APPLICATION OF DIGITAL PEDAGOGIES AND SMART CLASSROOMS IN LIBRARY AND INFORMATION SCIENCE EDUCATION: CHALLENGES AND WAYS FORWARD

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Abstract
The integration of digital technologies into higher education has reshaped teaching and learning practices, with significant implications for Library and Information Science (LIS) education. Digital pedagogies such as blended learning, flipped classrooms, and e-learning alongside smart classroom technologies, including learning management systems, interactive tools, and emerging applications like artificial intelligence, offer new possibilities for enhancing instructional delivery and student engagement. This conceptual paper explores the application of these innovations in LIS education and their potential to support the development of critical digital competencies required in contemporary information environments. Despite their benefits, the adoption and effective use of digital pedagogies and smart classrooms in LIS education face several challenges, particularly in resource-constrained contexts. These include inadequate technological infrastructure, limited funding, insufficient digital skills among educators and learners, resistance to change, and weak institutional and policy support. Drawing on theoretical perspectives such as constructivism, connectivism, and the Technology Acceptance Model, the paper analyzes the factors influencing technology integration in LIS education. The study proposes strategic pathways for improvement, including investment in infrastructure, capacity building, curriculum reform, and the adoption of open and cost-effective technologies. It concludes that while digital innovations hold transformative potential, their successful implementation requires a balanced, inclusive, and context-sensitive approach to ensure sustainable and equitable advancement in LIS education.

Keywords: Digital pedagogies, smart classrooms, library and information science education:

Introduction
The transformation of education in the digital era has fundamentally reshaped teaching and learning processes across disciplines. The rapid advancement of digital technologies, particularly artificial intelligence, learning management systems, and immersive tools has driven the shift from traditional, teacher-centered approaches to more flexible, learner-centered environments (Ngongpah & Oni, 2025; Forsström et al., 2025). This transition aligns with emerging paradigms such as Education 5.0, which emphasize personalization, accessibility, and technology-enhanced learning experiences (Ahmad, Umirzakova, Mujtaba, Amin & Whangbo, 2023). Moreover, digital education has gained prominence for its role in ensuring continuity, democratizing knowledge, and expanding access to learning opportunities globally (Makda, 2024). Within this evolving landscape, Library and Information Science (LIS) education has undergone significant transformation (Onyebuchi, et al., 2024; Wyman & Imamverdiyev, 2018). Traditionally focused on cataloguing, classification, and information organization, LIS education now incorporates digital competencies such as data management, information retrieval, and the use of intelligent information systems.

This evolution reflects the changing role of information professionals in a knowledge-driven society. The emergence of digital pedagogies such as blended learning,

flipped classrooms, and online learning, and smart classroom technologies has further redefined instructional practices (Panda et al., 2025; Nagaraja & Davidson, 2024). These innovations foster interactive, collaborative, and personalized learning environments, enhancing student engagement and learning outcomes (Panda et al., 2025). Smart classrooms, in particular, integrate technologies such as interactive displays, artificial intelligence, and Internet of Things (IoT) devices to create adaptive and dynamic learning spaces (Amimi et al., 2022). Digital pedagogies use digital technologies to improve interaction, collaboration, assessment, and personalised learning, while a smart classroom is a technology-enabled environment equipped with tools such as computers and interactive whiteboards (Panda et al., 2025). Smart classrooms provide the infrastructure, and digital pedagogy determines how educators use this infrastructure to achieve their learning objectives. Therefore, digital pedagogy emphasises teaching techniques, while smart classrooms focus on the environment and technology. Despite these advancements, significant gaps remain in the adoption, effectiveness, and inclusivity of digital pedagogies and smart classrooms, especially in resource-constrained contexts (Dhouib et al., 2025; Wang et al., 2026). Gkrimpizi et al., (2023) classified the challenges into six broad categories, which include inadequate infrastructure, limited digital literacy, and institutional constraints in LIS education context.

Purpose of the Study

This paper aims to explore the application of digital pedagogies and smart classroom technologies in LIS education, identify key challenges, and propose strategic pathways for effective implementation. It seeks to address the following questions: What constitutes digital pedagogies, smart classrooms and their benefits in LIS education? What barriers limit their adoption? And what strategies can enhance their effective and inclusive use?

