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REPOSITIONING THE ROLE OF LIBRARIANS IN PROMOTING DIGITAL INFORMATION LITERACY IN THE ERA OF EMERGING TECHNOLOGIES

BY

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Abstract

Introduction: *The rapid pace of technological advancement in the 21st century has fundamentally changed how we create, access, and share information. As technology continues to advance, libraries are transitioning from conventional print-based repositories to innovative digital knowledge centers. Consequently, librarians must urgently champion Digital Information Literacy (DIL), the ability to locate, evaluates, ethically use, and communicate information through digital technologies. This shift positions librarians as critical agents in bridging the digital divide, supporting lifelong learning, and ensuring equitable participation in an increasingly digital society. Despite this evolving mandate, a significant gap persists between the demanded digital roles and the current realities faced by librarians, particularly in developing contexts like Nigeria. The core problem is that many librarians are ill-equipped to fulfill expanded responsibilities as digital educators, AI and data literacy advocates, and information ethics promoters due to a combination of systemic and skills-based challenges.*

Purpose*: This paper sought to examine the concept of digital information literacy, explore technological developments and their impact on libraries, discuss the evolving roles of librarians, identify challenges facing librarians in promoting DIL, and suggest strategies for enhancing librarians' effectiveness in the digital era.*

Methodology: *The paper is literature based*

Findings: *The study revealed that technological development has fundamentally transformed librarianship, requiring a redefinition of librarians' professional identity. Librarians remain indispensable in promoting digital information literacy, bridging the digital divide, supporting lifelong learning, and empowering individuals to engage effectively, responsibly, and ethically in the digital environment.*

Practical Implications*: The study highlights that the redefinition of librarians' roles requires more than conceptual recognition; it demands coordinated efforts from librarians, institutions, and policymakers. Sustained investment in capacity building, infrastructure, and supportive policies is essential to translate these emerging roles into practice. Otherwise, the envisioned functions of librarians as digital educators, facilitators, AI advocates, and information ethics promoters may be difficult to achieve, especially in developing countries with limited resources.*

Originality/Value*: This paper contributes to the growing discourse on digital transformation in librarianship by providing a comprehensive conceptual analysis of how librarians' roles must be redefined to support digital information literacy in the era of emerging technologies.*

Research Limitations*: This paper is limited by its conceptual and literature-based approach**, as it does not employ empirical methods such as surveys, interviews, observations, or case studies to validate the issues discussed. Consequently, the findings and conclusions are derived from existing scholarly literature and may not fully reflect the current realities and experiences of librarians across different library settings.*

Paper Type: *Conceptual and literature-based approach paper.*

Introduction

The rapid pace of technological development in the 21st century has transformed the way information is created, accessed, and disseminated. Libraries, traditionally focused on print

resources, are transitioning to becoming digital information hubs in which librarians are key to promoting digital information literacy. Digital information literacy is defined as the capacity to find, assess and responsibly use digital information and technologies (Ng, 2022). With the shift towards digital platforms for learning, working and engaging in society, librarians will need to transition from traditional cataloguing and circulation management to enabling digital and lifelong learning (Yelwa & Abdulkadir, 2021).

Librarians in Nigeria and worldwide are playing a pivotal role in addressing the digital divide through providing equal access to ICT facilities, workshops, and inclusion of digital literacy skills in school curricula (Olatoye & Oyewumi, 2025). Now, they are involved in instruction of digital skills, training users to interact effectively in the digital environment, and facilitating ethical engagement in the digital world. Nevertheless, this evolving role necessitates sustained training, institutional backing, and innovative approaches to enable librarians to effectively embrace and leverage emerging technologies such as artificial intelligence, big data, and cloud computing (Edewor & Agbro, 2024). The importance of the re-imagining of the role of librarians lies in the fact that digital literacy is no longer a luxury but essential for academic achievement, employment and participation in society. In an era of digital disruption in education and research, librarians need to re-imagine their roles as digital educators, partners with academics, and champions for equitable access to information.

