Visual Analysis of Information Literacy Education for Chinese University Students Based on Citespace

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Abstract

To investigate the research progress and development trends of information literacy education for college students in China, this study employs literature on college student information literacy education collected in the CNKI (China National Knowledge Infrastructure) database as its data source, utilizes bibliometric methods and the CiteSpace knowledge mapping tool to conduct keyword clustering analysis, and performs an in-depth examination of key literature. The study finds that early research primarily focused on defining the connotation of information literacy; after 2016, the research focus shifted to three aspects: the educational content of college student information literacy education, the current status, and the reform of educational models—that is, greater attention was devoted to how to conduct information literacy education for college students in the information age, what problems exist in current college student information literacy education, and how to solve these problems.

Full Text

Visual Analysis of Information Literacy Education for Chinese College Students Based on CiteSpace

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Abstract: To investigate the research progress and development trends of information literacy education for Chinese college students, this paper employs the China National Knowledge Infrastructure (CNKI) database as its data source, utilizing bibliometric methods and the CiteSpace knowledge mapping tool to conduct keyword cluster analysis while examining key literature. The study

reveals that early research primarily focused on defining the connotation of information literacy; since 2016, the research focus has shifted to three aspects: educational content, current status, and educational model reform of college students' information literacy education, emphasizing how to conduct information literacy education in the information age, what problems exist in current practices, and how to solve these problems.

Keywords: information literacy education; CiteSpace knowledge graph; educational model reform; MOOC; flipped classroom

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Paul Zurkowski, Chairman of the US Information Industry Association, first proposed the concept of information literacy in 1974, defining it as "the techniques and skills used by individuals in utilizing information to solve problems" [1]. As technology advanced and the information society developed, scholars continuously enriched the concept with new dimensions. In 2002, Hannelore B. Rader, Librarian at the University of Louisville, summarized information literacy as comprising three components: information awareness, information capability, and information ethics [2]. Thus, information literacy is not a singular skill but a comprehensive quality encompassing awareness, knowledge, skills, and ethics. It requires not only that students independently retrieve, acquire, process, and utilize information resources, but also that they demonstrate innovative thinking throughout the information processing cycle [3].

Chinese universities recognized the importance of cultivating information literacy among college students as early as the 1980s. In 1982, the State Education Commission (now the Ministry of Education) issued a document explicitly requiring the teaching of information retrieval courses as part of information literacy education for college students. In 2002, the Ministry of Education reaffirmed the importance of information retrieval courses and mandated their implementation in all higher education institutions nationwide [4]. Numerous domestic scholars began researching the meaning of information literacy and the content and significance of college student information literacy education. Following the approval of the *Framework for Information Literacy for Higher Education* by the Association of College and Research Libraries (ACRL) Standards Committee in February 2015, research priorities shifted toward examining the current status of information literacy education in China and strategies for its improvement.

CiteSpace Knowledge Graph Analysis

Data Sources

Using CNKI' s advanced search function, we retrieved literature with "college student information literacy education" in the title field, limited the publication period to January 1, 2013–December 31, 2022, and selected "journal articles" only, yielding 158 valid sample documents.

Research Methods

This study employs the CiteSpace bibliometric visualization tool to analyze literature in the field of "college student information literacy education." The process involved data cleaning (format conversion and deduplication) of the 158 documents downloaded from CNKI, followed by parameter configuration in CiteSpace. The time span was set to January 1, 2013–December 31, 2022, with a time slice of one year and a threshold of Top 50 (selecting the 50 most frequently occurring nodes in each time slice). We then performed keyword co-occurrence analysis and used the LLR algorithm for cluster analysis. The resulting Modularity Q value was 0.594, exceeding the critical value of 0.4, indicating a tightly clustered network structure. The Silhouette value (reported as QS in the original) was 0.73, well above the critical threshold of 0.5, confirming that the clusters fall within a credible range and demonstrating high-quality cluster analysis suitable for further investigation.