Methods

The study adopted a conceptual review design to synthesise findings from existing literature and develop conceptual models that illustrate the key concepts underpinning the study. Relevant scholarly sources, including peer-reviewed journal articles and conference papers, were identified through systematic searches of academic databases and reputable open-access repositories. These materials were selected based on their relevance, credibility, and contributions to understanding the application of digital pedagogies and smart classrooms in library and information science education, as well as the associated challenges and future prospects.

Theoretical Underpinning

This study is based on the theoretical foundation of constructivism, connectivism, and the Technology Acceptance Model (TAM) (Davis, 1989), which collectively provide a comprehensive lens for understanding learning processes, knowledge networks, and technology adoption in digitally mediated learning environments.

Developed by (Piaget, 1970; Vygotsky, 1978), Constructivism posits that learning is an active, learner-centered process in which individuals construct knowledge through interaction, experience, and reflection. Digital pedagogies such as blended learning, flipped classrooms, and problem-based learning align with this perspective by promoting active engagement, collaboration, and experiential learning. Studies on smart learning environments emphasize that modern digital tools enable immersive, interactive, and student-centered experiences that support deeper understanding and knowledge construction, reinforcing constructivist principles in technology-enhanced settings (Lister, 2021). Similarly, contemporary digital learning environments encourage learners to

connect prior knowledge with new information through active participation in digitally mediated tasks and collaborative activities (Taber, 2016).

Connectivism further extends constructivist assumptions by conceptualizing learning as a process distributed across networks of people, digital tools, and information resources (Duke, Harper & Johnston, 2013). In the context of LIS education, where information access, organization, and dissemination are central, connectivism is particularly relevant. Digital pedagogies and smart classrooms facilitate continuous interaction with online repositories, databases, and collaborative platforms, enabling learners to build and navigate knowledge networks. Recent research highlights that connectivist learning is supported by digital technologies that enable real-time updates, personalized learning pathways, and networked knowledge exchange, thereby fostering adaptability and lifelong learning competencies (Chen & Chan, 2024; Mampota et al., 2023). This networked approach aligns closely with LIS professional competencies, which emphasize information retrieval, evaluation, and sharing in interconnected digital environments.

While constructivism and connectivism explain how learning occurs in digital environments, the Technology Acceptance Model (TAM) provides insight into the determinants of technology adoption among educators and students. TAM posits that perceived usefulness and perceived ease of use significantly influence users' acceptance of technological systems. Empirical studies in digital education contexts show that successful adoption of learning technologies depends not only on technological availability but also on users' attitudes, self-efficacy, and perceived value of the systems (Zhang, 2025). In LIS education, resistance to change, limited digital skills, and concerns about usability can hinder the effective integration of digital pedagogies and smart classroom tools.

Collectively, these three theoretical perspectives offer a robust framework for analyzing the integration of digital pedagogies and smart classrooms in LIS education. Constructivism emphasizes active, learner-centered engagement; connectivism highlights the importance of networked knowledge and digital connectivity; and TAM explains the behavioral and perceptual factors influencing adoption. Together, they provide a holistic foundation for understanding both the pedagogical opportunities and implementation challenges, as well as for guiding strategies toward effective, inclusive, and sustainable integration of digital learning innovations in LIS education.

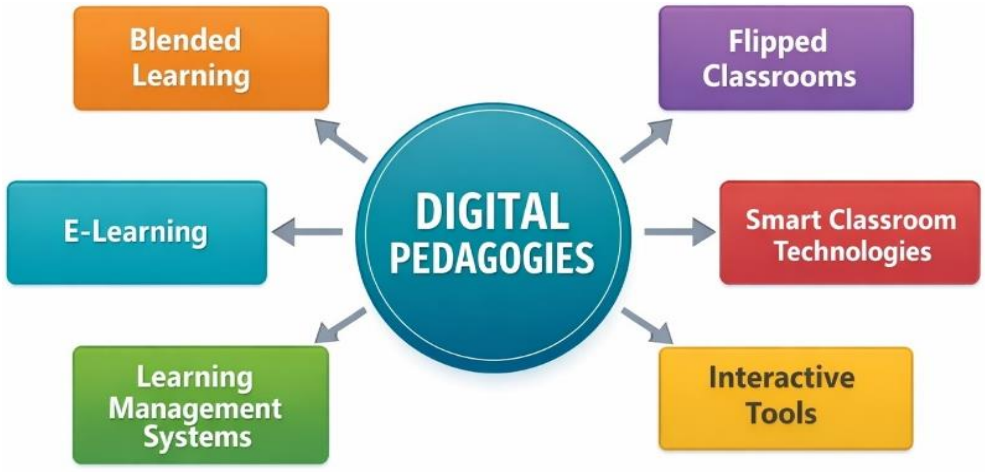

Figure 1: Scopes of Digital Pedagogies. (Author's Impression)

