



AI LITERACY AMONG LIBRARY PROFESSIONALS: READINESS, CHALLENGES, AND FUTURE COMPETENCIES IN THE DIGITAL ERA

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Abstract

Artificial Intelligence (AI) is increasingly transforming library services, information management, and knowledge dissemination. The present study examines AI literacy among library professionals with special reference to their readiness for AI adoption, challenges faced, and future competency requirements. The study is based on a survey of 200 library professionals working in academic and higher education institutions. Data were analyzed using percentage analysis, mean scores, Chi-square test, and One-Way ANOVA.

The findings reveal moderate levels of AI literacy among respondents, with significant variations based on educational qualifications, professional experience, and participation in AI-related training programmes. While library professionals recognize the potential benefits of AI in improving library services, challenges relating to technical skills, infrastructure, training, and ethical concerns continue to affect adoption. The study emphasizes the need for continuous professional development and institutional support to strengthen AI competencies among library professionals.

I. Keywords: Artificial Intelligence, AI Literacy, Library Professionals, Academic Libraries, Digital Competencies.

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most influential technologies shaping the future of information management and knowledge services. Rapid advancements in machine learning, natural language processing, chatbots, and generative AI have significantly transformed the way information is organized, retrieved, and disseminated. Academic libraries are increasingly adopting these technologies to enhance user services, automate routine operations, and improve access to information resources.

The growing integration of AI into library environments has created new opportunities for innovation and service delivery. AI-powered applications are being utilized for intelligent information retrieval, virtual reference services, collection management, research support, and personalized user experiences. Consequently, library professionals are required to acquire new knowledge and skills to effectively manage

and utilize these emerging technologies. AI literacy refers to the ability to understand, evaluate, and effectively use Artificial Intelligence tools and applications. In the context of libraries, AI literacy has become an essential professional competency. Library professionals must not only understand the technical aspects of AI but also address issues relating to ethics, privacy, transparency, and responsible use of technology.

Despite the growing importance of AI, variations continue to exist in the levels of awareness, preparedness, and competency among library professionals. Factors such as educational background, professional experience, training opportunities, and institutional support may influence AI literacy levels. Understanding these dimensions is essential for developing effective training programmes and policy interventions.

Against this backdrop, the present study examines AI literacy among library professionals, focusing on their readiness for AI adoption, challenges encountered, and future competency requirements in the digital era.

2. REVIEW OF LITERATURE

The growing adoption of Artificial Intelligence (AI) has generated significant scholarly interest within the field of Library and Information Science. Cox, Pinfield, and Rutter (2019) observed that AI technologies have the potential to transform academic libraries by improving information retrieval, user services, and operational efficiency. Their study emphasized the need for library professionals to acquire new technological competencies to adapt to AI-driven environments.

Wheatley and Hervieux (2019) examined librarians' perceptions of AI and reported a generally positive attitude towards AI applications, particularly in areas such as reference services, automation, and information management. However, they also identified concerns relating to skill gaps and professional readiness.

The emergence of generative AI technologies has further accelerated research in this area. Lund and Wang (2023) argued that tools such as ChatGPT are reshaping information services by providing new opportunities for research support, user engagement, and knowledge discovery. Similarly, UNESCO (2023) highlighted the transformative potential of generative AI while emphasizing the importance of ethical governance, transparency, and digital literacy.

Recent studies have increasingly focused on AI literacy among information professionals. Okolie et al. (2024) found that although awareness of AI technologies is growing among librarians, many professionals lack advanced competencies required for effective implementation. The study emphasized the importance of continuous professional development and specialized training programmes.

Zhang and Liu (2024) reported that AI-related skills are becoming essential components of modern librarianship. Their findings indicate that competencies relating to data analytics, AI-assisted information retrieval, digital content management, and ethical decision-making are increasingly important for library professionals.

Research has also identified several barriers to AI adoption in libraries. ACRL (2024) noted that inadequate training, limited technological infrastructure, financial constraints, and concerns regarding privacy and security continue to hinder effective implementation. Similarly, IFLA (2024) emphasized that successful AI integration requires institutional support, policy frameworks, and workforce preparedness.

Overall, the literature indicates that AI is transforming the professional landscape of libraries and information services. While substantial opportunities exist for enhancing service quality and operational efficiency, significant challenges remain in developing the competencies required for effective AI adoption. This highlights the growing importance of AI literacy among library professionals in the digital era.

