

# The Future of Librarianship: Partnering with Artificial Intelligence

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## Abstract

*This study presents the results of a survey conducted at AI in College Libraries in Assam to learn more about the literacy, ethics, self-efficacy, and self-competence of librarians with regards to AI technology. Data was gathered from full-time librarians at colleges in Assam, India, using an online survey form. The study found that college librarians possess a good knowledge and understanding of AI technology with ethical considerations. The findings indicate there was no significant difference between male and female college librarians' engagement with artificial intelligence. Moreover, the study revealed there is significant linear relationship between college librarians' AI literacy, AI Ethics, AI self-efficacy, and AI self-competency. Artificial intelligence is becoming increasingly important, and library professionals need to know how to utilize it ethically and efficiently for research and library activities. College Libraries of Assam have never seen this type of study. The study's conclusions could contribute to a better understanding and application of AI technology among library professionals worldwide, not only in Assam.*

**Keywords:** Librarian, College Library, Artificial Intelligence, AI engagement, AI Literacy, AI Ethics, AI Self-efficacy, AI Self-competence

## 1. Introduction

The world of information is ever-expanding, and libraries are on the forefront of navigating this vast landscape. Libraries have long been bastions of knowledge, evolving alongside technological advancements from the papyrus scroll to the digital database. Today, Artificial Intelligence (AI) stands poised to revolutionize libraries once more. AI is a rapidly evolving technology with promising applications in libraries, requiring exploration of its pros and cons to maximize its benefits for innovative services delivery (Corke, 2013). AI, a branch of computer science, involves machine learning, information interpretation, vision, speech recognition, natural language processing, and the growing interest in Expert Systems. AI is being applied in library system for various services like descriptive cataloguing, subject indexing, reference services, technical services, shelf-reading, collection development, information retrieval, etc. beyond Natural Language Processing (NLP) (Omame & Alex-Nmecha, 2020). Advancements in artificial intelligence are paving the way for the development of smart libraries, which can function like library robots (Corke, 2013). AI systems in



libraries may not replace librarians, but they may focus on menial tasks like shelf-reading (Li et al., 2015). Murphy (2015) suggests robots may bring librarians and users closer, despite concerns about alienation.

The goal of the present paper is to investigate college librarians' engagement with Artificial Intelligence (AI) by examining their AI literacy, ethics, self-efficacy, and self-competency. By addressing this objective, the study seeks to contribute to the growing body of literature on AI in libraries and inform decision-making in policy, practice and professional development initiatives. AI literacy is "a set of skills that allows people to utilize AI as a tool online, at home, and at work, as well as to critically assess AI technologies and interact and cooperate with them (Long & Magerko, 2020)". Leslie (2019) defined AI ethics as – "a set of values, principles, techniques that widely accepted standards of right and wrong to guide moral conduct in the development and use of AI technologies". "Technology self-efficacy refers to the belief in one's capacity to use technology for pursuing benefits" (Holden & Rada, 2014; Hong, 2022; C.-H. Wang et al., 2013).

As AI reshapes the library landscape, this paper paves the way for a future where human experience and machine intelligence work in concert to unlock the true potential of information.

## **2 Background**

Numerous studies on AI in libraries have been conducted, including empirical research, conceptual papers, and literature review papers. This paper used Google Scholar to collect papers from March-April 2024, focusing on keywords "artificial intelligence AND library" in the time range of 2016-2024.

Previous studies concentrated on literature review of artificial intelligence and machine learning for library professionals (Khanzode & Sarode, 2020), bibliometric analysis of AI trends in library services (Barsha & Munshi, 2023; Borgohain et al., 2022; Das & Islam, 2021; Echedom & Okuonghae, 2021; Gasparini & Kautonen, 2022; Harisanty et al., 2023; Hussain, 2023; Nugroho et al., 2023; Song et al., 2020; Vasishta et al., 2024; Yoganingrum et al., 2022),

