Research on the AI Literacy Education Mode of University Library Facing Students

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Abstract: Against the backdrop of artificial intelligence (AI) technology's deep integration into society and its transformative impact on higher education, AI literacy has become a core competency for college students to adapt to future workplaces. This study first defines the four-dimensional connotation of AI literacy encompassing "knowledge, skills, attitudes, and values," clarifying four essential capabilities required for students: foundational AI knowledge understanding, practical tool application, ethical awareness, and interdisciplinary innovation. It then analyzes the necessity from three perspectives: evolving talent demands, shifting educational objectives, and expanded library functions, while demonstrating feasibility through resource allocation, team collaboration, and spatial optimization. The research subsequently establishes an integrated AI literacy education model featuring "tiered cultivation, diversified integration, practice-oriented approaches, and ethical considerations." This model includes: a progressive curriculum system, resource support through "physical collections + digital resources + collaborative partnerships," a practice platform combining "in-campus simulations + off-campus real-world applications," and a composite faculty team comprising "library staff + departmental experts + industry mentors." Finally, it proposes implementation strategies involving "quadruple collaboration among libraries, departments, universities, and enterprises," innovative teaching methods, improved evaluation systems, and enhanced promotion efforts. The study aims to provide actionable AI literacy education solutions for university libraries, fostering high-quality talents who "master technology, excel in application, and shoulder responsibilities" in the AI era, thereby alleviating talent supply-demand imbalances.

Keywords: Artificial Intelligence; University Library; AI Literacy Education

1. Introduction

With the widespread application and deep integration of artificial intelligence across various fields, human society is accelerating into the intelligent era. According to the "Global Artificial Intelligence Development Report (2024)", the annual growth rate of AI-related job demand reaches 35.7%[1]. The rapid development of AI technology has not only transformed people's production and lifestyle but also profoundly impacted the talent cultivation goals and models of higher education. Possessing strong AI literacy has become an essential ability for college students to establish themselves and develop in future society. This requires students to not only master AI-related knowledge and skills but also develop proper AI ethics, innovative thinking, and the ability to integrate AI technology with professional expertise. University libraries, equipped with abundant information resources, professional service teams, and a supportive learning environment, have accumulated rich experience in student information literacy education. The Ministry of Education's "Regulations for University Libraries (2022 Edition)" explicitly states that libraries should "conduct information literacy education to cultivate faculty and students 'information awareness, capabilities, and ethics", providing policy support for AI literacy education[2]. In the AI era, university libraries actively expand their functions and implement AI literacy education. This serves as both an inevitable choice to align with the tide of development and meet students' learning needs, and a crucial measure to enhance service quality and fulfill educational responsibilities. By building a scientific and effective AI literacy education model, university libraries can provide students with systematic and comprehensive AI literacy education, helping them enhance their AI literacy, cultivate innovative spirit and

practical abilities, and lay a solid foundation for their future career development and social contributions.

2. The Connotation of AI Literacy and the AI Literacy Competencies That College Students Should Possess

2.1 The Connotation of AI Literacy

AI literacy is a multifaceted concept that has yet to gain a unified definition in academia. It generally refers to an individual's ability to understand, master, and apply artificial intelligence technologies, along with their ethical awareness, innovative thinking, and social responsibility in using such technologies. This concept encompasses multiple dimensions, including knowledge, skills, attitudes, and values.

From a knowledge perspective, AI literacy encompasses foundational understanding of AI concepts, principles, technical frameworks, and historical development, alongside awareness of its applications across various fields. At the skill level, it requires the ability to apply AI technologies to solve real-world problems. This includes practical skills like using AI tools and platforms for data analysis, model training, and algorithm optimization, as well as the capacity to integrate AI with professional expertise for innovative research and practice. Regarding attitude, AI literacy emphasizes a proactive approach and enthusiasm for learning AI. In terms of values, it demands proper ethical awareness and social responsibility. When using AI technologies, students must comply with relevant laws, regulations, and ethical guidelines, respect others' intellectual property and privacy, and avoid ethical issues and social risks caused by improper use of AI technologies [3].

2.2 AI Literacy Competencies for College Students

The ability to understand basic AI knowledge, college students should possess a solid understanding of fundamental AI concepts, which serves as the foundation for cultivating other AI literacy skills. Students need to grasp the basic concepts, development history, technical systems, and application fields of AI. The ability to apply and practice AI tools is a significant manifestation of college students' AI literacy. A survey by the China College AI Education Alliance shows that the most valued AI skills by enterprises for college graduates are Python programming, data processing, and machine learning framework application, in that order. Students should be proficient in using common AI tools and platforms, applying their AI knowledge to solve practical problems [4].