3. RESEARCH GAP

Existing studies have extensively discussed the applications and implications of Artificial Intelligence in libraries. However, limited empirical research has focused specifically on assessing the AI literacy, readiness, challenges, and future competency requirements of library professionals. Furthermore, the rapid emergence of generative AI technologies has created new skill demands that remain insufficiently explored. Therefore, the present study seeks to examine AI literacy among library professionals and identify the factors influencing their preparedness for AI adoption in contemporary library environments.

4. OBJECTIVES OF THE STUDY

The present study aims to examine AI literacy among library professionals in the digital era. The specific objectives are:

1. To assess the level of AI literacy among library professionals.
2. To examine the readiness of library professionals for AI adoption in library services.
3. To identify the major challenges affecting AI implementation in libraries.
4. To analyze future competency requirements for effective utilization of AI technologies.
5. To examine the relationship between selected demographic variables and AI literacy levels.

5. HYPOTHESES

H₁: There is a significant association between educational qualification and AI literacy levels among library professionals.

H₂: Professional experience significantly influences readiness for AI adoption.

H₃: Participation in AI-related training programmes is significantly associated with AI competency levels.

H₄: Significant differences exist in AI literacy scores among library professionals with varying levels of work experience.

6. METHODOLOGY

The study adopts a descriptive survey research design. Primary data were collected through a structured questionnaire administered to 200 library professionals working in university, government, aided, and private college libraries in Andhra Pradesh. Respondents were selected using purposive sampling to ensure adequate representation of professionals engaged in library and information services across the state.

The questionnaire consisted of items relating to AI awareness, readiness for AI adoption, challenges in implementation, and future competency requirements. Responses were measured using a five-point Likert scale wherever applicable.

Data were analyzed using both descriptive and inferential statistical techniques. Percentage analysis and mean scores were employed to assess AI literacy levels and respondent perceptions. The Chi-square test was used to examine associations between demographic variables and AI literacy levels, while One-Way ANOVA was applied to identify differences in AI literacy and readiness across experience groups.

Statistical interpretations were made at the 5 percent level of significance.

7. RESULTS AND ANALYSIS

Table 1: Demographic Profile of Respondents (N = 200)

Variable	Category	Frequency	Percentage
Gender	Male	118	59.0
	Female	82	41.0
Qualification	MLISc	126	63.0
	M.Phil./Ph.D.	74	37.0
Experience	Below 5 Years	42	21.0
	5–10 Years	58	29.0
	11–15 Years	54	27.0
	Above 15 Years	46	23.0

Interpretation

The demographic profile indicates that the majority of respondents were male (59%) and possessed MLISc qualifications (63%). Respondents represented diverse experience groups, with the largest proportion (29%) having 5–10 years of professional experience. This distribution ensures adequate representation of library professionals across different educational and professional backgrounds.

Table 2: Awareness of AI Tools among Library Professionals (N = 200)

AI Tool	Aware	Not Aware
ChatGPT	182 (91.0%)	18 (9.0%)
Gemini	156 (78.0%)	44 (22.0%)
Microsoft Copilot	148 (74.0%)	52 (26.0%)
AI Chatbots	164 (82.0%)	36 (18.0%)
AI Search Tools	139 (69.5%)	61 (30.5%)

Interpretation

The findings reveal a high level of awareness of AI technologies among library professionals. ChatGPT emerged as the most widely recognized AI tool (91%), followed by AI Chatbots (82%) and Gemini (78%). Awareness of AI Search Tools was comparatively lower (69.5%). Overall, the results indicate increasing familiarity with AI applications and growing exposure to emerging technologies among library professionals.

Table 3: Level of AI Literacy among Library Professionals

AI Literacy Level	Frequency	Percentage
High	48	24.0
Moderate	108	54.0
Low	44	22.0
Total	200	100.0

Interpretation

The majority of respondents (54%) reported a moderate level of AI literacy, while 24 percent demonstrated high literacy levels. However, 22 percent of respondents exhibited low AI literacy, indicating the existence of competency gaps that may hinder effective adoption of AI technologies in library services.

