

Visual Analysis of the Research Status of Open Education Resources

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Abstract: Since the epidemic, online and offline mixed teaching has become the trend of the times. The development, construction, sharing and sustainable development of educational resources have become the research hotspots and focus of online teaching in recent years. Based on the academic journal papers published by CNKI, high-frequency keyword analysis, social network map analysis, category analysis and other contents, with the help of visual charts, this paper analyzes the development trend, hot spots and focus of China's development of OER.

Keywords: Open Education Resources, Visual charts, Hotspots and focus.

1. Introduction

The most widely recognized definition of "Open Education Resources(OER)" is "it is a free and open digital resource provided to teachers, students and self scholars, which can be repeatedly applied to teaching, learning and research" (Ren Qilong, Chen Xinyue, Mao Guangxiong, & Wang qianyun, 2022).A large number of Chinese scholars have carried out research on the OER. In order to better summarize the research status, grasp the cutting-edge trends, and improve the research quality, With the help of CO word analysis, this study makes a visual analysis of the data of domestic OER, grasps the research status of domestic OER, and predicts the development trend of domestic OER in the future, so as to provide reference for later in-depth research.

2. Research Methods and Research Process

2.1. Research Object

The data source of this study is the academic journal papers of China National Knowledge Network (CNKI), and the key words "OER", "oer", "open Courses" and "open courseware" are used for literature retrieval in "title" and "key words"

respectively, in which the matching logic is "or", and the publication date of the literature is from January 1, 1998 to June 31, 2022. A total of 2301 literature resources are retrieved, the retrieved literature was screened, and the conference notices, interviews, non academic articles and other irrelevant literature were deleted. Finally, 1672 effective literature was obtained.

2.2. Research Methods

This study uses co word analysis, make a quantitative analysis of the literature on the research of domestic OER, summarize the research status of domestic OER and predict the future development trend.

2.3. Research Process

2.3.1. Get High-Frequency Keywords

1672 effective documents selected were saved as text files and keyword frequency statistics were carried out. A total of 1520 keywords were found. In order to avoid problems in word frequency statistics, this study combines and deletes keywords with the same or similar meanings. 14 keywords with a frequency of no less than 20 times are selected as high-frequency keywords, which are sorted in descending order according to the frequency of their occurrence, as shown in Table 1.

Table 1. High frequency keywords

Key word	Frequency
Big Data	602
Internet+	571
Higher education	103
College Students	72
Innovation	39
Internet thinking	39
Vocational Education	38
Educational Information	29
Learning analysis	26
Wisdom education	26
Continuing Education	25
Mobile Internet	24
Distance Education	22
talent development	21

Table 1 shows the 14 high-frequency keywords in the literature related to domestic OER. The top three are Big Data, Internet+, higher education, college students, innovation and Internet thinking, with word frequencies of 602, 571, 103, 72, 39 and 39 respectively.

Table 2 shows the co word matrix of some high-frequency keywords. For example, Big Data and Internet+ appear 6 times, which show that the two research topics are closely related. Extensive data and Internet+college students and Big Data appear 12 times, and college students and Internet+ appear 20 times, indicating that the two research topics are also closely related.

2.3.2. Social Network Map Analysis

Social network analysis method can explore the research structure of a topic. If the frequency of keyword co-occurrence map is greater than 10, it will be displayed by drawing, and the size of node circle represents the centrality, as shown in Figure 1.

The map shows that: (1) big data is at the center of the social network of high-frequency keywords in OER, which shows that big data plays a decisive role in the research of OER; (2) From the analysis of node size, big data, internet+, college students, internet+education, innovation are the hot

keywords of open education research, which explains the research direction and development trend of OER; (3) From the analysis of the thickness and number of solid lines connected by nodes, the lines connected by open education resource nodes and other keyword nodes are more and thicker, which reflects that the core of domestic open education research is OER, and its related research is also carried out more around this theme; (4) From the overall network analysis, the Open University, teaching mode, teaching reform, etc. are at the edge of the social network map, and there are fewer and finer connections with other nodes, reflecting that the research topics represented by these keywords are relatively unpopular.

