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AI literacy among librarians in Qom: a case study in Iran

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Introduction

The emergence of Artificial Intelligence (AI) represents one of the most revolutionary technological developments in recent decades. This transformation, particularly marked by the introduction of generative AI such as ChatGPT in late 2022, has attracted widespread attention and sparked extensive debate regarding its impact on various aspects of human life.

Artificial Intelligence (AI) refers to the use of computers and technology to simulate intelligent behaviour and critical thinking comparable to that of a human. The term was first coined by John McCarthy in 1956, who described it as the science and engineering of creating intelligent machines. Consequently, AI cannot be regarded as a new concept[1].

This technology possesses the capability to analyse data, process natural language, and generate content, with applications observed across diverse fields, including healthcare, education, transportation, and commerce[1].

Libraries have not been exempt from these transformations. This shift is particularly relevant in the field of library and information science (LIS), where artificial intelligence presents both challenges and opportunities that warrant careful consideration[2].

AI-based analytics can offer insights into user behaviour and preferences, supporting collection development and resource allocation[3]. The use of systems such

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1 Peng-Ran Liu [*et al.*], *Application of artificial intelligence in medicine: an overview*, «Current medical science», 41 (2021), n. 6, p. 1105-1115, DOI: 10.1007/s11596-021-2474-3; Giovanni Briganti, *Artificial intelligence: an introduction for clinicians,* «Revue des maladies respiratoires», 40 (2023), n. 4, p. 308-313, DOI: 10.1016/j.rmr.2023.02.005.

2 Elizabeth Tait; Cameron M Pierson, *Artificial intelligence and robots in libraries: opportunities in LIS curriculum for preparing the librarians of tomorrow*, «Journal of the australian library and information association», 71 (2022), n. 3, p. 256-274, DOI: 10.1080/24750158.2022.2081111.

3 Abid Fakhre Alam [*et al.*], *AI literacy and Zambian librarians: a study of perceptions and applications*, «Open information science», 8 (2024), n. 1, p. 1-13, DOI: 10.1515/opis-2022-0166.

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as Andisearch and Radio Frequency Identification (RFID) exemplifies practical applications of this technology in libraries, resulting in time savings and enhanced operational efficiency[4]. Furthermore, artificial intelligence can analyse user behaviour and offer personalised services based on individual preferences[5].

Despite librarians' enthusiasm for artificial intelligence[6], there are also concerns regarding its implementation. Issues such as privacy, data security, algorithmic bias, and threats to job security are among the primary challenges associated with this technology[7]. These concerns are particularly significant in libraries, whose mission is to ensure fair and impartial access to information[8]. It is therefore entirely reasonable for librarians to develop an understanding of artificial intelligence in order to acquire the necessary skills for its effective use and to guide users accordingly[9].

This brings the concept of artificial intelligence literacy to the forefront. Although a universally accepted definition has not yet been established[10], artificial intelligence literacy is commonly defined as «a set of competencies that enables individuals to critically evaluate artificial intelligence technologies, interact with artificial intelligence,

4 ALA, <https://www.ala.org/future/trends/artificialintelligence>; Muhammad Asim [*et al.*], *Investigating applications of artificial intelligence in university libraries of Pakistan: an empirical study*, «Journal of academic librarianship», 49 (2023), n. 6, p. 102803, DOI: 10.1016/j.acalib.2023.102803; Shivaranjini Mogali, *Artificial intelligence and its applications in libraries*, «In conference: bilingual international conference on information technology: yesterday, today and tomorrow», Ministry of defence Delhi: at defence scientific information and documentation centre, 2014, p. 1-11.; A Subaveerapandiyan; Alfian Akbar Gozali, *AI in Indian libraries: prospects and perceptions from library professionals*, «Open information science», 8 (2024), n. 1, p. 1-13, DOI: 10.1515/opis-2022-0164.

5 Adebowale Jeremy Adetayo, *Conversational assistants in academic libraries: enhancing reference services through bing chat*, «Library hi tech news», vol. ahead-of-print (2023), n. ahead-of-print, DOI: 10.1108/LHTN-08-2023-0142.

6 Dessy Harisanty [*et al.*], *Leaders, practitioners and scientists' awareness of artificial intelligence in libraries: a pilot study*, «Library hi tech», 42 (2024), n. 3, p. 809-825, DOI: 10.1108/lht-10-2021-0356; Barbara A. Wood; David Evans, *Librarians' perceptions of artificial intelligence and its potential impact on the profession*, «Computers in libraries», 38 (2018), n. 1, p. 1-10, <http://www.infotoday.com/cilmag/jan18/Wood-Evans—Librarians-Perceptions-of-ArtificialIntelligence.shtml>.