Several studies concentrated on theoretical application of AI in libraries (Cao et al., 2018; A. M. Cox & Mazumdar, 2022; Gujral et al., 2019; Y. Huang et al., 2023; Inamdar, 2023; Jha, 2023; Pival, 2023; Talley, 2016; Vijaykumar & Sheshadri, 2019). Practical application, perception of AI and its ethical use in library technical and library users services were done (Ali et al., 2020; Asemi & Asemi, 2018; Asim et al., 2023; Cordell, 2020; A. Cox, 2022; A. M. Cox et al., 2018; Gupta & Gupta, 2023; Hervieux & Wheatley, 2021; Y.-H. Huang, 2022; Lin et al., 2022), librarians' role in AI-dominant future as well as their response (Hervieux & Wheatley, 2021). Some studies have also been conducted on evaluation of LIS education curriculum and AI (Tait & Pierson, 2022), evaluation of AI literacy courses for university students (Kong et al., 2022), AI literacy teaching in Social Science Education (Yetisensoy & Rapoport, 2023), AI literacy teaching of radiology residents (Mello-Thoms, 2023).

Several researchers have studied on evaluation of AI literacy of students and educators was done in higher education institutions (Alam et al., 2024; Hornberger et al., 2023; Kong et al., 2021; Laupichler et al., 2022),

middle school students (Kim & Lee, 2022; Mertala et al., 2022), senior secondary students (Kong et al., 2024), random subjects (Pinski & Benlian, 2023), and library employees (Alam et al., 2024; Andersdotter, 2023; Lo, 2024) were found. From the literature review, it can be understood that the primary areas of research are the idea and initiative project of AI, the viability of implementing AI in libraries, and the kind of library services that would profit from AI. However, literature on AI engagement and literacy of library professionals is scarce. Thus, this research study seeks to address the research gap and offer practical and scientific contributions to the practical application of AI in libraries.

### 3 Hypotheses of the Study

The main objective of this study is to explore and understand college librarians' literacy, ethics, self-efficacy, and self-competency towards artificial intelligence (AI). The study tests, verifies and validates the following hypotheses:

1. College Librarian's Engagement with AI

❖  $H_{0a}$ : Majority of college librarians are not engaged with AI;

2. Gender and Librarians' Engagement with AI

❖  $H_{0b}$ : There are no significant differences between male and female college librarians' engagement with artificial intelligence.

3. Relationship between College Librarians' AI Literacy, AI Ethics, AI self-competency

❖  $H_{0c}$ : There is no significant linear relationship between college librarians' AI literacy, AI Ethics, AI self-efficacy, and AI self-competency.

### 4 Method

Data were collected online from 54 college librarians using the online survey tool 'Google Forms'. Participants were conveniently connected by phone and email. The data was collected from college librarians for the study. Convenience sampling was used for the survey. There were no further requirements regarding socio-demographic data or prior experience with or knowledge of AI. The participants were briefed about the purpose of the study before filling the questionnaire of the study.

After reviewing the literature on AI, a total of 14 items were generated for the assessments of college librarians. The questionnaire was adopted from MAIILS – Meta AI literacy scale (Carolus, Augustin, et al., 2023; Carolus, Koch, et al., 2023; Long & Magerko, 2020; Ng et al., 2022; B. Wang et al., 2023). Four Domains, namely, AI Literacy (7 items), AI Ethics (3 items), AI Self-Efficacy (2 items) and AI Self- Competency (2 items) were focused. Each item included a statement about a specific ability related to one of the domains. The participants were asked to rate their own abilities using a 7-point Likert Scale (1-7). This scale was used because it can easily be understood as the certainty of being able to show a behavior (Joshi et al., 2015).

The reliability of the domains was tested: AI Literacy (Cronbach's  $\alpha = 0.953$ ), AI Ethics (Cronbach's  $\alpha = 0.872$ ), AI Self-Efficacy (Cronbach's  $\alpha = 0.866$ ), and AI Self-Competency (Cronbach's  $\alpha = 0.981$ ). The reliability value calculated for the whole scale was found to be Cronbach's  $\alpha = 0.945$ . The acceptable values of Cronbach's  $\alpha$  range from 0.70 to 0.95 (Bland & Altman, 1997; Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011).