This study compares and analyzes the published open education research literature in China. According to the comparison results, oer research is divided into five categories, as shown in Figure 2.

Figure 3 divides the topics of key representative literature comparison into five categories. From 1998 to 2022, a total of 359 papers were issued about OER, a total of 350 articles were published about open education, 94 papers were published about distance radio education, 92 papers were published about the Open University, 75 papers were published about teaching resources.

Table 2. CO word matrix of some high-frequency keywords

0	Big Data	Internet+	the Internet	College Students	Higher education	Innovation	Internet thinking	Vocational Education	Colleges	education
Big Data	0	6	4	12	15	11	0	5	14	14
Internet+	6	0	1	15	14	9	7	28	9	8
College Students	12	15	8	0	0	1	1	0	3	1
Higher education	15	14	5	0	0	1	0	0	0	0
Innovation	11	9	2	1	1	0	5	1	3	1
Internet thinking	0	7	0	1	0	5	0	0	1	0
Vocational Education	5	28	0	0	0	1	0	0	0	0
Colleges	14	9	3	3	0	3	1	0	0	0
education	14	8	5	1	0	1	0	0	0	0

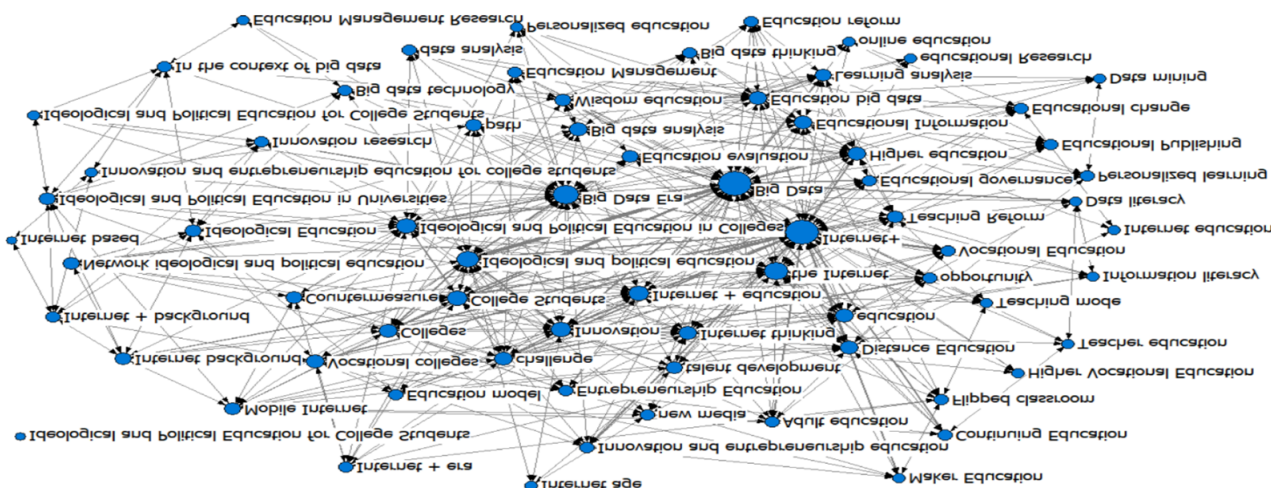


Figure 1. Social network analysis diagram

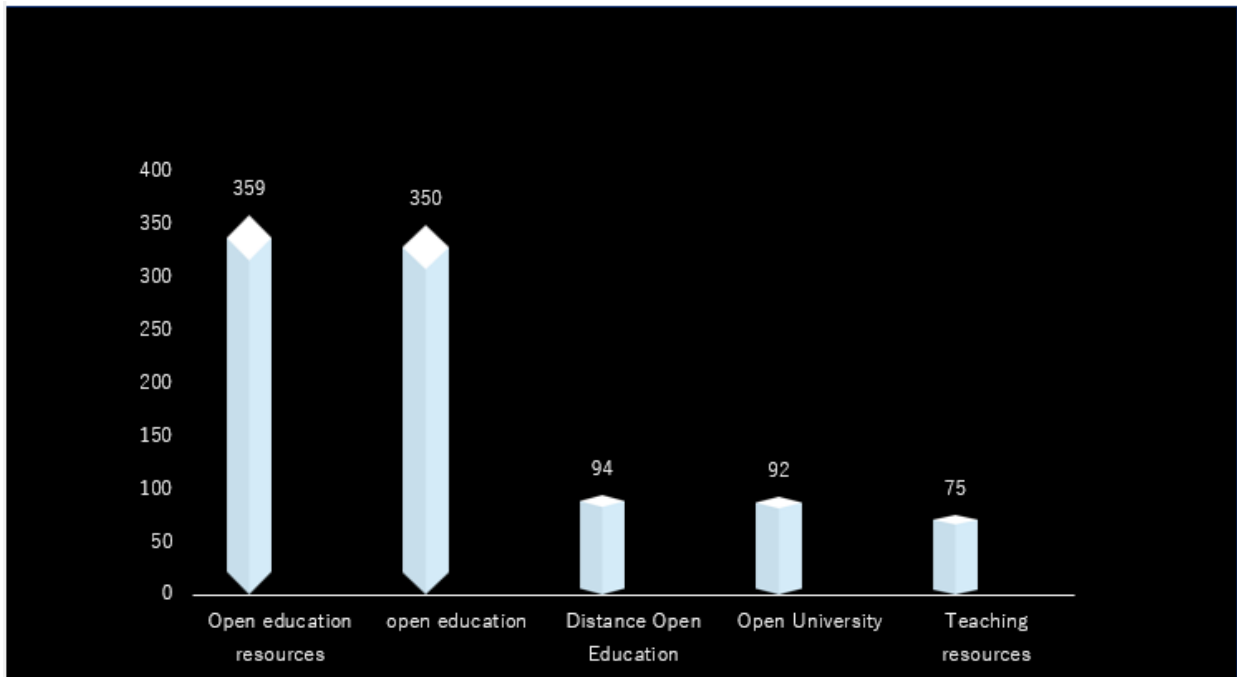


Figure 2. Subject data of documents issued from 1998 -2022

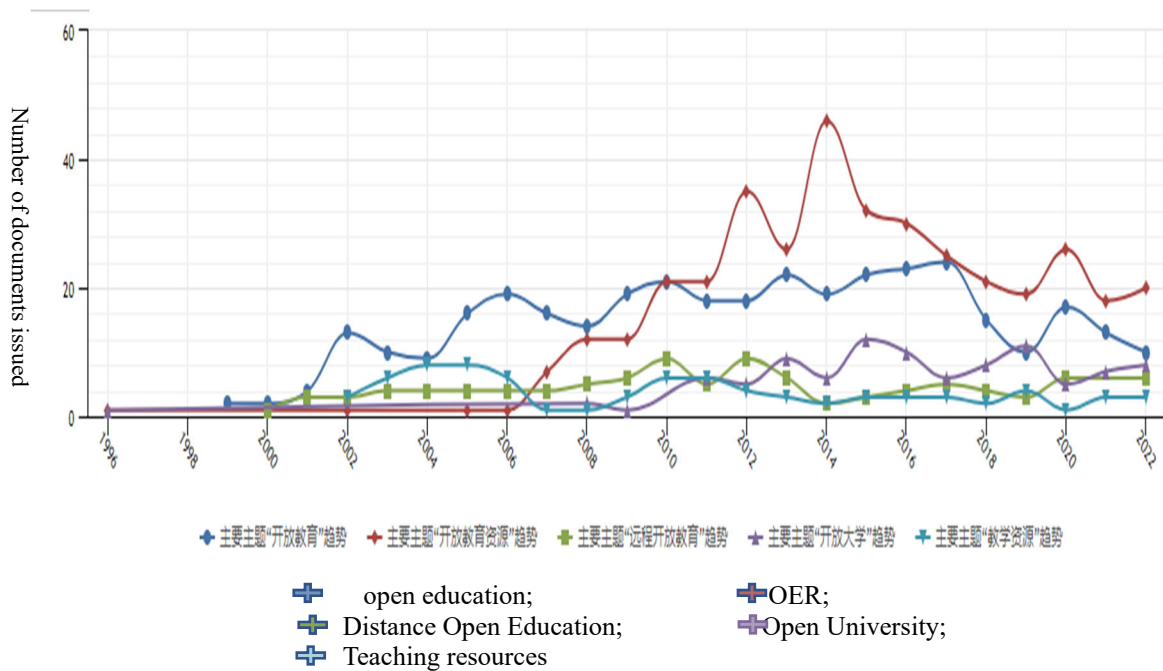


Figure 3. Topics with the most posts

3. Data Analysis

3.1. Analysis of Subject Categories in The Research Field of OER

This theme is composed of high-frequency keywords such as open educational resources, open courseware, and national quality courses. Xiao Junhong (2016) studied the relationship between OER and personal learning. It focuses on how individuals use their personal learning environment to give the most effective play to the role of OER in supporting individual learning, and puts forward relevant reference conclusions on the benefits of OER to individual learning and the objective hardware and software environment that needs to be created (Stephen dawn & Xiao Junhong, 2016). The theme mainly focuses on the construction and development of OER themselves, and the mode of national OER construction;

