



# Exploring the Path of Information Literacy Education for College Students Driven by AI

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## Abstract

With the rapid advancement of artificial intelligence (AI) technology, college students face both new challenges and opportunities in information literacy education. This study explores the application and challenges of AI in enhancing information literacy among university students, proposing an integrated “teaching-competition-professional” educational model that combines academic instruction, competitions, and professional roles. By leveraging competition-driven approaches to stimulate active learning and practical engagement, this model aims to improve students’ comprehensive information literacy. The research also establishes an evaluation system for student information literacy, emphasizing the creation of scientific assessment and feedback mechanisms to drive continuous improvement in teaching and learning. Through this exploration, we aim to help students better adapt to the challenges of the information age, develop into versatile talents with strong information literacy, while providing theoretical support and practical guidance for higher education reform. Future research will focus on deepening AI applications in education, exploring how intelligent technologies can enhance students’ information literacy levels while ensuring sustained improvements in educational quality.

## Subject Areas

Information Science

## Keywords

Artificial Intelligence, Information Literacy Education, Innovation of Education Mode, Evaluation Index System, Integration of Teaching, Competition and Profession

## 1. Introduction

### 1.1. New Requirements of the Information Age for College Students' Information Literacy

With the rapid advancement of information technology, particularly the rise of artificial intelligence (AI), traditional knowledge and skills can no longer meet the rapidly evolving social and economic demands. In this context, cultivating information literacy among college students—future builders and leaders of society—has become an indispensable component of higher education. Information literacy encompasses not only the ability to access information but also effective management, critical analysis, innovative thinking, and ethical judgment [1]. Currently, there exists a gap between college students' information literacy performance and societal expectations, primarily manifested in deficiencies in critical thinking, data processing and analysis capabilities, and ethical decision-making. Additionally, issues like information overload and cybersecurity pose new challenges for students' information literacy. Therefore, integrating the characteristics and advantages of AI technology to innovate and optimize information literacy education pathways becomes crucial [2]. AI technology can not only provide personalized learning experiences but also enhance students' understanding and absorption of information through intelligent analysis [1]. Simultaneously, AI applications help students develop innovation and practical skills while solving real-world problems, which significantly improves the applicability of information literacy [2]. In conclusion, this study explores AI-driven approaches to information literacy education for college students, aiming to provide theoretical support and practical guidance for higher education reform. This will help students better adapt to the challenges of the information age and evolve into versatile talents with strong information literacy [2].

### 1.2. The Integration Trend of AI Technology and Information Literacy Education

In today's rapidly evolving digital age, advancements in artificial intelligence (AI) technology present new challenges and requirements for college students' information literacy. Information literacy now encompasses not only the ability to acquire, evaluate, and utilize information, but also extends to data analysis, decision-making, and ethical awareness. The integration of AI technology has opened new pathways for enhancing information literacy while bringing innovative opportunities to educational practices. As AI continues to advance, its applications in education have grown increasingly widespread, offering personalized learning paths, intelligent study aids, and more precise assessment methods. These technological integrations help students master information technology while improving critical thinking skills, strengthening data processing and analytical capabilities, and cultivating sound information ethics. However, the AI era also presents new challenges for information literacy education, such as how to effectively utilize AI technology to enhance teaching efficiency, ensure students' comprehensive devel-

opment of information literacy through AI-assisted learning, and safeguard privacy protection during AI application. Therefore, exploring AI-integrated approaches to information literacy education requires attention not only to technological development itself but also to innovation in educational practices and the holistic development needs of students [2]. By innovating educational models and implementing practical pathways, this research aims to provide theoretical support and practical guidance for higher education reform, thereby promoting comprehensive information literacy enhancement among college students in the AI era.

## **2. The Necessity and Challenge of Information Literacy Education for College Students in the ERA of AI**

### **2.1. Modern Definition and Importance of Information Literacy**

In the rapidly evolving information age, information literacy has become a crucial indicator of an individual's ability to effectively adapt to social development and demonstrate competitiveness [1]. Information literacy refers to an individual's ability to effectively acquire, evaluate, use, create, and communicate information in an information society. It involves not only technical skills but also encompasses multiple aspects such as critical thinking, ethical awareness, and legal consciousness.

