

Original Paper

Visual Analysis of Education Evaluation Reform in China Based on CiteSpace

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Abstract

With the digital transformation and continuous development of education in China, the reform of education evaluation will also enter a new chapter. Taking "Education Evaluation Reform" as the research object, 304 articles were retrieved on CNKI using the "title" search method and imported into the CiteSpace bibliometric tool for visual analysis. We mainly conducted visual analysis on the author collaboration, research institutions, disciplinary distribution, and research hotspots of literature related to educational evaluation reform. The results indicate that a core research group has not yet been formed; The main research institutions include universities and research institutes, but being concentrated in the Beijing area is not conducive to cross regional exchange and cooperation of educational information; The research hotspots include education evaluation, evaluation reform, moral education, new era, value-added evaluation, etc., and there is still a certain research prospect in the future.

Keywords

Educational evaluation, Education evaluation reform, CiteSpace, Visual analysis

1. Introduction

In October 2020, the issuance of the Overall Plan for Deepening the Reform of Education Evaluation in the New Era opened a new era of education evaluation reform. Subsequently, many researchers conducted in-depth research and exploration on education evaluation reform. In 2022, the Ministry of Education issued the "Key Points for the Work of the Ministry of Education in 2022", which clearly stated: "Implementing the Digital Education Strategy Action." After the 20th National Congress of China, the digital transformation of education in China has been continuously promoted, bringing new momentum to the reform of education evaluation in the new era. Modern education evaluation is moving towards a new form characterized by digitization and collaborative innovation among multiple

subjects (Liu, Zhang, Hu, & Zhu, 2023).

Based on this, this article uses CiteSpace software to visually analyze relevant literature on education evaluation reform in China. Through visual analysis of collaborating authors, research institutions, distribution, research hotspots, etc., it aims to provide reference for future research and practice of education evaluation in China.

2. Data Sources and Research Methods

2.1 Data Sources

The literature is sourced from the China National Knowledge Infrastructure (CNKI) database, and the search method is to input the title "Education Evaluation Reform" without time span limitation. The literature type is academic journals, and a total of 354 articles were obtained. Visual analysis of all search results on CNKI revealed that before 2020, the number of publications was relatively low. Therefore, the limited time was from 2013 to 2023, and the search was conducted on November 20, 2023, resulting in a total of 304 articles. Due to the search method of the article title, the literature is relatively consistent with the topic, so the literature will not be excluded.

2.2 Research Methods

Use CiteSpace 6.1.R6 visualization software to analyze the literature. Export the 304 literature retrieved from CNKI to Refworks format, and then perform CNKI format conversion in CiteSpace software. In the analysis process, the time range is from January 2013 to December 2023, and the time slice is set to 1. Other parameters are defaulted. Select the author, institution, and keywords in the node type for analysis, and then perform cluster analysis, timeline analysis, and other related tasks on the keywords.

3. Research Results and Data Analysis

3.1 Annual Publication Volume Analysis

The annual distribution of the article is shown in Figure 1. From 2013 to 2019, the annual publication volume did not fluctuate significantly and remained in single digits. After 2019, the number of publications began to increase, and after 2022, the number of publications decreased. At the end of 2019, the COVID-19 broke out. Classes were suspended in all regions. The teaching method was changed from offline teaching to online teaching, followed by certain changes in the teaching evaluation method, which promoted the reform of teaching evaluation. In October 2020, the country issued the Overall Plan for Deepening Education Evaluation Reform in the New Era, constructing a new blueprint for education evaluation reform.