3. Conceptual Clarifications

Digital Pedagogies: Definition, Scope, and Role in Learner-Centred Education

Digital pedagogies refer to the intentional integration of digital technologies into teaching and learning processes to enhance instructional delivery, learner engagement, and knowledge construction. They encompass not only the use of digital tools but also the design of pedagogical strategies that leverage technology to support interactive, flexible, and student-centered learning experiences. In contemporary higher education context, Wang et al. (2023) and Mishra (2025) posits that digital pedagogy is understood as a "pedagogy-first approach" in which technology functions as an enabler of active, collaborative, and meaningful learning rather than merely a delivery mechanism for content.

The scope of digital pedagogies (Fig.1) includes a range of instructional models such as blended learning, flipped classrooms, e-learning, and mobile learning. Blended learning integrates face-to-face instruction with online components, enabling flexibility, improved access to resources, and personalized learning experiences (Thomas, Joshi, Anjana, Dolly & Chavan, 2025). Empirical studies indicate that blended learning approaches enhance student engagement, self-efficacy, and learning outcomes compared to traditional classroom instruction (Schmid et al., 2023). Flipped classrooms, a variant of blended learning, reverse the traditional instructional model by delivering content outside the classroom and using class time for discussion, collaboration, and problem-solving. This approach has been shown to promote active learning, deeper engagement, and improved critical thinking skills (Oknaryana et al., 2025). Mobile learning (m-learning) extends these benefits by enabling learners to access educational content anytime and anywhere through mobile devices, thereby supporting continuous and context-aware learning. E-learning, on the other hand, refers to fully online instructional delivery that facilitates synchronous and asynchronous interaction across digital platforms. These digital teaching methods combine to promote accessibility, active participation, collaboration, hands-on learning, and continuous assessment.

Digital pedagogies play a critical role in advancing learner-centred education by shifting the focus from teacher-directed instruction to active learner participation. They promote autonomy, collaboration, and personalized learning by allowing students to engage with content at their own pace while interacting with peers and instructors through digital platforms. Research shows that these approaches enhance flexibility, accessibility, and learner engagement while fostering self-regulated learning and independent inquiry skills (Thomas, et al., 2025; Oknaryana et al., 2025). In addition, digital pedagogies support the development of essential 21st-century competencies such as digital literacy, problem-solving, collaboration, and critical thinking. By creating interactive and inclusive learning environments, they align with the evolving demands of modern education systems and professional fields, including Library and Information Science education, where digital fluency and information management skills are essential. Digital teaching and smart learning overlap in digital technologies adoption to enhance education. However, digital teaching defines teaching strategies, while smart learning provides the intelligent environment and technical support necessary for their implementation.

Smart classrooms refer to technology-enhanced learning environments that integrate digital tools, networked systems, and intelligent technologies to support interactive, adaptive, and student-centered teaching and learning. Unlike traditional classrooms, smart classrooms leverage advanced technologies to facilitate real-time interaction, personalized instruction, and data-driven decision-making in educational processes. They are increasingly viewed as a key component of modern digital education

ecosystems that align pedagogy with emerging technological capabilities (Kurnia et al., 2026). Smart classrooms are typically composed of several interconnected components. Interactive boards, such as smart whiteboards and touch-enabled displays, enable dynamic content presentation and real-time collaboration between instructors and learners. These tools enhance visualization, engagement, and interactivity during instruction. Learning Management Systems (LMS), including platforms such as Moodle and Canvas, serve as centralized hubs for course management, content delivery, communication, assessment, and tracking of learner progress. Study by Paul and Lal (2025) show that LMS platforms support blended and online learning by organizing instructional resources and facilitating continuous engagement beyond the physical classroom.