Individuals with strong information literacy can swiftly retrieve, accurately assess, effectively utilize, and securely manage vast amounts of data, profoundly impacting their learning, professional development, and career trajectories [1]. Amid the rapid advancement of artificial intelligence (AI) technology, cultivating information literacy among college students—key contributors to future society—is not only essential for education but also aligns with national digital strategies. AI applications provide innovative tools like smart search engines, data analytics software, and online education platforms that significantly enhance information processing capabilities. However, these technologies present new challenges: maintaining critical thinking in big data environments and making informed decisions regarding information security and privacy protection. Therefore, information literacy education must evolve alongside AI advancements [1]. This requires not only updating existing curricula but, more importantly, developing students' information literacy and proficiency in using AI tools to meet societal demands. Through such education, college students can better grasp the initiative of the information age and make contributions to their personal development and social progress [1].

### **2.2. Challenges and Opportunities of Education in an AI Background**

In today's digital age, the rapid advancement and widespread application of artificial intelligence (AI) technology have raised higher demands for college students' information literacy. Information literacy encompasses not only the acquisition, processing, and application of information, but also critical analysis and

ethical judgment—crucial elements in nurturing students’ innovative thinking, cognitive abilities, and character development. While AI integration presents new opportunities for information literacy education, it also brings challenges such as accessibility issues, resource integration, faculty development, teaching innovation, and evaluation system establishment. Therefore, exploring educational pathways for AI-era information literacy not only enhances students’ competencies but also holds significant practical and long-term implications for higher education reform. To address these challenges, we need to establish a student-centered, competency-driven educational model that leverages AI’s strengths by designing personalized learning paths and strengthening practical, interactive approaches. Additionally, effective evaluation and feedback mechanisms should be implemented to ensure educational activities align with evolving societal needs and genuinely improve students’ information literacy. Such exploratory efforts will provide valuable references for the future development of higher education.

### **3. Analysis of the Current Situation and Demand of Information Literacy of Contemporary College Students**

#### **3.1. Research Review of Academic Literature and Education Model**

In today’s digital age, the rapid advancement and widespread application of artificial intelligence (AI) technology have created unprecedented challenges and opportunities for information literacy education among college students. Information literacy extends beyond basic information acquisition and processing to encompass critical thinking, data analysis skills, ethical awareness, and technology usage capabilities. In the AI era, cultivating these competencies has become both more complex and essential. While AI applications enable personalized learning, they also demand innovative educational frameworks and teaching methodologies. Analysis of existing academic research and pedagogical models reveals several shortcomings in current information literacy education, including uneven distribution of educational resources, a lack of practical teaching components, and a disconnect between curriculum content and real-world needs.

#### **3.2. Evaluation Framework of Information Literacy Ability of Contemporary College Students**

In today’s educational landscape, the rapid advancement and widespread application of artificial intelligence (AI) technology present both challenges and opportunities for information literacy education among college students. Information literacy extends beyond basic information acquisition and processing capabilities to encompass practical skills in utilizing information, along with ethical and legal knowledge related to IT applications. With the advent of the “Internet+” era and big data, students are being tasked with new responsibilities and expectations. They must not only meet traditional academic requirements but also learn to filter, analyze, and utilize information in an information-saturated environment. This competence is crucial not only for personal academic growth and career de-

velopment but also for enhancing national innovation capabilities and comprehensive national strength. Therefore, establishing a scientific, rational, and comprehensive evaluation framework for college students' information literacy becomes particularly vital [3]. This study employs multiple research methods, including literature review, expert interviews, and questionnaire surveys, to conduct an in-depth exploration and systematic analysis of the connotation, evaluation system, and educational models of student information literacy. Through multidimensional assessments covering information acquisition, processing, utilization, and ethics, a holistic evaluation system has been developed. This framework not only facilitates comprehensive measurement of students' information literacy levels but also provides valuable references for subsequent educational reforms and practical implementation. Ultimately, the research proposes an integrated education model centered on "teaching, competition, and career development" (TCCD), while exploring AI-powered personalized learning pathways to meet diverse student needs. The study further highlights the crucial role of practical activities in developing information literacy, while emphasizing the effectiveness of information literacy competitions in enhancing students' hands-on capabilities [1]. In conclusion, this research not only provides innovative perspectives and methodologies for exploring pathways in information literacy education for college students, but also establishes theoretical foundations and practical experiences for creating educational models adapted to the AI era. These contributions carry significant practical value and long-term application potential, demonstrating substantial real-world significance.