Statement of the Problem

Despite the growing importance of digital information literacy, librarians face several challenges in adapting their roles to meet technological demands. Poor ICT infrastructure, poor internet connectivity and lack of funding limit the implementation of digital literacy programs in many academic and public libraries (Olatoye & Oyewumi, 2025). Furthermore, many librarians lack continuous training opportunities to update their digital competencies, resulting in a skills gap between technological advancements and librarians' capacity to teach and support users (Edewor & Agbro, 2024).

Another challenge is the lack of user participation and awareness of the need for digital literacy. Students and community members may not fully appreciate the value of formal digital

literacy training, believing that simply using social media or search engines demonstrates digital literacy. This perception places an extra burden on librarians to develop engaging and relevant programs that emphasize the broader aspects of digital literacy, such as information evaluation, ethical use and cybersecurity (Ng, 2022).

But the pace of technological change also poses a challenge for librarians. New technologies such as artificial intelligence-powered search engines, open educational resources and online learning platforms require innovative teaching methods. In the absence of institutional and policy frameworks that promote digital literacy, the role of the librarian in the educational ecosystem becomes secondary, diminishing the significance of the librarian in the digital era (Yelwa & Abdulkadir, 2021).

As such, it is not just a matter of digital skill training for librarians but reskilling them to reimagine their role in line with technological landscape. To reshuffle the librarian job description, a multifaceted approach that includes infrastructure, training, curriculum and partnerships with faculty and policy makers is needed. Overcoming these challenges is crucial to ensure librarians continue to play a key role in promoting digital inclusion and community empowerment in the digital age.

Concept of Digital Information Literacy

Digital information literacy refers to the ability to locate, evaluate, use, and communicate information using digital technologies. It goes beyond basic literacy to encompass media literacy, data literacy and AI literacy. Recent research highlights the need for information literacy to counter misinformation and facilitate decision-making in the digital world. Moreover, the use of digital technologies has broadened literacy to include technical and critical thinking skills. Digital information literacy (DIL) is an increasingly recognized concept as digital technologies play an ever-growing role in how we access, evaluate and create information. Digital information literacy is often defined as a blending of digital literacy and information literacy, encompassing technical, cognitive and critical skills needed to navigate digital environments. It goes beyond technical literacy to the critical engagement with digital information landscapes (Mbandje, Loureiro & Lucas, 2024).

The idea of digital information literacy is recently being considered as a

multifaceted construct. Mbandje et al. (2024) note that digital competence and information literacy are complementary areas of focus: digital competence relates to the technical use of digital technologies and information literacy to the ability to find, assess, and ethically use information. Together they create a competence that supports effective engagement with digital information. This view is consistent with broader digital competence models, such as the European DigComp model, which recognises information and data literacy as an integral element of digital competence along with communication, content creation, safety and problem-solving (Sánchez-Macías. Julien, Simmons, & Bowler, 2024). They stress that digital information literacy encompasses social, ethical and critical thinking skills, not just technical skills. Digital literacy is defined as the capacity to access, assess, produce and share information through digital technologies, both in cognitive and socio-cultural terms. This is in line with recent discourse that people also need to be able to evaluate the quality of information found online, counter misinformation and engage with information in a responsible manner. Ahsan (2022) also highlights that digital literacy (and by extension, digital information literacy) is a dynamic term that needs to be redefined owing to changing technologies and information practices.

A further recent focus is on the importance of digital information literacy for education and self-regulated learning. Wijayati et al. (2023) point out that students' capability to independently learn in digital media environments is closely related to their digital and information literacy. These skills help students cope with information clutter, filter information, and build knowledge. Likewise, Ahsan (2022) showed that digital literacy includes skills such as evaluating information, creating and communicating information, which are critical for successful navigation of the digital world**.** This highlights the need for digital information literacy to be integrated into all levels of education.

Recent studies show that well-designed educational approaches based on constructivist and cognitive learning theories effectively improve students' digital literacy skills, implying that DIL is not a natural ability but requires education and training. This supports the notion that teachers, such as librarians, are important in developing these skills. Moreover, digital information literacy is increasingly seen as having implications for lifelong learning and social inclusion. It is seen as a

prerequisite for employment, participation and integration in the digital economy. With persistent digital divides, gaps in digital information literacy can contribute to knowledge and opportunity gaps. As a result, developing DIL is a focus for policymakers and educational institutions seeking to create knowledge societies.

