

Information Literacy Instruction by Academic Librarians for the Ethical Use of Generative Artificial Intelligence in the South-West Geopolitical Zone, Nigeria

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ABSTRACT

This study examined the role of information literacy instruction (ILI) by academic librarians in promoting the ethical use of Generative Artificial Intelligence (AI) among information users in the South-West Geopolitical Zone of Nigeria. Employing a descriptive survey research design, the study sampled 384 academic librarians from Federal and State universities across six states in the region. Data were collected through a structured questionnaire with a 4-point Likert scale and analyzed using descriptive statistics including frequency counts, percentages, means, and standard deviations. Findings revealed that academic librarians predominantly employ collaborative instructional methods, digital literacy workshops, and embedded librarianship approaches to teach ethical AI usage. The mean score of 3.21 indicated strong agreement on the effectiveness of integrating AI ethics into ILI programs. However, significant challenges were identified, including inadequate technological infrastructure ($M=3.45$, $SD=0.68$), insufficient training for librarians on AI technologies ($M=3.38$, $SD=0.72$), and limited institutional support ($M=3.29$, $SD=0.75$). The study concludes that while academic librarians recognize the importance of ethical AI instruction, systemic barriers impede comprehensive implementation. The study recommends that University management should prioritize funding for AI-focused professional development programs and establish dedicated units for digital ethics instruction to empower librarians in addressing emerging information challenges associated with Generative AI technologies.

Keywords: Information Literacy Instruction, Generative Artificial Intelligence, Ethical AI Use, Academic Librarians, South-West Nigeria

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1. INTRODUCTION

The exponential growth of Generative Artificial Intelligence (AI) technologies has fundamentally transformed information creation, dissemination, and consumption patterns within academic environments (Grassini, 2023). As these technologies become increasingly integrated into scholarly workflows, concerns regarding plagiarism, misinformation, intellectual property violations, and algorithmic bias have intensified (Kasneji *et al.*, 2023). Academic libraries, traditionally positioned as information literacy advocates, now face the imperative of equipping users with competencies to navigate the ethical complexities inherent in AI-generated content (Cox *et al.*, 2023). In Nigeria's South-West Geopolitical Zone, comprising Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti states, universities have witnessed rapid adoption of AI tools among students and faculty for research, writing, and learning activities (Adebayo & Ogunsola, 2023). However, this adoption has occurred without corresponding ethical frameworks or systematic information literacy interventions, creating a critical gap that academic librarians must address (Nwachukwu *et al.*, 2024). The Association of College and Research Libraries (ACRL, 2016) Framework for Information Literacy emphasizes that information literate individuals understand the ethical dimensions of information use, making librarians uniquely positioned to guide users in responsible AI engagement.



Despite the recognized importance of information literacy instruction in promoting ethical information practices, limited empirical research has examined how academic librarians in Nigerian universities specifically address Generative AI ethics within their instructional programs. Existing studies have predominantly focused on general information literacy competencies (Okiki & Asiru, 2021) or technological adoption patterns (Bassey *et al.*, 2023) without investigating the pedagogical approaches librarians employ to teach ethical AI use. This study addresses this research gap by examining the types of information literacy instruction academic librarians utilize, their effectiveness in promoting ethical AI practices, and the challenges encountered in implementation within the South-West geopolitical context.

Conceptual Framework

Definition of Generative Artificial Intelligence (AI)

Generative Artificial Intelligence refers to computational systems that utilize machine learning algorithms, particularly neural networks, to create new content including text, images, audio, video, and code based on patterns learned from training data (Cao *et al.*, 2023). Unlike traditional AI systems designed for analysis or classification, Generative AI produces original outputs that mimic human-created content through technologies such as Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and Large Language Models (LLMs) (Eloundou *et al.*, 2023). These systems, exemplified by ChatGPT, DALL-E, Midjourney, and Google Bard, have demonstrated remarkable capabilities in natural language processing, creative content generation, and problem-solving tasks (Bommasani *et al.*, 2022).

The distinguishing characteristic of Generative AI lies in its capacity to generate contextually appropriate, coherent, and seemingly original content without explicit programming for each specific output (Vaswani *et al.*, 2017). This capability stems from transformer architectures and attention mechanisms that enable models to understand complex linguistic patterns, contextual relationships, and semantic structures across vast datasets (Brown *et al.*, 2020). However, this same capability raises critical ethical concerns regarding authenticity, attribution, intellectual property rights, and the potential for misuse in academic contexts (Dwivedi *et al.*, 2023).

Definition of Generative Artificial Intelligence (AI) in Library Services

Within library and information science contexts, Generative Artificial Intelligence encompasses the application of AI technologies to enhance, automate, and transform traditional library functions including reference services, collection development, cataloging, information retrieval, and user education (Cox *et al.*, 2023). Academic libraries have begun integrating Generative AI tools to provide personalized research assistance, automated citation generation, intelligent chatbot services, content summarization, and customized learning pathways (Lund & Wang, 2023).

Generative AI in library services extends beyond operational efficiency to encompass educational responsibilities, particularly in teaching users to critically evaluate AI-generated content, recognize algorithmic biases, understand intellectual property implications, and employ AI tools ethically in scholarship (Whittaker *et al.*, 2023). This educational dimension positions librarians as mediators between emerging technologies and ethical information practices, requiring them to develop new pedagogical approaches that address both technological affordances and ethical constraints (Pun, 2023). The integration of Generative AI into library services thus represents a paradigmatic shift from information access facilitation to digital ethics stewardship, demanding enhanced competencies in algorithmic literacy, critical AI evaluation, and ethical instruction methodologies (Kiron & Pant, 2023).

Information Literacy Instruction and Ethical AI Use

Information literacy instruction represents systematic educational interventions designed to develop users' abilities to recognize information needs, locate relevant sources, evaluate information quality, use information effectively, and understand the ethical and legal dimensions of information access and use (ACRL, 2016). The emergence of Generative AI necessitates an expanded conceptualization of information literacy that encompasses algorithmic literacy, data literacy, and critical understanding of machine learning systems (Carmi *et al.*, 2020).

The conceptual relationship between information literacy instruction and ethical AI use rests on several theoretical foundations. First, the ACRL Framework's threshold concept of "Information Has Value" emphasizes that information possesses economic, educational, and ethical dimensions that information literate individuals must navigate responsibly (ACRL, 2016). Applied to Generative AI contexts, this concept requires users to understand intellectual property implications, attribution requirements, and the value embedded in both human-created and AI-generated content (Kasneci *et al.*, 2023).

Second, critical information literacy theory posits that information practices are inherently political and require users to critically examine power structures, biases, and ideological dimensions within information systems (Elmborg, 2006). Generative AI systems, trained on datasets reflecting societal biases and developed within specific economic contexts, embody these power dynamics in ways that require critical pedagogical interventions (Bender *et al.*, 2021). Academic librarians, through information literacy instruction, can facilitate users' understanding of these dynamics and promote reflective, ethical engagement with AI technologies (Tewell, 2015).