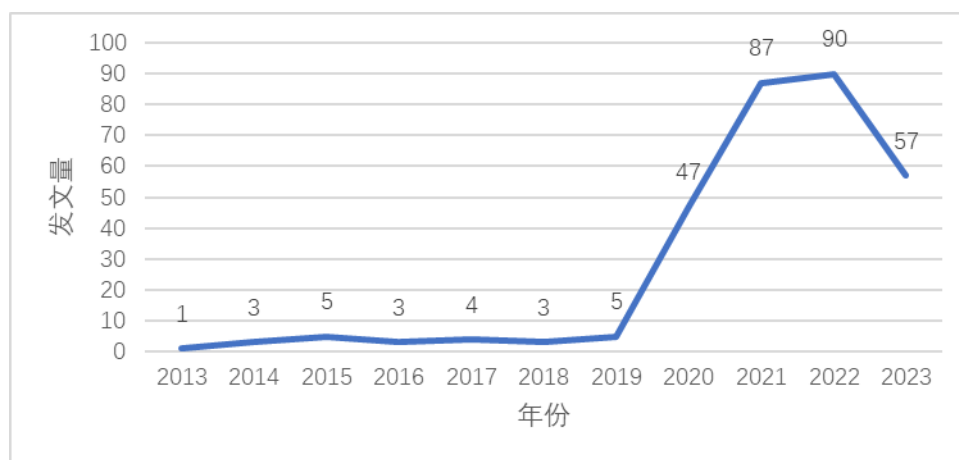


Figure 1. Analysis Chart of Publication Volume

3.2 Co linear Analysis of Author Collaboration Network

Since 2013, there have been many research authors in China's education evaluation reform. The maximum number of articles published is 3 by Zhu Dequan, 3 by Yuan Yimin, followed by 2 by authors such as Cong Yuhao, Yu Kailian, Liu Zhentian, and Liu Lei. From the co linear network graph of the authors in Figure 2, it can be seen that there is a certain degree of teamwork, but the core author group has not yet formed in China's education evaluation reform.

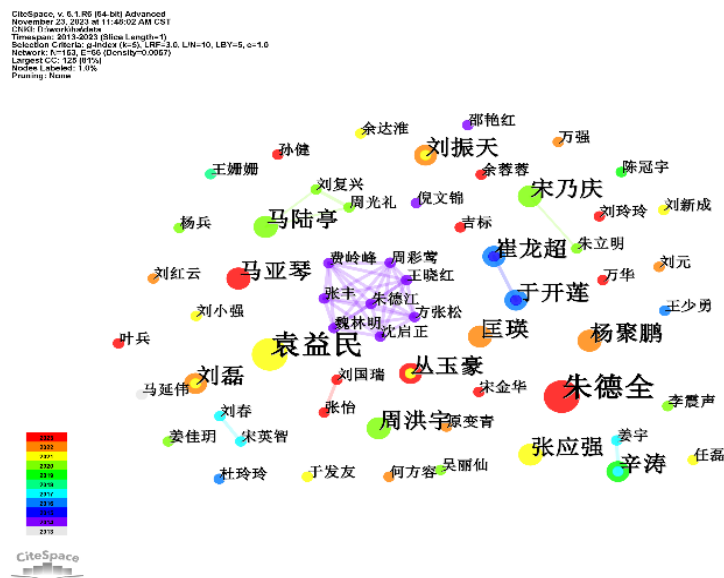


Figure 2. Co Linear Analysis of Author Collaboration Network

3.3 Institutional Collinearity Analysis

To ensure the accuracy of data analysis, following the approach of previous researchers (Chen & Sang, 2021), further categorize and organize secondary colleges or departments into corresponding institutional units. The number of articles published by institutions in descending order is 18 at Beijing

Normal University, 9 at the China Academy of Educational Sciences, 8 at East China Normal University, 5 at Southwest University, 5 at Shanghai Education Evaluation Institute, 4 at Central China Normal University, 4 at South China Normal University, and 4 at Hunan University. It can be inferred that the institutions with a higher volume of publications are mainly teacher training universities, followed by research institutes. From Figure 3, it can be seen that overall, the publishing institutions cover a wide range, including universities, research institutes, educational societies, primary and secondary schools, etc. According to the collaborative knowledge graph of research institutions, most of them belong to the same school or regional cooperation, concentrated in the Beijing area, which is not conducive to the national development of educational evaluation reform and the cross regional flow of educational information.