Despite the progress in defining and conceptualizing digital information literacy, there are still issues. The first is the absence of a clear definition, given the concept's overlap with other terms, including digital literacy, media literacy, and data literacy. Some researchers suggest this can make it difficult to establish consistent measurement and teaching approaches (Mbandje et al., 2024). However, there is increasing agreement that digital information literacy is a comprehensive skill set that combines technical skills, critical thinking, ethical considerations and effective information use in the digital environment.

Technological Development and Its Impact on Libraries

The rise of technologies like artificial intelligence (AI), big data and online education platforms have transformed library services. Libraries are now not just physical repositories of books but dynamic digital information centres that use various technologies to improve access, speed and user satisfaction. The existing literature emphasizes that technological advancements in the form of artificial intelligence (AI), cloud computing, automation and digital resources have transformed the library model (Kadam, 2021; Verma, 2023).

One of the most noticeable outcomes of a technology development is the digitization of library resources and services. With the widespread availability of e-books, online journals, and digital databases through libraries, users can now access content remotely. According to Okwu, Okwu, and Oladokun (2024), technological advancements have expanded library holdings beyond physical objects by offering remote access and virtual services that meet the needs of modern users. In addition to improving accessibility and ease, this move has made research and online education easier. Similarly, Kadam (2021) notes that through linked data systems and discovery tools, digital transformation has enhanced resource visibility, boosting the efficiency of information retrieval.

Another significant improvement in library operations is the application of automation and artificial intelligence. AI-

driven chatbots, automated cataloguing, and RFID systems are a few examples of technology that have improved service delivery and sped up library processes. Studies show that automation increases productivity, reduces manual work, and enhances user satisfaction (Kadam, 2021). Furthermore, Oyelude (2024) highlights the increasing usage of AI technologies in library systems to improve user interaction and provide customized services. However, incorporating AI also raises the question of how to balance technical efficiency with human-centered services.

Technological advancements have also contributed to the transformation of libraries into collaborative and innovative learning environments. In order to foster innovation, research, and knowledge exchange, modern libraries now include makerspaces, digital labs, and online learning environments. According to Singh (2025), libraries are evolving from "places" to "platforms," providing both digital and physical environments for creativity and cooperation. This change is a reflection of libraries' wider role in promoting community involvement and assisting with the development of information in the digital era.

Additionally, the importance of libraries in supporting research has grown with the rise of data analytics and digital scholarship. Currently, libraries help users manage research data, employ data-driven technologies, and engage in digital scholarship. According to Verma (2023), one important technological development that helps libraries better understand user behavior and enhance service delivery is data analytics. Instead of being passive information suppliers, these developments present libraries as active collaborators in the research process.

Despite these benefits, the literature identifies several challenges associated with technological development in libraries. Issues such as inadequate funding, lack of technical expertise, digital preservation concerns, and cybersecurity threats continue to affect the effective implementation of new technologies. Okwu et al. (2024) emphasize that libraries must invest in staff training and infrastructure to fully leverage technological innovations. Additionally, emerging trends such as generative AI introduce new ethical and policy challenges, including misinformation and data security risks.

Furthermore, technological development has significantly impacted the roles and competencies of librarians. Librarians are now required to possess advanced digital skills, including expertise

in information technology, data management, and digital instruction. This shift necessitates continuous professional development to keep pace with rapidly evolving technologies. As libraries become more technology-driven, the role of librarians is increasingly centered on facilitating access to digital information, supporting users, and managing technological systems.

