2.47	0.827	Disagreed
Criterion Mean					2.50		

Keys: Strongly Agree(SA); Agree(A); Disagree(D); Strongly Disagree(SD)

Table 6. Mean and Standard Deviation Responses of the Areas of Application of AI-powered Tools in Research Writing by LIS Professionals (n = 142)

Item Statements	SA	A	D	SD	Mean	Std.	Decision
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						Dev.	
To identify my research topic	58	62	15	7	3.20	0.821	Agreed
For paraphrasing/editing my work	20	33	57	32	2.29	0.972	Disagreed
For checking plagiarism in my work	58	55	22	7	3.15	0.861	Agreed
For checking grammatical errors/ misspellings	38	72	27	5	3.01	0.776	Agreed
For accessing summary of information	45	55	28	14	2.92	0.953	Agreed
For real-time collaboration with colleagues	57	60	11	14	3.13	0.929	Agreed
For getting citation reports	73	51	10	8	3.33	0.840	Agreed
For tracking my personal citations	50	59	24	9	3.06	0.881	Agreed
For analyzing my research data	57	56	17	12	3.11	0.923	Agreed
For testing theories and scenarios	5	33	59	45	1.99	0.834	Agreed
For creating experimental design models	8	41	68	25	2.23	0.802	Disagreed
For communicating my research results and findings to a wider audience	54	53	27	8	3.08	0.892	Agreed
Grand Mean					2.88	0.874	Agreed
Criterion Mean					2.50		

Keys: Strongly Agree(SA); Agree(A); Disagree(D); Strongly Disagree(SD)

Table 6 above reveals the mean and standard deviation responses of the areas of application of AI-powered tools in research writing by LIS professionals. The results reveal that the major areas of application of AI-powered tools for research writing by LIS professionals include: getting citation reports related to my research area (3.33); identifying my research topic (3.20); checking plagiarism in my work (3.15); for real-time collaboration with my colleagues (3.13), among other areas. The results of the individual items were confirmed by a higher grand mean of 2.88 against the criterion mean of 2.50, which indicates that LIS professionals apply AI-powered tools in those areas to aid their research process. This implies that LIS professionals make use of few AI-powered tools in certain aspects of research writing as shown in the result.

4.3 Transcription of Interview Responses

IQ 1: What are your reasons for low awareness level of AI-powered tools for research writing?

The transcribed interview responses from ULs and DULs on the question above were summarized in the following quotes:

“Most LIS professionals who were interviewed were not aware of most of the AI-powered tools for research writings.”

“The reasons advanced for their low awareness level was inactive appeal and disposition towards emerging AI-powered tools for research writing, poor understanding and failure to recognize the value of AI-powered tools to research.”

“Majority of them has reached the peak or zenith of their professional career as university librarians and professors as such their interest in knowing these innovative tools is low.”

“Few of them are no more interested in research writing since they are already professors and not expecting promotion and they lack time because of heavy administrative responsibilities.”

IQ 2: In your opinion, what contributes to the high-level competencies in the use of AI-powered tools for research writing?

The transcribed interview responses from ULs and DULs on the question above were summarized in the following quotes:

“All the 20 interviewees believe that skills and competencies are the main drivers of the modern-day university libraries anywhere in the world.”

“LIS professionals have already acquired basic skills to use of other basic technologies which could be extended to explore AI-powered tools for enhanced research writings.”

“They believe that most LIS professionals, especially the top-ranking ones have yearning to improve their competencies which they do through personal commitment.”

“AI is becoming everything in research writing from problem identification, data collection, data analysis, communication of research results, as well as citations tracking as such LIS professionals are making personal effort to acquire the basic skills.”

IQ 3: How do you assess your institutional support towards the use of AI-powered tools for research writing? What are the justifications for your answer?

The transcribed interview responses from ULs and DULs on the questions above were summarized in the following quotes:

"The support received from most universities in Nigeria, including my university towards the use of AI-powered tools is noted to be very low."

"The university management appears reluctant and uninterested in supporting the use of AI tools for research writings and most times complains of lack of funds."

"This is evident in LIS professionals not sponsored to conferences, workshops, and other forms of trainings; LIS professionals not being skilled enough to apply some of the AI-powered tools in research writing; computer systems in libraries are often not maintained for optimal use; Internet connection is often not strong and reliable; most LIS professionals lack the abilities for effective use of AI-powered tools because they are not trained."

IQ 4: How satisfied are you with the application of AI-powered tools in your research writing? If not satisfied, what are the challenges?

The transcribed interview responses from ULs and DULs on the questions above were summarized in the following quotes:

"Out of the 20 respondents interviewed, 12 of them expressed satisfaction on the application of AI-powered tools to identify research topic, track citations, test theories, check plagiarism, and engage in real-time collaboration, among others."

"The remaining 8 respondents expressed dissatisfaction with the application of the tools in research writing noting the following challenging factors: lack of alternative power supply, poor internet connection, low motivation, lack of training on the use of AI-powered tools."