7 Yuan-Ho Huang, *Exploring the implementation of artificial intelligence applications among academic libraries in Taiwan*, «Library hi tech», 42 (2024), n. 3, p. 885-905, DOI: 10.1108/LHT-03-2022-0159; Maya C. Jackson, *Artificial intelligence & algorithmic bias: the issues with technology reflecting history & humans*, «J bus & tech l», 16 (2021), n. 2, p. 299-316, <https://digitalcommons.law.umaryland.edu/jbtl/vol16/iss2/5>; Lama H. Nazer [*et al.*], *Bias in artificial intelligence algorithms and recommendations for mitigatio*, «PLOS digital health», 2 (2023), n. 6, p. 1-14, DOI: 10.1371/journal.pdig.0000278; Josiah Chukwumaobi Nworie; Veronica Añunobi Chinwe, *Current trends in librarianship: african perspective*. Nigeria: Kranos media publishers, 2022.

8 Helena Olsson [*et al.*], *Developing a human rights library*. Lund: Raoul Wallewnberg institute, 2015.

9 Leo S. Lo, *Evaluating AI literacy in academic libraries: a survey study with a focus on U.S employees*, «College & research libraries», 85 (2024), n. 5, p. 1-61, DOI: 10.5860/crl.85.5.635; A. Adetayo, *Conversational assistants in academic libraries: enhancing reference services through Bing Chat* cit.

10 Stefka Tzanova, *AI in academic libraries: success, pitfalls, perceptions, and why we need AI literacy*. In: Applications of artificial intelligence in libraries, Iman Khamis. IGI global: Hershey, PA, 2024, p. 19-44, DOI: 10.4018/979-8-3693-1573-6.ch002.

collaborate effectively, and use artificial intelligence as an online tool at home and in the workplace»[11].

The successful integration of artificial intelligence technologies into library services depends on the AI literacy of librarians and information professionals. Those who are willing to adapt tend to embrace artificial intelligence, while those resistant to change often oppose its adoption[12].

Nevertheless, librarians and information professionals are the best individuals to promote artificial intelligence literacy. In this context, examining and analyzing the opinions and experiences of Iranian librarians in this field can help in better understanding the existing challenges and opportunities, and provide solutions for improving the integration of artificial intelligence in library services. Several studies have explored artificial intelligence literacy among librarians[13].

For example, a study conducted among librarians in Zambia revealed that they possess a solid understanding of the principles of artificial intelligence and maintain a positive attitude towards its benefits in library services. However, challenges remain, including the need to enhance expertise, resistance to change, and budgetary constraints[14]. Similarly, a study on Indian librarians' perspectives regarding the use of artificial intelligence in libraries indicated that, while they are aware of its advantages and challenges, they express concerns about the replacement of human intelligence, as well as issues related to privacy, funding, and alignment with institutional goals[15].

Despite global attention to artificial intelligence, no significant research has yet been conducted on the perspectives of Iranian librarians in this area. Iran ranks as the second country in terms of scientific production in the Middle East[16]. With the increasing expansion of artificial intelligence (AI) across various fields, such as clinical research, agriculture, and education, these technologies are permeating multiple aspects of social and economic life[17]. However, numerous barriers hinder the effective and successful implementation of AI in educational and research contexts.

11 Duri Long; Brian Magerko, *What is AI literacy? Competencies and design considerations*. In: *CHI ' 20: Proceedings of the 2020 CHI conference on uuman factors in computing systems*. Honolulu, HI, USA, 2020, p. 1-16, DOI: 10.1145/3313831.3376727.

12 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

13 S. Tzanova, *AI in academic libraries: success, pitfalls, perceptions, and why we need AI literacy* cit.; J. Adetayo, *Conversational assistants in academic libraries: enhancing reference services through Bing Chat* cit.; A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

14 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

15 S. Mogali, *Artificial intelligence and its applications in libraries* cit.

16 Scimago journal & country rank. 2025, <https://www.scimagojr.com/> (ultima consultazione: 16/04/2025).

17 Sheshadri Chatterjee; Kalyan Kumar Bhattacharjee, *Adoption of artificial intelligence in higher education: a quantitative analysis using structural equation modelling*, «Education and information technologies», 25 (2020), n. 5, p. 3443–3463, DOI: 10.1007/s10639-020-10159-7; Jia-Cing Liang [*et al.*], *Roles and research foci of artificial intelligence in language education: an integrated bibliographic analysis and systematic review approach*, «Interactive learning environments», 31 (2021), n. 7, p. 4270–4296, DOI: 10.1080/10494820.2021.1958348; Julian Varghese, A*rtificial intelligence in medicine: chances and challenges for wide clinical adoption*, «Visceral medicine», 36 (2020), n. 6, p. 443–449, DOI: 10.1159/000511930; P.R. Liu [*et al.*], *Application of artificial intelligence in medicine: an overview* cit.

One of the major issues faced by researchers is the restrictions imposed by AI companies on certain geographic regions, including Iran, which limits Iranian scholars' access to innovative technologies and their ability to participate more prominently in the international arena. In addition to external restrictions, such as sanctions and geo-blocking, domestic factors, including internet filtering and surveillance policies, may also impede access to AI tools. For instance, low internet speeds, often attributed to domestic infrastructure policies, pose a significant challenge for users attempting to access AI technologies. Even the use of geo-restriction circumvention tools, such as VPNs, requires high-speed internet for a stable and effective connection[18], which may not be readily available to many users. This situation can hinder access to AI tools, even for those attempting to bypass restrictions through unofficial means. Nevertheless, the primary barriers stem from international restrictions, while domestic policies play an indirect role, largely shaped by geopolitical challenges.

