Ethical Artificial Intelligence Awareness and Digital Divide/Cybersecurity Issues among Library and Information Science Professionals of Selected Academic Libraries in South-South and South-West, Nigeria

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Abstract

This study examined Ethical Artificial Intelligence awareness and perceptions of Digital Divide/Cybersecurity issues among Library and Information Science (LIS) professionals in selected polytechnics and universities in South-South and South-West Nigeria. As academic libraries increasingly adopt AI-driven systems, concerns regarding algorithmic bias, unequal access to digital resources, and cybersecurity vulnerabilities have become more pronounced. A descriptive survey design was employed, and purposive sampling was used to select 132 LIS professionals with relevant experience in digital library systems. Data were collected using a structured questionnaire administered through KoboToolbox and analysed using descriptive statistics, including frequencies, percentages, mean, and standard deviation. The findings revealed a moderate level of Ethical Artificial Intelligence awareness

among LIS professionals, with notable limitations in their ability to critically evaluate AI-generated outputs and apply ethical AI principles in practice. The study also found that Digital Divide and Cybersecurity issues constitute significant challenges to academic library service delivery, particularly with respect to poor digital infrastructure, unequal access to ICT resources, inadequate cybersecurity readiness, and insufficient staff training. The study concluded that while LIS professionals are increasingly exposed to emerging technologies, their preparedness to address Ethical AI and Digital Divide/Cybersecurity challenges remains limited. The study recommends continuous professional development on Ethical Artificial Intelligence and increased investment in digital infrastructure and cybersecurity capacity-building programmes to enhance equitable, secure, and sustainable library service delivery.

Keywords: *Academic Libraries, Cybersecurity, Digital Divide, Ethical Artificial Intelligence, Library and Information Science Professionals, Nigeria.*

Introduction

Academic libraries are undergoing a profound transformation driven by the integration of artificial intelligence (AI) and digital technologies into core library operations. These technologies, ranging from automated cataloguing systems to AI-driven discovery platforms and generative tools, have redefined libraries as hybrid knowledge infrastructures that combine human expertise with algorithmic processes. While these developments offer unprecedented opportunities for improving efficiency and user experience, they also introduce complex ethical, social, and technological challenges that require critical examination within Library and Information Science (LIS) scholarship (Cox et al., 2019; Lo, 2024). A central concern in this transformation is the ethical implications of AI systems in mediating access to information. Algorithmic tools often operate as "black boxes," making decisions about information visibility without transparency. This raises issues of bias, fairness, and accountability, particularly when recommender systems prioritise popular or dominant knowledge sources at the expense of marginalised perspectives (Bojic, 2024). Ethical AI frameworks developed by UNESCO (2021) and the American Library Association emphasise the need for transparency, inclusivity, and user privacy, positioning LIS professionals as critical mediators in ensuring responsible AI adoption.

Beyond ethical considerations, the persistent digital divide continues to shape access to information resources, particularly in developing regions. In Nigeria, disparities

in infrastructure, digital literacy, and socio-economic conditions significantly influence users' ability to engage with digital library services. This aligns with Savolainen's (2017) Everyday Life Information Seeking (ELIS) theory, which highlights how socio-cultural contexts determine patterns of information access and use. Consequently, the benefits of AI-driven services may not be evenly distributed, potentially exacerbating existing inequalities. Furthermore, the increasing reliance on digital platforms exposes academic libraries to cybersecurity threats that can undermine system reliability and user trust. Cyberattacks, data breaches, and weak security infrastructures pose significant risks, particularly in contexts where institutional preparedness is limited (Corrado, 2020). These challenges underscore the need for a holistic approach that integrates ethical AI practices, digital inclusion strategies, and robust cybersecurity frameworks. It is within this context that this study investigated Ethical Artificial Intelligence awareness and perceptions of Digital Divide/Cybersecurity issues among LIS professionals.