### 3.3. Methods

This study employed a combination of literature review, expert interviews, and questionnaire surveys to clarify the current status and demands of contemporary college students' information literacy, providing an empirical foundation for subsequent educational path development of *Broussonetia papyrifera*.

#### 1) Data Sources

**Literature Review:** Systematic searches were conducted in databases such as CNKI, Web of Science, and Google Scholar for core literature published in the past five years on topics including "college students' information literacy" and "AI applications in education." Representative and highly cited research outputs were selected to form the theoretical framework.

**Expert Interviews:** Ten experts in higher education information literacy (covering library science, pedagogy, and computer science) were invited for semi-structured interviews focusing on key competencies in college students' information literacy, application scenarios of AI technology, and pain points in educational practices.

**Questionnaire Survey:** Questionnaires were distributed to undergraduates from 15 universities nationwide (encompassing comprehensive, science, engineering, and teacher-training institutions), with 200 valid responses collected. The ques-

tionnaire covered dimensions such as information acquisition ability, data processing skills, and information ethics consciousness, using a Prunus salicina 5-point Likert scale for quantitative assessment.

## 2) Research Design

**Literature Review:** Thematic analysis was adopted to summarize core elements of information literacy and integration models of AI technology in existing studies, identifying research gaps.

**Expert Interviews:** Based on grounded theory, an interview outline (e.g., “AI’s impact on information literacy education” and “shortcomings of current educational models”) was designed, with expert perspectives extracted through audio transcription and textual coding.

**Questionnaire Survey:** The questionnaire underwent pretesting (Cronbach’s  $\alpha = 0.87$ ) to ensure reliability. SPSS 26.0 was used for descriptive statistics, factor analysis, and correlation tests to validate data effectiveness.

## 3) Sample Size

**Expert Interviews:** Ten Homo sapiens (with diverse disciplinary backgrounds, all holding associate professor or higher titles).

**Questionnaire Survey:** 200 valid samples (47% male, 53% female; balanced distribution across freshman to senior years, covering disciplines such as humanities, science/engineering, and arts).

## 4. Innovation of AI-Driven Information Literacy Education Model for College Students

### 4.1. The Construction of the Integrated Education Mode of “Teaching, Competition, and Professional”

In the rapidly evolving information age, the integration of artificial intelligence (AI) technology has brought new opportunities and challenges to information literacy education for college students. Information literacy is not merely about acquiring and applying information; it also encompasses critical thinking, data analysis, and information ethics—essential competencies in this new era. The application of AI technology, particularly in handling big data, supporting personalized learning, and optimizing educational pathways, provides fresh perspectives and tools for cultivating information literacy [4]. Currently, students’ demand for information literacy continues to grow. They need to skillfully utilize information technology to support academic and research activities while critically evaluating and filtering massive information resources to avoid information overload and misinterpretation. Consequently, traditional information literacy education models can no longer fully meet these emerging needs. The AI-based “Teach-Compete-Practice” integrated education model proposes a new solution. This approach not only emphasizes integrating AI technology into teaching processes but also stimulates students’ learning interest and practical skills through information literacy competitions, ultimately enhancing their application capabilities via internships [2]. The establishment of this model not only elevates students’ information liter-

acy levels but also promotes their holistic development, enabling them to better adapt to diverse societal demands in the future. Additionally, the implementation of the “Teach-Compete-Professional” integrated education model provides innovative approaches and methods for educational practice. Through continuous exploration and practice, we can continuously optimize educational content and methods, developing exemplary and replicable educational models that provide valuable references for other higher education institutions. In summary, the integration of AI technology has opened new avenues for enhancing college students’ information literacy while injecting fresh momentum into the development of higher education.