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AI ethics and security awareness have become increasingly prominent with the widespread application of AI technology. According to the Global AI Ethics Risk Report (2024),67.8% of AI application cases pose data privacy leakage risks, while 42.3% of algorithm models exhibit bias issues. As the future workforce, university students should develop a strong awareness of AI ethics and security [5].

AI requires innovative thinking and interdisciplinary integration. With AI technology advancing at an unprecedented pace, students must cultivate creative approaches to explore and implement novel methods, thereby driving technological innovation. They should boldly challenge conventional thinking patterns and proactively propose groundbreaking ideas and solutions.

3. Necessity and Feasibility of AI Literacy Education in University Libraries

3.1 Necessity of AI Literacy Education in University Libraries

The evolving demands of the era for AI literacy among professionals have become increasingly prominent. In today's intelligent age, AI technology has permeated various sectors including finance, education, and transportation, emerging as a core driver for industrial upgrading and social progress. Zhaopin's "2024

AI Talent Employment Report" reveals that 87.2% of employers prioritize AI application capabilities as a key hiring criterion, with the internet, finance, and healthcare industries showing the highest demand for AI literacy at 92.3%,88.5%, and 85.1% respectively. However, only 31.5% of college graduates can skillfully utilize AI tools to address professional challenges, highlighting a significant supply-demand gap [6].

With AI technology's growing influence on socioeconomic development, universities are continuously adjusting and optimizing their talent cultivation objectives. The Ministry of Education's "Higher Education Artificial Intelligence Innovation Action Plan" emphasizes the need to "cultivate innovative talents with AI literacy," integrating AI literacy into the core talent development framework [7]. The traditional knowledge-centered approach has become inadequate for meeting the demand for innovative and interdisciplinary professionals. According to a survey by the Department of Higher Education, 78.3% of Chinese universities have incorporated "AI + major" integrated courses into their curricula by 2024, while 65.4% have established AI-related innovation and entrepreneurship programs.

The intrinsic need for libraries to expand their service functions. As the primary information hubs and learning support centers of universities, academic libraries have long been tasked with providing information services and fostering information literacy education for faculty and students. According to the "Development Report of University Libraries (2024)" by the Chinese Library Association, 62.3% of "Double First-Class" university libraries have incorporated AI literacy education into their annual priorities, while 45.7% of regular undergraduate libraries have organized AI-related lectures or training sessions [8]. In the AI era, traditional library service models face significant challenges but also new opportunities. Implementing AI literacy education is essential for academic libraries to broaden their service scope and enhance service quality.

3.2 Feasibility of AI Literacy Education in University Libraries

University libraries house vast collections of information resources spanning diverse academic disciplines, including abundant AI-related materials such as books, journals, theses, and research reports. These resources serve as comprehensive knowledge repositories for students to explore AI technology, enabling them to systematically study fundamental concepts, historical development, technical principles, and application fields through the library's collection system. Furthermore, with the advancement of digital technologies, academic libraries now provide rich electronic resources like e-books, digital journal databases, and academic videos. These resources offer convenience, real-time access, and interactivity, allowing students to conveniently learn AI knowledge anytime, anywhere via online platforms. Additionally, by curating and integrating high-quality AI resources from the internet, libraries provide one-stop resource navigation services, helping students swiftly locate required learning materials.

University libraries maintain a professional service team with librarians possessing solid expertise in library science and information science, and proficient in information resource organization, management, and service processes. As libraries increasingly prioritize the application of new technologies and service innovation, many librarians actively acquire AI knowledge to continuously enhance their professional competencies and overall capabilities.

4. Construction of AI Literacy Education Model for College Libraries

To implement AI literacy education, university libraries should develop a scientific and practical model by aligning with student needs, leveraging institutional resources, and adapting to AI technological advancements. This model, guided by the principles of "tiered cultivation, diversified integration, practice-oriented learning, and ethical considerations," comprises four key components: curriculum design, resource support, practical platforms, and faculty development. It establishes a closed-loop system encompassing "knowledge delivery, resource provision, practice reinforcement, and faculty support" [9] (see Figure 1).

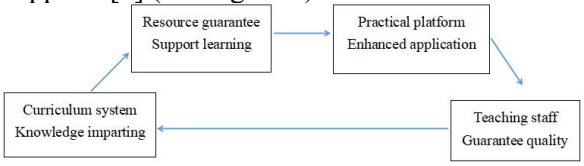

Figure 1. Closed-Loop System for AI Literacy Education in University Libraries

4.1 Construction Principles

The layered cultivation principle recognizes that AI literacy requirements differ across disciplines and academic levels: freshmen should master foundational AI knowledge, upperclassmen should focus on tool applications integrated with their majors, while graduate students must concentrate on AI innovation research and ethical considerations. The multi-dimensional integration principle advocates transcending disciplinary and contextual boundaries in AI literacy education, achieving "integration of library resources and external environments, online and offline learning, and knowledge with practice." Within the library, this is realized through its physical space and resources, while external collaborations involve academic departments and enterprises. Online platforms facilitate digital learning, while offline sessions provide hands-on training. By adopting a "theory + case studies + project practice" approach, AI knowledge is transformed into practical skills, ensuring alignment between education and real-world applications.

