



The impact of AI on librarians' profession: Chinese librarians' perceptions and concerns

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Abstract

Introduction. The application scope of artificial intelligence (AI) in libraries is gradually expanding, inevitably exerting certain influences on librarians. An investigation on librarians' perceptions of AI application within libraries, as well as librarians' AI literacy and AI-related training programs for librarians provided by libraries has significant management and development implications.

Method. An online questionnaire comprising 4 5-point Likert scales of total 15 items was distributed to randomly selected Chinese librarians. 392 valid responses were collected, and descriptive statistical analysis was conducted using SPSS 26.0.

Results. Under the context of AI applied in libraries, librarians hold a more positive attitude towards AI, perceiving support effect higher than substitution effect on profession. However, contradictions and concerns of inadequate application depth of AI in libraries, low level of librarians' AI literacy, insufficient AI-related training programs for librarians, and future employment concerns caused by the development trend of AI exist.

Conclusion. Librarians' perceptions and concerns regarding AI application provide references for personnel management in libraries and professional development of librarians, bringing the necessity of firmly believing the irreplaceable core role of library professionals in human-machine collaboration.

Introduction

Artificial intelligence (AI) refers to 'machines that imitate some features of human intelligence, such as perception, learning, reasoning, problem-solving, language interaction and creative work' (UNESCO K, 2022, p.9). Currently, the horizontal expansion of AI application causes the labor market undergoing profound transformation (Liu et al., 2024). Due to its effective improvements in the provision of services and the ease of users' operations, AI has been adopted by a lot of libraries (Al-Aamri & Osman, 2021), especially in the field of knowledge generation (Cox, 2023). However, the concern of 'substitution risk' resulting from the reconfiguration of librarians' roles by AI application also emerges (Wang & You, 2023). Highly repetitive and predictable jobs and even repetitive knowledge and service tasks will be replaced by more advanced applications of AI (Cox, 2021), exerting certain influence on professional development of librarians. Although significant potential of AI has been stressed by IFLA to support libraries' core values (Cox & De Brasdefer, 2025), the comprehensive application of AI in libraries is difficult to realise without librarians possessing sufficient knowledge and skills related to AI (Cox et al., 2019). Sufficient AI literacy, and libraries providing robust AI-related training programs for librarians are important prerequisite for cultivating librarians' overall capabilities in the AI era. Therefore, this study focuses on gaining a thorough understanding of librarians' perceptions of the impact of AI on their profession, librarians' AI literacy as well as AI-related training programs for librarians provided by libraries, in order to provide insights for the management of library talent teams to adapt to the AI era.

Previous studies have investigated librarians' different views toward the application of AI in libraries, demonstrating its complex impact on the professional development of librarians. From the perspectives of awareness, perceptions, readiness and challenges, some research finds that librarians' overall view on the integration of AI systems into libraries is positive, believing it can elevate libraries to a new level (Ajani et al., 2022), enhancing the working efficiency and service effectiveness of libraries (de Leon et al., 2024). Respondents in another survey show a strong interest in the professional development brought about by Generative AI, 63% positively engaging in self-directed learning, showing a collective desire toward self-improvement (Lo & Vitale, 2025). Besides, university librarians also believe in the necessity of applying AI in libraries (Zhao et al., 2025). While some librarians express their negative concerns. 36% of librarians from Canadian and North American universities in a survey believe that AI might replace some of their job responsibilities (Hervieux & Wheatley, 2021). Another survey on librarians' perceptions of AI has revealed their lack of related knowledge, more than 75% having not read anything about AI related technologies, only 47.42% interested in attending a workshop on AI in the library (Wood & Evans, 2018). A study suggests that the application of AI may give rise to issues such as user privacy risks and algorithmic biases and may even pose a threat to the work of librarians (Cox et al., 2019). LIS professionals even believe that AI has made them lazy and has threatened their careers, and they are afraid that most of the career roles will be replaced by intelligent machines (Subaveerapandian et al., 2023).

Previous studies have mostly explored the impact of AI application from perspectives such as enhancing library services, conducting AI literacy education, and strengthening the application of technologies in library, less focusing on the professional development of librarians in the AI era, which is crucial for library industry and librarians to adapt to the transformative changes brought about by AI. Based on this, employing the questionnaire survey method with Chinese librarians as respondents, this study comprehensively explores librarians' perceptions and concerns about the impact of AI applied in libraries on their profession, librarians' AI literacy as well as AI-related training programs for librarians provided by libraries. The aim is to understand the influence of technological change on librarians' roles from the perspective of librarians' professional development, to strengthen the subjectivity of librarians in the AI era, and also to provide references for the development of librarianship in developing countries. Research questions are as follows:

- (1) How do librarians perceive support or substitution effect on their profession brought about by the application of AI?
- (2) How is the level of librarians' AI literacy and how is AI-related training programs for librarians provided by libraries?