This study examines AI literacy in a country subject to such restrictions, clearly highlighting the existing challenges and barriers in this field. By comparing the results of this research with those from non-sanctioned countries, a better understanding of the impact of sanctions on the development and adoption of AI in Iran can be achieved. This innovative approach represents a strength in the study of AI literacy among Iranian librarians, helping to identify the needs and opportunities for improving AI literacy in the country. Ultimately, this research may serve as a valuable resource for policymakers and educational administrators in planning and implementing effective strategies for the advancement of AI literacy in Iran.

Objectives

The objectives of this research are designed to provide insight into the current landscape of AI as it relates to the field of librarianship in Iran. Specifically, the study aims to:
– evaluate the level of understanding of artificial intelligence among Iranian librarians;
– examine their attitudes and perceptions towards artificial intelligence in library settings;
– assess their competencies and awareness regarding artificial intelligence tools;
– identify the perceived benefits of integrating artificial intelligence into library operations.

Literature review

To conduct the literature review, searches were performed using well-known academic databases such as Scopus and Web of Science. The search strategy was based on relevant keywords including 'AI literacy', 'artificial intelligence literacy', and 'librarian', in order to identify the most pertinent studies in the field. The selection of articles was guided by their relevance to the research objectives, recency, and contribution to the understanding of AI literacy among librarians. It is important to note that this review does not claim to be exhaustive, but rather focuses on a curated list of key articles that provide valuable insights into the topic.

The integration of artificial intelligence (AI) into library services has become a critical focus in contemporary librarianship, highlighting the necessity for librarians to develop AI literacy. As academic institutions increasingly recognise the importance

18 Avani J. Patel; Ankita Gandhi, *A survey of VPN performance evaluation*, «International journal on recent and innovation trends in computing and communication», 5 (2017), n. 5, p. 409–413, DOI: 10.17762/ijritcc.v5i5.534.

of AI education, librarians emerge as pivotal figures in promoting AI literacy among various stakeholders[19]. Current literature establishes that academic librarians possess extensive experience in delivering information, digital, and media literacy training, making them well-suited to facilitate AI literacy initiatives. Their roles encompass educating patrons about AI's implications, thereby ensuring the responsible and effective use of AI technologies within educational environments.

A study conducted in Zambia[20], which explored librarians' perceptions and applications of AI, revealed a solid understanding of AI fundamentals. While Zambian librarians recognised the potential benefits of AI in enhancing library services, they also faced challenges such as a lack of expertise and budgetary constraints. This underscores the need for targeted training and support to empower librarians to effectively leverage AI technologies in their work.

Comparative studies across regions, such as an exploratory analysis conducted in Malaysia and Indonesia[21], show that librarians generally assess AI support positively in terms of enhancing learning experiences, promoting lifelong learning, and advancing digital literacy. This research not only highlights the favourable views of librarians regarding AI's potential but also provides empirical evidence that can guide investments in AI technologies within libraries. The development of a measurement scale for assessing AI support further contributes to the discourse on how libraries can strategically implement AI solutions.

The impact of AI literacy on work performance is particularly significant in specialised contexts such as medical librarianship[22]. A study investigating the perceived AI literacy among head medical librarians in Pakistan found a strong positive relationship between AI literacy and work performance. These findings suggest that enhancing AI-related skills among medical librarians can lead to improved service delivery and operational efficiency. The research emphasises the importance of investing in AI training and support mechanisms to facilitate the successful integration of AI within medical libraries.

In this context, recent research has explored the perspectives of Indian library professionals regarding AI adoption in libraries[23]. Findings reveal that, while professionals recognise AI's potential benefits, they express concerns about its capacity to replace human roles. Primary challenges include user privacy concerns, funding constraints, staff competency gaps, and institutional alignment issues. Furthermore, the study identifies ethical considerations, such as algorithmic bias, intellectual freedom, and transparency, as significant barriers to implementation.

19 Plamen Miltenoff, *Academic librarians in times of AI and AI literacy: tasks, responsibilities, and leadership*, «The international information & library review», 56 (2024), n. 3, p. 296-305, DOI: 10.1080/10572317.2024.2381182.

20 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

21 Fitri Mutia [*et al.*], *An exploratory comparative analysis of librarians' views on AI support for learning experiences, lifelong learning, and digital literacy in Malaysia and Indonesia,* «Publications», 12 (2024), n. 3, p. 1-13, DOI: 10.3390/publications12030021.

22 Shahzeb Mughari; Ghulam Murtaza Rafique; Muhammad Asif Ali, *Effect of AI literacy on work performance among medical librarians in Pakistan,* «Journal of academic librarianship», 50 (2024), n. 5, p. 102918, DOI: 10.1016/j.acalib.2024.102918.

23 A Subaveerapandiyan; A. Akbar Gozali, *AI in Indian libraries: prospects and perceptions from library professionals* cit.