The practice-oriented principle emphasizes that the core of AI literacy lies in practical application. Educational models should prioritize hands-on learning to reduce purely theoretical instruction. By creating simulated scenarios and real-world projects, students can master essential skills like AI tool usage, data processing, and model optimization through practical experience. The principle of ethical consideration requires that AI applications, which carry ethical risks, must be integrated into educational models with continuous emphasis on AI ethics and safety awareness, avoiding the tendency to prioritize technology over ethics.

4.2 Core Module Design

The tiered curriculum system, serving as the core framework for AI literacy education, is structured into three progressive levels-"Foundation Level-Application Level-Innovation Level" -tailored to student needs. The Foundation Level provides general education courses for all students, aiming to "popularize AI knowledge" through courses like "Introduction to Artificial Intelligence" and "AI Technology Development and Social Impact." These courses cover fundamental AI concepts, technical principles, and typical application scenarios, combining online MOOCs with offline lectures to lower learning barriers. The Application Level offers interdisciplinary courses for students from various majors, focusing on "AI + professional applications" through departmental collaboration. The Innovation Level provides advanced practical courses for students with advanced learning needs, such as senior undergraduates and graduate students, targeting "AI Innovation and Ethical Reflection" through courses like "AI Project Development Practice" and "AI Ethics and Security Special Topics."

To build a precise and integrated resource support system, university libraries should leverage their resource advantages to establish a "collection + digital + collaboration" trinity system, providing support for AI literacy education. The collection resources should be optimized by screening and integrating core AI-related materials, establishing a "AI Literacy Education Special Bookshelf" that covers AI technology textbooks, industry reports, and ethical works. At the same time, the collection structure should be enhanced by adding high-end resources such as foreign journals and conference papers in the AI field to meet students 'needs for in-depth learning. For example, Tsinghua University Library's "AI Special Collection" includes over 120 foreign journals and updates more than 50 industry reports annually, achieving a resource utilization rate of 68.5%. Digital resources should be aggregated by building an "AI Learning Resource Platform" that integrates e-books, video courses, and tool resources, and employs AI technology to achieve "personalized recommendations" -pushing suitable resources based on students' majors and learning progress. External resources should be linked by collaborating with AI companies like Baidu and Huawei, as well as research institutions, to introduce cutting-edge industry resources.

The scenario-based practice platform serves as a crucial bridge between knowledge and application. It requires establishing two types of scenarios: "in-campus simulations + off-campus practical training" to enhance students 'AI application capabilities in real-world environments. For in-campus simulation spaces, the library has established an "AI Practice Workshop" equipped with high-performance computers, AI development software (such as PyTorch and MATLAB), and datasets to provide foundational practice scenarios. For example, a

"Data Processing Training Zone" allows students to practice data cleaning using Pandas, while the "Model Building Zone" guides them in constructing simple image recognition models through TensorFlow. Regular "AI Skill Workshops" like "Python Fundamentals and AI Data Visualization" are also organized, with on-site guidance from librarians or volunteers. Off-campus practical collaboration projects involve partnerships with academic departments and enterprises to develop "AI practical projects," offering students real-world application scenarios. For instance, the "AI Academic Early Warning System" was co-developed with the university's academic affairs office, enabling students to participate in data collection and model training. The "AI Community Service" project with local governments guides students in optimizing community elderly care demand analysis and traffic route planning using AI technology. Through project-based learning, students transform AI skills into problem-solving capabilities while accumulating project experience.

To ensure the quality of AI literacy education, a composite faculty team comprising librarians, departmental experts, and industry mentors is essential to address the limitations of single-source teaching.

Table 1. Composition of Compound Faculty for AI Literacy Education in University Libraries

Faculty Type	staff composition	division of responsibilities	Percentage (example)	Strengths and features
librarian	Librarians with experience in information literacy education	Basic course teaching, resource navigation, and learning guidance	45%	Familiar with student needs and highly service-oriented
Experts from the departments within the university	Teachers in fields such as computer science, AI, and ethics	Professional integration curriculum teaching and advanced practice guidance	35%	Solid professional knowledge and deep teaching
Enterprise Mentor	AI Enterprise Technical Expert and Product Manager	Industry updates, hands-on project guidance, and career advice	20%	Extensive practical experience and close to workplace needs

Meanwhile, a faculty sharing mechanism will be established. Through regular teaching research meetings (e.g., monthly AI teaching experience exchanges) and cross-department collaborations (e.g., joint course development by librarians and faculty), the team's collaborative capabilities will be enhanced to ensure stable teaching quality.