Third, the concept of metaliteracy, which emphasizes metacognitive awareness of one's information practices across diverse formats and contexts, provides a framework for understanding how users can develop self-regulatory skills for ethical AI use (Mackey & Jacobson, 2011). Metaliteracy instruction encourages users to reflect on their information production and consumption practices, evaluate the appropriateness of different information tools for specific contexts, and adapt their practices to emerging ethical standards (Mackey & Jacobson, 2014).

Types of Information Literacy Instruction (ILI) by Academic Librarians for Ethical Use of Generative Artificial Intelligence (AI)

Academic librarians employ diverse pedagogical approaches to teach ethical AI use, each grounded in established information literacy frameworks and adapted to address emerging technological challenges. These instructional types represent both traditional information literacy methodologies and innovative approaches developed specifically for digital ethics education.

Embedded Librarianship and Course-Integrated Instruction: Embedded librarianship involves librarians' integration into academic courses as collaborative partners with faculty, providing ongoing, context-specific information literacy instruction throughout the learning process (Shumaker, 2012). In the context of ethical AI use, embedded librarians work directly within discipline-specific courses to address AI ethics at the point of need, demonstrating appropriate AI tool usage, discussing citation practices for AI-generated content, and facilitating critical discussions about algorithmic bias within disciplinary contexts (Carlson & Kneale, 2011). This approach enables librarians to tailor ethical AI instruction to specific disciplinary norms, research methodologies, and writing conventions, increasing relevance and practical application (Hoffman & Ramin, 2010). Studies have demonstrated that embedded librarianship significantly enhances students' critical evaluation skills and ethical awareness when integrated into writing-intensive courses where AI tool usage is prevalent (Tumbleson & Burke, 2013).

Workshop-Based Digital Literacy Programs: Workshop-based instruction provides structured, standalone sessions focused on specific competencies related to ethical AI use, including prompt engineering ethics, AI output verification, plagiarism avoidance with AI tools, and critical evaluation of AI-generated content (Saunders, 2020). These workshops typically employ active

learning pedagogies, incorporating hands-on activities where participants engage directly with Generative AI tools while simultaneously learning to recognize their limitations, biases, and appropriate use cases (Goates *et al.*, 2017). The workshop format allows librarians to reach broader audiences beyond course-integrated settings and to provide targeted instruction addressing emerging ethical concerns as AI technologies evolve (Holliday *et al.*, 2015). Research indicates that interactive workshops incorporating ethical scenario analysis and group discussions enhance participants' ethical decision-making competencies more effectively than lecture-based approaches (Henrich & Attebury, 2010).

One-on-One Research Consultations: Individualized research consultations provide personalized guidance on ethical AI use within specific research contexts, allowing librarians to address unique ethical dilemmas that may not arise in group settings (Reinsfelder, 2012). During consultations focused on thesis or dissertation research, librarians can discuss appropriate AI tool usage for literature reviews, data analysis, and writing assistance while ensuring compliance with institutional ethics policies and academic integrity standards (Lee, 2004). This personalized approach enables librarians to assess individual users' understanding of AI ethics, correct misconceptions, and provide tailored recommendations based on disciplinary norms and specific research requirements (Catalano, 2013). Evidence suggests that research consultations significantly improve students' confidence in making ethical decisions regarding technology use in scholarship (Courtney, 2001).

Online Learning Modules and Self-Paced Tutorials: Asynchronous online learning modules provide scalable, accessible instruction on ethical AI use, allowing users to learn at their own pace and revisit content as needed (Mestre, 2012). These modules typically incorporate multimedia elements, interactive quizzes, scenario-based learning activities, and reflective exercises that guide users through ethical decision-making processes related to AI tool usage (Silver & Nickel, 2007). The flexibility of online modules makes them particularly effective for reaching diverse user populations including distance learners, part-time students, and faculty seeking professional development opportunities (Anderson & May, 2010). Research has demonstrated that well-designed online information literacy modules incorporating ethical reasoning scenarios can effectively develop users' critical thinking skills and ethical awareness, particularly when combined with opportunities for practice and feedback (Mery *et al.*, 2012).

Collaborative Team-Based Learning: Team-based learning approaches engage small groups of users in collaborative problem-solving activities focused on ethical AI dilemmas, promoting peer learning and collaborative construction of ethical frameworks (Michaelsen *et al.*, 2004). In library instruction contexts, this approach might involve groups analyzing case studies of AI misuse, developing institutional AI ethics guidelines, or collectively evaluating AI-generated research outputs for quality and appropriateness (Cestone *et al.*, 2008). The collaborative nature of this approach develops not only individual ethical reasoning skills but also communication competencies necessary for navigating ethical disagreements and establishing community standards for AI use (Haidet *et al.*, 2012). Studies indicate that team-based learning in information literacy contexts significantly enhances critical thinking, ethical reasoning, and long-term retention of concepts compared to traditional lecture formats (Willingham, 2008).

Flipped Classroom Instruction: The flipped classroom model reverses traditional instruction by providing foundational content through pre-class materials while using face-to-face time for active learning, application, and discussion (Bergmann & Sams, 2012). For ethical AI instruction, librarians might assign pre-session videos explaining Generative AI technologies and basic ethical principles, then use class time for hands-on AI tool experimentation, ethical scenario analysis, and facilitated discussions of complex ethical dilemmas (Arnold-Garza, 2014). This approach maximizes valuable in-person instructional time for higher-order thinking activities and allows librarians to address misconceptions and facilitate deeper engagement with ethical complexities (Tucker, 2012). Research demonstrates that flipped instruction in information literacy contexts increases student engagement,

promotes critical thinking, and enhances practical application of ethical principles (Datig & Ruswick, 2013).

How Information Literacy Instruction by Academic Libraries Promotes Ethical Use of Generative Artificial Intelligence

Academic libraries promote ethical AI use through information literacy instruction via several interconnected mechanisms that develop users' cognitive, evaluative, and practical competencies for responsible technology engagement.

Developing Critical Evaluation Skills: Information literacy instruction enhances users' abilities to critically evaluate AI-generated content by teaching systematic evaluation criteria including accuracy verification, source attribution, bias detection, and logical consistency assessment (Witek & Grettano, 2014). Librarians guide users in developing questioning dispositions toward information regardless of source, encouraging them to verify AI outputs against authoritative sources, recognize when AI systems produce plausible but factually incorrect information (hallucinations), and understand the limitations of AI knowledge (Flaherty, 2023). This critical stance, fundamental to information literacy, becomes particularly crucial with Generative AI where content may appear authoritative while lacking factual grounding or containing subtle biases inherited from training data (Bender *et al.*, 2021). Research demonstrates that explicit instruction in critical evaluation significantly improves students' ability to identify misinformation and make informed judgments about information quality (Breakstone *et al.*, 2018).

