Global Review of Library and Information Science (GRELIS)
Vol. 21, No. 2, 2025
ISSN: 3428-0009

Transformative Roles of Artificial Intelligence in LIS Education and Practice for Innovative Workforce in FUTMinna

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Abstract

This study examines the transformative role of Artificial Intelligence (AI) in Library and Information Science (LIS) education and practice to advance workforce innovation at the Federal University of Technology, Minna, Nigeria. It evaluates AI's impact on LIS curricula, professional practice, skills development, and adoption challenges, while proposing strategies for effective integration. A quantitative research design was adopted, utilizing a structured questionnaire based on a 5-point Likert scale (5 = Strongly Agree to 1 = Strongly Disagree). The study population comprised 23 LIS educators, 421 undergraduate and postgraduate students, and 24 professional librarians, totaling 448 respondents. 448 questionnaires were distributed of these, 394 valid responses were received, yielding an 87.95% response rate. Results show that 85% of respondents agreed or strongly agreed that AI integration in LIS curricula is essential for preparing a competent workforce, while 82% indicated that AI enhances operational efficiency and user engagement. Furthermore, 80% acknowledged AI's role in fostering creativity and innovation, whereas 76% cited high implementation costs and inadequate training as major constraints. The study concludes that AI integration is critical for bridging the LIS skills gap, driving innovation, and sustaining relevance in the 21st-century knowledge economy. It recommends regular AI-focused training for LIS stakeholders, strategic technology partnerships,

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supportive policy frameworks, and increased government funding to accelerate adoption. These measures are essential to equip LIS professionals with future-ready competencies and position the discipline as a driver of digital transformation.

Keywords: Artificial Intelligence, Library and Information Science, workforce innovation, LIS education, AI adoption, digital transformation

Introduction

In contemporary knowledge societies, rapid technological advancements continue to redefine educational systems and professional practices across disciplines. STEAM education characterized by the infusion of the Arts into Science, Technology, Engineering, and Mathematics has gained prominence for its capacity to foster creativity, innovation, and interdisciplinary problem-solving, competencies essential for navigating the complex challenges of the twenty-first century (Corrigan, et al., 2025). These competencies have become central to the modern knowledge economy, in which intellectual capital, particularly the ability to generate and apply new knowledge, constitutes a major driver of socioeconomic development (Powell & Snellman, 2004). As this economy transitions toward a computational knowledge ecosystem, the emphasis increasingly lies not only on access to information but also on individuals' and institutions' capacity to compute, analyze, and derive insight from data using advanced technological tools (Mokyr, 2002). Within this broader landscape, Artificial Intelligence (AI) has emerged as a transformative force, enabling new modalities of automation, personalization, and data-driven decision-making across educational, social, and institutional contexts (Luckin et al., 2016).

Library and Information Science (LIS) education and practice are deeply embedded within this paradigm shift. Traditionally, LIS programmes prepared professionals for roles centred on organizing, preserving, and facilitating access to information resources. However, the rapid digitization of information, coupled with the proliferation of networked platforms and increasingly diverse user expectations, has significantly expanded the scope and complexity of information work. Contemporary libraries now rely heavily on digital infrastructures and intelligent systems to enhance operational efficiency and service delivery. Empirical studies indicate a growing adoption of AI-enabled tools in libraries for tasks such as resource discovery, personalized recommendation services, and predictive collection management (Fabunmi & Akinyemi, 2024). Yet, despite these developments, many LIS curricula remain anchored in conventional paradigms, resulting in a widening gap between educational preparation and real-world professional demands. This gap underscores the need for strategic reform in LIS education to ensure that graduates possess the competencies required for effective practice in technologically mediated environments.

The imperative for transformation is further reinforced by the evolving societal role of libraries. Far beyond their traditional custodial functions, modern libraries serve as community learning

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hubs, digital literacy centres, and inclusive access points for technology and information. These expanded roles require professionals who are proficient in data literacy, digital curation, ethical information governance, and pedagogical design (Oyelude, 2021). Without comprehensive curricular renewal and sustained professional development, LIS practitioners may be ill-prepared to navigate the ethical, technical, and socio-cultural complexities introduced by AI-driven information ecosystems. To sustain the relevance and professional integrity of the field, LIS education must therefore be recalibrated to address current realities while anticipating future developments.

Artificial Intelligence offers significant opportunities for reshaping LIS practice and addressing emerging challenges in the field. AI systems defined by their capacity to perform tasks commonly associated with human intelligence, such as reasoning, learning, and pattern recognition are increasingly integrated into core library operations. In technical services, AI supports the automation of routine tasks including cataloguing, classification, indexing, and metadata generation, resulting in enhanced precision and operational efficiency (Fernandez, 2023). Beyond these functions, AI facilitates the delivery of advanced user-centred services such as intelligent search platforms, personalized resource recommendations, virtual reference assistance, and predictive analytics for informed decision-making (Fabunmi & Akinyemi, 2024). By alleviating the burden of repetitive tasks, AI enables librarians to engage more strategically in higher-order responsibilities, including information literacy instruction, ethical guidance on technology use, community engagement, and institutional policy development (Tammaro, 2020). These developments reinforce libraries' enduring mission to preserve cultural heritage, bridge digital divides, and promote equitable lifelong learning within dynamic and inclusive information environments (Ifijeh & Yusuf, 2020).

Problem Statement

Library and Information Science (LIS), as both a discipline and a profession, remains constrained by traditional methods of cataloguing, classification, information retrieval, and user services approaches that are increasingly insufficient in an AI-driven knowledge environment (Ifijeh & Yusuf, 2020; Oyelude, 2021). Despite the transformative potential of emerging AI technologies such as natural language processing, machine learning, and predictive analytics (Fernandez, 2023), many LIS professionals lack the technological competencies required to harness these tools effectively (Tammaro, 2020). Moreover, LIS curricula, particularly in developing regions, remain largely traditional and insufficiently aligned with contemporary technological demands, with limited integration of AI literacy, data science, or computational thinking (Fabunmi & Akinyemi, 2024). This persistent gap hinders the capacity of LIS education to produce graduates capable of driving innovation and thriving in an AI-augmented workforce (Corrigan, et al., 2025). Bridging this gap is therefore critical to sustaining the relevance, impact, and future viability of the LIS profession.

Objective

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The purpose of this paper is to examine how Artificial Intelligence is transforming Library and Information Science education and practice to meet the demands of a skilled and innovative workforce Specifically, the paper explores:

1. To examine the influence of Artificial Intelligence integration on the transformation of Library and Information Science (LIS) education in addressing workforce innovation needs.
2. To explore the ways in which Artificial Intelligence enhances professional practice in LIS for improved efficiency and user engagement.
3. To investigate how AI-driven tools and applications support skill development and innovation among LIS professionals.
4. To identify the challenges affecting the adoption of Artificial Intelligence in LIS education and professional practice.
5. To propose strategies for maximizing the potential of Artificial Intelligence in driving workforce innovation within the LIS sector.

Research Questions

1. How does Artificial Intelligence integration influence the transformation of Library and Information Science education to meet workforce innovation needs?
2. In what ways does Artificial Intelligence enhance Library and Information Science professional practice for improved efficiency and user engagement?
3. How can Artificial Intelligence-driven tools and applications support skill development and innovation among LIS professionals?
4. What challenges and barriers affect the adoption of Artificial Intelligence in Library and Information Science education and practice?
5. What strategies can be employed to maximize the potential of Artificial Intelligence for workforce innovation in the LIS sector?

LITERATURE REVIEW

Conceptual Overview

The diagram in figure 1 is a conceptual framework illustrating the relationship between Artificial Intelligence (AI), Library and Information Science (LIS) education, workforce innovation, and moderating factors. Here's a detailed explanation:

Artificial Intelligence (IV – Independent Variable): AI is positioned as the independent variable that drives changes in the system. It represents technological advancements and AI tools that have the potential to influence library practices and education.