Learn from the advanced experience of foreign OER construction, and focus on the construction of hardware and software foundation.

3.2. Themes of Open Education, Distance Development Education and Open Universities

The research on open education, distance development education and open university mainly focuses on the application practice of open resources. In terms of the application of open resources, this paper discusses the rational utilization of open educational resources in domestic colleges and universities, and begins to establish various new educational resource platforms. The epidemic since 2019, the world began to teach online, which objectively promoted the mutual recognition and exchange between platforms,

promoted the development of open education and distance education at home and abroad, and promoted the promotion and sharing of OER. From the perspective of current world trends, open education and distance education are equally important future needs and trends that exist in the future and offline education at the same time.

3.3. Theme of Teaching Resources, Higher Education and Innovative Education

It can also be seen from the social network map in Figure 1 that at present, the research on OER is mostly focused on Mu class. This topic includes more than 10 keywords, such as teaching mode, excellent courses, shared resources, mobile learning, teaching resources, open courses, Mu class, higher education, University Library, etc The research under this theme focuses on the role of the development of open education in higher education, and the impact of innovative education using information technology to change the space-time boundaries of education.

3.4. Themes in the Environment of OER

The theme consists of open education, educational resources, autonomous learning, learners, innovative learning and other keywords Researchers under the above topics mainly focus on the cultivation of students' autonomous learning ability under the environment of open educational resources Meet the needs of national economy and Society for innovative talents.

3.5. Research on OER under the Theme of Big Data