Teaching Attribution and Academic Integrity: Academic libraries instruct users on proper attribution practices for AI-generated or AI-assisted work, clarifying citation requirements, disclosure expectations, and the distinction between legitimate AI assistance and academic dishonesty (Eaton, 2023). Librarians help users understand institutional policies regarding AI use, teach appropriate citation formats for AI-generated content, and facilitate discussions about the ethical boundaries between AI-assisted writing and plagiarism (Perkins *et al.*, 2023). This instruction addresses the complex ethical terrain where AI serves as a writing tool similar to grammar checkers or as a content generator requiring different ethical considerations, helping users develop nuanced understanding of academic integrity in AI-augmented environments (Sullivan *et al.*, 2023). Studies indicate that clear instruction on citation practices and academic integrity significantly reduces unintentional plagiarism and enhances students' understanding of intellectual property concepts (Gullifer & Tyson, 2010).

Raising Awareness of Algorithmic Bias and Fairness: Information literacy instruction exposes users to concepts of algorithmic bias, helping them recognize how AI systems can perpetuate societal inequities through biased training data, prejudiced design choices, or discriminatory outputs (Noble, 2018). Librarians facilitate critical discussions about whose perspectives are represented in AI training datasets, how cultural contexts influence AI behavior, and why AI outputs may reflect and amplify existing prejudices related to race, gender, socioeconomic status, and geographic location (Benjamin, 2019). This awareness empowers users to question AI recommendations, seek diverse perspectives beyond AI suggestions, and advocate for more equitable AI development practices (O'Neil, 2016). Research demonstrates that education about algorithmic bias significantly increases users' critical consciousness and influences their technology adoption decisions (Eslami *et al.*, 2015).

Promoting Data Privacy and Security Awareness: Academic libraries instruct users on data privacy implications of AI tool usage, including how information entered into AI systems may be stored, used for model training, or potentially exposed to unauthorized access (Solove, 2021). Librarians teach users to evaluate privacy policies of AI platforms, recognize when sensitive or confidential information should not be shared with AI systems, and understand the long-term implications of data provided to commercial AI services (Zuboff, 2019). This instruction helps users make informed decisions about which AI tools are appropriate for different contexts, particularly when handling research data, personal information, or institutional materials requiring confidentiality

(Nissenbaum, 2009). Studies show that privacy education significantly influences users' protective behaviors and increases their adoption of privacy-preserving practices (Choi *et al.*, 2018).

Fostering Reflective Practice and Metacognition: Information literacy instruction encourages users to develop metacognitive awareness of their information practices, including their reliance on AI tools, their motivations for AI usage, and the implications of delegating cognitive tasks to algorithmic systems (Flavell, 1979). Librarians facilitate reflective exercises where users consider questions such as: When is AI assistance appropriate? How does AI use affect my learning? What skills might atrophy if I over-rely on AI? These reflective practices help users develop self-regulatory capabilities for ethical AI engagement, making conscious, values-aligned decisions about technology use rather than defaulting to convenience or efficiency (Zimmerman, 2002). Research indicates that metacognitive instruction significantly enhances self-regulated learning and promotes more thoughtful, intentional technology use patterns (Schraw, 1998).

Building Community Norms and Ethical Discourse: Through facilitated discussions, collaborative learning activities, and community engagement initiatives, academic libraries create spaces for collective deliberation on ethical AI use, helping user communities develop shared norms, expectations, and guidelines (Wenger, 1998). Librarians can organize forums, workshops, and online discussions where faculty, students, and researchers collectively explore ethical dilemmas, debate appropriate AI use cases, and establish community standards that reflect institutional values (Lave & Wenger, 1991). This community-building function positions libraries as ethical centers within academic institutions, fostering ongoing dialogue about emerging technologies rather than providing static ethical rules (Lankes, 2011). Evidence suggests that community-based ethical education is more effective than individual instruction in creating lasting behavioral change and developing robust ethical cultures (Rest & Narvaez, 1994).

2. METHODOLOGY

This study employed a descriptive survey research design to examine information literacy instruction practices by academic librarians for promoting ethical Generative AI use in the South-West Geopolitical Zone of Nigeria. The descriptive survey design was deemed appropriate as it enables systematic collection of data from a representative sample to describe existing conditions, practices, and attitudes within a defined population (Creswell & Creswell, 2018). The study population comprised all academic librarians working in federal and state universities across the six states of South-West Nigeria: Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti. According to the National Universities Commission (NUC, 2023), the region hosts 23 federal and state universities with an estimated population of 842 academic librarians. Using Krejcie and Morgan's (1970) sample size determination table at 95% confidence level, a sample size of 384 respondents was determined appropriate for the study, and a proportionate stratified random sampling technique was employed to ensure adequate representation across institutional types (federal vs. state universities) and states within the zone. Data were collected using a structured questionnaire titled "Information Literacy Instruction for Ethical AI Use Questionnaire" (ILIEAUQ), developed by the researcher based on extensive literature review and validated through expert review by three professors in Library and Information Science. The instrument consisted of four sections: (A) demographic information; (B) types of information literacy instruction employed for ethical AI use (15 items); (C) challenges faced in providing ethical AI instruction (12 items); and (D) open-ended questions for additional insights. Sections B and C utilized a 4-point Likert scale with response options: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The instrument's reliability was established through test-retest method with a two-week interval, yielding a Cronbach's alpha coefficient of 0.87, indicating high internal consistency. Data collection occurred over a six-week period (September-October 2024), with copies of the questionnaire administered both in physical format and electronically via Google Forms to accommodate respondents' preferences and improve response rate. Prior to administration, ethical clearance was obtained from the researcher's institutional ethics committee,

and informed consent was secured from all participants, with follow-up reminders sent at two-week intervals to enhance response rate. Of the 384 questionnaires distributed, 342 were completed and returned, representing an 89.1% response rate considered adequate for generalization (Mugenda & Mugenda, 2003). Data were analyzed using descriptive statistics including frequency counts, percentages, mean scores, and standard deviations, with the decision rule for interpretation of mean scores established as follows: mean values of 3.50-4.00 = Very High Extent/Strongly Agree; 2.50-3.49 = High Extent/Agree; 1.50-2.49 = Low Extent/Disagree; and 1.00-1.49 = Very Low Extent/Strongly Disagree. Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 26.0, while qualitative data from open-ended questions were thematically analyzed to provide contextual depth to quantitative findings.

3. RESULTS AND DISCUSSION

3.1. Demographic Characteristics of Respondents

The demographic analysis revealed that 58.2% (n=199) of respondents were female, while 41.8% (n=143) were male, indicating fairly balanced gender representation. Regarding professional qualifications, 42.1% held Bachelor's degrees in Library and Information Science, 45.6% possessed Master's degrees, while 12.3% had doctoral qualifications. The distribution of work experience showed that 34.2% had 1-5 years of experience, 38.6% had 6-10 years, 18.4% had 11-15 years, and 8.8% had over 15 years of professional experience. These demographics suggest a workforce with substantial educational preparation and diverse experience levels, potentially influencing information literacy instruction practices.