Evolving Roles of Librarians in Digital Information Literacy

- **Librarians as Educators**

The role of librarians has undergone a substantial transformation in recent years, evolving from traditional information custodians to active educators within academic, school, and community learning environments. One of the most prominent dimensions of librarians' educational role is their contribution to information literacy instruction. Information literacy has become a foundational skill in the digital age, and librarians are uniquely positioned to teach students how to locate, evaluate, and use information effectively. According to Merga (2020), school librarians act as literacy educators who directly influence students' reading habits, engagement, and academic achievement. This instructional role extends beyond traditional library sessions to embedded teaching within curricula, where librarians collaborate with classroom teachers to design and deliver learning experiences. Similarly, academic librarians increasingly conduct workshops, seminars, and credit-bearing courses that support students' research and critical thinking skills (Greenwood, 2023).

In higher education, the identity of librarians as educators has gained stronger recognition. Research indicates that many librarians now adopt pedagogical frameworks such as Technological Pedagogical Content Knowledge (TPACK) to enhance their teaching effectiveness (Greenwood, 2023). This shift signifies a move from ad hoc instruction toward more structured, theory-informed teaching practices. Moreover, librarians are embracing student-centered approaches, including active learning, inquiry-based instruction, and formative assessment, which align with contemporary educational trends (Saunders et al., 2025). These practices not only improve learning outcomes but also reinforce the librarian's role as a partner in curriculum development and delivery.

The expansion of digital and online learning environments has further strengthened librarians' roles as educators. During and after the COVID-19 pandemic, librarians adapted rapidly to remote and hybrid teaching contexts, providing virtual

instruction, creating online tutorials, and supporting digital scholarship. Akanbiemu (2024) highlights that in open and distance education, librarians function as knowledge facilitators who curate digital resources and guide learners in navigating online information systems. This expanded role requires proficiency in educational technologies, instructional design, and digital pedagogy, positioning librarians as key contributors to e-learning ecosystems.

Librarians also play a crucial role in specialized and interdisciplinary education. For example, in health sciences education, librarians contribute to evidence-based practice by teaching students and professionals how to access and evaluate medical information. A scoping review by Cyrus et al. (2025) demonstrates that librarians are actively involved in competency-based medical education, supporting curriculum delivery and research training. Similarly, Cheng (2024) finds that librarian-led instructional interventions significantly improve individuals' health information-seeking behaviors, illustrating the broader societal impact of librarians as educators beyond formal academic settings.

Another important aspect of librarians' educational function is their role in developing feedback literacy and scholarly communication skills. Recent literature highlights that librarians provide formative feedback to learners, helping them refine research strategies, evaluate sources, and improve academic writing (Saunders et al. 2025). This interactive and supportive approach positions librarians not only as instructors but also as mentors who facilitate deeper learning and critical engagement with information.

Despite these advancements, challenges persist in fully recognizing and supporting librarians as educators. Role ambiguity remains a concern, as librarians often balance instructional responsibilities with traditional duties such as collection management and administrative tasks. Additionally, there is a growing need for professional development and formal training in pedagogy. Saunders et al. (2025) argue that library and information science (LIS) programs must better integrate teaching competencies into their curricula to prepare librarians for their expanding educational roles. Without such preparation, librarians may struggle to meet the increasing expectations associated with instructional responsibilities.

- **Librarians as Digital Facilitators**

The concept of librarians as digital facilitators has become increasingly

prominent in recent literature, reflecting the transformation of libraries into digitally driven knowledge environments. Librarians now actively assist users in accessing, comprehending, and making use of digital technology and resources rather than acting as passive information stewards. Digital literacy training, technological mediation, and the advancement of equitable access to information are all included in this facilitative function (Cheng, 2024, Jadhav, 2025).

A key theme in the literature is the role of librarians in bridging the digital divide and promoting digital inclusion. Libraries are widely recognized as institutions that provide equitable access to digital tools, internet services, and information resources, particularly in developing contexts. Igbinovia and Aiyebelehin (2023) argue that librarians act as facilitators of digital inclusion by helping users develop the skills needed to participate effectively in the digital society. Their work highlights that libraries serve as community hubs where individuals can acquire essential digital competencies, thereby supporting social and economic development. This perspective positions librarians as key agents in achieving broader developmental goals, including education and lifelong learning.