An investigation assessing AI literacy among Master of Library Science (MLS) students in India found mixed perspectives[24]. While students demonstrated optimism about AI's potential to enhance library services, they also voiced concerns regarding ethical implications and the potential for job displacement within the profession.

Recent findings[25] indicate a moderate understanding of AI concepts among academic library employees, alongside limited practical experience with AI tools and gaps in ethical discussions and collaboration. Despite recognising AI's potential benefits, there is a low level of readiness for implementation. The study highlights the need for comprehensive training and the establishment of ethical guidelines to support the effective integration of AI in library services.

Another recent study[26] examined the use of AI and related technologies in public and academic libraries in North America. It found that academic librarians were more aware of and more likely to use these technologies, while public librarians held more positive views of them. Overall, 67% of librarians believed that AI and related technologies could transform the way libraries function, and 68% reported having received training in this area. The study underscores the role of librarians in preparing for the challenges posed by emerging technologies and their evolving roles in the digital era.

In summary, the existing literature highlights the critical role of AI literacy in empowering librarians across various domains. From enhancing educational services to improving work performance, the promotion of AI literacy is essential for librarians to effectively navigate the complexities of modern information management. As the field continues to evolve, ongoing research and investment in AI literacy training will be vital to ensure that librarians remain competent and capable in an increasingly AI-driven landscape.

Methodology

This applied research employs a descriptive survey method with a quantitative approach to investigate the perspectives of the target population. The statistical population comprises 75 librarians from 24 public libraries and 33 academic librarians from seven universities in the city of Qom. These universities include Qom University, Industrial University, Hazrat Masoumeh (SA) University, Teacher Training University, Qom University of Medical Sciences, Islamic Republic of Iran Broadcasting University, and Payame Noor University.

Sampling was conducted using a census method to ensure the inclusion of all librarians in these institutions, resulting in 72 participants (66.66%) taking part in the study. This response rate is significantly higher than the average online survey response rate of 44.1%[27], indicating that the required threshold for data collection was met and supporting the validity and reliability of the findings.

24 A Subaveerapandiyan [*et al.*], *Fostering AI literacy for future librarians*, «College & Undergraduate Libraries», 32 (2024) n. 2, p 1-25, DOI: 10.1080/10691316.2024.2425092.

25 L. Lo, *Evaluating AI Literacy in Academic Libraries* cit.

26 Jung Won Yoon; James E. Andrews; Heather L. Ward, *Perceptions on adopting artificial intelligence and related technologies in libraries: public and academic librarians in North America*, »Library hi tech«, 40 (2022), n. 6, p. 1893-1915, DOI: 10.1108/LHT-07-2021-0229.

27 Meng-Jia Wu; Kelly Zhao; Francisca Fils-Aime, *Response rates of online surveys in published research: a meta-analysis*, «Computers in human behavior reports», 7 (2022), p. 1-11, DOI: 10.1016/j.chbr.2022.100206.

The data collection tool was an online questionnaire adapted from a previous study[28] and translated into Persian. The questionnaire, created using an Iranian online platform[29], included Likert-scale questions and was distributed via online networks such as WhatsApp and Telegram. It comprised several sections: demographic information; assessment of AI literacy among Iranian librarians (10 questions); awareness and skills related to AI applications for library advancement (10 questions); perceived benefits of implementing AI in library services; and anticipated challenges in adopting AI technologies (10 questions).

The questionnaire was distributed over a one-month period, from 20 November to 20 December 2024, allowing ample time for responses. The collected data were analysed using SPSS (version 2021) and Excel (2022). The reliability of the questionnaire was assessed using Cronbach's alpha, a coefficient that measures the internal consistency of a psychometric instrument—particularly suitable for cross-sectional studies. This index assumes that all test items measure the same underlying construct equally, extrapolating the reliability of a single item across the entire scale[30]. The obtained value of 0.89 indicates excellent reliability, suggesting strong consistency among the questionnaire items.

Statistical methods such as analysis of variance (ANOVA) were used to compare the means of different groups (e.g. gender, education level, and library type) in terms of awareness and attitudes towards artificial intelligence. The significance level (p-value) was used to determine whether differences were statistically significant, with values below 0.05 considered significant. Standard deviation (SD) was also calculated to indicate the degree of dispersion of responses around the mean, with an SD of 1 suggesting relatively low variability.

Results

Demographic Information

The demographic profile of librarians working in academic and public libraries in Iran reveals a predominantly female workforce, with a wide range of experience levels and professional roles. Female respondents accounted for 72% of the total, indicating a notable gender imbalance. In terms of professional experience, 17% of participants reported having between 6 and 10 years of experience, while 71% had more than a decade of service. Regarding educational qualifications, the majority of respondents (76%) held graduate degrees, while 18% had completed undergraduate studies. Among the 33 academic librarians, 90% participated in the survey, compared to 56% of the 75 public library librarians.

28 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

29 Porsline, <https://survey.porsline.ir>.

30 Carlos G. Forero, *Cronbach' s alpha*. Springer: Encyclopedia of quality of life and well-being research, 2014, p. 1357–1359, DOI: 10.1007/978-94-007-0753-5_622.