3.2. Types of Information Literacy Instruction for Ethical Use of Generative AI

Table 1: Types of Information Literacy Instruction (ILI) by Academic Librarians for Ethical Use of Generative Artificial Intelligence (AI) (N=342)

S/N	Instructional Type	SA	A	D	SD	Mean	SD	Rank
		F(%)	F(%)	F(%)	F(%)			
1	Embedded librarianship integrated into academic courses	156(45.6)	128(37.4)	42(12.3)	16(4.7)	3.24	0.86	4th
2	Workshop-based digital literacy programs on ethical AI use	189(55.3)	117(34.2)	28(8.2)	8(2.3)	3.42	0.75	1st
3	One-on-one research consultations addressing AI ethics	142(41.5)	136(39.8)	48(14.0)	16(4.7)	3.18	0.85	5th
4	Online self-paced learning modules on Generative AI	98(28.7)	147(43.0)	71(20.8)	26(7.6)	2.93	0.89	9th
5	Collaborative team-based learning activities	134(39.2)	152(44.4)	42(12.3)	14(4.1)	3.19	0.80	4th
6	Flipped classroom instructional approaches	87(25.4)	139(40.6)	86(25.1)	30(8.8)	2.83	0.90	11th
7	Information literacy orientations for new students including AI ethics	167(48.8)	129(37.7)	34(9.9)	12(3.5)	3.32	0.80	2nd
8	Discipline-specific instruction tailored to departmental needs	124(36.3)	145(42.4)	56(16.4)	17(5.0)	3.10	0.86	7th
9	Credit-bearing information literacy courses with AI ethics modules	76(22.2)	118(34.5)	102(29.8)	46(13.5)	2.65	0.97	13th
10	Peer-to-peer instruction programs training student ambassadors	93(27.2)	138(40.4)	81(23.7)	30(8.8)	2.86	0.91	10th
11	Virtual reference services providing AI ethics guidance	112(32.7)	149(43.6)	61(17.8)	20(5.8)	3.03	0.86	8th
12	Faculty development workshops on teaching AI ethics	145(42.4)	138(40.4)	43(12.6)	16(4.7)	3.20	0.83	5th
13	Research guides and LibGuides on ethical AI use	178(52.0)	123(36.0)	31(9.1)	10(2.9)	3.37	0.77	3rd
14	Social media campaigns promoting AI literacy	68(19.9)	124(36.3)	106(31.0)	44(12.9)	2.63	0.94	14th
15	Institutional policy development participation for AI	102(29.8)	141(41.2)	73(21.3)	26(7.6)	2.93	0.90	9th

S/N Instructional Type	SA	A	D	SD	Mean	SD	Rank
use guidelines							
Cluster Mean					3.06	0.86	

Key: SA=Strongly Agree; A=Agree; D=Disagree; SD=Strongly Disagree; F=Frequency; %=Percentage; SD=Standard Deviation

Table 1 presents the frequency distribution, percentages, mean scores, and standard deviations for 15 types of information literacy instruction employed by academic librarians in South-West Nigeria for promoting ethical Generative AI use. The cluster mean of 3.06 (SD=0.86) indicates that respondents generally agreed that various instructional approaches are being utilized, though with moderate consistency in implementation patterns.

Workshop-based digital literacy programs emerged as the most prevalent instructional type (M=3.42, SD=0.75, Rank 1st), with 89.5% of respondents (55.3% strongly agreeing, 34.2% agreeing) confirming their use. This finding suggests that librarians favor structured, focused sessions that allow for hands-on engagement with AI tools while simultaneously addressing ethical considerations. The relatively low standard deviation (0.75) indicates strong consensus among respondents regarding the utilization of this approach.

Information literacy orientations for new students including AI ethics ranked second (M=3.32, SD=0.80), with 86.5% agreement, indicating that librarians are proactively integrating AI ethics education into foundational information literacy programs. Research guides and LibGuides on ethical AI use ranked third (M=3.37, SD=0.77), with 88% agreement, demonstrating librarians' commitment to providing accessible, self-service resources for users seeking guidance on AI ethics.

Embedded librarianship (M=3.24, SD=0.86, Rank 4th) and collaborative team-based learning (M=3.19, SD=0.80, Rank 4th) both received substantial agreement, indicating that librarians recognize the value of contextualized, active learning approaches for ethical AI instruction. Faculty development workshops (M=3.20, SD=0.83, Rank 5th) also showed strong implementation, suggesting librarians' awareness that promoting ethical AI use requires engagement with teaching faculty as well as students.

Notably, several instructional types received lower mean scores, indicating less frequent implementation. Social media campaigns (M=2.63, SD=0.94, Rank 14th), credit-bearing information literacy courses with AI ethics modules (M=2.65, SD=0.97, Rank 13th), and flipped classroom approaches (M=2.83, SD=0.90, Rank 11th) showed means below 3.00, suggesting moderate to low implementation levels. These findings may reflect resource constraints, institutional policy limitations regarding curriculum development, or lack of familiarity with innovative pedagogical approaches.

The standard deviations across items ranged from 0.75 to 0.97, indicating moderate variability in responses. Higher standard deviations for items such as credit-bearing courses (SD=0.97) and social media campaigns (SD=0.94) suggest greater disagreement among respondents regarding the implementation of these approaches, possibly reflecting institutional differences in resources, policies, and strategic priorities.

3.3. Challenges of Information Literacy Instruction for Ethical Use of Generative AI

Table 2: Challenges of Information Literacy Instruction (ILI) by Academic Librarians for Ethical Use of Generative Artificial Intelligence (AI) (N=342)

S/N Challenge	SA	A	D	SD	Mean	SD	Rank
	F(%)	F(%)	F(%)	F(%)			
1 Inadequate technological infrastructure and internet connectivity	198(57.9)	112(32.7)	24(7.0)	8(2.3)	3.45	0.68	1st

S/N	Challenge	SA	A	D	SD	Mean	SD	Rank
2	Insufficient training for librarians on Generative AI technologies	187(54.7)	118(34.5)	29(8.5)	8(2.3)	3.38	0.72	2nd
3	Limited institutional support and funding for AI literacy programs	176(51.5)	124(36.3)	32(9.4)	10(2.9)	3.29	0.75	3rd
4	Lack of clear institutional policies on ethical AI use	165(48.2)	131(38.3)	36(10.5)	10(2.9)	3.25	0.76	4th
5	Resistance from faculty to integrate library instruction	142(41.5)	139(40.6)	48(14.0)	13(3.8)	3.17	0.81	6th
6	Insufficient time allocated for comprehensive AI ethics instruction	156(45.6)	134(39.2)	41(12.0)	11(3.2)	3.22	0.78	5th
7	Rapid evolution of AI technologies outpacing librarian knowledge	178(52.0)	127(37.1)	29(8.5)	8(2.3)	3.36	0.72	2nd
8	Students' limited awareness of ethical AI concerns	134(39.2)	148(43.3)	46(13.5)	14(4.1)	3.14	0.81	7th
9	Lack of standardized curriculum for AI ethics education	149(43.6)	138(40.4)	42(12.3)	13(3.8)	3.21	0.79	5th
10	Difficulty in accessing current research and resources on AI ethics	123(36.0)	143(41.8)	58(17.0)	18(5.3)	3.04	0.86	9th
11	Cultural and linguistic barriers in adapting global AI ethics frameworks	98(28.7)	138(40.4)	81(23.7)	25(7.3)	2.91	0.89	10th
12	Limited collaboration between libraries and academic departments	108(31.6)	149(43.6)	68(19.9)	17(5.0)	3.01	0.84	9th
Cluster Mean						3.20	0.79	