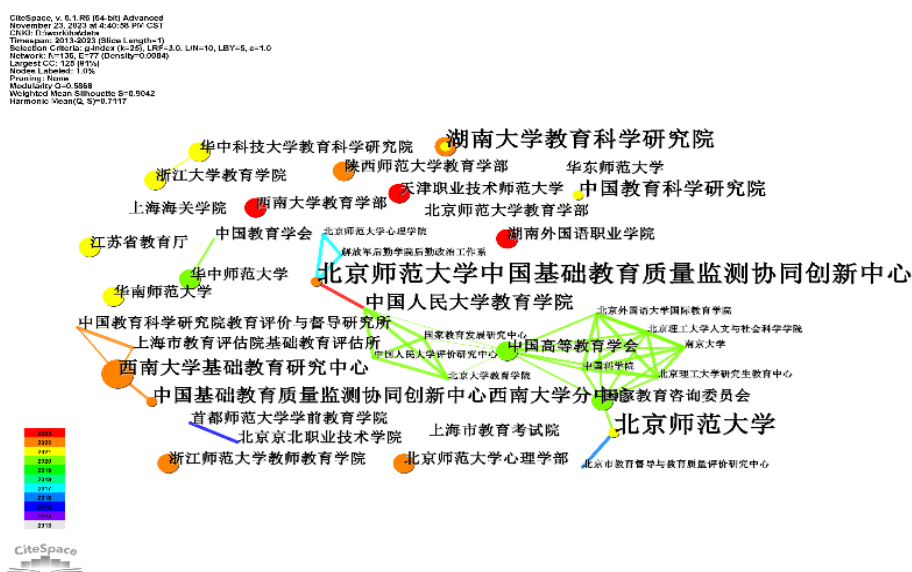


Figure 3. Collinear Analysis of Research Institutions

3.4 Discipline Distribution

Visual analysis of all retrieved literature on CNKI can obtain a disciplinary distribution map of educational evaluation reform, as shown in the figure. From the graph, it can be seen that the disciplines involved are diverse, with 117 articles on educational theory and management accounting for 35.35%, ranking first, followed by 82 articles on higher education, accounting for 24.77%; 45 articles were published in vocational education, accounting for 13.06%; The number of articles published in secondary education is 41, accounting for 12.39. From the perspective of academic stage, research on education evaluation reform in China mainly focuses on secondary education, vocational education, and high school education. The reform of educational evaluation involves relatively few aspects in preschool education, primary education, and adult education. In addition, most researchers focus on the fields of humanities and social sciences, with less research on science and engineering such as computer science, chemistry, and medicine.

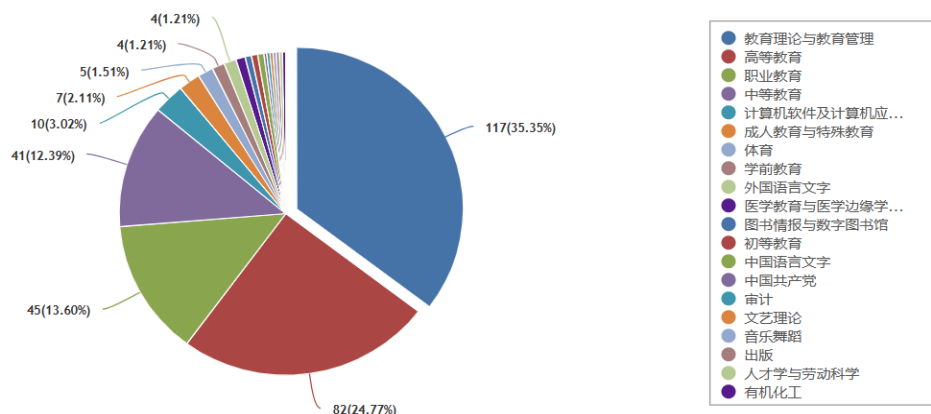


Figure 4. Discipline Classification Diagram of Educational Evaluation Reform Research