Table 4: Readiness for AI Adoption among Library Professionals

Statement	Mean Score	Rank
Willingness to learn AI tools	4.32	I
Readiness to integrate AI into library services	4.18	II
Confidence in using AI applications	3.84	III
Institutional support for AI adoption	3.62	IV
Availability of AI training opportunities	3.41	V

Scale: 1 = Strongly Disagree to 5 = Strongly Agree

Interpretation

The results indicate a generally positive attitude towards AI adoption among library professionals. Respondents expressed the highest willingness to learn AI tools (Mean = 4.32), followed by readiness to integrate AI into library services (Mean = 4.18). However, lower mean scores for institutional support and training opportunities suggest the need for greater organizational commitment towards AI capacity building.

Table 5: Challenges in AI Adoption among Library Professionals

Challenge	Mean Score	Rank
Lack of AI training programmes	4.41	I
Insufficient technical skills	4.26	II
Inadequate infrastructure	4.12	III
Financial constraints	3.98	IV
Ethical and privacy concerns	3.85	V
Resistance to technological change	3.54	VI

Scale: 1 = Least Serious to 5 = Most Serious

Interpretation

The findings identify lack of AI training programmes as the most significant challenge (Mean = 4.41), followed by insufficient technical skills (Mean = 4.26). Infrastructure and financial limitations also emerged as important barriers. These results indicate that capacity building and institutional investment are essential for successful AI implementation in libraries.

Table 6: Future Competency Requirements for AI-Driven Libraries

Competency Area	Mean Score	Rank
AI Tool Utilization Skills	4.46	I
Data Analytics Skills	4.29	II
Digital Content Management	4.18	III
AI Ethics and Governance	4.11	IV
Programming and Automation Skills	3.92	V

Scale: 1 = Not Important to 5 = Highly Important

Interpretation

The respondents perceived AI Tool Utilization Skills as the most important future competency (Mean = 4.46), followed by Data Analytics Skills (Mean = 4.29). The findings suggest that future library professionals will require a combination of technical, analytical, and ethical competencies to effectively operate in AI-enabled library environments.

hypothesis testing

Table 7: Chi-Square Test Results

Association between Educational Qualification and AI Literacy Levels

Variable	χ^2 Value	df	p-value	Result
Educational Qualification × AI Literacy	9.84	2	0.007	Significant

Association between AI Training Participation and AI Competency Levels

Variable	χ^2 Value	df	p-value	Result
AI Training × AI Competency	12.56	2	0.002	Significant

Interpretation

The Chi-square analysis reveals a significant association between educational qualification and AI literacy levels ($\chi^2 = 9.84$, $p < 0.05$). Similarly, participation in AI-related training programmes is significantly associated with AI competency levels ($\chi^2 = 12.56$, $p < 0.05$). Therefore, Hypotheses H₁ and H₃ are accepted. The findings indicate that higher educational attainment and professional training positively influence AI literacy and competency among library professionals.

Table 8: One-Way ANOVA Results

Difference in AI Readiness Scores Based on Professional Experience

Source of Variation	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	18.42	3	6.14	4.87	0.003
Within Groups	246.93	196	1.26		
Total	265.35	199			

Interpretation

The One-Way ANOVA results indicate significant differences in AI readiness scores among respondents with varying levels of professional experience ($F = 4.87$, $p < 0.05$). Thus, Hypotheses H_2 and H_4 are accepted. The findings suggest that professional experience influences readiness for AI adoption, with experienced professionals generally demonstrating higher preparedness for integrating AI technologies into library services.

Table 9: Summary of Hypothesis Testing

Hypothesis Statement	Result
H_1 Educational qualification is associated with AI literacy levels	Accepted
H_2 Professional experience influences AI readiness	Accepted
H_3 AI training is associated with AI competency levels	Accepted
H_4 Significant differences exist in AI literacy across experience groups	Accepted

Interpretation

The statistical analysis supports all four hypotheses. Educational qualification, professional experience, and participation in AI-related training programmes were found to significantly influence AI literacy, competency, and readiness among library professionals.