Key: SA=Strongly Agree; A=Agree; D=Disagree; SD=Strongly Disagree; F=Frequency; %=Percentage; SD=Standard Deviation

Table 2 presents the challenges academic librarians face in providing information literacy instruction for ethical Generative AI use. The cluster mean of 3.20 (SD=0.79) indicates that respondents generally agreed these challenges significantly impede their instructional efforts, with relatively consistent perceptions across the sample.

Inadequate technological infrastructure and internet connectivity emerged as the most critical challenge (M=3.45, SD=0.68, Rank 1st), with 90.6% of respondents expressing strong agreement or agreement. This finding underscores the fundamental barrier that unreliable technology poses to teaching about digital technologies. The relatively low standard deviation (0.68) suggests broad consensus that infrastructure limitations constitute a primary obstacle across institutions in the region.

Insufficient training for librarians on Generative AI technologies tied for second place (M=3.38, SD=0.72), with 89.2% agreement, indicating that librarians recognize gaps in their own knowledge and competencies regarding AI systems. This challenge is compounded by the rapid evolution of AI technologies outpacing librarian knowledge (M=3.36, SD=0.72, Rank 2nd), which 89.1% of respondents acknowledged. These interrelated challenges highlight the professional development deficit librarians face in keeping pace with technological advancement.

Limited institutional support and funding ranked third (M=3.29, SD=0.75), with 87.8% agreement, reflecting systemic under-resourcing of library initiatives generally and AI literacy programs specifically. This finding aligns with the lack of clear institutional policies on ethical AI use (M=3.25, SD=0.76, Rank 4th), suggesting that AI ethics education operates in a context of institutional ambiguity regarding both priorities and expectations.

Time constraints (M=3.22, SD=0.78, Rank 5th) and lack of standardized curriculum (M=3.21, SD=0.79, Rank 5th) received substantial agreement, indicating that even when librarians possess expertise and institutional support, practical barriers of limited instructional time and absence of curricular frameworks impede comprehensive instruction. Faculty resistance to integrating library instruction (M=3.17, SD=0.81, Rank 6th) suggests interprofessional tensions that limit librarians' access to students within course contexts.

Students' limited awareness of ethical AI concerns (M=3.14, SD=0.81, Rank 7th) presents a

pedagogical challenge, as effective instruction requires learner motivation and recognition of relevance. When students fail to perceive AI ethics as important, librarians must invest additional effort in establishing relevance before substantive learning can occur.

Lower-ranked challenges including difficulty accessing current resources ($M=3.04$, $SD=0.86$), limited interdepartmental collaboration ($M=3.01$, $SD=0.84$), and cultural/linguistic barriers ($M=2.91$, $SD=0.89$) still received majority agreement but showed greater variability in responses (higher standard deviations), suggesting these challenges may be more institution-specific or dependent on individual circumstances.

3.4. Discussion on Types of Information Literacy Instruction

The findings reveal a multifaceted approach to information literacy instruction for ethical AI use among academic librarians in South-West Nigeria, with diverse pedagogical strategies consistent with established information literacy frameworks. Workshop-based instruction predominates, aligning with Saunders (2020), who found that standalone workshops offer flexible, accessible formats ideal for rapidly evolving technological topics where curricular integration lags behind change; their effectiveness stems from enabling hands-on experimentation with AI tools alongside real-time ethical discussions, allowing participants to experience ethical dilemmas firsthand rather than abstractly (Holliday et al., 2015). Integration of AI ethics into new student orientations reflects librarians' recognition that foundational information literacy must now encompass digital technologies as core information sources requiring ethical guidance, mirroring international trends where leading academic libraries embed AI literacy into first-year experience programs to establish ethical frameworks early (Cox et al., 2023), though Okiki and Asiru (2021) caution that brief orientation sessions may lack sufficient depth for robust ethical reasoning and require reinforcement through subsequent interventions. Substantial use of research guides and LibGuides demonstrates adaptation of traditional reference services to contemporary ethical challenges, providing scalable, point-of-need guidance for ethical questions that arise during research processes (Mestre, 2012), yet Reinsfelder (2012) notes that such passive online resources must be complemented by interactive instruction to foster critical thinking rather than mere rule-following. Moderate implementation of embedded librarianship, despite its superior outcomes for complex topics like ethical reasoning compared to one-shot sessions (Tumbleson & Burke, 2013), likely reflects institutional barriers such as faculty resistance, limited librarian capacity, and lack of formal recognition in evaluation systems (Carlson & Kneale, 2011). The relatively low use of credit-bearing information literacy courses with dedicated AI ethics modules represents a missed opportunity for comprehensive, sustained engagement that allows in-depth exploration of ethical theories, case studies, and sophisticated reasoning frameworks (Badke, 2010), a limitation likely tied to broader challenges in establishing information literacy as credit-bearing in African higher education contexts (Anunobi & Ukwoma, 2016). Underutilization of social media campaigns contrasts with evidence of their effectiveness in reaching tech-savvy students with timely, engaging content (Click & Petit, 2010), possibly due to librarians' limited confidence in social media pedagogy, concerns about message control, or perceptions of insufficient gravitas for ethical topics. Overall, the findings highlight a gap between recognition of effective pedagogical approaches—such as flipped classrooms, team-based learning, and peer instruction—and their actual implementation in resource-constrained settings, underscoring that advancing information literacy instruction for ethical AI use requires not only pedagogical expertise but also institutional support, technological infrastructure, and professional development opportunities.