## **4.2. Design of Personalized Learning Path Supported by Artificial Intelligence Technology**

In the rapidly evolving information age, college students’ digital literacy has become a crucial foundation for adapting to society, acquiring knowledge, and future development. The rapid advancement of artificial intelligence (AI) technology has not only brought profound transformations across various sectors but also provided new perspectives and tools for teaching and learning in education. Against this backdrop, digital literacy education for college students faces both challenges and opportunities. The application of AI technology, particularly in designing personalized learning paths, offers innovative approaches to enhance students’ digital literacy [4]. Through AI’s data analysis capabilities, educators can gain deep insights into each student’s learning habits, preferences, and needs, thereby creating customized study plans and resource recommendations that not only improve learning efficiency but also strengthen targeted and effective education [2]. Additionally, AI-powered recommendation systems assist students in filtering and organizing vast information resources, enhancing both the efficiency of information acquisition and practical application [5]. Simultaneously, AI-assisted adaptive learning platforms dynamically adjust content difficulty levels and study paths based on students’ progress and mastery levels, ensuring continuous and systematic learning [6]. In educational practice, AI-supported personalized learning path design not only elevates students’ digital literacy but also stimulates their interest in learning and boosts motivation, ultimately cultivating high-quality talents with solid theoretical foundations and practical skills to meet future societal demands [7]. Therefore, exploring the path of information literacy education for college students driven by AI is not only an innovation to the existing education model, but also an important exploration to improve the quality of education [8].

## **5. Implementation Paths and Strategies of Information Literacy Education for College Students in the ERA of AI**

### **5.1. The Combination of Academic Curriculum and Information Literacy Education**

In today’s educational landscape, information literacy has emerged as a crucial

indicator of students' comprehensive capabilities [9]. With the rapid advancement of artificial intelligence (AI) technology, traditional information literacy education models can no longer fully meet the demands of the new era [3]. Therefore, integrating AI technology with academic curricula to enhance students' information literacy has become a key focus in education. On one hand, AI integration provides innovative tools and methodologies for information literacy education. By leveraging AI, we can rapidly filter, analyze, and process large volumes of data, helping students develop critical thinking skills and improve their ability to solve complex problems. For instance, using machine learning algorithms to analyze big data enables students to master fundamental data analysis skills while cultivating critical information evaluation abilities. On the other hand, combining AI with academic curricula allows for more systematic and personalized information literacy development. Through analyzing individual differences in learning habits and interests, AI can provide customized learning paths and resource recommendations, making information literacy education more tailored to students' needs and thus enhancing learning effectiveness and efficiency. Additionally, this educational model promotes innovation in teaching methods. For example, AI-assisted simulation platforms allow students to conduct scientific experiments in virtual environments, which not only fosters interest in scientific inquiry but also strengthens understanding of experimental operations and safety awareness. In conclusion, the AI-integrated model for college students' information literacy education not only lays a solid foundation for their future development but also drives innovation in the education sector. Future educational practices need to explore concrete approaches for combining AI technology with academic curricula further, as well as how to effectively integrate and utilize educational resources while maintaining quality standards.

## 5.2. Cultivation of Information Literacy Skills in Practical Activities

In the information age, college students, as active members of society, have their information literacy directly impacting their ability to adapt to social and future development. With the rapid advancement of artificial intelligence technology, information literacy education for undergraduates faces both new challenges and opportunities. Traditional methods can no longer fully meet the demands of rapidly evolving information technologies and students' personalized learning needs. Therefore, this study proposes an AI-driven approach to enhance information literacy education for college students. By leveraging technological support and innovative teaching models, we aim to improve educational personalization and interactivity to adapt to the ever-changing information environment [10]. In practical implementation, we focus on cultivating students' information literacy skills through project-based learning, case analysis, and problem-solving processes. This methodology not only enables students to master practical skills in information retrieval, screening, analysis, integration, and application but also develops critical thinking and problem-solving abilities. For instance, in science com-