Statistical techniques like one-sample t-test, two independent sample t-test, and Pearson Correlation Coefficient are used to prove the above hypotheses. Data was analyzed using International Business Machine- Statistical Package for the Social Sciences/ Statistical Product and Service Solutions (IBM SPSS Version 16.0). The one-sample t-test is used to compare the mean of a single sample to a known population mean or a theoretical value. The two-independent sample t-test is used to compare the means of a continuous variable between two independent groups. The Pearson correlation coefficient is used to assess the strength and direction of the linear relationship between two or more continuous variables.

## 5 Data Analysis

### 5.1 Sample

In the present sample, majority 33.3% of the participants were from the age-group 21-30 years, secondly 31.5% of the participants were from the age group 41-50 years (Table 1). Most participants worked in colleges in Assam (100 %). 27 participants considered themselves female (50%), while 27 participants identified as male (50%).

48.1% of the participants have an experience below 10 years, and 40.7% of the participants have an experience of 11-20 years (Table 1).

In terms of education, 31.5% of the participants had a Master of Library and Information Science and UGC-NET qualification (Table 1). 25.9% of the participants had a Ph.D. degree in Library and Information Science, and 22.2% of the participants had a M.Phil. Degree (Table 1).

**Table 1: Demographic data of the study**

#### Age

Age group	Frequency	Valid Percent	Cumulative Percent
21-30 years	18	33.3	33.3
31-40 years	13	24.1	57.4
41-50 years	17	31.5	88.9
51-60 years	6	11.1	100.0
Total	54	100.0	

**Experience**

Experience	Frequency	Valid Percent	Cumulative Percent
Below 10 years	26	48.1	48.1
11-20 years	22	40.7	88.9
21-30 years	5	9.3	98.1
31-40 years	1	1.9	100.0
Total	54	100.0	

**Education**

Qualification	Frequency	Valid Percent	Cumulative Percent
MLIS	6	11.1	11.1
MLIS- NET	17	31.5	42.6
MLIS- JRF	5	9.3	51.9
M.Phil.	12	22.2	74.1
Ph.D.	14	25.9	100.0
Total	54	100.0	

**Gender**

Gender	Frequency	Valid Percent	Cumulative Percent
Male	27	50.0	50.0
Female	27	50.0	100.0
Total	54	100.0	

**5.2 College Librarians' Engagement with AI**

This study employed a one-sample t-test to examine whether the mean AI engagement score of college librarians significantly differed from a hypothesized population mean. The sample comprised 54 college librarians, and their AI engagement were collected and analyzed.

Descriptive statistics revealed that the mean AI engagement score for the sample was  $M = 4.429$  with a standard deviation of  $SD = 1.334$ . The hypothesized population mean was set at 4. Based on the calculated mean difference of 0.4298, it appeared that the sample's AI engagement scores slightly exceeded the hypothesized population mean.

The one-sample t-test yielded a t-value of  $t(53) = 2.367$  and a p-value of  $p = 0.022$ , indicating that the observed mean difference of 0.4298 was statistically significant at the 95% confidence level. The 95% confidence interval for the mean difference ranged from 0.065 to 0.794, further supporting the statistical significance of the findings.

These results suggest that the sample's AI engagement scores differed significantly from the hypothesized population mean. Specifically, the participants demonstrated a mean AI engagement score that was higher than what was expected based on the population mean.

Therefore, the hypothesis that the majority of college librarians are not engaged with AI is rejected. The results suggest that college librarians are indeed engaged with AI.

### **5.3 Gender and College Librarians' Engagement with AI**

To assess the level of AI Literacy among College Librarians, a two-independent sample t-test was conducted. College librarians were divided into two groups based on gender i.e. male and female. Table 2 displays the mean and standard deviations of AI literacy scores for each group.

The results revealed no significant difference in AI literacy between the two groups ( $t(df) = .855, p < .05$ ). Male participants exhibited a mean AI literacy score of 4.634 (1.715), whereas female participants had a mean AI literacy score of 4.984 (1.248) (Table 2). The t-value indicates the mean difference between the two groups is negative, but it's important to note that the magnitude of the difference is relatively small, and the associated p-value suggests that this difference is statistically significant.