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LIS Education (M1 – Mediator): LIS education acts as a mediator between AI and workforce innovation. It includes components like AI literacy, curriculum redesign, experiential labs, and Continuous Professional Development (CPD). The idea is that the impact of AI on the workforce is mediated by how well LIS education equips students and professionals with relevant AI skills.

Workforce Innovation (DV – Dependent Variable): This is the outcome variable, reflecting changes in workforce practices due to AI. Examples include automation, enhanced user services, and data analytics in libraries. Workforce innovation occurs when LIS professionals apply AI-driven practices learned through education.

Moderators (Infrastructure, Policy, Funding, Organizational Culture): These factors influence the strength or direction of the relationships. For instance, even if LIS education is strong, inadequate infrastructure or funding could weaken the effect of AI on workforce innovation.

The framework suggests that AI can drive workforce innovation in libraries, but this effect is mediated by the quality of LIS education. Moreover, organizational and environmental factors (moderators) such as infrastructure, policy, funding, and culture can either strengthen or hinder this process.

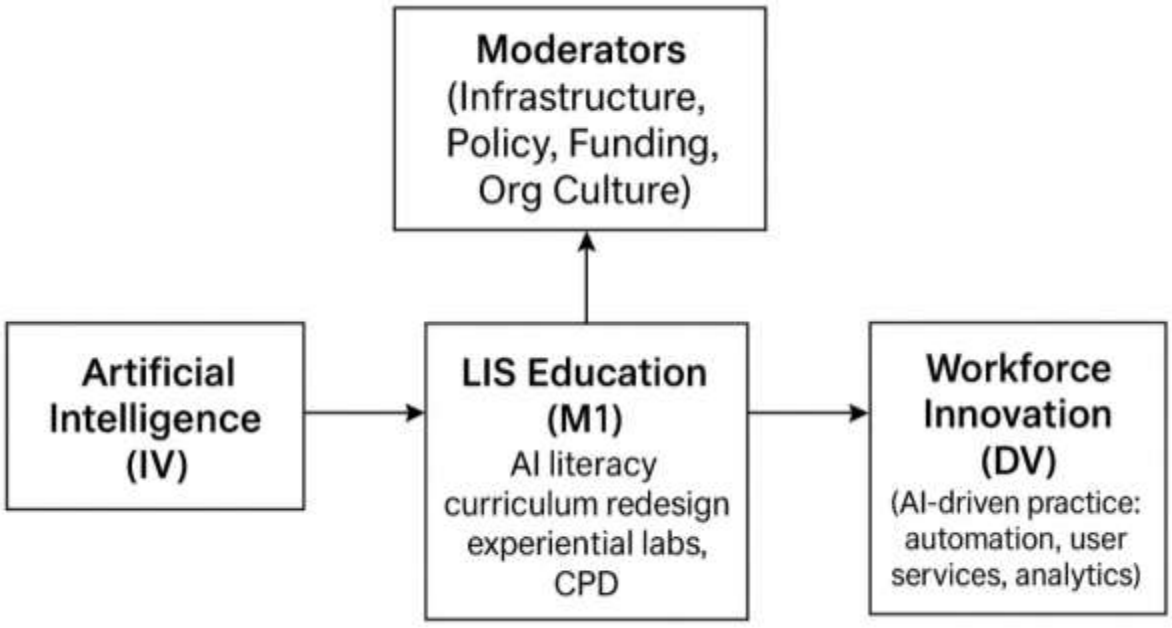

Figure 1. *Conceptual Framework: AI–Driven Transformation of LIS Education and Practice for Workforce Innovation*

Theoretical Framework

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To guide the examination of Artificial Intelligence (AI) adoption in Library and Information Science (LIS) education and practice, this study draws on two established theoretical perspectives: the Technology Acceptance Model (TAM) and Diffusion of Innovations (DoI) Theory.

Technology Acceptance Model (TAM)

Developed by Davis (1989), TAM posits that two key factors Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) influence an individual's intention to adopt and use a new technology. In the LIS context, TAM provides a useful lens for understanding how librarians, educators, and students perceive AI-powered tools, such as automated cataloguing systems or intelligent search engines, and how these perceptions influence actual adoption (Venkatesh & Davis, 2000). By applying TAM, this study can explore how attitudes toward AI usability and utility shape integration in both LIS curricula and professional services.

Diffusion of Innovations (DoI) Theory

Rogers' (2003) Diffusion of Innovations Theory explains how new technologies and practices spread within a social system over time, emphasizing the roles of innovation attributes (e.g., relative advantage, compatibility, complexity, trialability, and observability), communication channels, and adopter categories (innovators, early adopters, early majority, late majority, and laggards). In the context of AI in LIS, DoI helps explain variations in adoption rates across institutions and regions, as well as the influence of organizational culture, leadership support, and infrastructure availability (Ifijeh & Yusuf, 2020).

Framework Relevance to This Study

The integration of TAM and DoI provides a dual perspective:

- **TAM** focuses on individual-level perceptions and behavioral intentions toward AI tools.
- **DoI** addresses the broader organizational and societal diffusion process influencing AI adoption in LIS education and practice.

Together, these models form a robust conceptual framework for analyzing the factors that drive or hinder the transformation of LIS through AI**,** and for identifying strategies that can accelerate the development of a skilled and innovative workforce in the sector.

Defining Artificial Intelligence in the LIS Context

Artificial Intelligence (AI) in the context of Library and Information Science (LIS) refers to the development of computer systems capable of performing tasks that normally require human intelligence, such as reasoning, learning, problem-solving, and language understanding (Russell

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& Norvig, 2021). In LIS, AI includes a range of applications such as expert systems, natural language processing (NLP), pattern recognition, robotics, image processing, and text mining, all aimed at improving the organization, retrieval, and dissemination of information (Ali, 2021). Intelligent systems in libraries can be seen as frameworks that interpret data and provide reasoned judgments to support decision-making, employing tools such as machine learning, case-based reasoning, genetic algorithms, fuzzy logic, and NLP (Tammaro, 2020).

Key AI Technologies in LIS

- **Machine Learning (ML)**: ML enables systems to identify patterns, make predictions, and improve performance without explicit programming. In LIS, ML is used for predictive analytics, automated indexing, and patron behavior analysis (Cox & Mazumdar, 2024).
- **Natural Language Processing (NLP)**: NLP powers semantic search, chatbots, automated transcription, and metadata generation, enhancing user interaction and information discovery (Fernandez, 2023).
- **Robotics and Robotic Process Automation (RPA)**: Robotics automates repetitive tasks such as book shelving, inventory management, and circulation, while RPA streamlines backend operations like record updates and data migration (IFLA, 2025).
- **Recommender Systems**: These systems suggest relevant resources to users based on borrowing history, search patterns, and content similarity, improving personalization in library services (Lu et al., 2015).
- **Expert Systems**: AI-powered expert systems simulate the decision-making of human professionals, assisting in areas such as reference services, cataloguing, and collection development (Ali, 2021).

Together, these technologies form the backbone of AI-driven transformation in LIS, enabling libraries to offer more efficient, responsive, and personalized services while equipping professionals with tools that align with the demands of a digitally skilled and innovative workforce.

AI in LIS Education

Curriculum Redesign to Include AI Literacy and Data Science

The rapid integration of Artificial Intelligence (AI) into library operations necessitates a rethinking of Library and Information Science (LIS) curricula to include AI literacy and data science competencies. AI literacy in this context extends beyond basic digital skills to encompass the understanding of algorithms, data ethics, machine learning concepts, and their applications in information retrieval and knowledge organization (Long & Magerko, 2020). LIS programs are increasingly encouraged to embed data science modules, covering data analytics, visualization,

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and database management, to equip graduates with the ability to manage and interpret large datasets generated by modern information systems (Shen et al., 2023).