The Internet of Things (IoT)-enabled devices further extend the functionality of smart classrooms by connecting physical devices such as sensors, smart projectors, and connected attendance systems to digital networks. These devices enable automation, monitoring, and contextual awareness, thereby improving classroom management and learning analytics. According to Bui and Nguyen (2023), AI-driven teaching tools are increasingly being integrated into smart classrooms to provide adaptive learning experiences, intelligent tutoring, automated assessment, and personalized feedback. Recent research indicates that AI applications in education enhance instructional efficiency and support individualized learning pathways by analyzing learner behavior and performance data.

Library and Information Science (LIS) Education

Library and Information Science (LIS) is an interdisciplinary field concerned with the organization, management, retrieval, dissemination, and preservation of information in various formats. Traditionally rooted in librarianship, LIS has evolved significantly in response to technological advancements and the increasing complexity of information environments. Modern LIS education extends beyond conventional library practices to encompass digital information systems, knowledge management, information architecture, and user-centered information services. This evolution reflects the broader transformation of libraries into dynamic, technology-driven knowledge hubs that support research, learning, and innovation (Bawden & Robinson, 2015).

The scope of LIS education now includes the integration of digital technologies and computational tools into information services and resource management. LIS programs are increasingly designed to equip students with competencies that align with the demands of the digital information society. These include skills in metadata creation, database management, digital curation, information retrieval, and the use of emerging technologies in managing both structured and unstructured data. Musa et al. (2025) reiterate that the transition towards digitally driven information environments has made it increasingly necessary for library and information science curricula to incorporate emerging areas such as artificial intelligence, big data analytics, and information systems.
Library and information science education is evolving to meet the demands of the changing information landscape. Incorporating digital pedagogies and smart classroom technologies is crucial for preparing future professionals to navigate digital environments, support open science, and enhance knowledge organisation and dissemination globally.

Applications of Digital Pedagogies in Library and Information Science (LIS) Education

Figure 2: Scopes of Digital Pedagogies in LIS Education (Author's Impression)

The integration of digital pedagogies into Library and Information Science (LIS) education has significantly transformed teaching, learning, and assessment practices. These pedagogical approaches (Fig. 2) leverage digital technologies to enhance instructional delivery, develop professional competencies, and support innovative evaluation methods aligned with the demands of contemporary information environments.

Teaching and Learning Innovations

Digital pedagogies have introduced diverse teaching and learning innovations in LIS education, particularly through online and blended learning environments. Blended learning, which combines face-to-face and online instruction, has been shown to enhance learner engagement, flexibility, and academic performance by enabling access to diverse learning resources and facilitating interactive learning experiences (Schmid et al., 2023). Similarly, fully online learning environments support asynchronous and synchronous interactions, expanding access to LIS education beyond geographical limitations.

Flipped classroom approaches according to Haetami et al. (2025) enhance instructional effectiveness by shifting content delivery outside the classroom and converting class period for active learning activities such as discussions, problem-solving, and collaborative projects. Baig and Yadegaridehkordi (2023) stated that it improves student's engagement and learning outcomes while raising critical thinking skills. In addition, virtual classrooms and webinars have become integral to LIS education, enabling real-time interaction, guest lectures, and global collaboration (Patrick, et al., 2021). These platforms support continuous learning and knowledge exchange, particularly in digitally mediated academic environments. These however can only be possible with adequate skills, hence skill development is considered very vital.

Skills Development

Digital pedagogies play a crucial role in developing essential competencies required for LIS professionals. Central among these is digital literacy, which enables students to effectively locate, evaluate, and use digital information resources. Information literacy, a core component of LIS education, is enhanced through engagement with digital tools and platforms that simulate real-world information environments.

Furthermore, digital pedagogies support the development of research and data management skills, including data organization, analysis, and curation. These skills are

increasingly important in the context of big data and digital scholarship. Students are also trained in the use of digital libraries and databases, which are fundamental to modern information services. Exposure to these tools enhances their ability to navigate complex information systems and provide efficient information retrieval services, as well as enabled curriculum design and innovation.