petitions, students need to utilize online resources for data collection, evaluate information reliability, collaboratively complete research reports, and ultimately present outcomes—all processes effectively enhancing their information literacy levels. Additionally, by integrating AI technology, we can design personalized learning paths through intelligent recommendation systems that provide customized learning resources and pathways, thereby more efficiently promoting students' information literacy improvement [11]. Meanwhile, through AI-assisted learning analytics tools, teachers can more accurately track students' academic progress and learning outcomes, enabling timely adjustments to teaching strategies and achieving truly personalized instruction [11]. In conclusion, integrating artificial intelligence into practical educational activities not only enhances the effectiveness of information literacy education but also drives innovation in teaching models. This approach provides robust support for cultivating high-quality, versatile talents who meet future societal demands [2].

### 5.3. Incentives and Practices of Information Literacy Competition

With the rapid advancement of information technology, AI applications in education have become increasingly prevalent, raising higher demands for college students' information literacy. Information literacy encompasses not only the acquisition, processing, and application of information, but also the ability to rapidly filter, evaluate, and create new knowledge from vast data [12]. Consequently, cultivating information literacy has emerged as a crucial component of higher education that cannot be overlooked [1]. In the AI era, traditional information literacy education models face both challenges and opportunities. The integration of AI technology provides innovative approaches for designing personalized learning paths, evaluating learning outcomes, and optimizing educational resource allocation. Simultaneously, AI technology offers new teaching resources and methods for information literacy education, such as intelligent recommendation systems and online open courses, which can effectively enhance students' information literacy levels [13]. To meet the requirements of the AI era, it is essential to establish a more open, flexible, and efficient model for college students' information literacy education. This requires educators to not only update their educational philosophies but also actively explore new educational practices integrated with AI technologies, such as the “teach-competition-candidate” integrated education model that combines education, competitions, and recruitment to stimulate students' learning motivation and innovative capabilities. Through this approach, information literacy education can be effectively integrated into students' daily studies and future career development, becoming a vital tool for cultivating lifelong learning skills and adapting to societal changes [1]. Additionally, evaluation and feedback mechanisms for college students' information literacy in the AI era should also be strengthened. By establishing a scientific evaluation system and feedback loop mechanism, we can more accurately assess students' information literacy levels and teaching effectiveness, providing evidence for educational reform and curriculum optimization.

tion. In conclusion, the pathways for cultivating information literacy among college students in the AI era require continuous exploration and refinement to adapt to technological advancements and societal demands, ultimately nurturing innovative, versatile talents capable of thriving in the information age.

## **6. Evaluation and Feedback Mechanism Construction of College Students' Information Literacy in the ERA of AI**

### **6.1. Evaluation Index System of Information Literacy Education**

With the rapid development and widespread application of artificial intelligence technology, information literacy education for college students faces new opportunities and challenges. Information literacy is not merely about acquiring and processing information; it also encompasses critical thinking, data-driven decision-making, ethical awareness, and other multifaceted competencies [14]. In this context, establishing a scientific evaluation framework for college students' information literacy has become particularly crucial. The objective of this study is to develop a scientific, rational, and practical evaluation system for information literacy among university students. By extensively collecting and analyzing theoretical and practical research findings from domestic and international sources, combined with expert interviews, Analytic Hierarchy Process (AHP), fuzzy comprehensive evaluation, and other methodologies, we conducted an in-depth exploration of information literacy's essence and established an evaluation framework accordingly. The construction of the evaluation system adheres to principles of systematicness, scientific rigor, operational feasibility, and measurable outcomes, aiming to accurately reflect students' comprehensive capabilities in information acquisition, processing, application, and ethical considerations. Through scientific weighting of indicators, we developed an evaluation system that not only demonstrates multidimensional competencies in information literacy but also adapts to diverse educational environments and learning needs. Additionally, this study integrates the evaluation system with practical applications by designing corresponding assessment tools and procedures to ensure objectivity and effectiveness. Through extensive surveys and feedback collection from students, we continuously refined and optimized the evaluation system to authentically reflect and advance information literacy education for college students. Ultimately, we aim to establish an evaluation system that not only serves as an effective tool for assessing college students' information literacy, but also provides crucial guidance for reforming and advancing information literacy education. Through this framework, we can better guide the cultivation of students' information literacy, empowering them to develop the competencies and qualities necessary to meet the challenges of our digital society [13].