The search results show that the topics most significantly related to OER are big data and Internet +, which shows that the current research on OER pays more attention to big data. From construction to sharing, OER are in a wider range of interconnected technology environment and sharing needs. The quality of information technology environment, information technology tools and information resource

platform will directly affect the development, utilization and sustainable development of OER.

4. Conclusions and Prospects

An important means to ensure the quality of OER projects depends on effective quality management. To improve the quality of OER, we need to promote competition. The more types and subjects of OER, the more people will distribute OER on the platform, and the better OER can be selected by users under the comparison of multiple parties. For example, the likes, favorable comments, long comments and audience viewing time of Bilibili platform and other platforms are good indicators to measure the advantages and disadvantages of OER. We should further improve the evaluation system of OER on major platforms.

Educational resource builders should be good at using platforms such as the Internet and new media to share educational resources, so as to serve the development and foothold of students, take targeted teaching in combination with students' learning portraits, and provide students with more effective and high-quality teaching resources. At the same time, the providers of open education adopt new media tools and platforms to constantly update and develop their own educational resources. Provide more ways and channels to give the public opportunities for lifelong learning.

References

- [1] Gu Hongtao Analysis on the research hotspots of University Libraries in China Liaoning Normal University.
- [2] Jia Tingbo, Zhao Jiamin, Huang Yangbin, Liu Yaji, & Li Hexiao (2021). Research on BIM Technology Learning Mode in Big Data environment Journal of Yunnan Open University, 23 (4), 7.
- [3] Jiao Jianli (2014). How can universities promote and develop Mu class—— Eight suggestions for principals.
- [4] Liu Yishan (2019). Research on the application of word frequency analysis method in "hot" articles Northeast Normal University.