Curriculum Design and Instructional Innovation

Digital pedagogies play a critical role in curriculum design and instructional innovation in LIS education by fostering flexible, learner-centered, and technology-enhanced learning environments. They enable the integration of Open Educational Resources and critical digital pedagogy principles, promoting inclusivity and active knowledge construction (Peuler & Harlow, 2025). Furthermore, adaptive and data-driven approaches enhance curriculum responsiveness and personalization, improving engagement and learning outcomes (Wang et al., 2025). Omarsaib (2024) argues that gaps in pedagogical training within LIS curricula remain a key challenge.

Student Engagement and Collaborative Learning

Digital pedagogies enhance student engagement and collaborative learning in LIS education through interactive, participatory, and community-driven learning environments (Boelens, 2021). It uses communication platforms such as WhatsApp and Microsoft Teams. These tools facilitate peer interaction, co-construction of knowledge, and social learning, which are critical for deep learning in higher education (Nirmala et al., 2025).

Research and Knowledge Production

Digital pedagogies enhance **research and knowledge production in LIS education** by enabling access to digital repositories, collaborative platforms, and data-driven inquiry (Barrios-del-Ángel et al., 2026). They support scholarly communication, open science, and AI-assisted research processes, improving efficiency and innovation. Moreover, digital competencies foster critical research skills and participation in global knowledge networks (Whitworth, 2020)

Assessment and Feedback

The application of digital pedagogies has also transformed assessment and feedback mechanisms in LIS education. E-assessment tools, such as online quizzes, assignments, and interactive tests, enable flexible and continuous evaluation of student performance. These tools often incorporate multimedia elements and real-time analytics, improving both assessment accuracy and learner engagement. Automated grading and feedback systems, often powered by artificial intelligence, provide immediate and personalized feedback to students, thereby enhancing learning efficiency and supporting self-regulated learning (Shubha et al., 2026). Such systems reduce the workload of instructors while ensuring timely feedback, which is critical for effective learning.

In addition, peer and collaborative assessment methods are increasingly facilitated through digital platforms. According to Shnai (2022), these approaches encourage active participation, critical evaluation, and knowledge sharing among students. Studies show that collaborative learning environments, particularly in blended and flipped classroom settings, improve student engagement and reduce academic procrastination while promoting deeper understanding of course content.

Smart Classroom Technologies in Library and Information Science (LIS) Education

The integration of smart classroom technologies into Library and Information Science (LIS) education has significantly enhanced teaching and learning processes by creating interactive, technology-driven environments that support modern information practices. Core technologies underpinning smart classrooms include interactive whiteboards and smart screens, which facilitate dynamic content delivery and real-time

collaboration between instructors and students. Learning Management Systems (LMS), such as Moodle and Canvas, serve as centralized platforms for course administration, content distribution, communication, and assessment, enabling both synchronous and asynchronous learning (Lobova & Ponkina, 2021). Additionally, emerging technologies such as Virtual Reality (VR) and Augmented Reality (AR) provide immersive learning experiences by simulating real-world environments, while AI-powered learning tools support adaptive instruction, automated feedback, and personalized learning pathways (Zawacki-Richter et al., 2020; Wang et al., 2023).

In LIS education, these technologies have practical applications that align closely with professional training needs. For instance, VR and simulation tools can replicate library environments, allowing students to practice user services, space management, and information retrieval in realistic settings. Digital cataloguing and metadata training are enhanced through interactive platforms that enable hands-on experience with classification systems and database management. Furthermore, smart classroom technologies facilitate the practice of virtual reference services, where students can engage in real-time or asynchronous communication with users, reflecting contemporary trends in digital librarianship.

The adoption of smart classroom technologies offers several pedagogical benefits. They enhance student engagement and interactivity by enabling collaborative and multimedia-rich learning experiences. Real-time access to digital resources and online databases supports efficient information retrieval and up-to-date learning. Moreover, the integration of AI and data analytics enables personalized learning experiences tailored to individual student needs, thereby improving learning outcomes and fostering the development of critical digital competencies essential for LIS professionals in the evolving information landscape.

Challenges in the Implementation of Digital Pedagogies and Smart Classrooms in Library and Information Science (LIS) Education and Ways Forward

The integration of digital pedagogies and smart classroom technologies in Library and Information Science (LIS) education presents significant opportunities, yet its implementation is constrained by a range of interrelated challenges. These challenges span technological, economic, human, pedagogical, institutional, and equity dimensions, particularly in resource-limited contexts. The challenges and proffered ways forward for the implementation of digital pedagogies and smart classrooms in Library and Information Science (LIS) Education is presented in figure 3.