Results and Discussion

Keywords provide a concentrated summary of a paper' s research content and typically represent hot topics in a given field. By analyzing the frequency and centrality of keywords through co-occurrence analysis, we can identify key issues in the domain. Based on the keyword clustering knowledge graph (Figure 1 [Figure 1: see original paper]) and the top nine keyword cluster information (Table 1), we summarize the research themes on "college student information literacy education" in China over the past decade into three main categories: educational content, current status, and educational model reform.

Educational Content for College Student Information Literacy in the Information Age

According to Hannelore B. Rader' s conceptualization, college student information literacy education encompasses three dimensions: enhancing information awareness, acquiring information knowledge and skills, and strengthening information ethics.

With the rapid development of self-media and the mixed quality of online information, college students—whose worldviews and values are still forming—require cultivation of scientific information awareness. This promotes their desire to actively acquire information, helps them critically evaluate online information while resisting negative influences, enables them to identify needed public relations information from complex information streams, and allows them to grasp information essence. Such awareness equips students with information evaluation and utilization capabilities, fostering strong social responsibility and critical spirit.

Information knowledge serves as the foundation of information literacy education, determining the efficiency and extent of information acceptance, discrimination, and use [5]. In the information age, information knowledge primarily

emphasizes computer skills related to information retrieval (acquisition), preservation, processing, analysis, and utilization. Information skills refer to students' abilities to keenly capture, select, focus on valuable information, and utilize it effectively—the core of information literacy. Mastering information knowledge and skills means enhancing students' capacities to identify, retrieve, apply, evaluate, communicate, reflect upon, and create information [6].

The emergence of new media grants students considerable autonomy and choice, allowing every individual to freely and conveniently publish and disseminate information through various channels. Without adherence to information ethics, numerous negative consequences inevitably arise, causing harm and losses to oneself and others, and in severe cases leading to social problems such as information crime, information leakage, and information plagiarism.

Current Status of Information Literacy Among Chinese College Students

Although China' s Ministry of Education mandated in 2002 that all higher education institutions offer information retrieval courses, some institutions have still not implemented them due to various reasons. Furthermore, college student information literacy education in China faces multiple challenges, including insufficient attention from institutions and students, an inadequate education system, overly monotonous teaching methods and content, and a shortage of qualified educators.

Insufficient Recognition of Information Literacy Education' s Importance. Information literacy education falls primarily within the domain of general education, yet Chinese universities prioritize specialized talent cultivation. Consequently, information literacy courses, like other general education courses in humanities, are offered as low-credit, short-duration public electives centered on specialized majors. This arrangement objectively leads to insufficient attention from both faculty and students. Additionally, college students generally exhibit weak information awareness, with most failing to recognize the significance of information literacy for their personal growth and development, resulting in inadequate learning motivation.

Incomplete Curriculum System and Inadequate Teaching Content and Methods. While most institutions have implemented the Ministry of Education' s directives and gradually recognized the importance of cultivating information literacy, course delivery remains predominantly lecture-based with minimal student interaction or hands-on practice. Due to faculty specialization limitations, information knowledge and capability training cannot be integrated with students' majors, preventing the incorporation of information skills development into specialized coursework.

Limited Participation in Information Literacy Education. In European and American countries, information literacy courses involve diverse teaching teams comprising university presidents, library directors, library staff, and fac-

ulty from various departments. This diversified approach enables closer integration between information literacy instruction and academic disciplines, yielding excellent educational outcomes. In contrast, most Chinese universities rely primarily on library or computer science department faculty for information literacy instruction. This single composition and insufficient number of instructors relative to the entire student body necessitate large-class teaching formats that hinder discipline-specific integration and prevent deeper educational development [7].

Educational Reform Models for Chinese College Student Information Literacy

Reforming the Educational Model. College student information literacy is not only crucial for individual growth and development but also represents an essential requirement for talent development in the information age. Therefore, contemporary information literacy education must receive collaborative support from government, universities, and various social information institutions, forming a tripartite educational model integrating government, higher education, and social information agencies. Government education authorities should provide clear support and, from a macro strategic perspective of national education, actively promote and evaluate the planning and policy formulation for college student information literacy education. As the primary educational arena and main task bearer, universities should integrate information literacy theory into daily, long-term teaching practices. While offering information retrieval courses, institutions should conduct freshman orientation training and actively organize campus cultural activities related to information literacy, such as "Reading Month," "Library Information Service Promotion," and discipline service activities. These events cultivate students' information ethics and awareness, enhance their attention to information, and encourage them to abide by national ethical norms and information regulations [8].