The incorporation of interdisciplinary STEAM approaches linking LIS with computer science, mathematics, and ethics can enhance students' ability to critically assess AI tools and adapt them for library contexts (Corrigan, et al., 2025). Furthermore, UNESCO (2021) recommends integrating AI policy, governance, and societal implications into LIS training, ensuring professionals can navigate both technical and ethical dimensions.

Training for Emerging AI-Driven Library Services

Beyond academic programs, continuous professional development is essential for current practitioners. Training should focus on the practical implementation of AI in areas such as automated cataloguing, intelligent search interfaces, chatbot-based reference services, predictive analytics for collection development, and robotic process automation for backend workflows (Fernandez, 2023; Cox & Mazumdar, 2024).

Workshops, MOOCs, and collaborative projects with technology companies can serve as effective platforms for skill development (Ifijeh & Yusuf, 2020). Partnerships between LIS schools and AI research labs can also foster experiential learning, allowing students to design, test, and evaluate AI-driven library tools in real-world environments (Tammaro, 2020). This approach ensures that LIS professionals remain relevant in a competitive job market shaped by AI-enabled knowledge economies.

AI in LIS Practice

AI-Powered Cataloguing and Metadata Creation

Artificial Intelligence is increasingly being used to automate and enhance cataloguing and metadata creation, reducing the time and human effort required for bibliographic processing. Machine learning and natural language processing (NLP) tools can extract descriptive, structural, and administrative metadata from diverse content types, ensuring consistent and high-quality records (Li et al., 2022). For example, AI systems can automatically classify resources into relevant subject categories, identify key terms, and link related materials across collections (IFLA, 2025). This automation enables libraries to handle larger volumes of digital content while maintaining metadata accuracy.

AI in User Services

AI-driven chatbots, virtual assistants, and recommender systems are now integral to library user services. Chatbots can provide 24/7 reference support, answer frequently asked questions, and assist with navigation of online catalogs (Fernandez, 2023). Recommender systems, powered by

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collaborative filtering and content-based algorithms, personalize resource suggestions based on user behavior, borrowing history, and research profiles (Lu et al., 2015). AI also enhances accessibility services, such as automatic language translation, text-to-speech for visually impaired users, and adaptive search interfaces (Cox & Mazumdar, 2024).

Predictive Analytics for Decision-Making

Predictive analytics, driven by AI algorithms, allows libraries to forecast demand for specific resources, optimize collection development, and anticipate shifts in user needs (Ifijeh & Yusuf, 2020). By analyzing circulation data, user demographics, and research trends, libraries can make data-driven decisions regarding acquisitions, programming, and staffing (Shen et al., 2023). This proactive approach helps libraries remain agile in responding to the evolving demands of an AI-driven knowledge economy.

Workforce Innovation and Skills Gap

Competencies Required for the AI-Augmented LIS Professional

The rise of AI technologies is reshaping the professional profile of Library and Information Science (LIS) practitioners, requiring an expanded set of competencies beyond traditional cataloguing, reference, and information management skills. AI-augmented LIS professionals must possess AI literacy, encompassing an understanding of algorithms, data ethics, and machine learning applications in library contexts (Long & Magerko, 2020). In addition, data science skills including data cleaning, visualization, statistical analysis, and database management are increasingly critical for managing large-scale datasets generated by AI-driven systems (Shen et al., 2023).

Soft skills remain equally important: adaptability, critical thinking, interdisciplinary collaboration, and ethical decision-making are necessary to navigate the socio-technical implications of AI in knowledge services (Cox & Mazumdar, 2024). UNESCO (2021) emphasizes that these competencies must be embedded in both LIS education and continuous professional development to ensure workforce readiness in a rapidly evolving information ecosystem.

Global Trends in AI-Enabled Workforce Transformation

Globally, AI is driving a paradigm shift in workforce structures, with the World Economic Forum (2023) projecting that up to 44% of workers' core skills will change within the next five years due to technological adoption. In the LIS domain, AI deployment is enabling roles such as data curator, digital scholarship librarian, and information analytics specialist positions that merge library science expertise with computational and analytical proficiencies (Ifijeh & Yusuf, 2020).

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Countries leading in AI integration, such as the United States, China, and Singapore, are implementing national AI strategies that include reskilling programs for information professionals (OECD, 2022). These trends underscore the urgency for LIS institutions worldwide to bridge the skills gap, ensuring that practitioners can leverage AI to innovate services, improve decision-making, and meet the dynamic needs of a global, knowledge-based economy (IFLA, 2025).

METHODOLOGY

This study adopted a quantitative research design, to collect and analyze numerical data that can be statistically interpreted to establish patterns, relationships, and differences among the variables under investigation. Quantitative research provides objective measurement of responses, reduces researcher bias, and facilitates generalization of findings to the target population (Creswell & Creswell, 2018). This design was particularly suitable for meeting the research objectives and testing the hypotheses by generating empirical evidence through statistical analysis on the relationships between Artificial Intelligence (AI), Library and Information Science (LIS) education and practice, and workforce innovation.

The target population comprised key LIS stakeholders, including 23 faculty members from accredited LIS programs, 421 undergraduate and postgraduate students enrolled in LIS degree programs, and 24 professional librarians currently employed under Federal University of Technology, Minna, Nigeria. Given the small population size of LIS educators and library practitioners, a census approach was adopted to ensure complete representation of these groups. For LIS students, a stratified random sampling technique was used to select LIS students, ensuring proportional representation from both undergraduate and postgraduate cohorts. The student population was first divided into two distinct strata undergraduate and postgraduate students. The sample size for each stratum was then determined based on its proportion within the total student population. Finally, participants were randomly selected from each stratum, allowing every student within the group an equal chance of inclusion while maintaining the overall representativeness of the sample.The total sample size was 468 respondents, which was considered statistically adequate and representative for capturing perspectives from both academic preparation (educators and students) and professional practice (practitioners). This composition enabled the study to gather a comprehensive understanding of how AI influences LIS education and practice and, ultimately, drives workforce innovation.

Data were collected primarily through a survey method, which served as the main technique for obtaining structured and quantifiable information from participants Structured questionnaires were designed to elicit information aligned with the research objectives. This method was used for its suitability for large samples, and ability to generate standardized data that can be easily compared and statistically analyzed. The instrument was designed to measure three primary constructs: the extent of AI integration (independent variable), the role of LIS education and LIS practice as mediating factors, and the level of workforce innovation (dependent variable).

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The questionnaire comprised of three sections. The first section captured demographic information such as gender, age, role (educator, student, practitioner), years of experience, and educational qualification to enable subgroup analysis. The second section contained Likert-scale items aligned with the research questions, focusing on the extent of AI integration in LIS education and practice, the perceived changes in skills and competencies, and the contribution of these changes to workforce innovation. The third section included open-ended questions, allowing respondents to share detailed insights on AI-driven opportunities, challenges, and strategic recommendations for preparing LIS professionals for an innovation-oriented workforce. Items were measured using a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1).

The questionnaire items were developed based on a synthesis of relevant literature on AI in LIS education, professional practice, and innovation (e.g., Alhassan, 2022; Cox et al., 2019; Kim, 2021). To ensure content validity, the draft instrument was reviewed by three subject-matter experts in LIS and educational technology. Feedback from the expert review was incorporated to improve clarity, precision, and relevance. A pilot test was conducted with 15 LIS students and practitioners not included in the main study sample. Feedback on question wording and comprehension was used to refine the final instrument. Reliability of the instrument was assessed using Cronbach's Alpha, with a coefficient of 0.70 or higher considered acceptable for internal consistency (Gliem & Gliem, 2003).