Demography		Item	Respondents	Percentage
Gender		Male	20	28%
		Female	52	72%
Experience	0–2 years	Male 0	4	6%
		Female 4		
	3–5 years	Male 1	5	7%
		Female 4		
	6–10 years	Male 2	12	17%
		Female 10		
	More than 10 years	Male 17	51	71%
		Female 34		
Academic degree	Undergraduate	Male 5	13	18%
		Female 8		
	Graduate (Master's)	Male 12	55	76%
		Female 43		
	PhD	Male 3	4	6%
		Female 1		
Librarian type	Public library (N=75)	Male 7	42	56%
		Female 35		
	Academic Librarian(N=30)	Male 13	30	90.9%
		Female 17		

Figure 1 - Demographic characteristics of Qom librarians

AI Knowledge and Awareness

The data presented in Figure 2 offer a comprehensive snapshot of respondents' perspectives on artificial intelligence within library settings. The survey explored various aspects of AI knowledge, attitudes, and perceptions. Overall, respondents demonstrated a strong inclination to learn more about AI and its applications in libraries. They expressed a high willingness to engage with the topic (mean = 4.4, SD = 1.0), recognised its potential to improve library services (mean = 4.4, SD = 1.1), and showed interest in exploring its implications (mean = 4.3, SD = 1.0). Optimism about the future of AI in libraries was also notably positive (mean = 4.3, SD = 1.0).

However, alongside this enthusiasm, respondents acknowledged potential challenges. They recognised that AI could introduce new difficulties in library contexts (mean = 3.8, SD = 1.4) and expressed concern about its possible malicious use (mean = 3.2, SD = 1.1). Despite these concerns, the overall outlook towards AI's capabilities and its impact on library services remained favourable.

While respondents reported a reasonable understanding of AI (mean = 3.3, SD = 1.1), their confidence in explaining AI concepts to others was slightly lower (mean = 3.2, SD = 1.2). Similarly, familiarity with specific types of AI—such as machine learning and natural language processing—was present but moderate (mean = 3.0, SD = 1.3), indicating room for improvement.

In summary, the findings reflect a generally positive and open attitude towards AI in libraries, coupled with a nuanced awareness of its potential challenges. The statistically significant results suggest a strong interest in further exploring AI's role in library services and highlight the need to enhance understanding and communication about this technology among library professionals and stakeholders.

Attitudes Towards AI in Library Settings	Mean	SD	T-value	P-value
I am willing to learn more about AI and its applications in libraries	4.4	1.0	7.2	<0.001
I believe that AI has the potential to improve library services	4.4	1.1	7.0	
I am interested in learning more about the ethical implications of AI	4.3	1.0	7.3	
I am optimistic about the future of AI in libraries	4.3	1.0	7.2	
Believe that AI has the potential to create new challenges for libraries	3.8	1.4	3.2	
I have a good understanding of what AI is	3.3	1.1	1.7	
I am concerned about the potential for AI to be used for malicious purposes	3.2	1.1	1.0	
I am confident that I can explain AI to a colleague or friend	3.2	1.2	0.8	
I am familiar with some types of AI, such as machine learning and natural language processing	3.0	1.3	0.0	
I know how AI is being used in libraries today	2.6	1.2	-1.8	

Figure 2 - Attitudes towards AI in Qom librarians

AI Impact on libraries

Figure 3 illustrates participants' perceptions and competencies regarding the application of AI for library advancement. Respondents expressed strong agreement with the idea that AI can improve the accessibility of library resources (mean = 3.7, SD = 1.4) and showed enthusiasm about its potential to transform library services (mean = 3.3, SD = 1.3). They reported feeling relatively comfortable using AI tools in their work (mean = 3.1, SD = 1.4) and moderately confident in communicating the benefits and risks of AI to users (mean = 3.0, SD = 1.3).

Awareness of the ethical implications of AI use in libraries was also notable (mean = 2.9, SD = 1.3), as was moderate familiarity with AI applications such as virtual assistants, personalisation, and cataloguing (mean range = 2.4 to 2.8, SD = 1.3 to 1.4). Participants demonstrated a moderate understanding of AI's role in automating user engagement analysis (mean = 2.8, SD = 1.3), along with moderate competence in evaluating the accuracy and reliability of AI tools (mean = 2.6, SD = 1.3).

Overall, the data reflect strong positive perceptions and moderate-to-high competencies across various AI applications in libraries. These findings underscore a consistent belief among participants in the potential of AI and its practical implications for enhancing library services.