Statement of the Problem

Academic libraries are expected to operate as secure, inclusive, and ethically guided knowledge systems where AI technologies enhance equitable access to information while safeguarding user privacy and data integrity. LIS professionals should possess adequate competencies in Ethical AI and Digital Divide/Cybersecurity-related practices. In South-South and South-West Nigeria, many academic libraries are adopting digital technologies without sufficient ethical oversight, infrastructure, or staff training. Discussions and observation by the researcher pointed out that there is evidence that suggests gaps in AI literacy, persistent digital inequalities among users, and weak cybersecurity systems that expose libraries to risks. This discrepancy between expected standards and actual practice necessitates an empirical investigation into the awareness and preparedness of LIS professionals. Understanding these gaps in Ethical AI awareness and Digital Divide/Cybersecurity issues is essential for developing policies and interventions that ensure ethical, inclusive, and secure library services.

Research Questions

The following research questions guided the study:

1. What is the level of awareness of ethical AI among LIS professionals in academic libraries of South-South and South-West Nigeria?
2. What are the perceptions of LIS professionals regarding Digital Divide and Cybersecurity issues in academic libraries of South-South and South-West Nigeria?

Conceptual Framework

This study is anchored on three interrelated theoretical perspectives:

i. **Wilson's Information Behaviour Model** emphasises user-centred information needs and access.
ii. **Savolainen's Everyday Life Information Seeking (ELIS)** explains socio-cultural influences on information access.
iii. **Ethical AI Frameworks (ALA & UNESCO)** provide normative guidance on privacy, fairness, and accountability.

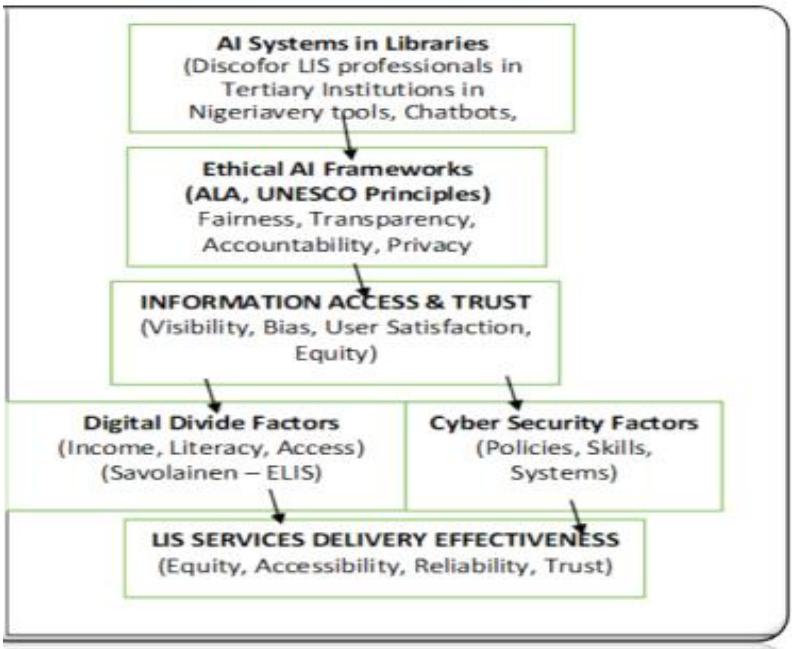

Figure 1: *Conceptual Model of Ethical Artificial Intelligence Awareness and Digital Divide/Cybersecurity Issues in LIS Service Delivery*

This study was anchored on an integrated theoretical framework that combines Wilson's Information Behaviour Model, Savolainen's Everyday Life Information Seeking (ELIS) theory, and contemporary Ethical Artificial Intelligence (AI) frameworks as articulated by the American Library Association (ALA) and UNESCO. The integration of these perspectives provided a robust lens for examining how technological, socio-cultural, and ethical dimensions intersect to shape Library and Information Science (LIS) service delivery in academic libraries. Wilson's (1999) Information Behaviour Model offers a foundational, user-centred perspective by conceptualising information seeking as a response to perceived needs,

influenced by intervening variables such as psychological, environmental, and technological factors. Within the context of AI-driven academic libraries, these intervening variables increasingly include algorithmic systems that mediate access to information. AI technologies such as recommender systems, discovery tools, and generative AI can enhance access efficiency; however, they may also introduce barriers through algorithmic opacity, bias, and filter bubbles. Thus, Wilson's model is particularly relevant in explaining how LIS professionals must navigate and manage these systems to ensure equitable access and user satisfaction.