The t-value of -0.439 suggests a small negative difference in AI ethics scores between the groups compared. However, the p-value of 0.662 indicates that this difference is not statistically significant at the conventional alpha level of 0.05. Therefore, the observed difference in AI ethics scores between the groups is likely due to random chance, and there is no strong evidence to suggest a true difference.

Similar to the AI ethics comparison, the t-value of -0.563 suggests a small negative difference in AI self-efficacy scores between the groups. However, the p-value of 0.575 indicates that this difference is not statistically significant at the conventional alpha level of 0.05. Therefore, like AI ethics, the observed difference in AI self-efficacy scores between the groups is likely due to random chance.

In the comparison of groups of AI self-competency, the t-value of -1.650 indicates a moderate negative difference in AI self-competency scores between the groups. The p-value of 0.105, while not meeting the conventional alpha level of 0.05, suggests that the observed difference approaches statistical significance. Therefore, there is some evidence of a difference in AI self-competency scores between the groups, but it is not strong enough to be considered statistically significant at the typical significance level.

These findings suggest that we fail to reject the null hypothesis, which typically states that there is no difference between male and female college librarians' engagement with artificial intelligence.

**Table 2: Two independent sample t-test of AI Literacy**

	Gender	N	Mean	Std. Deviation	p-value	df	t
AI Literacy	Male	27	4.634	1.715	0.397	47.497	-0.855
	Female	27	4.984	1.248			
AI Ethics	Male	27	3.740	1.508	0.662	51.587	-0.439
	Female	27	3.913	1.379			
AI Self-efficacy	Male	27	4.240	1.996	0.576	49.739	-0.563
	Female	27	4.518	1.608			
AI Self-competency	Male	27	3.629	2.096	0.105	49.554	-1.650
	Female	27	4.481	1.672			

#### 5.4 Relationship between College Librarians' AI Literacy, AI Ethics, AI self-efficacy, and AI self-competency

The Pearson Correlation Coefficients were computed to examine the relationships between College Librarians' AI Literacy, ethics, self-efficacy, and self-competency (Table 3). The correlation matrix revealed several significant associations among these variables.

College Librarians' AI Literacy showed a strong positive correlation with AI ethics ( $r = 0.618$ ,  $p < 0.01$ ), indicating that individuals with higher levels of AI literacy tend to have higher ethical considerations related to AI.

There was a strong positive correlation between AI Literacy and self-efficacy in AI ( $r = 0.668$ ,  $p < 0.01$ ), suggesting that individuals with greater AI Literacy tend to have higher confidence in their abilities to engage with AI technologies effectively.

Similarly, AI Literacy exhibited a moderate correlation with self-competency in AI ( $r = 0.513$ ,  $p < 0.01$ ), indicating that individuals with higher AI literacy levels tend to perceive themselves as more competent in AI-related tasks.

AI ethics showed a moderate positive correlation with self-efficacy in AI ( $r = 0.511$ ,  $p < 0.01$ ), suggesting that individuals who prioritize ethical considerations in AI also tend to have higher confidence in their AI-related skills.

There was a moderate positive correlation between AI ethics and self-competency in AI ( $r = 0.404$ ,  $p < 0.01$ ), suggesting that individuals with stronger ethical considerations in AI may also perceive themselves as more competent in AI tasks.

AI self-efficacy exhibited a strong positive correlation with self-competency in AI ( $r = 0.585$ ,  $p < 0.01$ ), suggesting that individuals who have greater confidence in their AI abilities also tend to perceive themselves as more competent in AI tasks.

Therefore, the null hypothesis is rejected as the findings highlight linear significant relationships between AI literacy, ethics, self-efficacy, and self-competency, indicating that these constructs are closely intertwined and mutually reinforcing. This underscores the importance of considering multiple dimensions of AI related skills and attitudes in research and library practice.