Methodology

Existing related research reveals that librarians' knowledge and perceptions of AI, opportunities, challenges, and concerns faced by librarians in integrating AI, the risk of librarians being replaced by AI, and perceptions on AI-related training among librarians have been explored and proved significance. Based on these, this study collected data through a structured questionnaire, selecting librarians from China as respondents. The above significant elements and mature scales used in previous similar studies were appropriately adapted to be suitable for this study, a survey questionnaire measured on five-point Likert scales (1 = 'Strongly Disagree' to 5 = 'Strongly Agree') generated. Questionnaire scales include: ①support effect (de Leon et al., 2024); ②substitution effect (Hervieux & Wheatley, 2021; Wood & Evans, 2018); ③AI-related training for librarians (Yoon et al., 2022; Shen and Benson, 2016); ④librarians' AI literacy (Subaveerapandiyan et al., 2023). Demographic information was also collected. Meanwhile, an optional fill-in-the-blank question was set up at the end of the questionnaire to collect librarians' additional viewpoints regarding the application of AI. The full questionnaire is shown in Figure 1.

Questionnaire: The impact of AI on librarians' profession

Dear Sir/Madam,

Currently, artificial intelligence (AI) technology is increasingly being applied in the field of libraries, playing an increasingly important role in services such as book borrowing, consultation services, and information retrieval. Under the context of AI applied in libraries, do you feel supported by AI at work? Or are you worried about being replaced by AI? Does the application of AI affect your profession? We hope to understand your views and attitudes on this issue. We sincerely hope you can spare a few minutes to fill out this questionnaire. To ensure the validity of your responses, please try to avoid the answer of "Neutral". We guarantee that all your demographic information and answers will be used solely for scientific research and will not be used for any other purposes. Your answers will have a significant impact on our research. Thank you again for your time and support. We wish you good health and success in your work!

Part One: Demographic information

Part Two: Support effect

A1: AI can successfully conduct a range of tasks currently undertaken by librarians, such as reference consultation service, subject service, data classification, and information retrieval.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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A2: AI can provide a workload comparable to that of librarians.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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A3: AI can provide labor of the same or even higher quality as that of librarians.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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A4: I believe that the application of AI in libraries has had a positive impact on my personal work efficiency and effectiveness.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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Part Three: Substitution effect

B1: I am concerned that certain core responsibilities of my work role might be substituted by AI in the future, such as automated catalog classification and intelligent question and answer system.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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B2: As the application of AI in areas such as information management and data processing becomes increasingly widespread, I am concerned that this might affect my job stability and lead to job replacement.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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B3: Given the impact of AI on industries such as library, I feel uncertain and concerned about my long-term career development and promotion opportunities.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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Part Four: AI-related training for librarians

C1: The library where I work frequently holds AI related training sessions, seminars, lectures, etc., ensuring that I can acquire sufficient knowledge to effectively utilize AI.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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C2: I think it is necessary to provide librarians with training on AI related knowledge and skills.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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C3: I am interested in training on AI related knowledge and skills.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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Part Five: Librarians' AI literacy

D1: AI can be applied in reader services in libraries, such as intelligent question and answer service and literature recommendation service, as well as decision-making support and smart space management.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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D2: I have read articles and books related to AI, or participated in related forums, and thus have a relatively clear understanding of the principles and applications of AI.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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D3: I am prepared to integrate AI technologies into my work.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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D4: I have gained an understanding of the potential risks associated with the application of AI technologies in libraries, including data breach and technology dependence.

☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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Fill-in-the-blank question: Do you have any other viewpoints about the impact of AI on librarians' profession you would like to add?

Figure 1. The full questionnaire.

The questionnaire was developed on 'Wenjuanxing' (<https://www.wjx.cn/vm/PhMXtqx.aspx>), after which the invitation emails for online surveys were distributed to randomly selected 650 librarians on *Directory of Participants for the 2025 Annual Conference of Library Society of China*, where email addresses of approximately 3000 librarians across China are collected. To ensure the accuracy and validity, a pre-research questionnaire was first distributed on a small scale, and then statements were modified and optimised based on the data preprocessing results and the feedback from the respondents. Subsequently, the formal questionnaire was distributed. Finally, 504 librarians responded, among which 392 were valid, with an effective response rate of 60.31%.

Besides, 17 text materials were collected in the fill-in-the-blank question. Those librarian respondents are from different genders, ages, educational levels, library types, departments, professional titles, positions, and working years, indicating that the sample has good representativeness. The descriptive statistical analysis results of the sample are shown in Table 1.