MAJOR FINDINGS

- The study revealed that 54.0% of library professionals possessed a moderate level of AI literacy, while 24.0% demonstrated high AI literacy and 22.0% reported low AI literacy levels.
- ChatGPT emerged as the most widely recognized AI tool, with 91.0% of respondents reporting awareness, followed by AI Chatbots (82.0%) and Gemini (78.0%).
- Library professionals exhibited a positive readiness towards AI adoption, with willingness to learn AI tools recording the highest mean score (4.32), followed by readiness to integrate AI into library services (Mean = 4.18).
- Lack of AI training programmes was identified as the most significant challenge to AI adoption (Mean = 4.41), followed by insufficient technical skills (Mean = 4.26) and inadequate infrastructure (Mean = 4.12).
- The study revealed that 54.0% of library professionals possessed a moderate level of AI literacy, while 24.0% demonstrated high AI literacy and 22.0% reported low AI literacy levels.
- ChatGPT emerged as the most widely recognized AI tool, with 91.0% of respondents reporting awareness, followed by AI Chatbots (82.0%) and Gemini (78.0%).
- Library professionals exhibited a positive readiness towards AI adoption, with willingness to learn AI tools recording the highest mean score (4.32), followed by readiness to integrate AI into library services (Mean = 4.18).
- Lack of AI training programmes was identified as the most significant challenge to AI adoption (Mean = 4.41), followed by insufficient technical skills (Mean = 4.26) and inadequate infrastructure (Mean = 4.12).
- AI Tool Utilization Skills emerged as the most important future competency requirement (Mean = 4.46), followed by Data Analytics Skills (Mean = 4.29).
- More than three-fourths of the respondents demonstrated awareness of major AI applications, indicating increasing exposure to emerging technologies in library environments.
- Institutional support for AI adoption recorded a comparatively lower mean score (3.62), suggesting the need for greater organizational commitment towards AI implementation.
- Availability of AI training opportunities received the lowest readiness score (Mean = 3.41), highlighting an important gap in professional development initiatives.
- Educational qualification was found to have a significant association with AI literacy levels ($\chi^2 = 9.84$, $p = 0.007$), indicating that higher educational attainment contributes to greater AI awareness and competency.

14. Participation in AI-related training programmes significantly influenced AI competency levels among library professionals ($\chi^2 = 12.56$, $p = 0.002$).
15. One-Way ANOVA results revealed significant differences in AI readiness across professional experience groups ($F = 4.87$, $p = 0.003$), suggesting that experienced professionals exhibit higher preparedness for AI adoption.
16. The Collaboration between technological competence and professional preparedness indicates that AI literacy is influenced by both individual capabilities and institutional support mechanisms.
17. Ethical and privacy concerns recorded a notable mean score (3.85), reflecting growing awareness regarding responsible and secure use of AI technologies in libraries.

The findings indicate a transition from traditional library competencies towards technology-oriented skills, particularly in the areas of AI applications, data analytics, and digital information management.

Overall, the study demonstrates that while library professionals show strong interest in AI adoption, sustained training, infrastructure development, and policy support are essential for effective integration of AI into library services.

SUGGESTIONS

1. Academic institutions and library authorities should organize regular AI-focused training programmes, workshops, and certification courses for library professionals.
2. Library and Information Science (LIS) curricula should be revised to incorporate subjects related to Artificial Intelligence, Machine Learning, Data Analytics, and Generative AI applications.
3. Universities and colleges should strengthen technological infrastructure to facilitate the effective implementation of AI-enabled library services.
4. Professional associations should promote continuous learning initiatives and capacity-building programmes to enhance AI competencies among librarians.
5. Special emphasis should be placed on ethical AI practices, data privacy, transparency, and responsible use of AI technologies in library environments.
6. Libraries should encourage collaboration with technology experts and research institutions to accelerate AI adoption and innovation in information services.
7. Government agencies and higher education institutions should provide financial and policy support for AI-driven digital transformation in libraries.
8. Future professional development programmes should focus on AI tool utilization, data analytics, digital content management, and AI governance competencies.

CONCLUSION

Artificial Intelligence is rapidly transforming the nature of library services and professional practices in the digital era. The present study found that library professionals possess moderate levels of AI literacy and demonstrate a positive attitude towards AI adoption. However, challenges relating to training opportunities, technical skills, infrastructure, and institutional support continue to affect effective implementation.

The statistical analysis confirmed that educational qualifications, professional experience, and participation in AI-related training programmes significantly influence AI literacy and readiness levels. The study also identified AI tool utilization, data analytics, and ethical awareness as key competencies required for future library professionals.

The findings highlight the need for continuous professional development, curriculum reforms, and institutional support mechanisms to strengthen AI preparedness. Enhancing AI literacy will enable library professionals to effectively utilize emerging technologies and contribute to the development of innovative, user-centred, and technology-driven library services.

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