3.5 Keyword Collinearity Analysis

Use CiteSpace to construct a collinear map of educational evaluation reform keywords, as shown in Figure 5. After 2020, the number of educational evaluation reform publications has increased, and the frequency of keywords from high to low is education evaluation (frequency 78), evaluation reform (frequency 24), moral education (frequency 18), new era (frequency 17), value-added evaluation (frequency 15), process evaluation (frequency 13), comprehensive evaluation (frequency 13), vocational education (frequency 12), and vocational colleges (frequency 12). In the collinear knowledge graph of key words in education reform evaluation, there are many connections and high density, and the connections between keywords are strong. In addition to the research background of the theme word education evaluation reform and the new era, moral education, value-added evaluation, and process evaluation are areas worth paying attention to in our future research.



Figure 5. Keyword Collinearity Analysis Chart

3.6 Keyword Clustering Analysis

Keyword clustering analysis can simplify the co-occurrence network relationships of keywords into a relatively small number of clusters through clustering statistics, which can reflect the distribution of research hotspots from different perspectives. According to the clustering results, Modularity (Q value)=0.5868. If the Q value is greater than 0.3, it indicates that the keyword clustering structure is significant. The contour value is 0.9042, which is greater than 0.7, indicating that the clustering results are reliable and reasonable (Chen, Chen, Liu, Hu, & Wang, 2015). As shown in Figure 6, the keyword clustering knowledge graph displays a total of 5 clusters: # 0 education evaluation, # 1 moral education, # 2 new era, # 3 value-added evaluation, and # 4 reform. The smaller the number, the more keywords are included in the cluster.

Cluster # 0 education evaluation is the research topic word, indicating that the retrieved literature is relatively consistent with the topic word. Mainly including educational evaluation, basic education, core competencies, process evaluation, and big data. After the release of the 2017 version of the Curriculum Standards for Ordinary High Schools, core competencies have gradually been applied to basic education and teaching evaluation in China. Subsequently, in 2022, China introduced a new version of the Compulsory Stage Curriculum Standards, which further increased the attention of researchers to core competencies and integrated them into educational evaluation reform, becoming a research hotspot in recent years.

Cluster # 1: Cultivating moral character is the fundamental task of our education, and its key clustering mainly includes cultivating moral character, evaluation system, universities, classified evaluation, and higher education evaluation. It is found that the clustering of the keyword "cultivating virtue and nurturing talents" mainly involves the evaluation system of universities. In China's education system, middle and secondary education focus more on student academic performance, while higher education may place more emphasis on the construction of students' ideological and moral cultivation. Establishing a scientific value orientation is a fundamental principle for educational evaluation reform.

Cluster # 2: The new era is a new background proposed in combination with the international situation and the current development status of China. Its keyword clustering mainly includes the new era, vocational education, evaluation reform, process evaluation, and the combination of five aspects of education. It is found that in the context of China's development entering a new era, vocational education is also constantly developing and progressing, and the education evaluation system of vocational education is also constantly reforming. In the new era, everything is completely new, and the reform of educational evaluation will also be comprehensively developed and implemented in China's education system. Reasonably utilizing the advantages of intelligent technology and resolving stubborn problems in educational evaluation is an inevitable demand for educational evaluation reform in the new era (Zhang, Yang, & Tan, 2023).

Cluster # 3 value-added evaluation is one of the evaluation methods. The Overall Plan for Deepening Education Evaluation in the New Era proposes a new concept of "four evaluations", which includes

"improving result evaluation, strengthening process evaluation, exploring value-added evaluation, and improving comprehensive evaluation". It is an important action guide for education evaluation in China. Cluster # 3 keywords mainly include value-added evaluation, comprehensive evaluation, outcome evaluation, process evaluation, and new era education discovery. It is found that the evaluation philosophy corresponds to the four evaluation methods in the Overall Plan for Deepening Education Evaluation in the New Era. Under the guidance of the overall plan, researchers are studying the impact of evaluation methods on China's education system. Among them, "value-added evaluation" is an evaluation model centered on student development, gradually becoming a research hotspot in China's education evaluation system. Value added evaluation focuses on the vertical development and progress of students, emphasizes the improvement of their comprehensive quality, and strengthens the differentiation of educational subjects (Li, Zheng, & Huang, 2022). Compared with traditional summative evaluation, value-added evaluation can better reflect students' progress and improve their self-efficacy in learning. However, currently there is still a long way to go from data description to value presentation in value-added evaluation (Wang & Pai, 2022). Therefore, researchers in this direction can further follow the research hotspots for in-depth research.