Perceptions and Competence in AI Applications for Library Advancement	Mean	SD	T-value	P-value
I believe that AI can be used to improve the accessibility of library resources.	3.7	1.4	2.7	
I am excited about the potential for AI to transform library services	3.3	1.3	1.4	
I am comfortable using AI tools and resources in my work.	3.1	1.4	0.4	
I can communicate AI's benefits and risks to library users.	3.0	1.3	-0.1	
I can identify the ethical implications of using AI in libraries	2.9	1.3	-0.3	
I know the potential for AI to be used for chatbots and other virtual assistants in libraries.	2.8	1.4	-0.9	0.729
I know how AI is applied to automate the process of analyzing user engagement with library resources for better insights and decision-making.	2.8	1.3	-0.7	
I know how AI is being used to personalize library recommendations.	2.6	1.3	-1.5	
I can evaluate the accuracy and reliability of AI-powered tools and resources.	2.6	1.3	-1.7	
I am familiar with how AI is used for tasks such as cataloguing and classification.	2.4	1.3	-2.5	

Figure 3 - Perceptions and competence in AI applications for Qom libraries advancement

Perceived benefits of AI implementation in libraries services

Figure 4 highlights the perceived benefits of AI implementation in library services, as reported by library and information science (LIS) professionals. Most respondents recognised the potential advantages, with the highest levels of agreement relating to automating routine tasks, improving accessibility, and promoting lifelong learning (66.7%). Other perceived benefits included enabling advanced data analysis (62.5%), creating virtual assistants (61.1%), enhancing search and retrieval of information, personalising user experiences (59.7%), providing personalised recommendations (54.2%), and protecting intellectual property (45.8%).

However, not all respondents shared the same views, with 23.6% expressing uncertainty or no opinion. Overall, the data underscore a collective recognition of AI's potential to enhance library services by improving access to information, personalising user experiences, and automating routine operations, while also supporting lifelong learning and safeguarding intellectual property.

Perceived Benefits of AI in Qom Libraries Services	Respondents	Percentage
Enhancing search and retrieval of information	43	59.7
Personalizing user experiences	43	59.7
Automating routine tasks	48	66.7
Enabling advanced data analysis	45	62.5
Providing personalized recommendations	39	54.2
Creating virtual assistant	44	61.1
Improving accessibility	48	66.7
Protecting intellectual property	33	45.8
Promoting lifelong learning	48	66.7

Figure 4 - Perceived benefits of AI implementation in Qom libraries services (N=72)

Anticipated challenges in adopting AI technologies in libraries

Figure 5 presents the anticipated challenges associated with adopting AI technologies in libraries, based on responses from LIS professionals. The most frequently cited challenges include budget constraints for AI integration (59.7%), issues related to data quality and availability (59.7%), and concerns about algorithmic bias (58.3%).

Conversely, the least acknowledged challenge was a lack of awareness of any issues, reported by 27.8% of respondents. These findings highlight the practical and ethical concerns that may hinder the effective implementation of AI in library environments. Further details are illustrated in the figure.

Challenges in Implementing AI Technologies in Libraries	Respondents	Percentage
Budget constraints for AI integration	43	59.70
Data quality and availability	43	59.70
Bias	42	58.30
Resistance to change from traditional methods	41	56.90
Lack of AI expertise among library staff	39	54.20
Staff training	38	52.80
Regulation	36	50.00
Privacy and security concerns	34	47.20
Interpretability	34	47.20

Figure 5 - Anticipated challenges in adopting AI technologies in Qom libraries (N = 72)

Demographic information and AI literacy components

The findings revealed that women exhibited a more positive attitude towards artificial intelligence (AI) (mean = 3.71) compared to men (mean = 3.44), although the variation in attitudes was greater among men (SD = 1.19). In terms of skills and abilities, women scored slightly higher (mean = 2.89) than men (mean = 2.80), though this difference was not statistically significant. Women also anticipated more challenges (mean = 3.56) than men (mean = 3.13), yet this difference was likewise not significant.

Across age groups, individuals with 0–2 years of work experience reported the highest mean scores in attitude (4.13), awareness (3.27), and perceived benefits (3.90). However, no statistically significant differences were observed among the age groups. Regarding educational background, participants with a master's degree demonstrated a more positive attitude (mean = 3.83) than those with a bachelor's degree (mean = 3.14), and also showed higher levels of awareness and skills (mean = 3.01 vs. 2.44).

In terms of library type, attitudes towards AI were more positive among academic librarians (mean = 3.90) than public librarians (mean = 3.65). Academic library staff also reported higher levels of awareness and skills (mean = 3.45), whereas public library staff showed a better understanding of AI's benefits (mean = 3.55). Overall, no significant differences were found in the perception of challenges across demographic groups. The only statistically significant difference ($p < 0.05$) was observed in attitudes and AI literacy based on education level. Further details are provided in Figure 6.

Items	Attitude	Awareness & skills	Perceived benefits	Challenges	P-value
Gender (Female VS Male)	3.7057 vs 3.4429	2.8857 vs 28000	3.5114 vs 3.5714	3.5600 vs 3.1286	p>0.05
Years of experience (library)	4.1333	3.2667	3.9000	3.5000	p>0.05
Academic degree (Undergraduate, Graduate (Master's), PhD)	3.8250 vs 3.1400	3.0063 vs 2.4400	3.7188 vs 3.1400	Not significant	P<0.05
Librarian type (Public library, Academic Librarian)	3.9000 vs 3.6500	3.4500 vs 2.8400	3.0000 vs 3.5475	3.9500 vs 3.4650	p>0.05

Figure 6 - Mean scores of demographic factors and AI literacy indicators

Discussion

Figure 1 provides an overview of the demographic characteristics of librarians in Qom. The findings indicate a predominance of female librarians, which aligns with broader societal trends[31]. Librarianship is widely recognised as a female-dominated profession, with male librarians comprising approximately 18% of the workforce across various library types[32]. However, some studies have reported male dominance

31 Kalpana Dasgupta, *Women as managers of libraries: a developmental process in India*, «IFLA Journal», 24 (1998), n. 4, p. 245–249, DOI: 10.1177/034003529802400406.

