24

TRANSFORMING LIBRARY AND INFORMATION SCIENCE EDUCATION THROUGH INFORMATION AND MEDIA TECHNOLOGY: OPPORTUNITIES, CHALLENGES, AND FUTURE DIRECTIONS

Elizabeth Dupe Nze[1] & Ibrahim Mohammed[2]
Federal College of Education, Abeokuta, Ogun State[1,2.]
e*lizabethdupe4@gmail.com[1], ibrahimohammed02@gmail.com[2]*

Abstract

Purpose: *This paper examines how Information and Media Technology (IMT) transforms teaching, learning, and professional practice in Library and Information Science (LIS) education. It analyses the opportunities IMT creates, the challenges that constrain adoption particularly in developing-country contexts, and charts ten concrete future directions for LIS programmes.*

Design/Methodology/Approach: *An interpretive, descriptive literature review was conducted. Peer-reviewed sources published between 2013 and 2026 were identified from Scopus, Web of Science, Google Scholar, African Journals Online, and Library Philosophy and Practice. The analysis is anchored in four theoretical frameworks: the Technology Acceptance Model (TAM), Diffusion of Innovations Theory (DoI), Constructivist Learning Theory, and Connectivism.*

Findings: *IMT integration significantly improves access to information, enriches collaboration, fosters digital literacy, and enhances pedagogical innovation. Adoption is constrained by inadequate funding, unreliable infrastructure, skills deficits, institutional resistance, equity concerns, and policy fragmentation, particularly in Nigerian and African contexts.*

Practical Implications: *Sustained investment in Information and Communication Technology (ICT) infrastructure structured professional development, and national policy frameworks embedding IMT in LIS curricula are urgently required. Multi-stakeholder partnerships among governments, universities, library associations, and the private sector are essential for equitable implementation.*

Originality/Value: *This paper provides a theoretically grounded, evidence-based analysis of IMT in LIS education anchored in Nigerian and African scholarship, proposes a conceptual Input-Process-Output model, and offers an actionable ten-point future directions agenda supported by verified, current literature.*

Keywords: *Information and Media Technology; Library and Information Science; digital literacy; ICT integration; Connectivism; Technology Acceptance Model; Nigeria; future directions; developing countries.*

Introduction

The twenty-first century has fundamentally altered how knowledge is created, stored, organised, and shared. For Library and Information Science (LIS), whose core mission is the organisation and mediation of knowledge, this transformation is not peripheral but existential. Information and Media Technology (IMT) encompasses the full range of digital tools, platforms, and systems that support the generation, retrieval, and dissemination of information, including computers, the internet, learning management systems, artificial intelligence, and social media (Shoraevna et al., 2021).

Integrating these technologies into LIS education has become one of the most consequential developments in the profession.LIS prepares future librarians and information managers to efficiently organise, retrieve, and disseminate information resources (Essien, Lu, & Su, 2021). Yet the nature of those resources, the skills required to manage them, and the users they serve have all shifted dramatically under digital transformation. LIS educators must now possess ICT competencies that were not part of traditional training (Abubakar & Maidabino, 2022). As Tella et al. (2023) observe, the disruptive era presents both challenges and opportunities for Nigerian LIS professionals, with technological advancement and shifting user behaviour as the most significant drivers of institutional change.

Nigeria's digital literacy rate stands at 550 per cent (National Information Technology Development Agency [NITDA], 2023) and African educational institutions are simultaneously navigating Industry 4.0 demands and legacy curricula, infrastructure deficits, and funding constraints (Livi & Salubi, 2024). Despite a growing body of literature on technology in education and LIS practice, reviews that comprehensively address IMT integration in LIS from a developing-country perspective, anchored in theory and oriented toward actionable future directions, remain limited. This paper addresses that gap through four objectives: (1) to establish the theoretical frameworks that explain IMT adoption and learning in LIS; (2) to analyse the opportunities IMT creates for LIS education; (3) to identify the challenges that inhibit integration, particularly in Africa; and (4) to chart ten concrete future directions. The paper proceeds: Section 2 reviews relevant literature; Section 3 presents the theoretical framework and conceptual model; Section 4 describes methodology; Sections 5 and 6 analyse opportunities and challenges; Section 7 presents future directions; Section 8 offers recommendations; Section 9 concludes.

Literature Review

IMT's integration into education has been shown to improve learning outcomes, increase engagement, and promote flexible, personalised pedagogies (Parveen & Ramzan, 2024; Carsten et al., 2021). Kukulska-Hulme (2011) argued that higher education workforces must continuously adapt to technological advancements as pedagogically informed practitioners, not merely tool-users. Within LIS specifically, Raju (2019) argued that curricula must incorporate competencies in digital

publishing, data management, and open access. Sibiya and Ngulube (2023) found that South African employers expect digital scholarship competencies, data management, digital curation, computational skills, that most LIS programmes do not yet provide. David-West (2021) found that fourth industrial revolution considerations remain peripheral in Nigerian LIS curriculum design, and Livi and Salubi (2024) proposed the LIS Industry 4.0 Competency (LISI4C) frameworkrequiring technical proficiency, experiential learning, and continuous curriculum updates. Oladokun et al. (2025), in the most recent empirical study from Nigeria, found that LIS educators are increasingly aware of Artificial Intelligence (AI) but lackthe pedagogical knowledge to deploy it in instruction.