The development of digital literacy and information skills is a crucial aspect of librarians' facilitative role. Librarians help consumers navigate complicated information settings, assess online sources, and utilize digital tools responsibly in the ever-evolving digital ecosystem. According to Onwubiko (2025), librarians are "digital literacy drivers" who assist users in overcoming the difficulties posed by cutting-edge technology like generative artificial intelligence. The study highlights

that librarians must strike a balance between addressing ethical issues like false information and data exploitation and ensuring that users acquire important skills. This emphasizes how librarians serve as educators and mediators in modern digital environments.

Additionally, as technology has advanced, librarians now have increasing responsibilities as digital service providers and technology facilitators. Pal, (2025), claims that librarians today carry out a variety of tasks, such as technical assistance, virtual service delivery, and digital resource management. They help people use digital tools for learning and research, navigate online platforms, and access electronic databases. In a similar vein, Jadhav (2025) point out that rapid growth of digital technologies has made it necessary to redefine the roles of librarians, requiring them to have sophisticated digital skills and be able to adjust to shifting user needs.

The literature also emphasizes how crucial professional skills and continuous education are to librarians' ability to serve as digital facilitators. According to Nakaziba and Ngulube (2023), librarians must continue their professional development in order to have the technological know-how needed for digital transformation. Similarly, Oladokun and Umar (2026) stress that in order for librarians to stay relevant in the Fifth Industrial Revolution (5IR), they must acquire skills in digital systems, data analytics, and artificial intelligence. They do point out that inadequate infrastructure and technical know-how still impedes efficient digital facilitation.

Furthermore, a growing number of librarians are assisting with digital research and scholarship. As facilitators, they help users manage digital data, use research tools, and participate in the production of digital material. The trend toward participatory and user-centered library services, in which librarians work with patrons to co-create knowledge rather than just provide access to information, is reflected in this enlarged position.

Despite these advancements, several challenges affect librarians' effectiveness as digital facilitators. These include limited funding, inadequate infrastructure, and the rapid pace of technological change, which can outstrip librarians' skills and institutional capacities. Ethical issues, particularly those related to artificial intelligence and data privacy, also present significant concerns that librarians must address in their facilitative roles (Onwubiko, 2025). As digital environments continue to evolve, the importance of librarians as facilitators will remain central to the mission of libraries.

➢ Librarians as AI and Data Literacy Advocates

The swift assimilation of artificial intelligence (AI) and data-centric technologies into societal frameworks has profoundly augmented the responsibilities of librarians, situating them as proponents of AI and data literacy. This nascent function is predicated on conventional information literacy competencies while integrating novel facets such as algorithmic cognizance, data analysis, and ethical deliberation (Ali & Richardson, 2025; Oladokun & Umar, 2026).

The increasing significance of AI literacy as an extension of information literacy is a major issue in current research. The ability to comprehend how AI systems work, assess their results critically, and apply them responsibly are all included in AI literacy. Ali and Richardson (2025), state that academic libraries are progressively creating AI literacy policies and guidelines to instruct users and librarians on the responsible and efficient application of AI technologies. These frameworks aim to ensure that users can engage with AI tools in a “literate and fair” manner, highlighting the educational and advocacy role of librarians in shaping responsible AI use. This positions librarians not only as instructors but also as policy influencers in institutional AI adoption.

Librarians are essential in fostering data literacy, which includes the capacity t o gather, analyze, and apply data efficientl y, in addition to AI literacy.These abilities are now crucial in both academic and profe ssional settings due to the growth of big da ta and data-driven decision-making.By tea ching users how to handle datasets, compr ehend data structures, and critically evalua te data sources, librarians make a valuable contribution.This position is further demon strated by the idea of the "librarian-in-the loop," in which librarians actively take par t in the processes of data curation, annotati on, and validation, especially in research s ettings (Fan et al., 2022).This illustrates ho w librarians assist with both the technical a nd interpretive facets of using data.