Data analysis employed both descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondent demographics and examine trends in AI adoption, LIS education and practice transformations, and workforce innovation. Pearson Product Moment Correlation (PPMC) was conducted to assess the relationships between AI integration, LIS education and practice, and workforce innovation. Multiple regression analysis was subsequently used to evaluate the predictive effect of AI integration on workforce innovation, both directly and through the mediating roles of LIS education and LIS practice. All analyses were performed using the Statistical Package for the Social Sciences (SPSS), with a significance level set at 0.05. Findings were presented in tables accompanied by interpretive narratives linking the results to the research objectives and hypotheses.

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Result Analysis and Interpretation

Figure 2: Response Rate of Distributed Questionnaires

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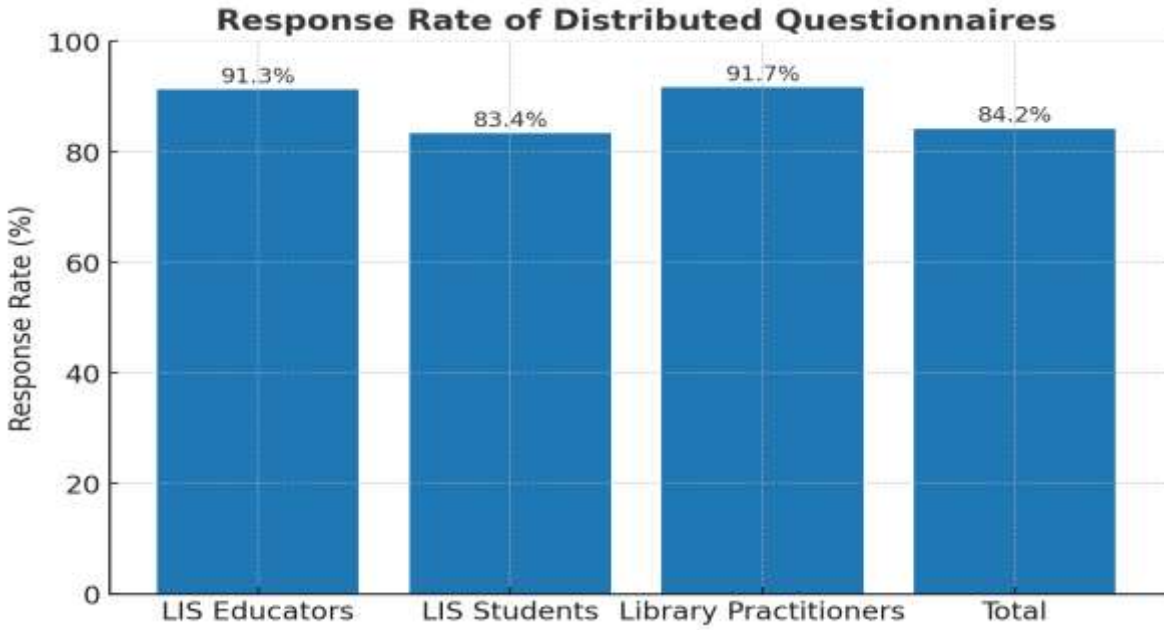

The results in figure 2 indicate a strong overall participation in the study, with an aggregate response rate of 84.2%. This high rate suggests that the findings can be considered representative of the target population. Across respondent categories, library practitioners recorded the highest response rate at 91.7%, closely followed by LIS educators at 91.3%. This near-complete return from both groups reflects a high level of engagement and interest in the study's subject matter among professionals already working or teaching in the field. LIS students, while slightly lower, still achieved a substantial response rate of 83.4%, which is commendable given the larger population size and the typical challenges associated with student survey participation. The relatively consistent response rates across categories indicate that all stakeholder groups academic, student, and practitioner are adequately represented, reducing the risk of nonresponse bias and enhancing the validity and generalizability of subsequent analyses.

Figure 3: Gender Distribution of Respondents

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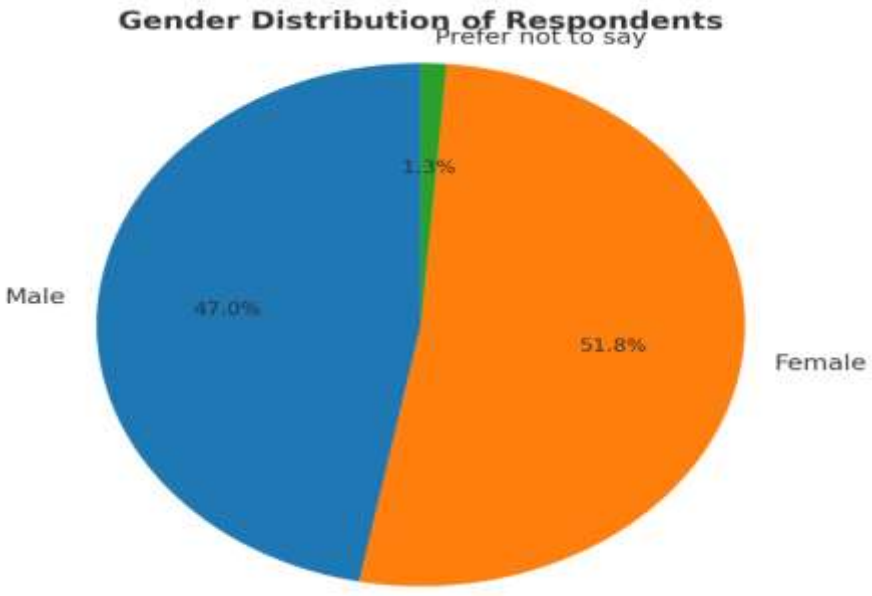

Figure 3 presents the gender distribution of the 394 respondents who participated in the survey. The majority of the participants identified as female, with a total of 204 individuals, representing 51.78% of the sample. This indicates a slightly higher female participation rate compared to other gender categories. Male respondents accounted for 185 individuals, which is 46.95% of the total. While this figure is slightly lower than that of female participants, it still reflects a relatively balanced representation between male and female respondents in the study. A small proportion of respondents, 5 individuals or 1.27%, chose not to disclose their gender by selecting the option "Prefer not to say." This indicates that while most participants were comfortable identifying their gender, a few opted for privacy. Overall, the data demonstrates a nearly even gender distribution, with female respondents forming a slight majority. The inclusion of a "Prefer not to say" category also reflects sensitivity to participant privacy and inclusivity in survey design.

Figure 4: Age Distribution of Respondents

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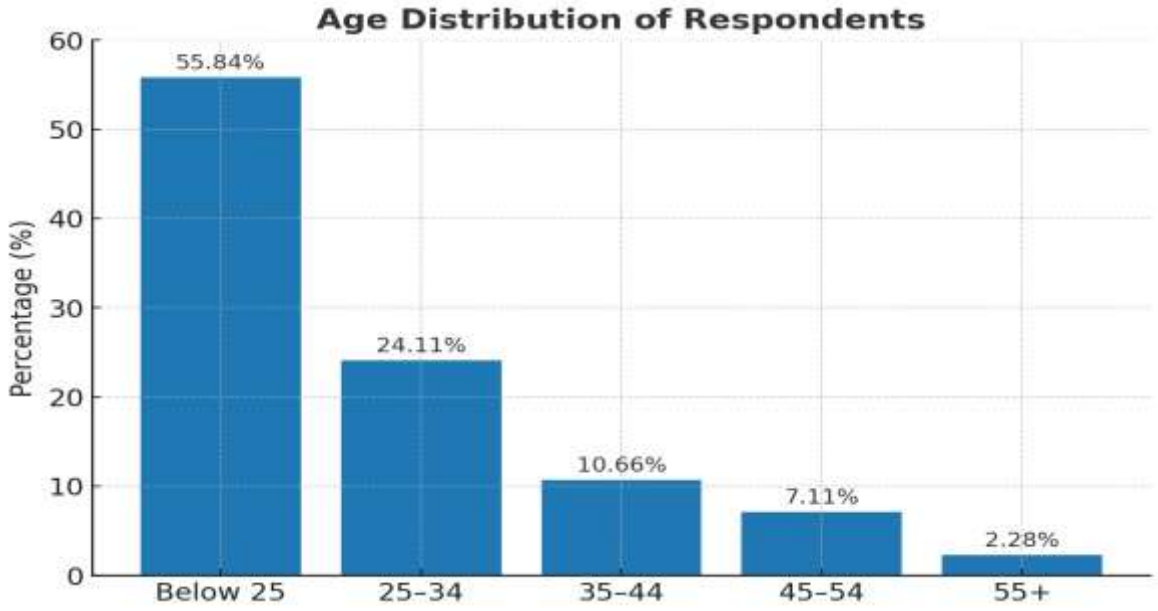