32 Aubrey Iglesias; *Charlotte gard, pursuing academic librarianship: gender identity and factors affecting job attainment*, «The journal of academic librarianship», 49 (2023), n. 6, DOI: 10.1016/j.acalib.2023.102806.

in the field[33], which contrasts with the present findings and may be attributed to cultural, social, economic, or organisational factors.

Figure 2 presents an overview of attitudes towards AI among Qom librarians. The rise of computer processing power, big data, and machine learning has driven AI developments across several library sectors[34]. Professionals in this study demonstrated a commendable understanding of and positive attitudes towards AI in libraries[35]. Their familiarity with AI concepts and applications is consistent with findings from similar studies. Nevertheless, despite their optimism, concerns about the potential misuse of AI reflect broader apprehensions found in the wider discourse on emerging technologies[36]. This cautious optimism is a notable feature of their attitudes.

Figure 3 illustrates perceptions and competencies related to AI applications for library advancement in Qom. The findings reflect a positive trend in AI literacy, with respondents showing familiarity with AI concepts, particularly in areas such as virtual assistants, personalisation, cataloguing, and classification. These observations are consistent with previous research[37].

Figure 4 outlines the perceived benefits of AI implementation in Qom libraries. Most respondents recognised the advantages of automating routine tasks, improving accessibility, and promoting lifelong learning. The study by Mutia et al. (2024) similarly found that librarians generally view AI support positively in terms of enhancing learning experiences and lifelong learning. Zambian librarians also acknowledged AI's potential to enhance library services[38]. Likewise, previous finding[39] indicate that Filipino librarians tend to view AI as an opportunity rather than a threat and are open to training for its integration into their workflows—reflecting similar sentiments.

Figure 5 summarises the anticipated challenges in adopting AI technologies in Qom libraries. Key concerns include budget constraints, data quality and availability, and algorithmic bias. These findings align with existing literature[40], which identifies similar challenges, including privacy and security concerns and resistance to technological change among some professionals.

33 A Subaveerapandiyan; A. Akbar Gozali, *AI in Indian libraries: prospects and perceptions from library professionals* cit.

34 Siguo Bi [*et al.*], *A survey on artificial intelligence aided internet-of-things technologies in emerging smart libraries*, «Sensors», 22 (2022), n. 8, p. 2991, DOI: 10.3390/s22082991.

3 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.; F. Mutia [*et al.*], *An exploratory comparative analysis of librarians' views on AI support for learning experiences, lifelong learning, and digital literacy in Malaysia and Indonesia* cit.; J. W. Yoon; J. E. Andrews; H. L. Ward, *Perceptions on adopting artificial intelligence and related technologies in libraries: public and academic librarians in North America* cit.

36 A Subaveerapandiyan [*et al.*], *Fostering AI literacy for future librarians* cit.

37 Adeyinka Tella; Oluwole Akanmu Odunola; Lawal WO, *Cataloguing and classification in the era of artificial intelligence: benefits, and challenges from the perspective of cataloguing librarians in Oyo State, Nigeria*, »Vjesnik bibliotekara hrvatske«, 66 (2023), n. 1, p. 159-176, DOI: 10.30754/vbh.66.1.1031.

38 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit.

39 Lady Catherine R. De Leon; Lejempf V. Flores; Anna Rita L. Alomo, *Artificial intelligence and Filipino academic librarians: perceptions, challenges and opportunities*, »Journal of the Australian library and information association«, 73 (2024), n. 1 p. 66-83, DOI: 10.1080/24750158.2024.2305993.

40 A Subaveerapandiyan; A. Akbar Gozali, *AI in Indian libraries: prospects and perceptions from library professionals* cit.

Figure 6 presents an analysis of demographic variables and their relationship to AI literacy. Gender-based patterns emerged, with women demonstrating more positive attitudes towards AI than men, although men showed greater variability in their responses. These results are consistent with a study conducted in Nigeria, which found that female librarians in academic libraries had more positive attitudes and made greater use of AI tools[41]. The Nigerian researchers suggested that motivations such as empowerment, career advancement, and complementary roles may explain these findings.

Librarians with less work experience reported the highest average scores in attitude, awareness, and understanding of AI benefits, suggesting that newer professionals may be more receptive to AI due to recent exposure to the technology. However, the absence of statistically significant differences across age groups indicates that acceptance of AI is not limited to early-career professionals.