Complementing this perspective, Savolainen's (2017) Everyday Life Information Seeking (ELIS) theory situates information behaviour within broader socio-cultural and economic contexts. ELIS emphasises that individuals' access to and use of information are shaped by their "way of life," including factors such as income level, education, digital literacy, and cultural orientation. In the context of this study, ELIS provides a critical framework for understanding the digital divide in South-South Nigeria, where disparities in infrastructure and socio-economic conditions significantly influence users' ability to engage with digital library services. This theoretical lens highlights the importance of inclusive strategies that address not only technological access but also the socio-cultural realities of library users. In addition to these behavioural theories, Ethical AI frameworks developed by UNESCO (2021) and the American Library Association (2020) introduce a normative dimension to the framework. These frameworks emphasise core principles such as fairness, transparency, accountability, and privacy in the design and deployment of AI systems. For LIS professionals, these principles are essential in ensuring that technological innovations align with the profession's longstanding commitment to intellectual freedom, equity of access, and user confidentiality. The integration of ethical AI frameworks into LIS practice is therefore not optional but imperative in maintaining trust and legitimacy in increasingly automated information environments.

Synthesising these perspectives, the conceptual framework posits that AI systems, socio-economic conditions, and cybersecurity capacity are interdependent determinants of effective LIS service delivery. AI systems directly influence information access, visibility, and user trust, as their design and implementation shape what information is retrieved and how it is presented. Socio-economic factors, as highlighted by ELIS, determine the extent of digital inclusion or exclusion, thereby affecting users' ability to benefit from library services. At the same time, cybersecurity infrastructure plays a critical role in ensuring system reliability, data integrity, and user confidence, particularly in environments where digital threats are

increasing. The interaction of these variables suggests a dynamic and multi-layered relationship: ethically grounded AI systems can enhance equitable access, but their benefits may be undermined by digital inequalities; similarly, improved access without adequate cybersecurity measures may expose users to risks that erode trust. Therefore, effective LIS service delivery depends on a balanced integration of ethical AI practices, inclusive access strategies, and robust cybersecurity frameworks. The framework provides a comprehensive and intellectually coherent foundation for analysing the awareness and perceptions of LIS professionals regarding ethical AI, the digital divide, and cybersecurity challenges. It not only explains the relationships among the key variables but also highlights the need for holistic and context-sensitive approaches to managing emerging technologies in academic libraries.

Literature Review

Ethical Artificial Intelligence Awareness

Lo (2024) investigated artificial intelligence literacy and its implications for academic librarians in a study published in College and Research Libraries. The research employed a survey design targeting academic librarians across North America, with a sample of 300 respondents selected through purposive sampling. Data were collected using a structured online questionnaire, and reliability was confirmed with a Cronbach's alpha above 0.85. The data were analysed using descriptive statistics and regression analysis. The findings revealed a moderate level of AI awareness among librarians (mean = 3.21), indicating that while many librarians were familiar with AI tools such as chatbots and discovery systems, they lacked a deeper understanding of algorithmic bias and ethical implications. The study further showed that formal training significantly influenced AI literacy levels ($p < 0.05$). Based on these findings, Lo (2024) recommended the integration of AI ethics into professional development programmes and LIS curricula. The study concluded that improving AI literacy is critical to ensuring responsible adoption of emerging technologies in libraries. Lo (2024) study provided strong empirical evidence of moderate awareness levels but highlights gaps in ethical competence, particularly in understanding algorithmic bias. However, the study was conducted outside the African context, leaving a gap regarding how LIS professionals in Nigeria perceive ethical AI.