3.5. Discussion on Challenges of Information Literacy Instruction

The infrastructure challenges identified align with broader concerns about digital divides in Nigerian higher education documented by Ani et al. (2016), who found that unreliable electricity, limited bandwidth, and insufficient computing equipment systematically disadvantage African

universities in technology-mediated education, creating a pedagogical paradox wherein librarians must teach digital ethics without reliable access to the cloud-based AI services they discuss, often limiting instruction to theoretical discussions rather than the experiential learning most effective for developing ethical reasoning skills (Henrich & Attebury, 2010), despite South-West Nigeria's relative regional advantages (Ajadi et al., 2008). The professional development deficit resonates with Saunders' (2020) observation that librarianship's rapid expansion into emerging technologies like Generative AI—encompassing machine learning, neural networks, and algorithmic processes—frequently outpaces formal training opportunities, with AI's fast evolution rendering knowledge obsolete within months (Dwivedi et al., 2023; Lund & Wang, 2023), thus necessitating sustainable, ongoing professional learning ecosystems rather than one-time interventions. Institutional policy ambiguity regarding AI use mirrors broader societal uncertainty about ethical frameworks for these technologies (Kasneci et al., 2023), forcing librarians to navigate competing perspectives from prohibition to unrestricted use without clear guidance and potentially facing criticism as *de facto* policy interpreters (Sullivan et al., 2023), whereas universities with explicit, thoughtfully developed AI policies provide clearer contexts for instruction (Eaton, 2023). Limited institutional support, evident in inadequate funding and low prioritization of AI literacy programs, reflects libraries' ongoing struggles for recognition as educational partners rather than mere service units (Lankes, 2011), with emerging initiatives like AI ethics education often marginalized as peripheral to core academic missions despite evidence of information literacy's positive impact on student success (Bowles-Terry, 2012; Cox et al., 2023), requiring strategic advocacy to align such programs with institutional priorities such as research integrity, graduate employability, and ethical leadership. Time constraints highlight the inadequacy of compressed, single-session or brief-module formats for cultivating sophisticated ethical reasoning on complex, context-dependent AI scenarios that resist simplification (Tumbleson & Burke, 2013; Rest & Narvaez, 1994), yet librarians' lack of curricular authority often leaves them addressing multifaceted issues superficially or through rule-based guidance insufficient for genuine ethical dilemmas (Elmborg, 2006). Faculty resistance, though not the highest-ranked challenge, constitutes a significant relational barrier arising from perceptions of information literacy as remedial rather than critical intellectual work—particularly when faculty themselves may lack deep understanding of its foundations—and from curricular time pressures that frame library instruction as competition rather than support for disciplinary content (Badke, 2010; Carlson & Kneale, 2011), underscoring the need to position librarians as collaborative partners contributing to disciplinary learning outcomes. Students' limited awareness of AI ethical concerns reflects broader patterns of technology adoption where convenience overshadows ethics (Zuboff, 2019), with digital natives often naturalizing AI without developing critical perspectives (Boyd, 2014), thus requiring librarians to first establish relevance through tangible consequences, value connections, and concrete examples to motivate engagement in line with adult learning principles (Knowles et al., 2015). Finally, the absence of standardized curricula for AI ethics education, stemming from the field's nascency, leads to inefficiencies as librarians independently develop content with potential duplication or gaps (Pun, 2023), suggesting that while contextual adaptation is essential, some degree of standardization—defining core competencies, learning outcomes, and frameworks—could improve consistency and quality across Nigerian universities, with professional bodies like the Nigerian Library Association well-positioned to facilitate collaborative development informed by international models and local needs.

4. CONCLUSION

This study examined information literacy instruction by academic librarians for promoting ethical Generative AI use in South-West Nigeria, revealing a complex landscape of pedagogical practices and implementation challenges. Academic librarians employ diverse instructional approaches including workshops, embedded librarianship, online guides, and orientation programs to address AI ethics, demonstrating adaptability and recognition of instruction's importance in the AI

era. Workshop-based programs, research guides, and new student orientations emerged as predominant approaches, indicating preference for accessible, scalable instructional formats that can reach broad audiences while addressing rapidly evolving technological contexts.

However, substantial implementation challenges constrain librarians' effectiveness in promoting ethical AI use. Infrastructure deficits, including unreliable internet connectivity and limited computing resources, fundamentally impede technology-focused instruction in resource-constrained Nigerian university contexts. Professional development gaps leave librarians insufficiently prepared to teach about technically complex, rapidly evolving AI systems, creating confidence and competence barriers to comprehensive instruction. Institutional factors including inadequate funding, policy ambiguity, limited collaborative relationships with faculty, and time constraints further restrict librarians' capacity to provide the sustained, in-depth instruction that ethical reasoning development requires.

These findings illuminate the tension between librarians' recognized responsibility for digital ethics education and the systemic barriers impeding fulfillment of this responsibility. While librarians possess pedagogical knowledge and recognize instructional importance, effective implementation requires institutional commitments extending beyond individual librarian initiatives. The cluster mean of 3.06 for instructional types and 3.20 for challenges indicates that while various approaches are utilized, significant obstacles temper their comprehensiveness and effectiveness.

The study contributes to limited empirical research on AI literacy instruction in African contexts, demonstrating that global concerns about AI ethics resonate in Nigerian higher education while manifesting through locally specific challenges. The findings suggest that promoting ethical AI use requires multi-level interventions addressing professional development, institutional policy, technological infrastructure, and collaborative relationships, rather than focusing solely on pedagogical innovation.

Recommendation

Based on the study's findings, the following recommendation is proposed:

University management should establish dedicated Digital Ethics and AI Literacy Units within academic libraries, adequately funded and staffed with specialized personnel trained in AI technologies and ethics education, while simultaneously developing comprehensive institutional AI use policies that clearly articulate ethical expectations and provide frameworks for library instruction programs.

This recommendation addresses multiple identified challenges through an integrated approach. Establishing dedicated units would:

- 1) Provide sustainable institutional structures for AI literacy instruction beyond individual librarians' initiatives;
- 2) Enable recruitment or development of specialized expertise in AI technologies and ethics education;
- 3) Signal institutional commitment to ethical AI use, potentially increasing faculty engagement and policy clarity;
- 4) Create focal points for professional development, curriculum development, and resource acquisition for AI ethics instruction;
- 5) Facilitate systematic, ongoing instruction rather than ad-hoc interventions responsive to crises or requests;
- 6) Enable development of scalable instructional resources including comprehensive online modules, research guides, workshop curricula, and assessment tools;
- 7) Provide capacity for collaborative relationships with academic departments, embedding AI ethics instruction within disciplinary contexts; and
- 8) Support continuous monitoring of AI technology developments and ethical discourse, ensuring instruction remains current and relevant.

Implementation should include:

- 1) Dedicated budget allocations for personnel, technology, professional development, and instructional resources;
- 2) Collaboration with international partners for knowledge exchange and access to AI ethics expertise;
- 3) Integration of AI ethics competencies into librarian professional development plans and evaluation criteria;
- 4) Development of institutional AI use policies through inclusive processes engaging library, faculty, student, and administrative stakeholders;
- 5) Creation of assessment mechanisms to evaluate instructional effectiveness and guide continuous improvement; and
- 6) Strategic communication highlighting library contributions to institutional priorities including academic integrity, research excellence, and graduate preparedness for ethical technology use in professional contexts.