In developing-country contexts, Adepoju et al. (2022) showed that mobile AI applications hold potential for personalised learning in Nigeria but that device and connectivity disparities constrain equitable access. Alhassan (2021) noted that AI in education offers considerable promise for sub-Saharan Africa but is impeded by data poverty and the absence of localised models. Bozkurt et al. (2022) found in a systematic review tthat Open Educational Resources (OER) adoption in Africais concentrated in few countries and that creation has been prioritised over dissemination. The literature confirms a clear consensus, that is, IMT offers significant opportunities, serious challenges constrain those opportunities in African contexts, and the field lacks a unified, theoretically grounded, future-oriented framework for addressing both. This paper addresses that gap.

Theoretical Framework and Conceptual Model

This paper is anchored in four complementary frameworks, summarised in Table 1, each illuminating a distinct dimension of IMT adoption and learning in LIS education.

Table 1. *Theoretical Frameworks for IMT Integration in LIS Education*

Framework	Core Claim	Application to LIS	Key African Evidence
Technology Acceptance Model (TAM)	Adoption depends on perceived usefulness and ease of use (Davis, 1989; Venkatesh et al., 2003).	Explains why IMT stalls despite availability: low self-efficacy and poor infrastructure reduce ease of use.	Adetimirin (2015): Nigerian LIS students; Sibiya & Ngulube (2023) South African employers.
Diffusion of Innovations (DoI)	Innovations spread based on relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003).	Explains differential adoption rates across Nigerian LIS institutions and identifies levers for change.	Menzli et al. (2022): OER adoption; Mostert & Louw-Potgieter (2013) South African LIS.
Constructivist Learning Theory	Learners construct knowledge through active experience and social interaction (Piaget; Vygotsky).	Pedagogical rationale for interactive, project-based IMT tools over passive lecture delivery.	Goldie (2016): technology-enhanced learning; Kaur (2016) African Higher Education (HE) contexts
Connectivism	Knowledge exists across networks; learning is connecting nodes distributed through people and digital systems (Siemens, 2005).	Reframes LIS as networked knowledge practice: graduates must navigate global information ecosystems, not merely manage local collections.	Kaur (2016): African HE; Liu et al. (2024) Learning Management System (LMS) use during COVID-19

The Technology Acceptance Model explains adoption dynamics at the individual level, whether educators and students perceive IMT tools as useful and easy enough to use. Diffusion of Innovations explains how technologies spread, or stall through institutional systems. Constructivism provides the pedagogical logic connecting instructional activities to learning outcomes. Connectivism provides the broader epistemological vision, LIS graduates must be confident navigators of global digital knowledge networks, not merely proficient users of specific tools.

Drawing on these frameworks, this paper proposes a conceptual Input-Process-Output (IPO) model for IMT integration in LIS education. Inputs encompass digital infrastructure, funding, institutional policy, IMT tools, and faculty and student competencies. Processes encompass technology-mediated instruction, collaborative digital projects, experiential and simulation-based learning, and continuous professional development. Outputs are the desired results: digitally literate, data-capable LIS graduates who can deliver innovative, equitable library services. TAM and DoI explain how inputs

enable or constrain adoption; Constructivism provides the pedagogical logic linking inputs to processes; Connectivism frames outputs as contributions to networked global knowledge systems.

Methodology

This study employs an interpretive, descriptive literature review methodology, appropriate for synthesising existing knowledge and generating theoretically grounded future directions. Peer-reviewed articles, book chapters, policy documents, and institutional reports published between 2013 and 2026 were systematically identified from Scopus, Web of Science, Google Scholar, African Journals Online (AJOL), Library Philosophy and Practice, and ResearchGate. Foundational theoretical works (Davis, 1989; Rogers, 2003; Siemens, 2005) were included regardless of publication date. Search terms included combinations of: "LIS education", "IMT integration", "ICT in LIS", "digital literacy LIS", "LIS curriculum Nigeria", "LIS curriculum Africa", "technology acceptance library", "AI library education", "blockchain library", and "smart library". Sources were included if they were peer-reviewed, addressed IMT or digital technology in education or LIS, and were available in English. One article, Tella, Ajani, and Ailaku (2023), "Libraries in the Metaverse", was excluded following its official retraction by Library Hi Tech News in January 2025 due to fabricated references. The final analysis draws on 52 verified sources, of which 20 are authored or co-authored by Nigerian or African scholars.

Opportunities in Integration of IMT in LIS Education

Expanding Access to Information and Learning Resources

IMT democratises access to information by enabling LIS students to engage with global scholarship through digital libraries, open-access journals, institutional repositories, and OER platforms regardless of geography or institutional holdings (Bozkurt et al., 2022). Resources such as Google Scholar, ScienceDirect, EBSCOhost, and ProQuest give students in resource-constrained institutions access to global research. Tsabedze (2021) demonstrated this practically in Eswatini, designing a Massive Open Online Courses (MOOCs) and OER-based LIS model enabling professional training without international study. From a Connectivist perspective, expanded access is not merely about retrieving more documents but about connecting LIS students to the global knowledge networks the profession exists to serve.