Figure 4 illustrates the age distribution of the 394 survey respondents. The largest portion of participants falls within the "Below 25" age group, with 220 individuals**,** making up 55.84% of the total sample. This indicates that over half of the respondents are relatively young, suggesting a youthful demographic was most engaged with the survey. The next largest group is the 25–34 age range**,** comprising 95 respondents or 24.11% of the sample. Combined with the youngest group, individuals under 35 account for nearly 80% of all participants, highlighting a strong representation of younger adults. Respondents aged 35–44 total 42 individuals**,** making up 10.66%**,** while those aged 45–54 number 28**,** or 7.11% of the sample. These figures show a gradual decrease in participation with increasing age. Only 9 participants**,** or 2.28%**,** are in the 55 and above age group, representing the smallest age category in the survey. This suggests limited engagement from older individuals. In summary, the data reveals a predominantly young respondent population, with a clear decline in participation as age increases. The survey appears to have been most accessible or appealing to individuals under 35.

Figure 5: Respondent Roles

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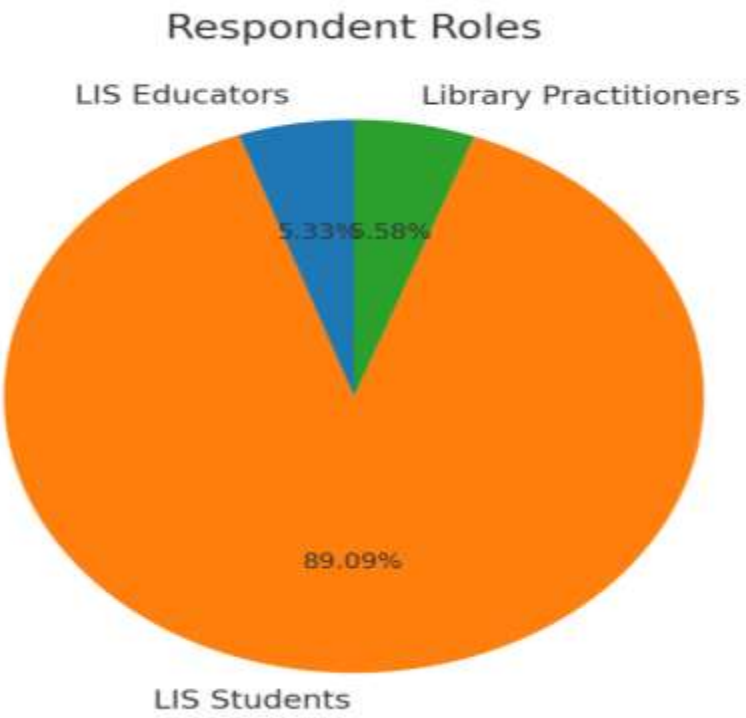

Figure 5 presents the roles of the 394 respondents who participated in the survey. The overwhelming majority of participants are LIS (Library and Information Science) students**,** totaling 351 individuals**,** which accounts for 89.08% of the sample. This indicates that the survey primarily reached or appealed to those currently studying in the LIS field. Library practitioners make up a small portion of the respondents, with 22 individuals or 5.58%**.** This suggests limited participation from those already working in the profession, which could reflect either the survey's focus or the accessibility to practitioners. LIS educators represent the smallest group, with 21 respondents**,** comprising 5.33% of the total. Their inclusion, though minimal, provides valuable insight from those involved in shaping LIS education. In summary, the data shows a strong student representation, with relatively few educators and practitioners participating. This may influence the survey's overall findings, as the perspectives are largely those of individuals still in training rather than experienced professionals or instructors.

Figure 6: Years in LIS Field

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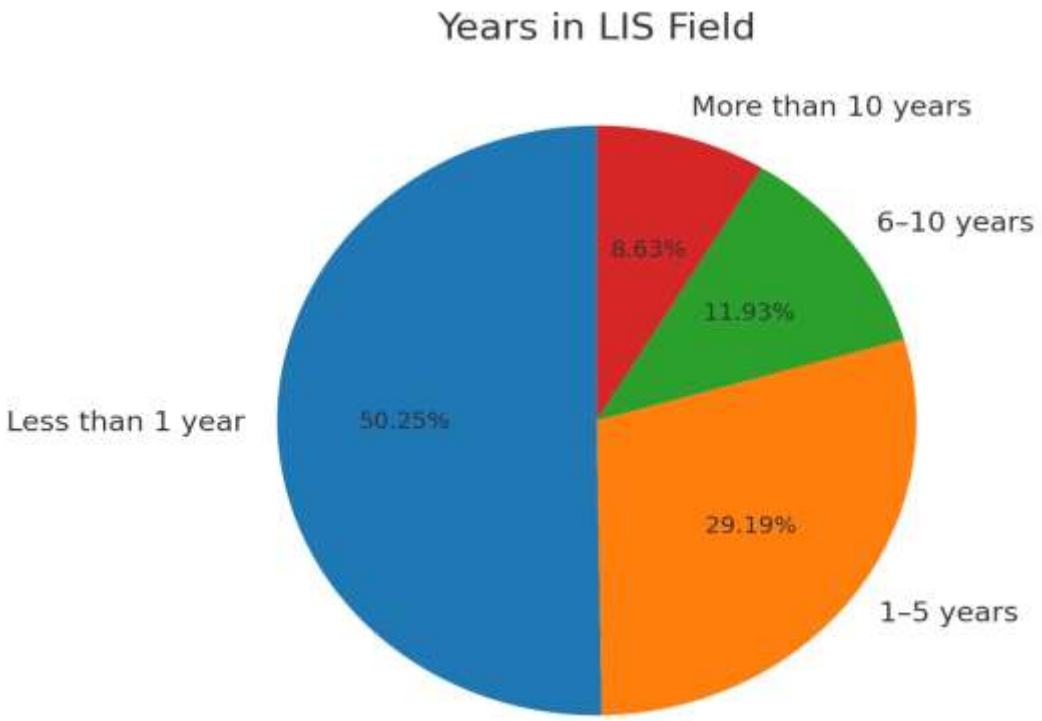

Figure 6 shows the distribution of respondents based on their years of experience in the Library and Information Science (LIS) field. The largest group, comprising 198 individuals or 50.25% of the respondents, have been in the LIS field for less than one year. This indicates that half of the participants are relatively new to the profession or are possibly students or recent graduates just beginning their careers. The next largest group consists of respondents with 1 to 5 years of experience, totaling 115 individuals or 29.19%. Together with the newcomers, these two groups make up nearly 80% of the sample, showing that the survey predominantly captures early-career professionals or those just starting out in LIS. Respondents with 6 to 10 years of experience number 47, which is 11.93% of the total. This reflects a smaller portion of mid-career professionals within the sample. Finally, those with more than 10 years of experience represent the smallest group, with 34 individuals **or** 8.63%**.** This suggests that more experienced LIS professionals were less represented in the survey. In summary, the data indicates that the majority of respondents are either new to the LIS field or have relatively few years of experience, with fewer mid- and late-career professionals participating. This trend aligns with the high percentage of students and recent entrants seen in earlier tables.