Mannheimer et al. (2024) examined responsible AI practices in libraries and archives in a study published in *Information Technology and Libraries*. The study adopted a systematic literature review methodology, analysing over 150 scholarly publications

on AI in libraries. Data were synthesised using thematic analysis. The findings indicated that while AI adoption is increasing, only a small proportion of studies explicitly addressed ethical considerations such as privacy, transparency, and accountability. The study also revealed that most libraries rely on vendor-provided AI systems without conducting ethical risk assessments. Mannheimer et al. recommended the development of institutional AI policies and ethical guidelines tailored to library environments. The study concluded that ethical awareness remains underdeveloped despite rapid technological adoption. This study provided comprehensive insight into the ethical gaps in AI use but lacks empirical data on individual librarians' awareness levels, especially in developing regions such as Nigeria. Ngulube and Mosha (2024) investigated the safe integration of AI technologies in academic libraries through a scoping review published in *Technical Services Quarterly*. The study reviewed 60 peer-reviewed articles focusing on AI adoption in libraries, particularly in the Global South. The findings revealed low awareness of ethical AI issues among librarians, attributed to limited training opportunities and infrastructural challenges. The study also found that ethical considerations were often overshadowed by the need for operational efficiency. Ngulube and Mosha recommended capacity-building initiatives and policy frameworks to guide ethical AI implementation. They concluded that without adequate awareness, AI adoption could exacerbate inequalities and ethical risks. The study is particularly relevant to the African context, providing evidence of systemic challenges affecting ethical awareness. However, it did not provide country-specific empirical data for Nigeria, which this study aims to address.

Bojic (2024) examined algorithmic bias in recommender systems using a conceptual and empirical analysis of AI systems, focusing on bias mechanisms such as popularity bias and filter bubbles. The findings revealed that algorithmic systems tend to prioritise frequently accessed content, thereby limiting exposure to diverse information. The study concluded that the lack of awareness among professionals contributes to the uncritical adoption of biased systems. Bojic recommended the development of algorithmic auditing skills among information professionals. This study highlights the critical role of ethical awareness in mitigating bias but does not specifically focus on LIS professionals, creating a contextual gap. Matsieli and Mutula (2025) investigated ethical concerns surrounding generative AI in libraries in a study. The research adopted a qualitative approach, analyzing case studies and expert opinions. The findings revealed that librarians have limited awareness of ethical risks such as misinformation, privacy breaches, and epistemic injustice. The study recommended integrating ethical AI training into LIS education and professional practice. The authors concluded that ethical awareness is essential for

maintaining trust in library services. While the study provided valuable insights into ethical challenges, it lacks quantitative measurement of awareness levels, particularly within Nigerian academic libraries.

Digital Divide Issues in Academic Libraries

Van Dijk (2020) investigated the nature and persistence of the digital divide in a study presented in his book *The Digital Divide*. The study employed a mixed-methods approach, combining survey data and secondary analysis across multiple countries. The findings revealed that digital inequality is multi-dimensional, involving access, skills, and usage disparities. The study reported that socio-economic status significantly influences access to digital resources. Van Dijk recommended policy interventions to address structural inequalities in digital access. The study concluded that the digital divide remains a critical barrier to equitable information access. While comprehensive, the study is global in scope and does not specifically address LIS professionals' perceptions, particularly in Nigeria. Adeleke and Olorunsola (2020) examined ICT utilisation in Nigerian academic libraries in a study published in *Library Philosophy and Practice*. The research adopted a descriptive survey design with a sample of librarians from selected Nigerian universities. Data were collected using questionnaires and analysed using descriptive statistics. The findings revealed that inadequate ICT infrastructure and funding constraints significantly limit access to digital resources. The study also reported that librarians perceive the digital divide as a major challenge to service delivery. The authors recommended increased funding and infrastructural development to bridge the gap. The study provides direct evidence from the Nigerian context but does not explore cybersecurity challenges in depth.

Cybersecurity Issues in Academic Libraries

Corrado (2020) investigated cybersecurity issues in libraries in a study published in *Library Technology Reports*. The research employed a qualitative review of cybersecurity practices in libraries. The findings revealed that many libraries lack formal cybersecurity policies and rely on outdated systems, making them vulnerable to cyberattacks. Corrado recommended the implementation of comprehensive cybersecurity frameworks and staff training programmes. The study concluded that cybersecurity is a critical but often neglected aspect of library management. While insightful, the study is largely conceptual and lacks empirical data on LIS professionals' perceptions. Bada and Nurse (2019) examined cybersecurity awareness and human factors in a study published in *Information & Computer*

Security. The research employed a survey design involving employees across multiple sectors, including information services. The findings revealed that it contributes to cybersecurity vulnerabilities. significantly contributes to cybersecurity vulnerabilities. The study reported that organisations with regular training programmes exhibited higher levels of security compliance. The authors recommended continuous awareness programmes to improve cybersecurity practices.