"Five of the respondents expressed dissatisfaction with the use of AI-powered tools, noting that the tools are capable of generating misinformation and faulty answers that are not reliable in the field of study, if great care is not taken."

"Two respondents emphasized on bad Nigerian economy stating that they do not

have funds to subscribe to AI-powered tools after making use of the trial version, buy bulk data, and upskill through attendance to conferences or workshops related AI."

4.4 Discussion of Findings

The responses to both online survey and telephonic interview provide the researchers opportunity to thoroughly analyze the research questions for the study.

The findings on the awareness level of LIS professionals on the application of AI-powered tools in research writing revealed a low level as shown in the negative outcome of the grand mean of 2.43 against the criterion mean of 2.50. The findings agree with the study conducted by Abba [9]; Ajani et al. [31], which revealed that librarians lack full knowledge of AI-powered tools and that some librarians are not yet prepared to use artificial intelligence in their activities respectively. However, the findings is at variance with the study conducted by Isiaka et al. [26] on the perceived awareness and usefulness of artificial intelligence technology by librarians, which revealed that librarians were highly aware of AI Robots, AI chatbots, face recognition technology, virtual references, Humanoids, Dynamed and AI expert systems. The interview findings revealed that LIS professionals are not fully aware of many AI-powered tools for research writing because of poor understanding and failure to recognize the value of AI-powered tools to research. Lack of interest and cumbersome responsibilities of librarians also contribute to the low awareness.

On the competencies of LIS professionals on the application of AI-powered tools in research writing, the result indicated a relatively high level of skills among librarians in using AI-powered tools, as confirmed by a higher grand mean of 2.72 against the 2.50 benchmark mean. The findings agree with Emiri [11] who investigated how librarians in university libraries in southern Nigeria adopted and used artificial intelligence using survey design. The analysis revealed that the librarians are knowledgeable about the many ways AI may be applied to provide services. The interview findings revealed that what contributes to the high competence among librarians is the basic skills they have already acquired for general use of emerging technologies which could be applicable to the use of AI-powered tools for research writing. The findings also revealed that librarians acquire basic skills through personal commitment.

The findings on institutional support towards the use of AI-powered tools for research writing indicated poor support, which is shown by a lower grand mean of 2.47, against the 2.50 criterion mean. The result is in line with Akwang, Eyo, & Bassey [30] who conducted a study on institutional preparedness and research data management practices in public university libraries in Akwa Ibom and Cross River States, Nigeria. The findings of the study revealed that the research data management practices is low across the public university libraries studied which is an indication that the institutions are not adequately supporting research data management practices. The interview responses on the assessment of institutional support also revealed low support. The interviewees justified their response on the fact that the university management appears reluctant and uninterested in supporting the use of AI tools for research writing and most times complains of lack of funds.

On the area of application of AI-powered tools in research writing by LIS professionals, the results revealed a higher grand mean of 2.88 against the criterion mean of 2.50, which indicates that LIS professionals apply AI-powered tools in relevant areas to aid their research and academic writing process. The findings disagree with Yusuf et al. [32] who examined the application of artificial intelligence for efficacy in library service delivery in university libraries in Nigeria, and found that the level of application of artificial intelligence by librarians in university libraries in Nigeria is relatively low. However, the results agree with Emiri [11] who investigated how librarians in university libraries in southern Nigeria adopted and used artificial intelligence using survey design. The analysis reveals that the librarians are knowledgeable about the many ways AI may be applied to provide services. The interview responses reveal that more twelve (12) interviewees were satisfied with the application of AI-powered tools, while eight (8) expressed dissatisfaction identifying lack of alternative power supply, poor internet connection, low motivation, lack of training as factors that stir the dissatisfaction among LIS professionals.

5. CONCLUSION

Artificial intelligence is a working alternative machine, programmes, or computer companions similar to human intelligence which is intended to perform specific tasks with accuracy. It is essentially a productivity tool which has

successfully revolutionized academic writing and research across many areas, including Library and Information Science. It becomes imperative to acknowledge the numerous impacts of AI-powered tools on research writing in terms of increased efficiency, improved accuracy, enhanced objectivity, updated context, and time-saving capabilities. In this wise, it is concluded that the application of AI-powered tools for research and academic writing be given necessary attention by all stakeholders such as university management team, university libraries, government agencies, funders, librarians, etc. This requires re-strategizing and improvement of efforts and interests in AI-powered tools by providing technological facilities, system support, staff training and policies, which are currently compromised in the public university libraries under investigation.

6. RECOMMENDATIONS

Based on the findings of this study, the following recommendations are necessary:

- i. Artificial intelligence should be included in the national curriculum for students at all educational levels in all tertiary institutions - universities, polytechnics, and colleges of education
- ii. The university administration should sponsor LIS professionals to attend trainings on the application of AI-powered tools.
- iii. The university administration should encourage more research on artificial intelligence and formulate a workable policy to guide its applicability.
- iv. Adequate facilities supporting the use of AI in institutions should be provided by the government or management team of tertiary institutions.
- v. LIS professionals should have to develop a positive perception on AI-powered tools.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

ETHICAL APPROVAL

As per international standards, written ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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