5. Implementation Strategies of AI Literacy Education Model in University Libraries

5.1 Establish a Collaborative Mechanism to Integrate Resources from Multiple Parties

AI literacy education should break through the limitation of "one-man show" in library and build a four-party cooperation mechanism of "library-department-school-enterprise".

Through institutional collaboration, the library partners with academic departments by signing cooperation agreements to clarify respective responsibilities. Libraries focus on resource integration, while departments design specialized curricula. Together, they develop an "AI Literacy Development Program" that incorporates AI education into the talent cultivation framework as a general education credit course, ensuring systematic and authoritative instruction. The library also works with the university's Academic Affairs Office and Research Office to integrate AI literacy education into the "Innovation and Entrepreneurship Education" and "General Education" systems, securing special funding for practical platforms and faculty training. Additionally, the library establishes long-term partnerships with AI enterprises to create "AI Practice Bases," organizing activities like "Corporate Mentors on Campus" and "Student Internships." Real-world corporate projects are introduced as teaching cases, and industry needs are transformed into student projects, bridging the gap between "teaching, practice, and employment."

5.2 Innovative Teaching Methods to Enhance the Attractiveness of Education

Traditional lecture-based teaching often fails to engage students, necessitating innovative approaches that leverage AI technology. Immersive learning utilizes library spaces to

create "AI immersion environments," such as VR simulations demonstrating AI applications for hands-on experience. The flipped classroom model in applied courses delivers pre-class resources through digital platforms, with in-class sessions focusing on problem-solving-students present group projects while teachers and peers collaboratively critique and discuss, fostering self-directed learning and critical thinking. Competition-driven initiatives like the "Library AI Innovation Design Competition" establish tracks such as "Resource Retrieval Optimization" and "Smart Service Design," encouraging team participation to boost motivation and identify top talent for advanced projects.

5.3 Improve the Evaluation Feedback Mechanism and Optimize the Education Mode Dynamically

We have established a closed-loop mechanism integrating "process evaluation + outcome assessment + feedback optimization" to ensure continuous improvement of the educational model. Process evaluation monitors students' learning behaviors and practical performance through the learning platform, using a "credit + points" system to track progress and avoid the one-sidedness of "one-time exams." Outcome assessment designs evaluation indicators across three dimensions: knowledge, skills, and attitudes. Among students participating in the AI course, 83.7% accurately identified AI ethical risks, 56.2 percentage points higher than non-participants, validating the effectiveness of the evaluation system. Feedback optimization involves regular student satisfaction surveys and teaching reflection meetings to gather feedback. By dynamically adjusting course content, practical projects, and resource allocation in response to AI technology advancements and evolving student needs, we ensure the timeliness and adaptability of the educational model.

5.4 Strengthen Publicity and Promotion to Improve the Coverage of Education

Campus Promotion: Utilize platforms such as the library's official website, WeChat official account, and campus radio to disseminate AI course information, practical activity previews, and exemplary student cases. Establish an "AI Literacy Education Zone" in the library lobby, showcasing educational achievements through posters and videos to engage students. Freshman Orientation: Integrate an "AI Literacy Education Introduction" into the library orientation program, explaining the importance of AI literacy, the library's educational resources, and course schedules. Incorporate AI literacy education into the "First Lesson of the Semester" to cultivate learning awareness from the outset. Cross-Campus Collaboration: Partner with other university libraries to form an "AI Literacy Education Alliance," sharing educational experiences, building resource platforms, and organizing cross-institutional AI competitions and academic forums to expand educational influence while elevating the library's industry standing. 6. Conclusion

As artificial intelligence reshapes employment markets and higher education training objectives, the stark contrast between AI job demand growth (35.7%) and AI competency attainment among college graduates (31.5%) makes AI literacy education in academic libraries an imperative. The "Four-Dimensional Integrated" model developed in this study-featuring tiered curricula, diversified resources, scenario-based practice, and interdisciplinary faculty-serves 87.2% of employer needs while transforming libraries from "document providers" to "innovation incubators". With generative AI advancements and deepening interdisciplinary demands, libraries must optimize content and strengthen four-party collaboration to build students' "technical application + ethical commitment" competency framework. This ultimately empowers universities to cultivate AI-era-ready professionals, delivering innovators with both creative thinking and social responsibility to drive safe, sustainable development of artificial intelligence technologies.

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