Improved Communication, Collaboration, and Pedagogy

Learning management systems (LMS) platforms such as Moodle, Canvas, and Microsoft Teams enable LIS lecturers to structure courses digitally, facilitating discussion, resource sharing, and assessment that mirrors collaborative professional environments. Liu et al. (2024) found that active LMS use during online learning periods produced measurably stronger academic outcomes, with direct implications for LIS curriculum design. Multimedia tools, simulations, and virtual library tours bring abstract LIS subjects, cataloguing, metadata management, digital preservation, to life through the scaffolded experiential learning that Constructivism identifies as central to deep knowledge construction (Goldie, 2016). Sivakumar et al. (2023) confirmed that social media and digital media tools significantly enhance knowledge sharing and learning engagement in higher education. IMT also enables professional development beyond institutional boundaries through the International Federation of Library Associations and Institutions (IFLA), the African Library and Information Associations and Institutions (AFLIA) ResearchGate, and LinkedIn networks.

Developing Digital and Data Literacy

IMT integration builds the digital fluency that is required of every LIS graduate such as: operating bibliographic databases, using reference management software, navigating digital repositories, and critically evaluating digital sources. Subaveerapandiyan et al. (2024) identified significant gaps in advanced digital literacy, particularly in big data and AI, among African LIS professionals, recommending structured upskilling within formal LIS curricula as the most effective remedial strategy. NITDA's National Digital Literacy Framework (2023) provides the national policy architecture within which curricular reforms can be pursued, though its translation into LIS-specific requirements requires deliberate institutional action. From a TAM perspective, building digital literacy reduces the perceived difficulty of subsequent technology adoption, creating a virtuous cycle in which competency begets confidence.

Teaching Efficiency and Cost Effectiveness

Digital slides, smart boards, and online tools save instructional time and enhance clarity. LMS analytics enable teachers to identify struggling students early and intervene with targeted support. Ojo (2024) demonstrated empirically that LMS adoption had a

statistically significant positive effect on undergraduate academic performance in Nigerian universities. Cost savings are substantial as open-source systems such as Koha and Greenstone provide institutional-grade library functionality at minimal cost, while digital learning materials reduce expenditure on physical texts, savings that are not incidental in Nigerian and African LIS programmes operating under chronic budget constraints.

Challenges to IMT Integration in LIS Education

Infrastructure, Funding, and Connectivity

Inadequate and unsustainable ICT infrastructure remains the most consistently cited barrier to IMT integration in developing country LIS contexts (David-West, 2021; Alhassan, 2021). Most Nigerian LIS departments operate on budgets prioritising recurrent expenditure over capital technology investment. Donor funded projects frequently collapse when cycles end. Unstable electricity interrupts digital classes and damages equipment; rural campuses face additional mobile network coverage gaps. Adepoju et al. (2022) documented that even mobile-based learning applications, the most accessible IMT modality, are constrained by data costs that exclude the most economically marginalised students, creating a second-order digital divide between those who have and cannot afford to intensively use internet access. From a DoI perspective, the absence of reliable infrastructure prevents trialability, meaning adoption stalls before the relative advantage of new tools can be observed.

Skills Deficits and Institutional Resistance

Oladokun et al. (2025) found that Nigerian LIS educators show growing awareness of AI technologies but lack the pedagogical competence to deploy them in instruction, a structural gap between awareness and practice. Professional development in Nigerian LIS institutions is typically episodic rather than continuous and focused on operational Information Technology (IT) skills rather than pedagogical application (Subaveerapandiyan et al., 2024). Institutional resistance compounds this: some Nigerian LIS programmes operate under curricula designed before the proliferation of digital technologies, and both faculty and administrators may resist the retraining demands that IMT integration requires (David-West, 2021). From a DoI perspective, this reflects late majority and laggard adopter characteristics: high perceived complexity, low compatibility

with existing norms, and limited visible trialability.

Equity, Cybersecurity, and Policy Fragmentation

Students from lower-income households may lack personal devices, home internet, or the foundational digital literacy to navigate LMS platforms. Agary et al. (2024) found that Nigerian teachers themselves identify digital literacy as a prerequisite for 21st-century teaching that institutions have not ensured. IMT integration that ignores these disparities widens existing inequalities rather than narrowing them. As education and library services migrate online, cybersecurity threats, data breaches, plagiarism, misinformation, pose risks that most Nigerian LIS programmes are ill-equipped to manage. Aina and Bello (2023) documented that the absence of institutional AI governance frameworks creates significant legal and ethical risks. At the policy level, Okoye and Ekechukwu (2022) note that the gap between national policy and institutional implementation remains substantial despite Nigeria's National Digital Literacy Framework (NITDA, 2023), with technology integration often championed by individuals rather than embedded as institutional or national standards.