Figure 7: Educational Qualification

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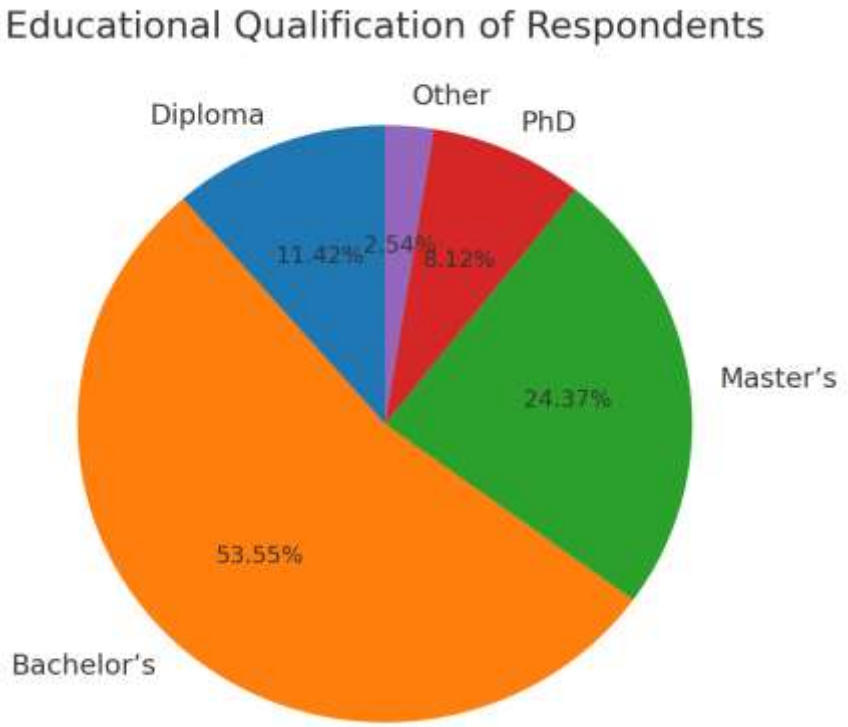

Figure 7 displays the educational qualifications of the 394 respondents. The majority hold a Bachelor's degree**,** with 211 individuals**,** accounting for 53.55% of the sample. This suggests that most participants have completed undergraduate studies. The second largest group consists of respondents with a Master's degree, numbering 96 or 24.37%. This indicates a significant portion of the sample has pursued postgraduate education. Those holding a Diploma make up 11.42% of the respondents, with 45 individuals**.** This reflects a smaller group with possibly shorter or more specialized training. Respondents with a PhD represent 8.12% of the total, totaling 32 individuals**.** Although a minority, this shows that some participants have attained the highest level of academic qualification. Lastly, 10 respondents (2.54%) reported having other qualifications, which may include certifications or qualifications outside the traditional LIS academic path. Overall, the data reveals a well-educated respondent group, predominantly holding bachelors and master's degrees, with smaller numbers at both the diploma and doctoral levels.

Key to Analysis table for research questions:

- **SA = Strongly Agree (5)**
- **A = Agree (4)**
- **N = Neutral (3)**
- **D = Disagree (2)**
- **SD = Strongly Disagree (1)**

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- **Total** = Sum of respondents per item
- **FX** = Frequency × Likert score
- **$\bar{X}$** = Mean score (FX ÷ Total)
- **Decision** = Interpretation (e.g., High Agreement, Moderate, Low)

Research question 1: How does Artificial Intelligence integration influence the transformation of Library and Information Science education to meet workforce innovation needs?

Table 1: AI Integration in LIS Education (RQ1)

No.	Statement	SA	A	N	D	SD	Total	FX	$\bar{X}$	Decision
1	AI integration in LIS curricula is essential for preparing a skilled workforce.	200	150	30	10	4	394	1708	4.34	High Agreement
2	AI concepts are adequately covered in LIS education.	90	140	100	45	19	394	1322	3.36	Moderate
3	Including AI-related courses enhances problem-solving and innovation skills.	180	160	35	14	5	394	1643	4.17	High Agreement
4	Exposure to AI tools during training improves students' employability.	210	140	28	10	6	394	1704	4.32	High Agreement
5	AI integration encourages interdisciplinary learning in LIS education.	175	160	40	12	7	394	1651	4.19	High Agreement

Source: Field survey, 2025

The findings in table 1 indicate a strong consensus among respondents that AI integration is critical for transforming LIS education to meet workforce innovation needs. The highest-rated statement was *"AI integration in LIS curricula is essential for preparing a skilled workforce"* ($\bar{X}$ = 4.34), suggesting overwhelming agreement on the necessity of curriculum reform. Similarly, respondents strongly agreed that *exposure to AI tools during training improves students' employability* ($\bar{X}$ = 4.32) and *encourages interdisciplinary learning* ($\bar{X}$ = 4.19). However, perceptions were more moderate regarding the adequacy of current AI coverage in LIS programs ($\bar{X}$ = 3.36), indicating a gap between perceived importance and current implementation.

Research Question 2: In what ways does Artificial Intelligence enhance Library and Information Science professional practice for improved efficiency and user engagement?

Table 2: AI in LIS Professional Practice (RQ2)

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No.	Statement	SA	A	N	D	SD	Total	FX	$\bar{X}$	Decision
6	AI improves efficiency in cataloguing and metadata creation.	185	160	30	14	5	394	1662	4.22	High Agreement
7	AI-powered systems enhance user engagement through personalized services.	150	170	50	18	6	394	1594	4.05	High Agreement
8	AI improves the accuracy of information retrieval and recommendations.	160	165	45	16	8	394	1595	4.05	High Agreement
9	AI reduces repetitive tasks, allowing focus on higher-value services.	140	180	50	18	6	394	1564	3.97	High Agreement
10	AI adoption increases user satisfaction with library services.	155	170	45	17	7	394	1585	4.02	High Agreement

Source: Field survey, 2025

Across all five items in this section, mean scores exceeded 3.9, reflecting high agreement on AI's potential to enhance LIS practice. The strongest consensus was around *improved efficiency in cataloguing and metadata creation* ($\bar{X}$ = 4.22) and *enhancing user engagement through personalized services* ($\bar{X}$ = 4.05). AI was also perceived as significantly improving the accuracy of information retrieval and recommendations ($\bar{X}$ = 4.05). These results suggest that practitioners, students, and educators recognize AI as a tool for operational efficiency and service personalization.

Research Question 3: How can Artificial Intelligence-driven tools and applications support skill development and innovation among LIS professionals?

Table 3: AI for Skills Development and Innovation (RQ3)

No.	Statement	SA	A	N	D	SD	Total	FX	$\bar{X}$	Decision
11	AI tools help LIS professionals acquire new technical skills.	170	165	40	14	5	394	1622	4.12	High Agreement
12	AI fosters creativity and innovation in library services.	165	170	40	14	5	394	1612	4.09	High Agreement
13	AI applications improve decision-making in LIS practice.	155	175	45	14	5	394	1595	4.05	High Agreement

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14	Continuous AI learning is necessary for LIS career growth.	180	165	35	10	4	394	1656	4.20	High Agreement
15	AI promotes collaboration between LIS professionals and other disciplines.	150	180	50	10	4	394	1600	4.06	High Agreement

Source: Field survey, 2025

Respondents agreed that AI tools are instrumental in acquiring new technical skills ($\bar{X}$ = 4.12) and fostering creativity in LIS services ($\bar{X}$ = 4.09). Continuous AI learning was seen as vital for career growth ($\bar{X}$ = 4.20), while AI's role in decision-making ($\bar{X}$ = 4.05) and promoting cross-disciplinary collaboration ($\bar{X}$ = 4.06) was also affirmed. These findings highlight AI's perceived role not only as a technical enabler but also as a catalyst for professional innovation.