Item	Type	n	%	Item	Type	n	%
Gender	Male	109	27.81	Department	Administrative department	112	28.57
	Female	283	72.19		Business department	278	70.92
Age	20~29	71	18.11		Else	2	0.51
	30~39	141	35.97	Professional title	Junior	91	23.21
	40~49	115	29.34		Medium	149	38.01
	50~59	62	15.82		Sub-senior	74	18.88
	60~	3	0.77		Senior	30	7.65
					Else	48	12.24
Educational level	Doctor's degree	18	4.59	Position	Project leader	46	11.73
	Master's degree	151	38.52		Middle-level cadre	71	18.11
	Bachelor's degree	189	48.21		Chief librarian \sub librarian	71	18.11
	Associate degree	32	8.16		None	204	52.04
	High school degree	2	0.51				
Library type	University library	143	36.48	Working year	More than 20	103	26.28
	Scientific professional library	4	1.02		15~19	51	13.01
	Provincial public library	33	8.42		10~14	68	17.35
	Municipal Public Library	125	31.89		5~9	59	15.05
	County-level public library	69	17.60		Less than 5	111	28.32
	Libraries below the county-level	7	1.79				
	Else	11	2.81				

Table 1. Descriptive statistics of research samples (N=392).

SPSS26.0 was used to analyse the collected questionnaire data. Given that the questionnaire was derived from mature scales in previous studies, the content validity and criterion validity are ensured. The reliability level of the questionnaire was measured by coefficient values of Cronbach's Alpha, with all 4 scales ranging from 0.7 to 0.9 and an overall value of 0.859, while the structural validity was examined through factor analysis, with the KMO value of 0.769, greater than 0.5, and the Bartlett's test of sphericity less than 0.01, confirming good reliability and validity of the questionnaire. Taking work engagement as the dependent variable, variance inflation factors (VIFs) were utilised to diagnose multicollinearity among the independent variables, with all VIF values falling within the range of 1.0 to 1.4, indicating no multicollinearity problem. Based on the above results, descriptive statistical analysis of the collected questionnaire data was conducted. The final statistics of the core items are presented in Figure 2.



Figure 2. Statistics of core questionnaire items (N=392).

Findings

Higher perceived support effect

Librarians have a complex but generally positive attitude towards the application of AI technology in libraries, believing its support effect on profession (80.10%) higher than substitution effect (41.33%), which is different from the previous research results - the possibility of librarians' positions being computerised in the future is as high as 0.65/1.00 (Frey & Osborne, 2017). This discrepancy between librarians' subjective view and the data prediction may, on one hand, result of the practical support by intelligent machines in repetitive tasks such as book shelving and inventory (Cox, 2024) for librarians' work. Meanwhile, the gradual enhancement of librarians' comprehensive capabilities, such as librarians' capacity to lead (Wong, 2021), mitigates the high risk of job replacement faced by traditional librarians. On the other hand, many library positions in China are tenure-based (Meng, 2007). This institutional stability has affected librarians' perception of substitution effect caused by AI. The library work in the AI era features the coexistence of loud technological application demands and irreplaceability of human labor.

Inadequate application depth of AI

The higher level of perceived support effect brought about by AI has not been reflected in its actual working efficiency. Only 40.31% of librarians recognise that AI can provide a workload comparable to that of librarians, and only 41.84% believe that AI can provide labor of the same or even higher quality. Meanwhile, some librarians add: Currently, the application of AI technology in libraries is still immature and cannot completely independently complete high-quality tasks, which requires human intervention. Functions such as large-scale AI models, personalised recommendations, and secondary automatic processing, organisation and output of knowledge should be deeply developed and applied in libraries. The application of AI in libraries cannot well meet the needs of readers and the technical gaps. More efforts are needed to conduct in-depth research and development of AI under the leadership of librarians.

Insufficient AI literacy and AI-related training programs for librarians

Librarians have generally recognised the importance of improving AI literacy but have a relatively low assessment of their AI literacy and AI-related training provided by libraries. 93.62% of librarians recognise the necessity of AI-related training programs for librarians within the library,

and 91.07% are interested in AI-related training programs, showing their strong self-improvement motivation. However, only 47.45% of librarians believe that the training programs provided by libraries can enable them to acquire sufficient knowledge to utilise AI. Some librarians state that currently, self-study by librarians is quite common, while official training is relatively slow, calling for more training, publicity, more case studies, and practical services. Meanwhile, less than half of the librarians have a positive assessment of their own AI literacy. The insufficient AI-related training programs for librarians provided by libraries fails to meet librarians' needs for skill improvement, leading to their low AI literacy.