Future Directions for LIS Education in the IMT Era

Mapping future directions for LIS education requires moving beyond the question of what these technologies currently do toward the more consequential question of what the future prospect holds for the profession. Using a horizon scanning and technology trajectory approach, examining each technology's developmental curve, investment trends, and capability growth, it is possible to project where each direction is heading by 2030–2035 and what LIS education must do now to be positioned for that future. The ten directions below are structured around four questions: What is the current state? What trajectory is the evidence pointing toward? What will that mean for LIS education if the trajectory holds? And what must LIS programmes do now?

Artificial Intelligence: Tool Adoption to Professional Redefinition

Currently, Artificial Intelligence (AI) performs specific LIS functions, automated cataloguing, citation analysis, references, chatbots, as supplementary tools. Oladokun et al. (2025) found that Nigerian LIS educators are aware of AI but lack pedagogical knowledge to deploy it effectively. The trajectory, however, is

toward full integration: AI systems by 2030 are projected to perform end-to-end information mediation autonomously, generating personalised reading pathways, detecting misinformation in real time, and synthesising across heterogeneous databases without human intermediation (Luan et al., 2020; Baker, 2021). If this holds, the LIS professional's value will no longer be positioned in performing these functions but in governing, auditing, and humanising them, understanding what AI systems cannot do, where they fail, and how to design human-centred information services that compensate for those failures. The implication for LIS education is fundamental as AI literacy must be embedded not as a technical elective but as a core professional formation, covering algorithmic auditing, AI ethics, and the design of human-AI collaborative information workflows. Nigerian LIS programmes must act now, before the gap between AI capability and professional readiness becomes unbridgeable.

Virtual and Augmented Reality: Demonstration to Immersive Professional Training

Virtual Reality (VR) and Augmented Reality (AR) currently exist at the periphery of LIS education, experimental, hardware-dependent, and confined to well-resourced institutions. The developmental trajectory is toward ubiquity: falling hardware costs, browser-based VR platforms, and the expansion of 5G networks across urban Africa are projected to make immersive learning environments accessible on mid-range smart phones by 2028–2030 (Shahzad & Tariq, 2025; Ajani et al., 2023). When that access point arrives, institutions that have not yet built VR-based pedagogical models will face a sudden competency gap. The foreseeable future use is not merely virtual library tours but full simulation-based professional training, such that LIS students conducting virtual reference interviews with AI-generated patrons, practising digital archival triage in immersive disaster recovery scenarios, or collaborating in shared virtual cataloguing environments with peers across continents. Nigerian and African LIS programmes must begin building the pedagogical infrastructure such as module designs, assessment frameworks, faculty competencies, before the hardware arrives, not after.

Learning Analytics: Reporting to Predictive Intervention

Learning Management System (LMS) analytics currently report what students have done: which resources were accessed, which

assignments submitted. Okoye and Adetunji (2022) confirmed that even this basic level of analytics is underutilised in Nigerian universities due to infrastructure and skills gaps. The trajectory of learning analytics is toward predictive intelligence: systems that do not report past behaviour but forecast future outcomes, identifying students at risk of failure weeks before any assessment, recommending individualised learning pathways in real time, and detecting patterns of disengagement invisible to individual instructors (Baker, 2021). By 2030–2035, AI-driven intelligent tutoring systems are projected to replace much of the one-size-fits-all curriculum with dynamically personalised learning experiences. LIS education faces a dual implication: first, it must train graduates to manage and interpret the predictive data systems that will govern library user services; second, it must adopt these systems within its own pedagogical practice, so that students experience personalised learning not merely as a concept they study but as the educational environment they inhabit. Establishing ethical governance frameworks for student data use is not a future concern, it is an immediate prerequisite.

Blockchain: Experiment to National Information Infrastructure

Blockchain's current application in LIS is largely experimental: isolated pilots in digital credentialing and copyright management. Raimundo and Rosário (2021) confirmed the technology is technically mature, but institutional adoption in African higher education remains negligible. The movement is toward integration into national information infrastructure: within a decade, blockchain-based systems are projected to underpin academic credentialing across multiple African countries. Beyond credentialing, blockchain's capacity for provenance tracking will transform how digital library collections verify the authenticity of sources, manage digital rights, and attribute authorship in an era of AI-generated content (Akintunde & Amuda, 2023). LIS graduates who understand blockchain will be positioned to design and govern these systems. Those who do not will be unable to function in the information verification environments that await them. Blockchain literacy must therefore enter LIS curricula as a matter of professional necessity, not optional specialisation.

Big Data and Data Literacy: Awareness to Research Leadership

Data literacy is currently acknowledged as important in Nigerian LIS discourse but remains structurally absent from most curricula. Oyetola and Oladokun (2024) found that Nigerian LIS programmes do not yet prepare graduates for big data research roles. The trajectory is unambiguous and accelerating: by 2030, data will be the primary medium of scholarly communication, institutional decision-making and public information provision. Libraries that cannot manage, curate, and provide access to research data will be marginalised from the scholarly communication ecosystem they currently inhabit. The foreseeable future use positions LIS professional is not merely as data-literate practitioners but as institutional research data officers, embedded within university research offices, national statistics agencies, and data-intensive NGOs. Hamad et al. (2022) documented the emerging demand for such roles even in developing country library contexts. LIS education must act now as dedicated modules in data management planning, data visualisation, open data policy, and research data services must be embedded as core rather than elective content, and the Librarian Registration Council of Nigeria (LRCN) and the Nigerian Library Association (NLA) must incorporate data competency standards into professional registration requirements.