### **6.2. Feedback Cycle Mechanism of Teaching and Learning**

In the rapidly evolving information age, cultivating information literacy among college students—future pillars of the nation—has become an indispensable com-

ponent of higher education. With the rapid advancement of artificial intelligence (AI), traditional approaches to information literacy education are increasingly inadequate for modern needs. Therefore, developing AI-driven pathways for information literacy education has become particularly crucial. The integration of AI not only enhances personalized and intelligent educational practices but also facilitates the formation of effective feedback loops between teaching and learning [7]. An efficient “teaching-learning feedback loop” should be dynamic, continuous, and interactive, ensuring that every piece of feedback during the educational process is effectively collected and utilized to drive mutual progress. Under AI-powered education models, educators can use smart analytics tools to track learners’ progress, comprehension levels, and interests in real-time, allowing timely adjustments to instructional strategies [15]. Simultaneously, learners receive personalized learning recommendations through instant feedback from intelligent systems, enabling more tailored and precise learning experiences. Additionally, AI technology helps establish a diversified evaluation system incorporating self-assessment, peer review, and teacher feedback. This not only improves assessment efficiency and accuracy but also provides students with comprehensive learning feedback. Through such evaluation mechanisms, students’ information literacy competencies can be scientifically assessed while simultaneously encouraging teachers to reflect on their teaching methods and innovate instructional approaches. In conclusion, the integration of AI technology has opened new possibilities for establishing a “feedback loop mechanism in teaching and learning.” Through intelligent data analysis and interactive learning platforms, this approach effectively facilitates two-way engagement between educators and learners, optimizes educational resource allocation, and ultimately enhances the quality and efficiency of information literacy education [3]. As AI continues to advance, this educational model is expected to be adopted across broader domains, providing robust support for personalized and intelligent education implementation.

## 7. Conclusions and Prospect

### 7.1. Research Summary and Theoretical Contributions

This study conducts an in-depth analysis of contemporary college students’ information literacy in the digital age, while considering the rapid development of artificial intelligence (AI) technology, to explore its applications and challenges in information literacy education for university students [2]. The research indicates that AI integration provides innovative tools and methodologies for information literacy education, effectively enhancing students’ digital competencies—particularly in cultivating critical thinking, data processing skills, and ethical awareness [16]. Additionally, the study proposes an integrated “teaching-competition-employment” model that combines traditional teaching, competition mechanisms, and recruitment systems. This approach drives students’ proactive learning and practical engagement through competitions, thereby improving their comprehensive information literacy. Furthermore, the research examines evaluation and feed-

back mechanisms for college students' information literacy in the AI era, emphasizing the establishment of scientific assessment criteria and feedback loops to promote continuous improvement in both teaching and learning. The theoretical contributions of this study lie in systematically elucidating the modern connotations of information literacy, providing innovative pathways and strategies for AI-era education, and offering theoretical foundations and practical guidance for higher education reform. These findings carry significant practical implications and application value.

## 7.2. Future Research Direction and Practical Significance

With the rapid advancement of artificial intelligence (AI) technology, traditional information literacy education models can no longer fully meet the demands of the new era. This study explores AI-driven pathways for college students' information literacy education, aiming to provide theoretical foundations and practical guidance for higher education reform [2]. The integration of AI technology has brought new opportunities in personalized learning, intelligent teaching assistance, and efficient assessment systems [2]. Future research will focus on deepening AI applications in education, exploring how smart technologies can enhance students' information literacy—particularly critical thinking, data processing skills, and ethical awareness [17]. Simultaneously, this study examines the practical outcomes of AI-embedded education and establishes effective evaluation mechanisms to ensure continuous quality improvement. By innovating educational models and developing practical approaches, we can effectively promote the comprehensive development of students' information literacy, laying a solid foundation for their sustainable growth in a future society.

## Conflicts of Interest

The author declares no conflicts of interest.

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