Participants with a master's degree exhibited more positive attitudes and higher levels of awareness and skills compared to those with a bachelor's degree, highlighting the role of advanced education in fostering AI literacy. Academic library staff also demonstrated more positive attitudes and greater awareness and skills than their counterparts in public libraries[42], likely due to the research-oriented nature of academic environments. In contrast, public library staff showed a stronger understanding of AI's benefits, possibly reflecting their focus on enhancing public services through technology.

No significant differences were observed in perceived challenges across demographic groups, suggesting that barriers to AI integration are widely recognised. This finding is consistent with literature identifying common obstacles such as budget limitations, varying attitudes, and a lack of technical skills[43]. Tailored professional development programmes can help address these differences and support the effective integration of AI into library services.

All findings were obtained in a context where access to AI tools such as ChatGPT and Gemini is restricted in countries like Iran, due to privacy and cybersecurity concerns[44]. Users in these regions often rely on VPNs to access such tools. With the removal of these restrictions and improvements in digital infrastructure, it is anticipated that AI adoption and usage in these areas will increase.

Conclusions

This study highlights the perceptions and awareness of Qom librarians regarding AI technologies in library services. While Iranian library professionals exhibit a generally positive disposition towards AI, addressing the identified challenges is essential for successful integration. Ongoing education, investment in resources, and a strong emphasis on ethical considerations will be crucial to harness the full potential of AI in enhancing library services. The study contributes valuable insights into the evolving

41 Imelda Barong Edam-Agbor [*et al.*], *Librarians' awareness, acceptability, and application of artificial intelligence in academic research libraries. multigroup analysis via PLS SEM*, «Social sciences & humanities open», 11 (2025), n. 1, p. 1-16, DOI: 10.1016/j.ssaho.2025.101333.

42 J. W. Yoon; J. E. Andrews; H. L. Ward, *Perceptions on adopting artificial intelligence and related technologies in libraries: public and academic librarians in North America* cit.

43 A. Alam [*et al.*], *AI literacy and Zambian librarians* cit. L. Lo, *Evaluating AI Literacy in Academic Libraries* cit.

44 Gemini apps help, <https://support.google.com/gemini/answer/13575153>; OpenAI, <https://help.openai.com/en/articles/7947663-chatgpt-supported>.

landscape of library science in Iran and underscores the importance of proactive engagement with AI technologies in shaping the future of the profession.

Limitations

This study has some limitations. Firstly, it is a case study focused on a single city, indicating the need for further research in other regions to enhance generalisability. Secondly, many AI tools are not readily accessible in Iran, which may have influenced the level of usage and, consequently, the opinions of participants.

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Alfabetizzazione all'intelligenza artificiale tra i bibliotecario di Qom: un caso di studio in Iran

Questo studio analizza l'alfabetizzazione all'intelligenza artificiale (IA) tra i bibliotecari, concentrandosi sulle loro percezioni e sull'applicazione dell'IA nei servizi bibliotecari. Utilizzando un metodo di indagine descrittiva, la ricerca ha coinvolto 75 bibliotecari di 24 biblioteche pubbliche e 33 bibliotecari accademici di sette università a Qom, con un totale di 72 partecipanti (66,66%) che hanno risposto. I dati sono stati raccolti tramite un questionario online, adattato e tradotto in persiano. Il questionario includeva informazioni demografiche e quattro componenti relative all'alfabetizzazione all'intelligenza artificiale. I bibliotecari hanno mostrato interesse per l'IA, esprimendo il desiderio di approfondirne la conoscenza e credendo nel suo potenziale per migliorare i servizi bibliotecari. Pur riconoscendo i vantaggi dell'IA, come l'automazione dei compiti di routine e il miglioramento dell'accessibilità, i partecipanti hanno anche segnalato delle sfide, tra cui vincoli di bilancio, problemi legati alla qualità dei dati e preoccupazioni etiche. L'analisi della relazione tra le informazioni demografiche e le componenti dell'alfabetizzazione all'IA non ha rilevato associazioni statisticamente significative, ad eccezione del livello di istruzione, sebbene siano emerse alcune differenze nei punteggi medi. Lo studio evidenzia la necessità di una formazione continua e di investimenti per integrare efficacemente le tecnologie IA nei servizi bibliotecari.

AI literacy among librarians in Qom: a case study in Iran

This study investigates AI literacy among librarians, focusing on their perceptions and applications of artificial intelligence in library services. Using a descriptive survey method, the research involved 75 librarians from 24 public libraries and 33 academic librarians from seven universities in Qom, with a total of 72 participants (66.66%) responding. Data were collected using an online questionnaire that was adapted and translated into Persian. The questionnaire included demographic information and

four components of artificial intelligence literacy. Librarians demonstrated interest in AI, expressing a desire to learn more and a belief in its potential to enhance library services. While respondents acknowledged the advantages of AI, such as automating routine tasks and improving accessibility, they also reported challenges, including budget constraints, data quality issues, and ethical concerns. The analysis of the relationship between demographic information and AI literacy components revealed no statistically significant associations, except for education level, although some differences in mean scores were observed. The study highlights the need for continuous training and investment to effectively integrate AI technologies into library services.