Research Question 4: What challenges and barriers affect the adoption of Artificial Intelligence in Library and Information Science education and practice?

Table 4: Challenges and Barriers to AI Adoption

No.	Statement	SA	A	N	D	SD	Total	FX	$\bar{X}$	Decision
16	High implementation costs limit AI adoption in LIS.	200	140	30	15	9	394	1682	4.27	High Agreement
17	Inadequate AI training for LIS educators and practitioners is a barrier.	180	150	40	15	9	394	1632	4.14	High Agreement
18	Poor ICT infrastructure hinders AI integration in LIS.	190	140	35	20	9	394	1652	4.19	High Agreement
19	Resistance to change slows down AI adoption.	130	160	60	30	14	394	1502	3.81	Moderate
20	Lack of institutional policy support affects AI implementation.	150	165	50	20	9	394	1567	3.98	High Agreement

Source: Field survey, 2025

The results reveal several significant barriers to AI integration in LIS. High implementation costs ($\bar{X}$ = 4.27) and inadequate AI training ($\bar{X}$ = 4.14) emerged as the most pressing issues. Poor ICT infrastructure ($\bar{X}$ = 4.19) was also highlighted as a major impediment. While resistance to change scored lower ($\bar{X}$ = 3.81), it still represented a moderate barrier, indicating that both human and institutional factors influence adoption rates. Lack of institutional policy support ($\bar{X}$ = 3.98) further underscores the need for systemic strategies

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Research Question 5: What strategies can be employed to maximize the potential of Artificial Intelligence for workforce innovation in the LIS sector?

Table 5: Strategies to Maximize AI Potential

No.	Statement	SA	A	N	D	SD	Total	FX	$\bar{X}$	Decision
21	Regular AI training will increase workforce readiness.	190	160	25	12	7	394	1683	4.27	High Agreement
22	Collaborations with tech companies will enhance AI adoption.	185	165	28	12	4	394	1685	4.28	High Agreement
23	Government funding is necessary for AI integration in LIS.	200	150	30	9	5	394	1707	4.33	High Agreement
24	AI innovation labs will encourage experimentation in LIS.	180	160	35	14	5	394	1657	4.21	High Agreement
25	Developing AI-related policies will ensure sustainable integration.	175	165	40	10	4	394	1643	4.17	High Agreement

Source: Field survey, 2025

Respondents identified multiple strategies with high levels of agreement. The most endorsed were *collaboration with tech companies* ($\bar{X}$ = 4.28), *regular AI training* ($\bar{X}$ = 4.27), and *government funding for AI integration* ($\bar{X}$ = 4.33). AI innovation labs ($\bar{X}$ = 4.21) and the development of AI-related policies ($\bar{X}$ = 4.17) were also strongly supported. These results point to a shared belief in the need for coordinated, multi-stakeholder efforts to embed AI in LIS practice and education sustainably.

Discussion of Findings

1. AI integration in LIS education is essential but under-implemented: Respondents strongly endorsed the need to embed AI in LIS curricula and agreed that hands-on exposure improves employability ($\bar{X} \approx 4.3$), yet they rated current coverage as only moderate ($\bar{X} \approx 3.36$). This gap echoes the literature that calls for curriculum redesign to include AI literacy, data science, and ethical AI awareness (Long & Magerko, 2020; Shen et al., 2023; Corrigan, et al., 2025). The finding suggests that while stakeholders accept the *utility* of AI (Perceived Usefulness in TAM), institutional and curriculum changes lag consistent with TAM's prediction that perceptions must be matched by enabling conditions for adoption (Davis, 1989; Venkatesh & Davis, 2000). Practically, LIS programmes should move beyond elective introductions to structured AI modules, experiential labs, and interdisciplinary collaborations (UNESCO, 2021).

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2. AI is perceived to improve core professional services and user experience: High agreement that AI enhances cataloguing, metadata creation, discovery, and personalization aligns with empirical and conceptual studies showing ML and NLP improve indexing, retrieval, and recommender functions in libraries (Li et al., 2022; Lu et al., 2015; Cox & Mazumdar, 2024). These results reinforce the view that AI can automate routine tasks boosting efficiency while enabling librarians to focus on higher-order roles (Tammaro, 2020). From a DoI perspective, these observable advantages (relative advantage, compatibility) explain why early adopters in libraries prioritize these applications (Rogers, 2003).

3. AI fosters skill development, creativity, and cross-disciplinary collaboration: Respondents rated AI highly for professional upskilling and innovation ($\bar{X} \approx 4.1–4.2$). This supports literature that positions AI as both a technical enabler and an impetus for new professional identities (e.g., data curator, digital scholarship specialist) requiring mixed technical and soft skills (Ifijeh & Yusuf, 2020; Shen et al., 2023). The emphasis on continuous learning echoes global workforce analyses stressing reskilling in response to AI-driven shifts (World Economic Forum, 2023). For LIS educators and managers, these findings indicate the importance of lifelong learning pathways, micro-credentials, and industry partnerships to build relevant competencies (Long & Magerko, 2020).

4. Significant structural barriers hinder AI adoption: cost, infrastructure, and training: High means for implementation costs, poor ICT infrastructure, and inadequate training ($\bar{X} \approx 4.1–4.3$) mirror recurring constraints in research on technology adoption in libraries particularly in developing contexts (Ifijeh & Yusuf, 2020; IFLA, 2025). Even where perception of usefulness is strong (TAM), external constraints (resources, infrastructure, organizational policy) can block actual uptake a pattern consistent with DoI's emphasis on contextual facilitators and inhibitors (Rogers, 2003; Venkatesh & Davis, 2000). Addressing these structural factors is therefore critical: investments in infrastructure, targeted capacity building, and cost-sharing partnerships are needed to translate positive attitudes into sustainable practice.

5. Stakeholders endorse multi-pronged strategies: training, partnerships, funding, labs, and policy: Respondents strongly supported government funding, industry collaborations, regular training, innovation labs, and AI policy ($\bar{X} \approx 4.2–4.3$). These recommendations resonate with calls in the literature for multi-stakeholder approaches to AI integration combining pedagogy, technical support, governance, and ethical oversight (UNESCO, 2021; Tammaro, 2020; Cox & Mazumdar, 2024). From a theoretical standpoint, these strategies address both the individual-level (TAM) and system-level (DoI) determinants of adoption: improving perceived ease of use and usefulness while strengthening the organizational environment for diffusion.

Implications

1. **Curriculum and Training**: The moderate coverage of AI in LIS programs ($\bar{X} \approx 3.36$) alongside respondents' recognition of its importance ($\bar{X} \approx 4.3$) implies an urgent need to

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integrate AI literacy and data science into core curricula. Additionally, continuous professional development initiatives should be expanded to equip current practitioners with hands-on AI skills and foster lifelong learning.

2. **Infrastructure and Funding**: High mean scores for implementation costs and inadequate ICT infrastructure ($\bar{X} \approx 4.1–4.3$) indicate that practical adoption of AI is constrained by resource limitations. Targeted investments and funding support are therefore necessary to remove these barriers and enable effective implementation of AI in LIS practice.
3. **Partnerships and Innovation Labs**: Respondents highlighted the value of experiential learning and collaboration ($\bar{X} \approx 4.2–4.3$). This suggests that establishing partnerships with technology firms and creating AI-focused innovation labs would provide practical opportunities for experimentation, skill development, and piloting AI applications in library settings.
4. **Policy and Ethical Governance**: The findings revealed concerns about responsible and effective AI use, signaling the need for institutional policies and ethical guidelines. Establishing frameworks for AI governance will ensure that implementation aligns with professional standards, user trust, and ethical considerations.