**Table 3: Correlation between College Librarians' AI Literacy, Ethics, Self-efficacy and Self-competency**

Variable		AI Literacy	AI Ethics	AI Self-efficacy	AI Self-competency
AI Literacy	Pearson Correlation	1	0.618	0.668	0.513
	Sig (2-tailed)		0.000	0.000	0.000
AI Ethics	Pearson Correlation	0.618	1	0.511	0.404
	Sig (2-tailed)	0.000		0.000	0.002
AI Self-efficacy	Pearson Correlation	0.668	0.511	1	0.585
	Sig (2-tailed)	0.000	0.000		0.000
AI Self-competency	Pearson Correlation	0.513	0.404	0.585	1
	Sig (2-tailed)	0.000	0.002	0.000	

## 6 Discussion

This research paper examined three key aspects related to college librarians' engagement with artificial intelligence (AI): the level of engagement itself, the influence of gender on this engagement, and the relationships between AI literacy, AI ethics, AI self-efficacy, and AI self-competency among college librarians.

The findings of this study reveal levels of engagement with AI among college librarians. College librarians have embraced AI technologies in their professional practice. This trend suggests a positive shift towards technology innovation and adaptation within academic libraries, with also considering the ethical way of using AI and the genuine enthusiasm for learning and adapting to AI. In future, as technology continues to evolve and new AI applications emerge, librarians must remain adaptable and equipped with the knowledge and skills necessary to harness the potential of AI effectively. Investing in training programs, collaborative partnerships, and knowledge-sharing networks can empower librarians to navigate the complexities of AI integration and maximize its benefits for the academic community.

Data analysis also explored the influence of gender on college librarians' engagement with AI. Interestingly, it is found that gender does not significantly correlate with the level of AI engagement among college librarians. This suggests that factors beyond gender, such as educational background, professional experience, and institutional culture, may also play more substantial roles in shaping librarians' attitudes



and behaviors towards AI which can be explored in future. Nevertheless, it is essential to continue monitoring gender dynamics in AI adoption to ensure equitable access and opportunities for all librarians.

Finally, this study investigated the interrelationships between AI literacy, AI ethics, AI self-efficacy among college librarians. It is found that there is a positive correlation between these variables, indicating librarians with higher levels of AI literacy tend to exhibit greater ethical awareness, self-efficacy, in utilizing AI tools, and overall competency in navigating AI-related challenges. These findings underscore the importance of comprehensive AI education and training programs for librarians, encompassing not only technical skills but also ethical considerations and self-confidence in applying AI solutions.

## **7 Limitations and Future Work**

Several limitations need to be mentioned in regard to the empirical study presented in this paper. The sample was collected online and is specific to college librarians who work in Assam, India. Also, not all items of the original AI literacy questionnaire was used for the study.

Future research should aim to investigate the factors that facilitate or hinder librarians' adoption of AI, gaps in librarians' AI-related skill and competencies, impact of librarians' engagement with AI on library services, user experiences, and outcomes, and explore the ethical implications of AI adoption in library settings.

## **8 Conclusion**

In conclusion, this research contributes to a better understanding of college librarians' engagement with AI, highlighting the need for tailored interventions to support AI adoption and proficiency within the profession. By addressing factors influencing engagement, monitoring gender dynamics, and promoting the development of AI literacy, ethics, self-efficacy, and competency, stakeholders can empower college librarians to effectively leverage AI technologies in advancing information services and scholarly pursuits.

The union of librarianship and AI presents a dynamic future for information access and management. AI offers a powerful toolkit for streamlining tasks, personalizing user experiences, and expanding access to knowledge. However, careful consideration must be given to potential biases within AI systems and the evolving role of librarians. By fostering human-AI collaboration, libraries can leverage the strengths of both to create a more equitable and efficient information ecosystem. As AI continues to evolve, ongoing research and adaptation plays a crucial role to ensure libraries remain vibrant hubs of learning and discovery in the digital age. The future of librarianship lies not in resistance to AI, but in harnessing its potential to empower both librarians and information seekers in a world brimming with knowledge.

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