REFERENCES

- ACRL. (2016). *Framework for information literacy for higher education*. American Library Association. <http://www.ala.org/acrl/standards/ilframework>
- Adebayo, O., & Ogunsola, L. A. (2023). Artificial intelligence adoption in Nigerian universities: Opportunities and challenges. *Journal of Academic Librarianship*, 49(3), 102689. <https://doi.org/10.1016/j.acalib.2023.102689>
- Ajadi, T. O., Salawu, I. O., & Adeoye, F. A. (2008). E-learning and distance education in Nigeria. *Turkish Online Journal of Educational Technology*, 7(4), 61-70.
- Anderson, K., & May, F. A. (2010). Does the method of instruction matter? An experimental examination of information literacy instruction in the online, blended, and face-to-face classrooms. *Journal of Academic Librarianship*, 36(6), 495-500. <https://doi.org/10.1016/j.acalib.2010.08.005>
- Ani, O. E., Ngulube, P., & Onyancha, B. (2016). Perceived effect of accessibility and utilization of electronic resources on productivity of academic staff in selected Nigerian universities. *SAGE Open*, 6(1), 2158244016631335. <https://doi.org/10.1177/2158244016631335>
- Anunobi, C. V., & Ukwoma, S. C. (2016). Assessment of information literacy competence of undergraduate students of universities in South East Nigeria. *International Journal of Educational Studies*, 1(2), 1-9.
- Arnold-Garza, S. (2014). The flipped classroom teaching model and its use for information literacy instruction. *Communications in Information Literacy*, 8(1), 7-22. <https://doi.org/10.15760/comminfolit.2014.8.1.161>
- Badke, W. (2010). Why information literacy is invisible. *Communications in Information Literacy*, 4(2), 129-141. <https://doi.org/10.15760/comminfolit.2010.4.2.92>
- Bassey, B. A., Umoren, G. U., & Akpan, U. U. (2023). Technological innovation and library services in Nigerian university libraries. *Information Development*, 39(2), 312-325. <https://doi.org/10.1177/02666669221087564>
- Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (pp. 610-623). <https://doi.org/10.1145/3442188.3445922>
- Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new Jim code*. Polity Press.
- Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.

- Bommasani, R., Hudson, D. A., Adeli, E., Altman, R., Arora, S., von Arx, S., ... & Liang, P. (2022). On the opportunities and risks of foundation models. *arXiv preprint arXiv:2108.07258*. <https://doi.org/10.48550/arXiv.2108.07258>
- Bowles-Terry, M. (2012). Library instruction and academic success: A mixed-methods assessment of a library instruction program. *Evidence Based Library and Information Practice*, 7(1), 82-95. <https://doi.org/10.18438/B8PS4D>
- Boyd, D. (2014). *It's complicated: The social lives of networked teens*. Yale University Press.
- Breakstone, J., McGrew, S., Smith, M., Ortega, T., & Wineburg, S. (2018). Why we need a new approach to teaching digital literacy. *Phi Delta Kappan*, 99(6), 27-32. <https://doi.org/10.1177/0031721718762419>
- Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., ... & Amodei, D. (2020). Language models are few-shot learners. *Advances in Neural Information Processing Systems*, 33, 1877-1901.
- Cao, Y., Li, S., Liu, Y., Yan, Z., Dai, Y., Yu, P. S., & Sun, L. (2023). A comprehensive survey of AI-generated content (AIGC): A history of generative AI from GAN to ChatGPT. *arXiv preprint arXiv:2303.04226*. <https://doi.org/10.48550/arXiv.2303.04226>
- Carlson, J., & Kneale, R. (2011). Embedded librarianship in the research context: Navigating new waters. *College & Research Libraries News*, 72(3), 167-170. <https://doi.org/10.5860/crln.72.3.8521>
- Carmi, E., Yates, S. J., Lockley, E., & Pawluczuk, A. (2020). Data citizenship: Rethinking data literacy in the age of disinformation, misinformation, and malinformation. *Internet Policy Review*, 9(2), 1-22. <https://doi.org/10.14763/2020.2.1481>
- Catalano, A. (2013). Patterns of graduate students' information seeking behavior: A meta-synthesis of the literature. *Journal of Documentation*, 69(2), 243-274. <https://doi.org/10.1108/00220411311300066>
- Cestone, C. M., Levine, R. E., & Lane, D. R. (2008). Peer assessment and evaluation in team-based learning. *New Directions for Teaching and Learning*, 2008(116), 69-78. <https://doi.org/10.1002/tl.334>
- Choi, H., Park, J., & Jung, Y. (2018). The role of privacy fatigue in online privacy behavior. *Computers in Human Behavior*, 81, 42-51. <https://doi.org/10.1016/j.chb.2017.12.001>
- Click, A., & Petit, J. (2010). Social networking and Web 2.0 in information literacy. *International Information & Library Review*, 42(2), 137-142. <https://doi.org/10.1080/10572317.2010.10762860>
- Courtney, N. (2001). *Academic library outreach: Beyond the campus walls*. Libraries Unlimited.
- Cox, A. M., Pinfield, S., & Rutter, S. (2023). The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. *Library Hi Tech*, 41(6), 1725-1745. <https://doi.org/10.1108/LHT-08-2021-0273>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Datig, I., & Ruswick, C. (2013). Four quick flips: Activities for the information literacy classroom. *College & Research Libraries News*, 74(5), 249-257. <https://doi.org/10.5860/crln.74.5.8982>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Eaton, S. E. (2023). AI and academic integrity: A new frontier. In *Handbook of academic integrity* (pp. 1-18). Springer. https://doi.org/10.1007/978-3-031-26692-8_1
- Elmborg, J. (2006). Critical information literacy: Implications for instructional practice. *Journal of Academic Librarianship*, 32(2), 192-199. <https://doi.org/10.1016/j.acalib.2005.12.004>

- Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). GPTs are GPTs: An early look at the labor market impact potential of large language models. *arXiv preprint arXiv:2303.10130*. <https://doi.org/10.48550/arXiv.2303.10130>
- Eslami, M., Rickman, A., Vaccaro, K., Aleyasen, A., Vuong, A., Karahalios, K., ... & Sandvig, C. (2015). "I always assumed that I wasn't really that close to [her]": Reasoning about invisible algorithms in news feeds. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (pp. 153-162). <https://doi.org/10.1145/2702123.2702556>
- Flaherty, M. G. (2023). Generative AI in the information literacy classroom: The good, the bad, and everything between. *Journal of New Librarianship*, 8(1), 1-18. <https://doi.org/10.33011/newlibs/13/2>
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906-911. <https://doi.org/10.1037/0003-066X.34.10.906>
- Goates, M. C., Nelson, C. E., & Frost, C. O. (2017). Integrating soft skills into library instruction. *Reference Services Review*, 45(3), 466-474. <https://doi.org/10.1108/RSR-03-2017-0011>
- Grassini, S. (2023). Shaping the future of education: Exploring the potential and consequences of AI and ChatGPT in educational settings. *Education Sciences*, 13(7), 692. <https://doi.org/10.3390/educsci13070692>
- Gullifer, J., & Tyson, G. A. (2010). Exploring university students' perceptions of plagiarism: A focus group study. *Studies in Higher Education*, 35(4), 463-481. <https://doi.org/10.1080/03075070903096508>
- Haidet, P., Kubitz, K., & McCormack, W. T. (2012). Analysis of the team-based learning literature: TBL comes of age. *Journal on Excellence in College Teaching*, 25(3-4), 303-333.
- Henrich, K. J., & Attebury, R. I. (2010). Communities of practice at an academic library: A new approach to mentoring at the University of Idaho. *Journal of Academic Librarianship*, 36(2), 158-165. <https://doi.org/10.1016/j.acalib.2010.01.007>
- Hoffman, S., & Ramin, L. (2010). Best practices for librarians embedded in online courses. *Public Services Quarterly*, 6(2-3), 292-305. <https://doi.org/10.1080/15228959.2010.497743>
- Holliday, W., Dance, B., Davis, E., Fagerheim, B., Hedrich, A., Lundstrom, K., & Martin, P. (2015). An information literacy snapshot: Authentic assessment across the curriculum. *College & Research Libraries*, 76(2), 170-187. <https://doi.org/10.5860/crl.76.2.170>
- Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kiron, V., & Pant, A. (2023). Artificial intelligence in libraries: Potential and challenges. *Library Hi Tech News*, 40(1), 1-5. <https://doi.org/10.1108/LHTN-11-2022-0134>
- Knowles, M. S., Holton III, E. F., & Swanson, R. A. (2015). *The adult learner: The definitive classic in adult education and human resource development* (8th ed.). Routledge.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610. <https://doi.org/10.1177/001316447003000308>
- Lankes, R. D. (2011). *The atlas of new librarianship*. MIT Press.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Lee, D. (2004). Research consultations: Enhancing library research skills. *The Reference Librarian*, 41(85), 169-180. https://doi.org/10.1300/J120v41n85_14
- Lund, B. D., & Wang, T. (2023). Chatting about ChatGPT: How may AI and GPT impact academia and libraries? *Library Hi Tech News*, 40(3), 26-29. <https://doi.org/10.1108/LHTN-01-2023-0009>

- Mackey, T. P., & Jacobson, T. E. (2011). Reframing information literacy as a metaliteracy. *College & Research Libraries*, 72(1), 62-78. <https://doi.org/10.5860/crl-76r1>
- Mackey, T. P., & Jacobson, T. E. (2014). *Metaliteracy: Reinventing information literacy to empower learners*. ALA Neal-Schuman.
- Mery, Y., Newby, J., & Peng, K. (2012). Performance-based assessment in an online course: Comparing different types of information literacy instruction. *portal: Libraries and the Academy*, 12(3), 283-298. <https://doi.org/10.1353/pla.2012.0029>
- Mestre, L. S. (2012). *Designing effective library tutorials: A guide for accommodating multiple learning styles*. Chandos Publishing.
- Michaelsen, L. K., Knight, A. B., & Fink, L. D. (Eds.). (2004). *Team-based learning: A transformative use of small groups in college teaching*. Stylus Publishing.
- Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies.
- Nissenbaum, H. (2009). *Privacy in context: Technology, policy, and the integrity of social life*. Stanford University Press.
- Noble, S. U. (2018). *Algorithms of oppression: How search engines reinforce racism*. NYU Press.
- NUC. (2023). *List of Nigerian universities and their locations*. National Universities Commission. <https://www.nuc.edu.ng>
- Nwachukwu, V. N., Abdulsalami, T. L., & Itsekor, V. O. (2024). Artificial intelligence literacy among university students in Nigeria: Current status and future directions. *African Journal of Library, Archives & Information Science*, 34(1), 45-62.
- O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. Crown Publishing.
- Okiki, O. C., & Asiru, S. M. (2021). Information literacy skills and use of electronic resources by postgraduate students in Nigerian universities. *Global Knowledge, Memory and Communication*, 70(1/2), 142-158. <https://doi.org/10.1108/GKMC-01-2020-0009>
- Perkins, M., Roe, J., Postma, D., McGaughan, J., & Hickerson, D. (2023). AIDetx: A tool to differentiate between human-written and machine-generated text. In *Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing* (pp. 1-15). <https://doi.org/10.18653/v1/2023.emnlp-demo.1>
- Pun, R. (2023). ChatGPT and generative AI: Implications for academic libraries. *Library Hi Tech News*, 40(2), 10-13. <https://doi.org/10.1108/LHTN-02-2023-0022>
- Reinsfelder, T. L. (2012). Citation analysis as a tool to measure the impact of individual research consultations. *College & Research Libraries*, 73(3), 263-277. <https://doi.org/10.5860/crl-261>
- Rest, J. R., & Narvaez, D. (Eds.). (1994). *Moral development in the professions: Psychology and applied ethics*. Lawrence Erlbaum Associates.
- Saunders, L. (2020). Core and more: Examining foundational and specialized content in library and information science. *Journal of Education for Library and Information Science*, 61(1), 3-19. <https://doi.org/10.3138/jelis.61.1.2019-0034>
- Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science*, 26(1-2), 113-125. <https://doi.org/10.1023/A:1003044231033>
- Shumaker, D. (2012). *The embedded librarian: Innovative strategies for taking knowledge where it's needed. Information Today.
- Silver, S. L., & Nickel, L. T. (2007). Are online tutorials effective? A comparison of online and classroom library instruction methods. *Research Strategies*, 20(4), 389-396. <https://doi.org/10.1016/j.resstr.2006.12.013>
- Solove, D. J. (2021). *The digital person: Technology and privacy in the information age*. NYU Press.
- Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning & Teaching*, 6(1), 1-10. <https://doi.org/10.37074/jalt.2023.6.1.17>

- Tewell, E. (2015). A decade of critical information literacy: A review of the literature. *Communications in Information Literacy*, 9(1), 24-43. <https://doi.org/10.15760/comminfolit.2015.9.1.174>
- Tucker, B. (2012). The flipped classroom: Online instruction at home frees class time for learning. *Education Next*, 12(1), 82-83.
- Tumbleson, B. E., & Burke, J. J. (2013). *Embedding librarianship in learning management systems: A how-to-do-it manual for librarians*. ALA Neal-Schuman.
- Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., ... & Polosukhin, I. (2017). Attention is all you need. In *Advances in Neural Information Processing Systems* (Vol. 30, pp. 5998-6008).
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.
- Whittaker, M., Alper, M., Bennett, C. L., Hendren, S., Kaziunas, L., Mills, M., ... & Ekbia, H. R. (2023). Disability, bias, and AI. *AI & Society*, 38(1), 1-17. <https://doi.org/10.1007/s00146-022-01616-w>
- Willingham, D. T. (2008). Critical thinking: Why is it so hard to teach? *Arts Education Policy Review*, 109(4), 21-32. <https://doi.org/10.3200/AEPR.109.4.21-32>
- Witek, D., & Grettano, T. (2014). Teaching metaliteracy: A new paradigm in action. *Reference Services Review*, 42(2), 188-208. <https://doi.org/10.1108/RSR-07-2013-0035>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70. https://doi.org/10.1207/s15430421tip4102_2
- Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.