Cluster # 4 reform includes keywords such as reform, new curriculum reform, preschool teachers, high school English, and teachers. From this, it can be seen that compared to other subjects, high school English is on the path of educational evaluation reform. In terms of objects, the main body of the evaluation system for educational evaluation reform is the teacher. Whether it is to carry out education evaluation reform from bottom to top or from top to bottom, it is far from enough to only focus on the level of teachers. Around the five main bodies of government, schools, teachers, students, and society, we should strengthen the responsibilities of the "five main bodies" and comprehensively build an education evaluation ecosystem. Therefore, researchers can also start their research from other aspects of the evaluation system in the next step. The times are developing, and reform has always been on the way. Especially in recent years, education reform has developed rapidly. Only through continuous reform can we find education evaluation methods that are suitable for China's national conditions and applicable to the current stage of education.

CiteSpace v. 5.10.R6 (64-bit) Advanced
 November 23, 2023 at 4:37:43 PM CST
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 Timespan: 2013-2023 (Slice Length=1)
 Selection Criteria: g-index (m=0.25, LRF=1.0, L/N=10, LBY=5, e=1.0)
 Network: N=173, E=306 (Density=0.0206)
 Largest CC: 135 (77%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.8868
 Weighted Mean Silhouette S=0.9042
 Harmonic Mean(Q, S)=0.7955

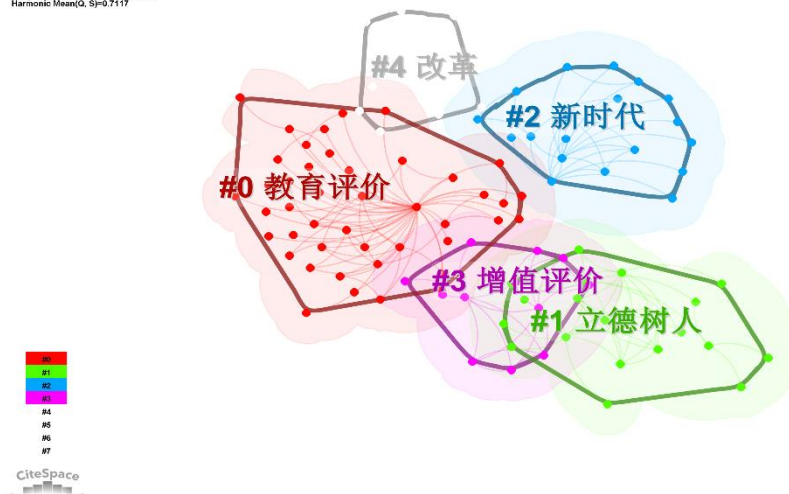


Figure 6. Keyword Cluster Analysis

3.7 Keyword Timeline Analysis

A keyword timeline chart presents keywords in chronological order on a straight line. From the timeline chart of key words in education evaluation reform in Figure 7, it can be found that education evaluation reform appeared as a theme word relatively early. Around 2020, many new nodes were added to the graph, including process evaluation, big data, artificial intelligence, higher education, universities, vocational education, and result evaluation. These nodes are relatively large. Especially in recent years, artificial intelligence and university nodes have been relatively large, so they can serve as a starting point for future research and in-depth exploration of the use of artificial intelligence in universities for educational evaluation reform.