This study highlights the importance of human factors but is not specific to academic libraries, indicating a contextual limitation. Khumalo, Rajkoomar, and Naicker (2025) investigated the use of AI tools in supporting disadvantaged library users in a study published in the *Journal of Electronic Resources Librarianship*. The study adopted a qualitative approach, focusing on case studies in developing contexts. The findings revealed that while AI tools can enhance access, infrastructural and socio-economic barriers limit their effectiveness. The study also highlighted concerns about cybersecurity risks associated with digital platforms. The authors recommended integrated strategies that address both access and security challenges. The study concluded that digital inclusion and cybersecurity must be addressed simultaneously to ensure effective library services. Although relevant, the study does not specifically focus on Nigerian LIS professionals, thereby reinforcing the need for local empirical research.

Methodology

This study adopted a descriptive survey design to assess Ethical Artificial Intelligence awareness and perceptions of Digital Divide/Cybersecurity issues among Library and Information Science Professionals of academic libraries in South-South and South-West Nigeria (Creswell, 2018). The population of the study comprised Library and Information Science (LIS) professionals working in selected polytechnics and universities in South-South and South-West Nigeria. A purposive sampling technique was employed to select respondents who were directly involved in the provision of digital library services and possessed relevant experience with emerging information technologies. The selected institutions were chosen based on the availability of functional academic libraries and the presence of LIS professionals actively engaged in technology-supported library services. A total of 132 LIS professionals constituted the sample for the study and participated in the survey. Data were collected using a structured, five-point Likert scale questionnaire administered electronically via **KoboToolbox,** a reliable digital survey platform. The research instrument was subjected to face and content validity by three experts in Library and

Information Science and Educational Research. Their observations and recommendations were incorporated into the final version of the questionnaire to ensure clarity, relevance, and adequacy of the items in measuring the variables under investigation. To establish the reliability of the instrument, a pilot study was conducted among LIS professionals outside the study area. The data obtained were analysed using Cronbach's Alpha reliability technique. The overall reliability coefficient obtained was 0.84, indicating that the instrument was sufficiently reliable for data collection, as the value exceeded the minimum acceptable threshold of 0.70. Data analysis included **descriptive statistics** (frequencies, percentages, mean, and standard deviation) to answer the research questions.

Data Presentation

Question 1. What is the level of awareness of ethical AI among LIS professionals in academic libraries of South-South and South-West Nigeria?

Table 1: Level of Ethical Artificial Intelligence Awareness among LIS Professionals (N = 132)

Item	SA	A	D	SD	Mean	SD	Decision
Awareness of AI tools in libraries	48 (36%)	52 (39%)	20 (15%)	12 (9%)	3.42	0.84	Moderate
Understanding of algorithmic bias	40 (30%)	45 (34%)	30 (23%)	17 (13%)	3.21	0.88	Moderate
Knowledge of AI ethics frameworks	30 (23%)	42 (32%)	35 (27%)	25 (19%)	3.05	0.92	Moderate
Ability to evaluate AI outputs critically	28 (21%)	40 (30%)	38 (29%)	26 (20%)	2.98	0.95	Moderate
Awareness of privacy implications	35 (27%)	48 (36%)	30 (23%)	19 (14%)	3.18	0.90	Moderate
Grand Mean					**3.17**		

Decision Rule: *Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).*
Mean scores were interpreted as follows: 3.50–4.00 = High; 2.50–3.49 = Moderate; 1.50–2.49 = Low; and 1.00–1.49 = Very Low.