Conclusion

In conclusion, this study has demonstrated that Artificial Intelligence (AI) holds significant potential to transform Library and Information Science (LIS) education and professional practice in ways that directly contribute to workforce innovation. By integrating AI into LIS curricula, future professionals can be equipped with advanced technological competencies, enabling them to thrive in an increasingly digital and data-driven information ecosystem. The findings show that AI applications ranging from automated cataloguing to intelligent information retrieval enhance operational efficiency, improve user engagement, and support the delivery of personalized services in libraries.

The study also revealed that AI-driven tools can play a pivotal role in skill development and innovation among LIS professionals by fostering adaptability, problem-solving, and creative approaches to service delivery. However, the adoption of AI is not without its challenges. Infrastructure deficits, funding limitations, skills gaps, and ethical considerations pose substantial barriers to effective integration. Addressing these issues requires strategic investments in technology, targeted training programs, and robust policy frameworks that ensure ethical, secure, and equitable use of AI in LIS contexts.

Ultimately, the transformative capacity of AI in LIS education and practice depends on proactive collaboration among educators, practitioners, policymakers, and technology experts. By embracing AI strategically and ethically, the LIS sector can position itself as a driver of workforce innovation, enhancing the relevance, efficiency, and societal impact of library and information services in the 21st century. This alignment of technological advancement with

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professional expertise will ensure that LIS graduates and practitioners remain competitive, resilient, and innovative in a rapidly evolving global information landscape.

Recommendations

Based on the study's findings, the following recommendations are proposed to guide policymakers, LIS educators, and practitioners in harnessing the transformative potential of Artificial Intelligence (AI) for Library and Information Science education, practice, and workforce innovation.

First, LIS curricula should be systematically revised to integrate AI concepts, applications, and ethics into both theoretical and practical coursework. This will ensure that graduates are equipped with the skills required for an AI-driven information environment. Collaborative initiatives between LIS schools and technology experts can help design specialized modules on machine learning, data analytics, natural language processing, and AI-assisted information retrieval to meet evolving workforce demands.

Second, LIS professional practice should embrace AI-powered systems to improve efficiency and enhance user engagement. Libraries should adopt AI-driven tools for cataloguing, information discovery, automated reference services, and personalized content delivery. Continuous professional development programs should be provided to ensure staff are competent in using such systems effectively.

Third, to support skill development and innovation, stakeholders should invest in hands-on AI training workshops, simulation environments, and internships with tech-focused organizations. This practical exposure will build confidence among LIS professionals, enabling them to explore innovative service delivery models, such as AI-assisted research support and predictive information services.

Fourth, addressing challenges and barriers to AI adoption requires strategic investment in infrastructure, including reliable internet connectivity, stable power supply, and secure data storage. Additionally, policy frameworks should be developed to address ethical issues, data privacy, and the responsible use of AI in libraries and educational contexts. Funding agencies and government bodies should provide targeted grants to support AI research and implementation in the LIS sector.

Finally, strategies to maximize AI's potential for workforce innovation should include fostering cross-disciplinary collaborations between LIS professionals, computer scientists, and industry partners. Knowledge-sharing platforms, such as AI and LIS innovation forums, should be established to disseminate best practices, case studies, and lessons learned. Libraries and LIS schools should also develop monitoring and evaluation systems to track the impact of AI tools on service quality, user satisfaction, and staff productivity, ensuring continuous improvement and relevance in a rapidly evolving technological landscape.

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References

Ali, A. (2021). Artificial intelligence: Role in libraries. *Library Philosophy and Practice*, 1–13. https://digitalcommons.unl.edu/libphilprac/

Corrigan, M. W., Wong, J. T., Grove, D., Andersen, S., & Hughes, B. S. (2025). Enhancing Elementary Students Conceptual Understandings of Scientific Phenomena: The Impact of STEAM-First and STEM-First Approaches. *Science Education*.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., ... Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International Journal of Information Management*, 57, 101994. https://doi.org/10.1016/j.ijinfomgt.2019.08.002

Fabunmi, S. O., & Akinyemi, O. E. (2024). Assessing the influence of artificial intelligence (AI) on library services and users' experience in the university library. *Communicate: Journal of Library and Information Science*, *26*(2), 127-140.Cox, A. M., & Mazumdar, S. (2024). Artificial intelligence in academic libraries: Emerging trends and applications. *Journal of Librarianship and Information Science, 56*(1), 3–16. https://doi.org/10.1177/09610006221142029

Fernandez, P. (2023). Artificial intelligence in libraries: Applications and implications. *Computers in Libraries, 43*(1), 12–17.

Goddard, L., & Rathi, D. (2022). Integrating artificial intelligence in library operations: A pathway to innovation. *Library Management*, 43(3/4), 207–223. https://doi.org/10.1108/LM-06-2021-0052

Ifijeh, G., & Yusuf, F. (2020). Artificial intelligence and academic libraries in Africa: The good, the bad and the ugly. *Library Hi Tech News*, 37(6), 1–5. https://doi.org/10.1108/LHTN-05-2020-0038

Ifijeh, G., & Yusuf, F. (2020). Libraries as drivers of lifelong learning. *Library Management, 41*(6/7), 401–414. https://doi.org/10.1108/LM-01-2020-0005

IFLA. (2025). *Developing a library strategic response to artificial intelligence*. International Federation of Library Associations and Institutions. https://www.ifla.org

Li, X., Zhang, Y., & Wang, L. (2022). Automating metadata generation in digital libraries using machine learning techniques. *Journal of Information Science, 48*(5), 675–688.

ISSN: 3428-0009

https://doi.org/10.1177/01655515211020345

Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. https://doi.org/10.1145/3313831.3376727

Lu, J., Wu, D., Mao, M., Wang, W., & Zhang, G. (2015). Recommender system application developments: A survey. *Decision Support Systems, 74*, 12–32. https://doi.org/10.1016/j.dss.2015.03.008

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

Mokyr, J. (2002). *The gifts of Athena: Historical origins of the knowledge economy*. Princeton University Press.

OECD. (2022). *Artificial intelligence in society*. Organisation for Economic Co-operation and Development. https://doi.org/10.1787/eedfee77-en

Oyelude, A. A. (2021). Libraries, digital transformation, and sustainable development goals. *Library Hi Tech News, 38*(3), 1–4. https://doi.org/10.1108/LHTN-02-2021-0014

Powell, W. W., & Snellman, K. (2004). The knowledge economy. *Annual Review of Sociology, 30*(1), 199–220. https://doi.org/10.1146/annurev.soc.29.010202.100037

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

Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Shen, X., Wang, Y., & Zhang, L. (2023). Integrating data science into library and information science education: Trends and practices. *Education for Information, 39*(2), 125–140. https://doi.org/10.3233/EFI-220056

Shen, Y., Wu, D., & Zhang, W. (2023). Artificial intelligence in education: Opportunities, challenges, and policy implications. *Computers & Education: Artificial Intelligence*, 4, 100120. https://doi.org/10.1016/j.caeai.2023.100120

Tammaro, A. M. (2020). Artificial intelligence and libraries: Challenges and opportunities. *JLIS.it, 11*(2), 1–6. https://doi.org/10.4403/jlis.it-12620

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

ISSN: 3428-0009

Vassilakaki, E., & Moniarou-Papaconstantinou, V. (2021). Library and information science professionals' skills and competencies for the digital era. *Library Review*, 70(2), 102–117. https://doi.org/10.1108/LR-08-2020-0091

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

World Economic Forum. (2023). *The future of jobs report 2023*. https://www.weforum.org