Clustering # 0, # 1, # 2, and # 3 has continued until recently, indicating that educational evaluation, moral education, new era, and value-added evaluation have been continuously studied since researchers began to pay attention to these contents. In the future, this part can still be studied in educational evaluation reform research. Combine current research hotspots with the practical problems encountered in China's education evaluation reform, and conduct research on education evaluation reform that is in line with China's national conditions and development needs.

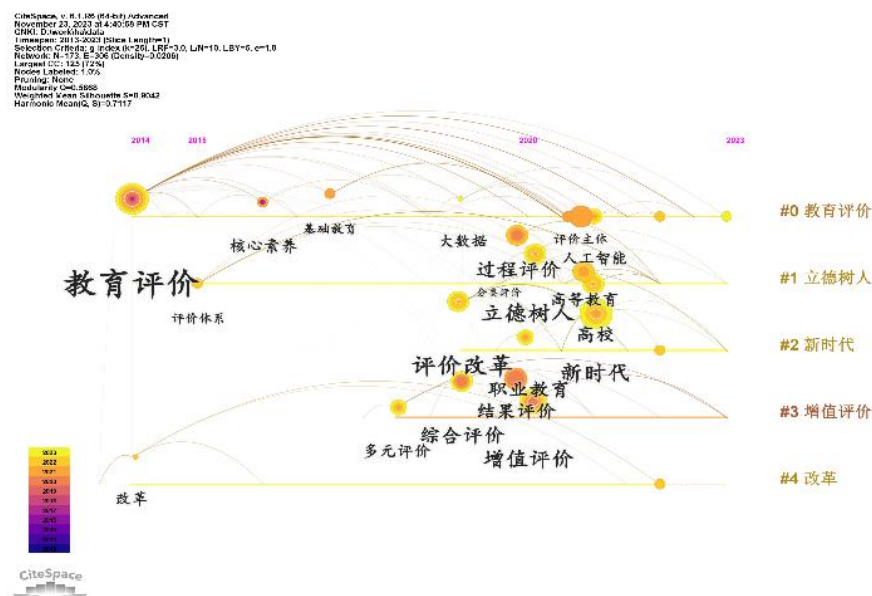


Figure 7. Keyword Timeline

4. Research Conclusion

Using the CiteSpace 6.1.R6 visualization analysis tool, a total of 304 articles collected by China National Knowledge Infrastructure (CNKI) from 2013 to 20223 were selected as data sources. Visual analysis was conducted from dimensions such as annual publication volume, co authorship, co research, co keyword, clustering, and timeline. The results indicate that:

From the annual publication volume of literature, it can be seen that the relevant literature on education evaluation reform in China has shown an upward trend since 2019. CNKI predicts that the publication volume in 2023 will be higher than in 2022, with a predicted number of 124 articles. However, as of November 20, 2023, the number of articles published by CNKI on teaching evaluation reform in 2023 was only 57. There is still a certain research prospect in the future.

From the perspective of research authors, the maximum number of publications is 3. There are many authors who have published in the field of educational evaluation reform, and there is some research cooperation, but no research cooperation team has been formed.

From the perspective of the research team, the main research institutions include Beijing Normal University, China Academy of Educational Sciences, East China Normal University, Southwest University, Shanghai Institute of Education Evaluation, Central China Normal University, and other universities and research institutes. Overall, the publishing institutions cover a wide range, including universities, research institutes, educational societies, primary and secondary schools, etc. However, most of the research belongs to the same school or regional cooperation, concentrated in the Beijing area, which is not conducive to the national development of educational evaluation reform and the cross regional flow of educational information.

From the perspective of disciplinary distribution, it mainly focuses on educational theory and

management, higher education, vocational education, and secondary education. From the perspective of academic stage, it mainly focuses on secondary education, vocational education, and high school education, with less involvement in preschool education, primary education, and adult education. Most researchers focus on the field of humanities and social sciences, with relatively few studies in science and engineering.

From the perspective of research hotspots in education evaluation reform, research hotspots include education evaluation, evaluation reform, moral education, new era, value-added evaluation, process evaluation, comprehensive evaluation, vocational education, etc.

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