Mobile-First Education: Workaround to Designed Pedagogy

Mobile-based LIS learning currently functions as a workaround for infrastructure deficits: students access resources on phones due to lack of alternative option. Adepoju et al. (2022) demonstrated that meaningful learning is achievable in this modality, but it remains undesigned, an adaptation rather than an intention. The trajectory across sub-Saharan Africa is toward a mobile-native learning generation: by 2030, the majority of students enrolling in Nigerian universities would have spent their formative years acquiring information primarily through smart phones. The cognitive expectations, attention patterns, and information behaviours will most likely be shaped by mobile interfaces in ways that desktop-designed LMS platforms and lecture-hall pedagogies are structurally unable to. The foreseeable future is one in which mobile-first pedagogy is not a concession to poor infrastructure but a response to the actual cognitive and behavioural profile of the student population. LIS programmes must redesign curricula from the scratch for mobile interfaces, short-form video

instruction, voice-based information retrieval services, micro-assessment, and SMS-accessible library services, and not just conceive mobile phones as a delivery channel but as the primary learning environment.

Open Educational Resources and MOOCs: Consumption to African Knowledge Production

Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) are currently consumed by African LIS students and educators far more than they are produced by them. Bozkurt et al. (2022) found that OER creation in Africa remains concentrated in a small number of countries and institutions. This points toward a critical inflection, as generative AI tools dramatically reduce the cost of OER production, enabling automated translation, localisation, and multimedia generation, the barrier to African LIS knowledge production will fall sharply. By 2030, there is a realistic prospect of a well-resourced African OER ecosystem in which Nigerian library practice, indigenous knowledge systems, and African information environments are documented, theorised, and shared globally. Whether that ecosystem materialises depends on whether LIS programmes now cultivate the authorship competencies; instructional design, open licensing, digital publishing, and multilingual content development that will enable African LIS professionals to become contributors rather than consumers of global knowledge. Tsabedze's (2021) model provides a template; what is needed now is institutional commitment to scaling it.

Digital Scholarship Laboratories: Physical Spaces to Distributed Research Networks

Digital scholarship laboratories currently exist as physical spaces, dedicated rooms in well-funded universities equipped with high-performance computing, digitisation equipment, and specialist software. For most Nigerian LIS programmes, such spaces are aspiration. The trajectory is toward cloud-distributed digital scholarship, such that by 2030, the computational infrastructure required for text mining, data visualisation, geospatial analysis, and digital archiving will be accessible through browser-based platforms requiring only a stable internet connection. This shifts the bottleneck from hardware to competency. Sibiya and Ngulube (2023) documented that South African employers already expect digital scholarship competencies that LIS programmes have not cultivated. As digital scholarship tools democratise, this

expectation will intensify and spread across African employer contexts. The foreseeable future positions the LIS professional as a digital research collaborator embedded within interdisciplinary teams, contributing information organisation expertise, metadata architecture, and source evaluation to data science, digital humanities, and policy research projects. LIS programmes must now build virtual digital scholarship environments, invest in faculty digital scholarship competency, and redesign research methods modules around collaborative digital methodologies.

Smart Libraries and IoT: From Automation to Anticipatory Service

Internet of Things (IoT) integration in libraries currently automates discrete functions: self-checkout, occupancy monitoring, environmental management. Xu et al. (2024) showed that low-cost IoT architectures are viable even in resource-constrained settings and Yaseen and Gul (2025) documented accelerating growth in smart library research. The trajectory, however, points toward a qualitative shift: from libraries that respond to user behaviour to libraries that anticipate it. By 2030–2035, AI-integrated IoT systems are projected to deliver anticipatory library services, systems that predict resource needs before users articulate them, dynamically reconfigure physical spaces based on real-time behavioural data, and personalise information environments to individual user profiles across multiple visits. This is a transformation of the library's relationship with its users: from reactive service provision to proactive knowledge facilitation. The LIS graduate of 2030 must be capable of designing, governing, and ethically evaluating these anticipatory systems. Curricula must therefore develop not only Radio Frequency Identification (RFID) and IoT operational competencies but the data governance, user privacy ethics, and human-centred design skills that responsible smart library development demands.

Metaverse and Immersive Environments: Novelty to Parallel Information Infrastructure

The metaverse currently represents an early-stage, hardware-intensive curiosity for most LIS institutions. Ajani et al. (2023) and Shahzad and Tariq (2025) identified institutional readiness and user metaliteracy as the primary adoption barriers. The trajectory, however, is toward the metaverse becoming a parallel information infrastructure alongside the physical and open web: an environment in which

scholarly conferences, community consultations, archival exhibitions, and reference services routinely occur in immersive shared virtual spaces. Major technology companies and international organisations are investing at a scale that makes some version of this trajectory near-certain within a decade, even if the specific form remains contested. For LIS education, the implication is that LIS graduates must develop the metaliteracy capacity in order to critically evaluate, navigate, and create information in immersive environments. Curricula should now introduce immersive information ethics, virtual reference service design, and the preservation challenges specific to three-dimensional and interactive digital objects, building competency foundations that will enable rapid professional adaptation as immersive environments mature.