Furthermore, the literature highlights that librarians are uniquely positioned to advocate for ethical AI and data practices. As AI technologies raise concerns about bias, privacy, and misinformation, librarians promote critical awareness and ethical engagement. Ali and Richardson (2025) study on AI adoption among academic librarians found that ethical literacy understanding issues such as algorithmic bias and data privacy is a key component of librarians’ professional

responsibilities. Similarly, instructional models for AI literacy emphasize ethics as a core component, with librarians guiding users through issues of transparency, accountability, and responsible AI use. This advocacy role aligns with the traditional values of librarianship, including intellectual freedom and equitable access to information.

Another significant development is the increasing involvement of librarians in AI and data literacy education and training. Libraries are offering workshops, seminars, and embedded instructional programs that address topics such as machine learning basics, data visualization, and AI tool evaluation. Research indicates that librarians leverage their expertise in critical pedagogy to design scaffolded learning experiences that move users from basic awareness to advanced evaluation of AI systems. These initiatives demonstrate that librarians are not only supporting digital transformation but actively shaping how users understand and interact with emerging technologies.

However, the literature also identifies several challenges that affect librarians' effectiveness as AI and data literacy advocates. The disparity between conceptual awareness and practical expertise is one of the main problems. Oladokun and Umar (2026) discovered that although many librarians understand the value of AI and have a basic understanding of it, they frequently lack sophisticated technical abilities in fields like programming, machine learning, and data analytics. Outdated library school curricula, poor infrastructure, and a lack of training opportunities all contribute to this disparity. Additionally, librarians find it challenging to stay up to date with new tools and practices due to the rapid pace of technology advancement.

Despite these obstacles, there is increasing acceptance that librarians play a critical role in promoting data literacy and artificial intelligence in knowledge societies. According to Porter (2026), libraries are increasingly seen as leaders in AI literacy programs, tasked with informing a variety of populations about the advantages and disadvantages of AI technologies. This leadership position emphasizes how crucial institutional support and ongoing professional development are to librarians' ability to effectively promote AI and data literacy.

➢ Librarians as Information Ethics Promoters

The role of librarians as information ethics promoters has gained renewed

scholarly attention in recent time particularly in response to the rapid growth of digital technologies, artificial intelligence (AI), and the proliferation of misinformation. Information ethics in librarianship refers to the principles guiding the responsible creation, access, use, and dissemination of information, including issues such as intellectual freedom, privacy, accuracy, and equitable access. According to recent research, librarians play a crucial role in encouraging responsible information practices and ethical awareness in increasingly complicated digital contexts (Adewojo et al., 2024; Onwubiko, 2025).

The role of librarians in dispelling false information and advancing information integrity is a recurring issue in current research. According to Adewojo et al. (2024), librarians are "guardians of information quality," highlighting their duty to select trustworthy sources and instruct patrons on how to differentiate between false and misleading information. Through instructional programs and community engagement activities, libraries are depicted as organizations that actively cultivate critical evaluation abilities. This is in line with the larger ethical mandate of librarianship, which places a high value on accuracy, truth, and intellectual freedom when disseminating knowledge. Librarians contribute to the development of more knowledgeable and resilient communities by educating patrons how to evaluate sources critically.

Also related is the role of librarians in promoting the ethical use of information in digital and AI-driven environments. The emergence of generative AI and algorithmic systems has brought forward new ethical challenges, such as bias, data privacy issues, and the proliferation of automated misinformation. Onwubiko (2025) highlights the role of librarians as mediators in this changing landscape by providing users with the skills to navigate the ethical issues associated with AI technologies

In addition, librarians play an important role in developing ethical awareness through information literacy education. Arumuru (2024) suggests that librarians can contribute to building an information-literate society by incorporating ethical considerations in literacy programs. These programs encourage the responsible use of information, respect for intellectual property, and the avoidance of plagiarism. Librarians who embed ethical principles in their instruction can assist users to not only access information, but apply it in socially responsible ways. This educational role

further strengthens the role of librarians as both educators and ethical guides.

Another important dimension is the promotion of equity, inclusion and intellectual freedom. Libraries are community centers that foster information literacy and democratic participation (Witt, 2024). Within this framework, librarians work to ensure equitable access to information resources and to protect the rights of users to seek and share information freely. These ethical commitments are especially important for addressing digital inequalities and ensuring that marginalized communities are not excluded from the information society. Thus librarians champion social justice in the information ecosystem.