The findings presented in Table 1 indicated that LIS professionals possess a moderate level of awareness of Ethical Artificial Intelligence (AI), with a grand mean of 3.17. The highest-rated item was awareness of AI tools in libraries (M =

3.42, SD = 0.84), suggesting that most respondents are familiar with the existence and application of AI technologies in library operations. Respondents also demonstrated moderate awareness of algorithmic bias (M = 3.21, SD = 0.88), AI ethics frameworks (M = 3.05, SD = 0.92), and privacy implications associated with AI systems (M = 3.18, SD = 0.90) and the ability to evaluate AI outputs critically recorded a moderate mean score (M = 2.98, SD = 0.95), The findings indicated that LIS professionals possess a moderate level of Ethical Artificial Intelligence awareness. Although respondents demonstrated awareness of AI tools, algorithmic bias, privacy implications, and ethical frameworks, their competence in critically evaluating AI-generated outputs was comparatively lower than in other dimensions of Ethical AI awareness. This suggests that while awareness of Ethical AI concepts exists, additional capacity-building initiatives are required to strengthen practical and analytical competencies for responsible AI adoption in academic libraries.

The finding of moderate Ethical AI awareness among LIS professionals is consistent with Lo (2024), who reported that academic librarians demonstrated moderate levels of AI literacy, particularly regarding familiarity with AI tools and applications. However, Lo (2024) also observed significant deficiencies in understanding algorithmic bias and broader ethical implications of AI systems, a finding that closely aligns with the present study. The low rating for the ability to evaluate AI outputs critically further suggests that awareness does not necessarily translate into competence, particularly in areas requiring analytical and ethical judgment. The findings also support Mannheimer et al. (2024), who found that although AI adoption is increasing within libraries and archives, ethical considerations such as transparency, accountability, privacy, and fairness remain insufficiently addressed. According to Mannheimer et al. (2024), many institutions utilise AI-driven systems without conducting adequate ethical assessments, thereby creating potential risks associated with algorithmic decision-making. The moderate awareness of AI ethics frameworks observed in this study may therefore reflect the limited institutional emphasis placed on ethical governance and responsible AI implementation. Similarly, the findings corroborate Ngulube and Mosha (2024), who reported low awareness of ethical AI issues among librarians in the Global South due to limited training opportunities, infrastructural challenges, and inadequate policy frameworks. Although respondents in the present study demonstrated moderate awareness rather than low awareness, the limited understanding of AI ethics frameworks and critical evaluation skills suggests that professional capacity development remains inadequate. This indicates the need for targeted training programmes that focus on the ethical dimensions of AI adoption within library environments. Furthermore, the findings are consistent with Matsieli and Mutula (2025), who found that librarians

often possess limited awareness of emerging ethical concerns associated with generative AI, including misinformation, privacy violations, and epistemic injustice. The moderate awareness of privacy implications reported in this study suggests that respondents recognise some ethical risks associated with AI technologies; however, the low competence in critically evaluating AI outputs indicates that many professionals may still be insufficiently prepared to identify and mitigate these risks in practice.

The results also lend support to Bojic (2024), who argued that inadequate awareness of algorithmic bias contributes to the uncritical adoption of AI systems that can reinforce information inequalities and limit exposure to diverse perspectives. Although respondents reported moderate awareness of algorithmic bias, the findings suggest that such awareness remains largely conceptual rather than operational. Consequently, LIS professionals may be aware of the existence of bias in AI systems without possessing the practical skills required to detect, evaluate, and address it effectively. The findings indicated that LIS professionals in South-South and South-West Nigeria have attained a moderate level of Ethical AI awareness; however, important gaps remain in areas related to critical evaluation, ethical governance, and practical application. The results underscore the need for continuous professional development programmes, institutional AI policies, and curriculum reforms that will strengthen Ethical AI competencies and promote responsible AI adoption within academic libraries.

Question 2. What are the perceptions of LIS professionals regarding Digital Divide and Cybersecurity issues in academic libraries of South-South and South-West Nigeria?