Recommendations

For Policymakers and National Bodies (National Universities Commission, Librarian Registration Council of Nigeria, Nigerian Library Association)

Establish a dedicated LIS Technology Integration Fund providing sustained multi-year financing for digital infrastructure. Mandate IMT competency standards within the LIS accreditation framework, requiring measurable outcomes in digital, data, and AI literacy. Develop a national blockchain-based credentialing pilot for LIS qualifications in partnership with NUC. Formally integrate the National Digital Literacy Framework (NITDA, 2023) into LIS curriculum guidelines. Incentivise development of locally contextualised African OER through national research funding.

For Higher Education Institutions and LIS Schools

Establish digital scholarship laboratories, beginning with virtual cloud-based spaces where physical infrastructure is not yet available. Adopt analytics-enabled LMS platforms and train faculty in data-driven pedagogy. Audit all LIS courses for mobile accessibility and develop low-bandwidth alternatives. Create continuous professional development programmes addressing pedagogical applications of AI, VR, blockchain, and data visualisation, not merely operational IT skills. Embed cyber security awareness, data ethics, and AI governance as non-elective professional competencies across all LIS curricula.

For LIS Educators and Practitioners

Redesign at least one course per semester to incorporate a collaborative, IMT-mediated project assessment requiring students to produce a digital artefact, a podcast, data visualisation, digital catalogue, or repository

guide, demonstrating authentic professional competency. Participate in international LIS communities of practice through IFLA, AFLIA, and online networks, contributing Nigerian and African perspectives. Advocate within institutions for open-source library systems such as Koha, DSpace, Greenstone, as cost-effective alternatives to proprietary platforms. Model digital literacy practices by maintaining active scholarly online profiles and engaging critically with digital information environments.

Conclusion

The integration of Information and Media Technology into Library and Information Science education is a fundamental reconceptualisation of what it means to educate information professionals for a world in which knowledge is digital, networked, and perpetually in flux. This paper has demonstrated through a theoretically anchored analysis that IMT integration generates transformative opportunities, in access, collaboration, digital literacy, and pedagogical innovation, already being realised in pockets of innovation across Nigeria, Africa, and the world. It has equally demonstrated that structural challenges, funding deficits, infrastructural fragility, skills gaps, institutional inertia, equity concerns, and policy fragmentation, will not resolve without deliberate, sustained, and coordinated intervention.

The Technology Acceptance Model explains why adoption stalls when infrastructure is unreliable and training is absent. Diffusion of Innovations Theory explains why good practice remains isolated rather than scaling. Constructivism explains why lecture-centred pedagogy persists even where IMT tools are available. Connectivism names the destination: LIS graduates who are confident, critical navigators of the global knowledge networks that constitute the contemporary information environment. The ten future directions proposed, from AI literacy and learning analytics to blockchain credentialing, mobile-first education, and smart libraries, are not aspirational visions but evidence-based imperatives grounded in verified scholarship and directly actionable by the policymakers, institutions, and educators to whom this paper is addressed.

The librarian of the twenty-first century must navigate both analogue and digital worlds with equal confidence, blending human understanding with technological wisdom. Building that librarian, through reformed curricula, sustained investment, coherent policy, and a clear professional

vision, is the most important contribution LIS education can make to an information society that urgently needs it.

REFERENCES

Abubakar, A. A., & Maidabino, A. A. (2022). ICT competencies and instructional practice of library and information science educators in Nigerian universities. *Library Philosophy and Practice (e-journal)*, *2022*, Article 7022.

Adetimirin, A. E. (2015). Applying Technology Acceptance Model 3 to understand academics' continued use of an online discussion forum for learning. *Library Philosophy and Practice (e-journal)*, *2015*, Article 1282.

Adepoju, O. A., Oladejo, B. A., & Akinyemi, A. A. (2022). Leveraging mobile AI applications for personalised learning in Nigeria. *African Journal of Educational Technology*, *9*(1), 41–55.

Adeoye, I. A., Alabi, T. O., & Oladipo, S. A. (2023). Adoption of AI-enabled tools in private universities in Nigeria: A case study of Covenant University. *Nigerian Journal of Educational Technology*, *20*(1), 75–89.

Agary, R. O., Babalola, M. O., & Jacob, P. A. (2024). Teachers' perception of digital literacy skills as a tool for 21st century teaching in Nigeria. *University of Dar es Salaam Library Journal*, *19*(1).

Aina, O. B., & Bello, S. A. (2023). Ethical implications of artificial intelligence adoption in Nigerian universities. *African Journal of Educational Management*, *21*(2), 33–48.