Further, emerging research highlights the importance of institutional policies and professional frameworks to support ethical practice in libraries. Ali and Richardson (2025) emphasize the need to develop guidelines and policies on AI literacy to ensure ethical use of emerging technologies in academic libraries. Such frameworks provide structured ways to address ethical concerns such as bias, transparency and accountability in AI systems. This implies that librarians are practitioners as well as policy makers in the area of information ethics.

Despite these advances, however, there remain several challenges. Rapid technological change, limited training, and emerging ethical dilemmas make it difficult for librarians to address all areas of information ethics consistently. And the tension between intellectual freedom and the need to combat harmful misinformation remains a difficult one. The literature, however, indicates that librarians are increasingly adapting to these challenges by broadening their competencies and taking on new ethical responsibilities.

Challenges Facing Librarians in Promoting Digital Information Literacy

The promotion of digital information literacy (DIL) has become a core responsibility of modern librarians; however, recent literature consistently shows that librarians face numerous challenges in fulfilling this role effectively. These challenges are shaped by rapid technological advancement, limited resources, skill gaps, and socio-institutional constraints that affect how librarians deliver digital literacy instruction and support users in navigating complex information environments.

The digital divide and unequal access to technology is a major issue identified in the recent studies, where

many libraries, particularly in the developing regions, lack the ICT infrastructure, poor internet connectivity, and limited digital tools, which makes it difficult for librarians to offer effective digital information literacy training (Dube et al., 2024). Erratic internet services, outdated infrastructure, and lack of staff development directly limit librarians' ability to implement information technology tools required for digital literacy education, and persistent digital inequality among users also hampers librarians' efforts to provide universal access to digital learning opportunities.

Another major challenge is the lack of enough skills and professional development, as librarians need to keep updating their skills due to rapid digital technology development, such as advanced databases and artificial intelligence, but many librarians lack sophisticated digital skills to teach students digital information literacy. While librarians may have a general concept of information literacy, Oladokun and Umar (2026) point out that they often struggle to learn and apply advanced technologies such as AI tools and data analytics, which are increasingly essential to teaching digital literacy, which hinders their effectiveness as instructors and digital facilitators.

In addition, technological complexity and rapid innovation pose ongoing challenges. The continuous emergence of new digital platforms, tools, and systems creates pressure on librarians to adapt quickly. According to recent literature, digital library environments are becoming increasingly complex due to AI-driven systems, semantic search tools, and automated services, requiring librarians to continuously adjust their instructional approaches (Ellington, 2025). This rapid change often outpaces training opportunities, leaving librarians underprepared for new digital literacy demands.

Limited funding and inadequate institutional support is another major barrier; budget limitations can prevent libraries from purchasing the latest technologies, subscribing to digital resources, and providing staff and user training, which according to various studies is one of the most significant challenges to digital initiatives in libraries and affects the quality of service and digital literacy programs (Hoopla Digital, 2025). Limited funding also means that librarians cannot fully develop or sustain digital information literacy initiatives.

Moreso, librarians face challenges in user adaptation, which include low

digital literacy levels and resistance to change, as many users do not have the basic digital skills required to effectively utilize specialized academic databases and digital library resources, nor are they inclined to learn to use them, leaving librarians with few means to encourage users to engage with library-led digital literacy programs.

Additionally, ethical and informational challenges, including misinformation, disinformation, and the rise of AI-generated content, complicate librarians' instructional role. Librarians must now teach users how to critically evaluate digital content while also addressing concerns about algorithmic bias and data reliability. This adds complexity to their instructional responsibilities and requires deeper ethical and analytical expertise.

Conclusion

The role of librarians has undergone a profound transformation in response to technological development. Librarians are no longer passive information custodians but active educators, digital facilitators, and literacy advocates. To remain relevance, librarians must continuously adapt to technological changes and develop new competencies in digital, data, and AI literacy. Their role is critical in empowering individuals to navigate the complex digital information landscape effectively and ethically.

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