Table 2: Perceptions of Digital Divide and Cybersecurity Issues (N = 132)

Item	SA	A	D	SD	Mean	SD	Decision
The digital divide affects access to digital information resources	65 (49%)	45 (34%)	12 (9%)	10 (8%)	3.74	0.78	High
Unequal access to ICT tools	60 (45%)	50 (38%)	12 (9%)	10 (8%)	3.70	0.76	High
Poor internet infrastructure	68 (52%)	40 (30%)	14 (11%)	10 (8%)	3.76	0.80	High
Awareness of cyber threats	42 (32%)	48 (36%)	25 (19%)	17 (13%)	3.28	0.87	Moderate

Institutional cybersecurity readiness	25 (19%)	38 (29%)	40 (30%)	29 (22%)	2.95	0.93	Low
Staff cybersecurity training	20 (15%)	35 (27%)	45 (34%)	32 (24%)	2.83	0.96	Low
Grand Mean					**3.38**		

Decision Rule: *Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).*
Mean scores were interpreted as follows: 3.50–4.00 = High; 2.50–3.49 = Moderate; 1.50–2.49 = Low; and 1.00–1.49 = Very Low.

The results presented in Table 2 indicated that LIS professionals perceive digital divide and cybersecurity issues as important factors influencing the effectiveness of academic library services. The item "Poor internet infrastructure" recorded the highest mean score (M = 3.76, SD = 0.80), indicating that respondents strongly perceive inadequate internet connectivity as a major challenge to information access and digital service delivery. Similarly, "The digital divide affects access" (M = 3.74, SD = 0.78) and "Unequal access to ICT tools" (M = 3.70, SD = 0.76) were rated high, suggesting a strong perception that disparities in access to digital technologies continue to hinder equitable access to information resources. The item "Awareness of cyber threats" recorded a moderate mean score (M = 3.28, SD = 0.87), indicating that respondents possess some level of awareness of cybersecurity risks. However, "Institutional cybersecurity readiness" (M = 2.95, SD = 0.93) and "Staff cybersecurity training" (M = 2.83, SD = 0.96) were rated low, suggesting that many institutions lack adequate cybersecurity preparedness and capacity-building initiatives. The overall grand mean of 3.38 indicates a moderate perception of digital divide and cybersecurity issues among LIS professionals in academic libraries of South-South and South-West Nigeria. Nevertheless, the high mean scores recorded for poor internet infrastructure, unequal access to ICT tools, and the effect of the digital divide on access to information resources suggest that these challenges remain prominent concerns among respondents.

The findings revealed that digital divide challenges remain a significant concern among LIS professionals. Respondents strongly agreed that poor internet infrastructure and unequal access to ICT facilities limit effective access to digital information resources and services. This finding is consistent with Van Dijk (2020), who argued that digital inequality extends beyond physical access to include disparities in digital skills, opportunities, and patterns of technology use. The finding

also supports Adeleke and Olorunsola (2020), who reported that inadequate ICT infrastructure and funding constraints constitute major barriers to effective information service delivery in Nigerian academic libraries. The high perception of digital divide issues observed in this study suggests that despite advancements in digital technologies, substantial infrastructural and socio-economic barriers continue to affect equitable access to information resources. The findings further indicated that although LIS professionals demonstrate a moderate awareness of cyber threats, institutional cybersecurity readiness and staff cybersecurity training remain inadequate. This suggests a gap between awareness of cybersecurity risks and the implementation of practical measures required to address such risks. The finding corroborates Corrado (2020), who found that many libraries lack comprehensive cybersecurity policies and continue to rely on outdated technological systems, thereby exposing them to cyber threats. Similarly, the result aligns with Bada and Nurse (2019), who observed that insufficient cybersecurity awareness and training significantly contribute to organisational security vulnerabilities. The low ratings for cybersecurity readiness and staff training imply that many academic libraries may be ill-equipped to respond effectively to cyberattacks, data breaches, and other emerging digital security threats.

The findings also support the observations of Khumalo et al. (2025), who reported that while digital technologies and AI tools can enhance access to information services, infrastructural limitations and cybersecurity concerns often undermine their effectiveness. Consequently, the results suggest that addressing digital divide challenges without simultaneously strengthening cybersecurity frameworks may limit the sustainability and reliability of digital library services. Therefore, academic libraries require integrated strategies that promote digital inclusion, improve technological infrastructure, and strengthen cybersecurity preparedness to ensure secure, equitable, and effective information service delivery.