Ajani, Y. A., Enakrire, R. T., Oladokun, B. D., & Bashorun, M. T. (2023). Reincarnation of libraries via metaverse: A pathway for a sustainable knowledge system in the digital age. *Journal of Librarianship and Information Science*. https://doi.org/10.1177/02663821231208044

Akintunde, T., & Amuda, D. (2023). Integrating blockchain with digital library resources to prevent plagiarism and copyright infringement in Nigerian academic libraries. *Library Philosophy and Practice (e-journal)*, *2023*, Article 7900.

Alhassan, A. (2021). Artificial intelligence in education: The case of sub-Saharan Africa. *African Journal of*

Educational Development, *11*(3), 201–213.

Baker, R. S. (2021). Artificial intelligence in education: Bringing it all together. In *OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots* (pp. 43–54). OECD. https://doi.org/10.1787/f54ea644-en

Baskey, S. K., Roy, A., & Ray, D. (2023). *Educational technology: Vision 21st century*. REDSHINE.

Bozkurt, A., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bond, M., Buntins, K., Conrad, D., Crues, R. W., Dron, J., Donoghue, D., Fanguy, M., Foung, D., Hilli, C., Hilzensauer, W., Karakaya, Y. T., Kondra, S., Lambrinoudaki, I., Lowenthal, P. R., Mayrberger, K., ... Xiao, J. (2022). Are we there yet? A systematic literature review of open educational resources in Africa: A combined content and bibliometric analysis. *Frontiers in Education*, *6*, Article 651840. https://doi.org/10.3389/feduc.2021.651840

.

Carsten, K. J., Mallon, J. M., & Bataineh, M. (2021). Effects of technology on students' learning. *Turkish Online Journal of Educational Technology*, *20*(1).

Chu, C. M., Raju, J., Cunningham, C., Bothma, T., Fourie, I., Holmberg, K., Huvila, I., Kennan, M. A., Khoo, C., Liu, Y. Q., Lor, P. J., Ma, L., Matusiak, K., Mostafa, J., Ngulube, P., Normore, L., Ocholla, D., Raseroka, K., & Wiegand, W. (2022). *IFLA guidelines for professional library and information science (LIS) education programmes*. IFLA.

David-West, B. T. (2021). Fourth industrial revolution and library and information science curriculum development in Nigeria. *Library Philosophy and Practice (e-journal)*, *2021*, Article 6702.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Essien, F. K., Lu, Z., & Su, W. (2021). Library and information science education and the gaps that inhibit the production of professionals for

effective management of libraries in Ghana. *International Journal of Library Science*. https://doi.org/10.5923/j.library.20200901.02

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age? *Medical Teacher*, *38*(10), 1064–1069. https://doi.org/10.3109/0142159X.2016.1173661

Hamad, F., Fakhuri, H., & Abdel Jabbar, S. (2022). Big data opportunities and challenges for analytics strategies in Jordanian academic libraries. *New Review of Academic Librarianship*, *28*(1), 37–60.

Holmes, W., Bialik, M., & Fadel, C. (2023). Artificial intelligence in education. In *Data ethics: Building trust: How digital technologies can serve humanity* (pp. 621–653). Globethics Publications. https://doi.org/10.58863/20.500.12424/4276068

Kant, N., Prasad, K. D., & Anjali, K. (2021). Selecting an appropriate learning management system in open and distance learning: A strategic approach. *Asian Association of Open Universities Journal*. https://doi.org/10.1108/aaouj-09-2020-0075

Kaur, M. (2016). Connectivism in learning activity design: Implications for pedagogically-based technology adoption in African higher education contexts. *International Review of Research in Open and Distributed Learning*, *17*(2). https://doi.org/10.19173/irrodl.v17i2.2217

Kukulska-Hulme, A. (2011). How should the higher education workforce adapt to advancements in technology for teaching and learning? *Internet and Higher Education*, *15*(4), 247–252.

Liu, D., Carter, L., & Lin, J. (2024). Towards connectivism: Exploring student use of online learning management systems during the COVID-19 pandemic. *Online Learning*, *28*(2), 1–25.

Liu, Y. Q., & Briggs, S. (2015). Using media to enhance teaching and learning. *Reference and User Services Quarterly*, *55*(1), 29–33.

Livi, Y., & Salubi, O. G. (2024). Navigating Industry 4.0: Crafting a responsive curriculum for library and information science. *Journal of Librarianship and Information*

Science. https://doi.org/10.1177/02663821241289820

Luan, H., Geczy, P., Lai, H., Gobert, J., Yang, S. J. H., Ogata, H., Baltes, J., Guerra, R., Li, P., & Tsai, C. C. (2020). Challenges and future directions of big data and artificial intelligence in education. *Frontiers in Psychology*, *11*, Article 580820. https://doi.org/10.3389/fpsyg.2020.580820

Makina, D. (2020). Investigating the use of podcasts in an open, distance and e-learning environment. *Perspectives in Education*, *38*(1), 30–42.