Future employment concerns in library industry

Generally, librarians have a negative attitude towards the future professional prospects in library industry. 70.41% of librarians believe that the in-depth application of AI may reduce traditional employment opportunities in the entire library industry, stating that *'In the context of the rapid development of AI, new breakthroughs may occur at any time, and it is difficult to guarantee that my views will not change in the short term due to new technological changes.'* As a technology driving and realising human-like intelligent tasks, 50% of organisations worldwide have adopted AI in their work (McKinsey, 2022). More than 60% of libraries are either evaluating or have already implemented AI technologies (Clarivate, 2024). Resulting of the speed and potential of technological development, the continuous expansion trend of AI application in libraries causes librarians have broader and deeper concerns about the uncertainty of their future work. The possibility of professional changes brought about by the in-depth development of AI needs to be highly valued.

Implications and suggestions

Transforming from passive acceptance into active guidance

Insufficient applying depth of AI calls for librarians to change their role positioning, shifting from passive acceptance to active guidance. With the entry of generative AI, it is expected to require 161,000 AI specialisations globally by 2030 (Bell et al., 2023, p.9). As frontline practitioners in reader services, librarians have a profound understanding and grasp of reader needs and business processes, possessing significant advantages in deeply integrating AI technology with the application requirements in libraries, which are necessary to achieve comprehensive capability enhancement by cultivating practical technology skills, critical ability and creative ability for adapting to technological development (Dezuanni et al., 2024, p.30), and respond to the actual needs of readers and the technical application gaps within the library. Meanwhile, librarians should undertake the tasks of literacy training for readers, becoming the leaders in technology and the guides for readers.

Enhancing libraries' initiative and responsibility of training effort

Librarians have recognised the shortage in their AI literacy and the necessity of self-improvement, but not receiving sufficient support from libraries, which may lead to *'capability anxiety'*. Therefore, it is urgent for libraries and the industry to take the responsibility and provide sufficient training resources for librarians through the improvement of AI application and personnel training system, and the development of feasible AI-related training programs for librarians in accordance with the usage needs of service recipients, the actual situation of the library and librarians' AI literacy, avoiding librarians becoming mere *'tools'* of AI. Besides, based on central-branch library system, it is necessary to improve the training resources of grassroots libraries and achieve resource sharing. Some excellent cases of human-machine collaboration can be promoted nationwide, emphasising the irreplaceability of librarians in the AI era and alleviating librarians' anxiety.

Improving sustainable future plan related to librarians and AI

The continuous development of AI technology makes librarians worry that the pace of their own career growth is not as fast as that of technological advancement, thereby generating anxiety

about future job replacement. Therefore, the establishment of a specialised trend research group led by industry experts to continuously monitor the dynamic development trends of AI and its potential impacts, and the formulation and update of future sustainable development plan for human-machine collaboration are important paths to avoid librarians being marginalised in the 'long river' of technological development. As a collaborative partner of AI technology, librarians themselves should also formulate their own development routes based on industry development trends and organisational talent cultivation plans, and fully enhance their AI literacy to adapt to the transformation of work roles.

Conclusion

Under the context of AI widely applied in libraries, librarians generally hold a positive perception towards the application of AI in libraries. However, problems of insufficient application depth of AI, insufficient AI-related training programs for librarians, low level of librarians' AI literacy, and concerns about future job replacement exist, providing important management references for librarians and library industry. This study also has some limitations: firstly, the impact of AI on librarians' profession do not distinguish different job positions and attributes. Secondly, the subjective factors inherent in librarians' responses to the questionnaire may compromise the objectivity of the survey results. The lack of analysis from an objective perspective may undermine the persuasiveness of the self-assessment from librarians. Therefore, more objective survey and analysis methods can be supplemented in future research to investigate the impact of AI on librarians of different demographic characteristics.

Considering the fundamental role of libraries in information services, adapting service and business processes in parallel with technological advances is a crucial agenda (Çakmak & Eroğlu, 2025) as well as a precious transformation opportunity. While the application of AI technology may lead to reduced operating costs for libraries, improved processes and the replacement of some positions, the legitimate responsibilities of librarians in cultural inheritance and knowledge dissemination should not be replaced (Zeng, 2024). The ARL's release of the AI guidelines also emphasises the significance of human involvement in the human-machine collaborative environment (Association of Research Libraries, 2024). A human-machine collaborative working environment established by libraries to strengthen the dominant position of librarians and professional competency enhanced by librarians to overcome concerns about future job replacement are essential to reinforce the irreplaceable core role of library professionals in promoting the long-term positive development of libraries in the AI era.

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