Findings of the Study

The study found that:

1. LIS professionals in selected polytechnics and universities in South-South and South-West Nigeria possess a moderate level of Ethical Artificial Intelligence awareness, with notable limitations in their ability to critically evaluate AI-generated outputs and apply ethical AI principles in practice.
2. LIS professionals perceive Digital Divide and Cybersecurity issues as significant challenges to academic library service delivery, particularly regarding poor digital infrastructure, unequal access to ICT resources, inadequate cybersecurity readiness and insufficient staff training.

Recommendations

From the findings of the study, the following were recommended:

1. Academic libraries, library schools, and professional associations should organise continuous training, workshops, and capacity-building programmes on Ethical Artificial Intelligence to improve LIS professionals' understanding of algorithmic bias, privacy implications, ethical AI frameworks, and the critical evaluation of AI-generated outputs.
2. Governments, institutional administrators, and library management should invest in digital infrastructure, expand access to ICT facilities, and implement comprehensive cybersecurity policies and staff training programmes to reduce digital inequalities and strengthen cybersecurity preparedness in academic libraries.

Conclusion

This study examined Ethical Artificial Intelligence awareness and Digital Divide/Cybersecurity issues among Library and Information Science professionals in selected polytechnics and universities in South-South and South-West Nigeria. The findings indicate that LIS professionals possess a moderate level of Ethical AI awareness, suggesting that they are familiar with AI technologies and related ethical concerns but require further development of advanced competencies in areas such as algorithmic accountability, ethical decision-making, and critical evaluation of AI-generated outputs. The study also revealed that digital divide challenges remain prevalent, particularly in relation to internet connectivity and access to ICT resources, while institutional cybersecurity preparedness and staff training remain inadequate despite moderate awareness of cyber threats. The study concluded that the effective adoption and utilisation of emerging technologies in academic libraries depend not only on awareness of Ethical AI but also on the availability of inclusive digital infrastructure and robust cybersecurity measures. Therefore, academic libraries must adopt integrated strategies that promote Ethical AI competence, digital inclusion, and cybersecurity resilience to ensure equitable, secure, and sustainable information service delivery in the digital age.

References

Adeleke, A. A., & Olorunsola, R. (2020). ICT utilisation in academic libraries in Nigeria. *Library Philosophy and Practice*, 1–15.

American Library Association. (2020). *Privacy: An interpretation of the Library Bill of Rights*. https://www.ala.org

Bada, M., & Nurse, J. R. C. (2019). Developing cybersecurity education and awareness programmes for small and medium-sized enterprises (SMEs). *Information and Computer Security, 27*(3), 393–410. https://doi.org/10.1108/ICS-07-2018-0080

Bojic, L. (2024). Artificial intelligence and bias in recommender systems. *Technology in Society, 74*, 102341.

Corrado, E. M. (2020). *Cybersecurity in libraries*. *Library Technology Reports, 56*(7), 5–38.

Cox, A. M., Pinfield, S., & Rutter, S. (2019). The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. *Library Hi Tech, 37*(3), 418–435. https://doi.org/10.1108/LHT-08-2018-0105

Creswell, J. W. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

Khumalo, N., Rajkoomar, M., & Naicker, N. (2025). Artificial intelligence tools and access to information in developing contexts. *Journal of Electronic Resources Librarianship*.

Lo, L. S. (2024). AI literacy in academic libraries: A survey study. *College & Research Libraries, 85*(1), 1–22.

Mannheimer, S., Young, S. W. H., & Rossmann, D. (2024). Responsible AI practices in libraries and archives. *Information Technology and Libraries, 43*(1), 1–20.

Matsieli, M., & Mutula, S. (2025). Ethical concerns of generative artificial intelligence in libraries. *Information, 16*(1), 45.

Ngulube, P., & Mosha, N. F. (2024). Integrating artificial intelligence safely in academic libraries: A scoping review. *Technical Services Quarterly*.

Savolainen, R. (1995). Everyday life information seeking: Approaching information seeking in the context of "way of life." *Library & Information Science Research, 17*(3), 259–294. https://doi.org/10.1016/0740-8188(95)90048-9

UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. UNESCO Publishing. https://unesdoc.unesco.org

Van Dijk, J. (2020). *The digital divide*. Polity Press.