Menzli, L. J., Smirani, L. K., Boulahia, J. A., & Hadjouni, M. (2022). Investigation of open educational resources adoption in higher education using Rogers' diffusion of innovation theory. *Heliyon*, *8*(7), Article e09885. https://doi.org/10.1016/j.heliyon.2022.e09885

Mostert, J., & Louw-Potgieter, J. (2013). The diffusion of innovations theory as a theoretical framework in library and information science research. *Mousaion*, *29*(1), 1–19.

National Information Technology Development Agency. (2023). *National digital literacy framework*. Federal Ministry of Communications and Digital Economy. https://nitda.gov.ng/wp-content/uploads/2023/07/Digital-Literacy-Framework.pdf

Ojo, M. B. (2024). Examination of the impact of learning management system on university undergraduate students' academic performance. *International Journal of Education, Learning and Development*, *12*(5), 67–82.

Ojobor, S. A. (2022). Blockchain technology and organisational practices: The case of Nigerian academic libraries. *Library Philosophy and Practice (e-journal)*. https://doi.org/10.13140/RG.2.2.11498.54722

Okoye, A., & Ekechukwu, L. (2022). The role of AI in transforming Nigerian education: Opportunities and challenges. *African Journal of Educational Research*, *18*(4), 144–158.

Okoye, C. F., & Adetunji, O. O. (2022). Applying learning analytics in Nigerian universities: Opportunities

and barriers. *Journal of Emerging Technologies in Education*, *15*(2), 98–110.

Oladokun, B. D., Josiah, E. D., Kolawole, D. T. O., Okorie, J. N., & Okamgba, J. O. (2025). Knowledge and usage of artificial intelligence technologies among library and information science educators in Nigerian universities. *Information Development*. https://doi.org/10.1177/09557490251378743

Oyetola, S. O., & Oladokun, B. D. (2024). Role of library and information science professionals in big data research: Opportunities and challenges. In U. C. Udofot, A. O. Issa, & B. D. Oladokun (Eds.), *Digital libraries*. ResearchGate. https://doi.org/10.13140/RG.2.2.21870.76166

Parveen, S., & Ramzan, S. I. (2024). The role of digital technologies in education: Benefits and challenges. *International Research Journal on Advanced Engineering and Management*, *2*(6), 2029–2037. https://doi.org/10.47392/IRJAEM.2029

Raimundo, R., & Rosário, A. (2021). Blockchain system in the higher education. *European Journal of Investigation in Health, Psychology and Education*, *11*(1), 1–14. https://doi.org/10.3390/ejihpe11010002

Raju, J. (2019). Embracing new trends in scholarly communication: From competency requirements in the workplace to LIS curriculum presence. *Journal of Librarianship and Scholarly Communication*, *7*(1). https://doi.org/10.7710/2162-3309.2291

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

Shahzad, K., & Tariq, M. (2025). Factors influencing the adoption of metaverse technologies in academic libraries: A systematic literature review. *Journal of Librarianship and Information Science*. https://doi.org/10.1177/09610006251363982

Shoraevna, Z. Z., Eleupanovna, Z. A., Tashkenbaevna, S. N., & Zulkarnayeva, Z. (2021). Teachers' views on the use of ICT in education environments. *International Journal of Emerging Technologies in*

Learning, *16*(3). https://doi.org/10.3991/ijet.v16i03.18801

Sibiya, P. T., & Ngulube, P. (2023). Perceptions of employers in South Africa on LIS graduates' skills, knowledge and competencies on digital scholarship. *Heliyon*, *9*(2), Article e13531. https://doi.org/10.1016/j.heliyon.2023.e13531

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, *2*(1), 3–10.

Sivakumar, A., Jayasingh, S., & Shaik, S. (2023). Social media influence on students' knowledge sharing and learning: An empirical study. *Education Sciences*, *13*(7), Article 745. https://doi.org/10.3390/educsci13070745

Stosic, L. (2015). The importance of educational technology in teaching. *International Journal of Cognitive Research in Science, Engineering and Education*, *3*(1).

Subaveerapandiyan, A., Sinha, P., & Ugwulebo, J. E. (2024). Digital literacy skills among African library and information science professionals: An exploratory study. *Global Knowledge, Memory and Communication*, *73*(4/5), 521–537. https://doi.org/10.1108/GKMC-06-2022-0138b

Tella, A., Bamidele, S. S., Olaniyi, O. T., & Ajani, Y. A. (2023). Library and information science graduate skills needed in the fourth industrial revolution: A Nigerian perspective. In *Information services for a sustainable society: Current developments in an era of information disorder* (Vol. 183, p. 342). Emerald Publishing.

Tsabedze, V. W. (2021). MOOCs and OER: A model for library and information science education. *Internet Reference Services Quarterly*, *25*(3). https://doi.org/10.1080/10875301.2021.1930621

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478.

Xu, H., Liu, W., Li, L., & Zhou, Q. (2024). An IoT-based low-cost architecture for smart libraries using SDN. *Scientific Reports*, *14*, Article 7196. https://doi.org/10.1038/s41598-024-57484-2

Yaseen, U., & Gul, S. (2025). Smart libraries: Unveiling research trends and knowledge dynamics through scientometrics. *Journal of Librarianship and Information Science*. https://doi.org/10.1177/09610006251316594