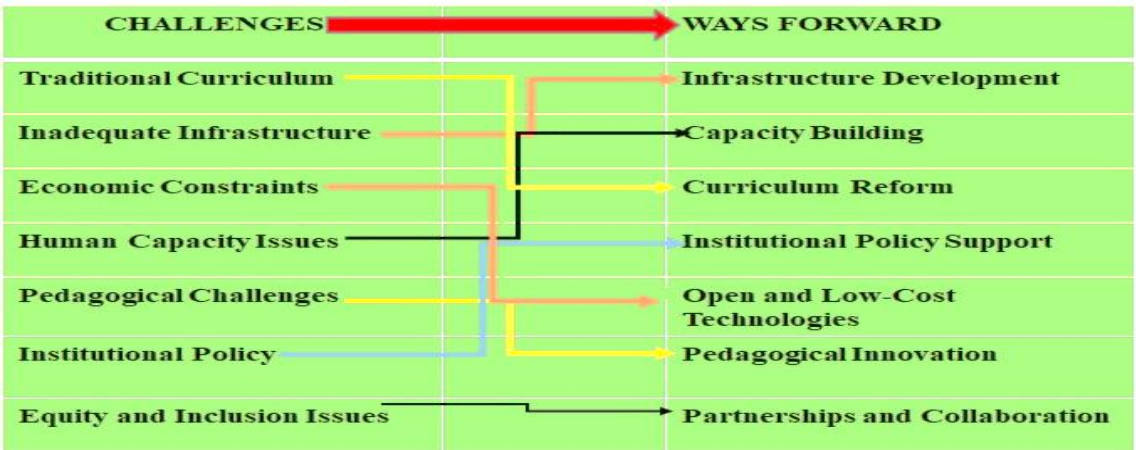

Figure 3: Challenges and Ways Forward Digital for Pedagogies and Smart Classrooms in LIS Education

Traditional curriculum

Traditional teaching methods continue to pose a significant challenge to the effective use of digital technologies and smart classrooms in library and data science education. Traditionally, this field has relied on teacher-centred lecture methods, where knowledge flows from teacher to student. This approach often emphasizes memorisation and formal learning, formal curricula, and limited use of communication tools or technology. It can also hinder the integration of digital methods, which rely on collaboration, critical thinking, and active student engagement through digital platforms. As a result, traditional teaching methods can limit the ability of library and data science education to provide students with the digital skills, data literacy, and adaptive skills needed to navigate the modern information environment. LIS curricula must be restructured to reflect the demands of the digital information landscape. This includes the integration of digital skills, data management, and emerging technologies such as artificial intelligence into course content. Additionally, incorporating practical, technology-driven modules will provide hands-on experience and better prepare students for real-world professional environments.

Inadequate Infrastructure

The effectiveness of digital pedagogies is heavily dependent on the availability of robust technological infrastructure. However, many institutions face inadequate ICT infrastructure, which limits the deployment of smart classroom technologies and digital learning platforms. Poor internet connectivity further constrains access to online resources, virtual classrooms, and cloud-based systems, thereby disrupting teaching and learning processes. In addition, limited access to digital devices among students and educators restricts participation in technology-mediated learning environments and exacerbates existing disparities.

Strengthening technological infrastructure is fundamental to the successful adoption of digital pedagogies. This involves sustained investment in ICT facilities, including modern hardware, smart classroom technologies, and digital learning platforms. Raihani and Mahliati (2024) outlines reliable and high-speed internet access to ensure seamless participation in online and blended learning environments, as well as access to digital information resources.

Economic Constraints

The high cost of acquiring, maintaining, and upgrading smart classroom technologies remains a major barrier to adoption. Tools such as interactive boards, advanced software, and AI-powered systems require substantial financial investment, which many institutions cannot sustain. Limited institutional funding further constrains the implementation of digital initiatives, particularly in developing regions where educational budgets are already under pressure.

To address financial constraints, institutions should prioritize the use of open-source and cost-effective technologies. Platforms such as open-source learning management systems and freely available digital tools can significantly reduce costs while maintaining functionality. This approach enhances accessibility and ensures broader participation in digital learning initiatives.