Flexible Application of MOOCs and Flipped Classrooms to Reform Teaching Methods. MOOCs (Massive Open Online Courses) are open-access online courses with free choice and open registration that integrate social networks with accessible web resources, typically led by leading figures in their respective fields [9]. Professor Pan Yantao notes that MOOCs feature four characteristics: interactivity, openness, flexibility, and engagement. Their interactivity enhances teaching effectiveness in college information literacy courses; their openness enables courses to reach all undergraduates and even the public; their flexibility facilitates modular teaching of information literacy courses; and their engagement promotes multi-party interaction and communication in information literacy instruction [9]. The flipped classroom model involves students watching online lecture videos before class, then engaging in interactive discussions with instructors and peers during class time about knowledge application, ultimately achieving learning objectives. In China, Professor Huang Ruhua of Wuhan University successfully implemented a flipped classroom for

the MOOC-based *Information Retrieval* course, which attracted over 15,000 registrants, with more than 1,000 students earning certificates. This experiment represents a successful case of flipped classroom application in information literacy education. Long Qian, a librarian at East China Normal University, conducted empirical research comparing flipped classroom and traditional teaching models in information literacy education, finding that flipped classrooms can improve students' performance on objective test questions [10]. However, flipped classroom instructional design is highly complex, requiring not only a complete knowledge system and flexible teaching techniques but also technical and environmental support. Therefore, flipped classrooms in information literacy education warrant further investigation by scholars. The development of MOOCs and other online teaching resources provides rich materials and technical support for pre-class learning in flipped classroom models, while flipped classroom implementation creates positive feedback between online and offline instruction. The flexible application and development of both approaches represent an inevitable trend in information literacy education in the new media era.

Enhancing Information Literacy Among Library Staff. University libraries bear the important responsibility of information literacy education, and librarians serve as the direct practitioners of college student information literacy education in China. They are not only awakeners of students' information awareness and navigators of information knowledge but also sowers of information innovation and guardians of information ethics [11]. Consequently, librarians' information literacy levels directly impact educational effectiveness. University libraries must prioritize staff quality development, fostering lifelong learning awareness and continuously improving librarians' specialized knowledge and computer retrieval skills. Through diversified teaching methods, librarians should fully apply their information skills in practical instruction, helping students retrieve, analyze, and utilize information according to their learning and research needs, actively stimulating their interest in using information resources, and guiding them to establish information literacy.

Conclusion

As contemporary information technology continues to develop, societal demands for college students'information literacy capabilities keep increasing. To improve information literacy education, we must reform educational models to establish a four-in-one national education model integrating government, universities, information dissemination institutions, and information service agencies. We must reform teaching methods by flexibly employing MOOCs, flipped classrooms, and other formats to achieve positive feedback between online and offline instruction. Finally, we must strengthen faculty development to enhance librarians' information literacy levels.

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A Review of Information Literacy Education for College Students Based on Citespace

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Abstract: In order to explore the research progress and development trend of the information literacy education for Chinese college students, this paper takes the literature on college students' information literacy education collected in China National Knowledge Network (CNKI) database as the data source, uses the bibliometric method and CiteSpace knowledge graph tool, carries out keyword cluster analysis, and studies the key literature. It is found that early studies mainly focus on the definition of information literacy; Since 2016, the research focus has shifted to three aspects: educational content, current situation and educational mode reform of college students' information literacy education, which means that more attention is paid to how to conduct information literacy education for college students to meet the requirements of the current information age, as well as the existing problems of information literacy education and how to solve them.

Key words: information literacy education; CiteSpace; education model reform; MOOC; flipped classroom

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Note: Figure translations are in progress. See original paper for figures.