Human Capacity

The successful integration of digital pedagogies depends on the digital competencies of both educators and learners. However, there is often a lack of adequate skills required to effectively use digital tools and platforms. This skills gap is compounded by resistance to change, as some educators may be reluctant to transition from traditional

teaching methods to technology-enhanced approaches, thereby slowing adoption and innovation.

It is essential for educators and students to develop their digital competencies. To improve proficiency with digital tools, learning management systems, and emerging technologies, institutions should put in place focused training programmes. Initiatives for ongoing professional development are also required to keep teachers informed about new developments in technology and pedagogy, which fosters confidence and efficient use.

Pedagogical Challenges

Adaption of the existing curricula to effectively integrate digital pedagogies presents another significant challenge. Many educational programmes struggle to align course content with digital tools in a meaningful way. Furthermore, there is a risk of over-reliance on technology without proper pedagogical grounding, which can undermine learning outcomes if technology is used without clear instructional purpose.

Effective integration of technology requires alignment with sound pedagogical principles. Educators should adopt innovative teaching approaches that blend digital tools with active learning strategies, such as problem-based learning and collaborative activities. Encouraging interactive and learner-centred practices will enhance engagement, critical thinking, and knowledge retention.

Institutional Policy

The absence of clear digital education policies and strategic frameworks limits the systematic implementation of digital pedagogies in LIS education. Weak institutional support, including inadequate training programs, lack of incentives, and insufficient leadership commitment, further hampers the adoption and sustainability of smart classroom initiatives.

The development of clear institutional policies and strategic frameworks is essential for guiding digital transformation efforts. Institutions should establish comprehensive digital learning strategies that align with broader educational goals. Furthermore, support from governments and relevant stakeholders is necessary to provide funding, policy direction, and regulatory frameworks that facilitate innovation and sustainability.

Equity and Inclusion Issues

Digital transformation in education also raises concerns about equity and inclusion. The digital divide among students stemming from disparities in access to devices, internet connectivity, and digital skills creates unequal learning opportunities. Additionally, accessibility challenges faced by disadvantaged groups, including students with disabilities, can limit their participation in digital learning environments if inclusive design principles are not adequately considered.

Collaboration with technology companies, academic institutions, and professional bodies can facilitate resource sharing, knowledge exchange, and capacity development. Partnerships can also support access to advanced technologies, training opportunities, and research collaborations. Additionally, inter-institutional knowledge sharing promotes best practices and fosters a community of innovation within LIS education.

Addressing the challenges associated with the implementation of digital pedagogies and smart classrooms in Library and Information Science (LIS) education requires a comprehensive and strategic approach. The following recommendations provide actionable pathways for fostering effective, inclusive, and sustainable integration. These strategic recommendations highlight the need for a coordinated and multi-stakeholder approach to advancing digital pedagogies and smart classrooms in LIS education, ensuring

that technological integration is effective, inclusive, and aligned with contemporary educational and professional demands

Conclusion

The application of digital pedagogies and smart classroom technologies in Library and Information Science (LIS) education has transformative potential for teaching, learning, and professional skills development. Digital pedagogies such as blended learning, flipped classrooms, and virtual learning environments enhance instructional delivery and promote learner-centered engagement, while smart classroom technologies enable interactive, adaptive, and technology-driven learning experiences. These innovations play a critical role in equipping LIS students with essential competencies, including digital literacy, data management, and the ability to navigate complex information systems.

Further, significant challenges, including inadequate infrastructure, limited funding, skills gaps, pedagogical misalignment, weak institutional support, and issues of equity and inclusion have been identified. These barriers underline the need for a holistic and context-sensitive approach to digital transformation in LIS education.

Suggestions

Based on the available literature that highlight the roles of digital pedagogies and smart classrooms in library and information science education, as well as the challenges and ways forward, this review recommends that:

1. Stakeholders including educational institutions, policymakers, educators, and technology providers prioritize investment in infrastructure, strengthen capacity-building initiatives, reform curricula to incorporate emerging technologies, and promote inclusive and equitable access to digital learning resources.
2. Collaboration and adoption of cost-effective technological solutions will be essential for sustainable implementation.
3. Adoption of a coordinated and strategic approach to ensure that LIS education remains responsive, resilient, and capable of preparing professionals for the demands of the digital age.

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