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Hot Topics, Dynamics and Trends in female Education Research

bibliometric analysis based on Citespace

Zhang Rui（Author1）
Military and Political Basic Education College
National University of Defense Technology
Hunan, China
*Corresponding author:e-mail: 654103304@qq.com

***Abstract*—With the growing global awareness of gender equality, female education has attracted much more attention worldwide. To comprehensively understand the current status and progress of relevant research on female education within domestic and foreign academic circles, this paper utilizes a collection of female education-related literature published in CSSCI journals, sourced from CNKI, as the research sample. Employing Citespace as a visualization tool, this study generates visual graphs encompassing keyword co-occurrence, keyword clustering, keyword co-occurrence area, and outburst words. But most of the current research focuses on specific regions and cultural backgrounds, neglecting to analyze the differences and commonalities of female education in different cultural backgrounds. In the future, it is necessary to make full use of big data to provide intellectual support for female education and to pay attention to the complexity and diversity of female education in practical application, so as to further promote the development of female education.**

Keywords— female education; Citespace; Research status; Big data

I. INTRODUCTION

As an important part of social science, the study of female education has attracted wide attention in recent years. Whether women have access to educational resources is not only one of the factors determining gender equality, but also an important factor affecting social development[1]. In the 21st century, the Internet and online education platforms have made educational resources more accessible and diversified, providing new opportunities and challenges for female education. Women's participation in education has further increased. However, traditional attitudes and socio-economic conditions still constrain the full development of female education. In the face of the gradual narrowing of the space for women's social development, some studies have pointed out that how to expand the space for women's social development through gender-equal education will be a more long-term and arduous task[2].Therefore, the hotspots, dynamics and trends in the field of women's education research need to be systematically sorted out and summarized. In this paper, the main hotspots, dynamics and trends of women's education research from 1998 to 2024 are summarized systematically by using the Citespace bibliometric analysis tool with the literature of CSSCI journals in CNKI as the research object. The results show that equal educational opportunities, female career development, educational policy impact and interdisciplinary research are the main concerns. Therefore, the relevant literature in the field of female education research is systematically analyzed with a view to revealing the research hotspots, dynamics and future trends in the field.

II. DATA SOURCES AND RESEARCH METHODOLOGY

Citespace is a visual tool for bibliometric analysis, mainly used to analyze the structure, rules and development trend of scientific literature. The core functions of Citespace include literature co-citation analysis, keyword co-occurrence analysis, and emergent word analysis. The software is designed to help scholars, researchers and scientists better understand the relationship between literature.[3]

A. Data sources

In this paper, China Knowledge Network (CNKI) is used as the data source, and "women" and "education" are used as the keywords for searching, and the publication

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time from February 20, 1998 to June 11, 2024 is selected as the time range for searching. After data cleaning and preprocessing, 313 eligible journal papers were ultimately obtained.Through the literature export function of China Knowledge Network (CNKI), the data information of eligible CSSCI journals was exported in Refworks format, and the data in CNKI format was visualized, analyzed and transformed using CiteSpace software.

B. Research Methodology

In this paper, CiteSpace 6.3.R1(64-bit) Basic was used to construct a model for visual analysis of 313 literatures on the topic of female education. Firstly, the literature will be imported into CiteSpace in the form of Refworks through the CNKI website, with a time span set from 1998 to 2024 and a time partition set to "1".The Term Source was set as Term, Keyword, Author, Institution, and the Knowledge Graph was constructed by CiteSpace software, and analyzed to obtain the Institutional Collaboration Network, Keyword Co-occurrence Graph, Keyword Clustering Graph, and Keyword Emergence Phrase.

III . FINDINGS AND ANALYSIS

A. Analysis of Annual Trends in Documentary Publishing

Based on Figure 1, it can be seen that the first literature on female education was published in 1998, in the journal Educational Review, with the title of the paper, "Identification of Misconceptions in Female Education Research". Since 2000, the literature related to female education in China's CSSCI journals has been increasing year by year, reaching a peak in 2010 with a total of 19 papers published, and the number of literature published each year from 2010 to 2023 has remained at about 10. Overall, the number of studies in journals related to women's education is in a booming period.

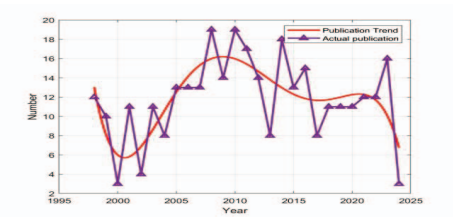


Figure 1. Distribution of Annual Publications on Female Education (1998-2024).

B. Distributional Analysis of Literature Sources

The number of publications published by a journal in a certain field can reflect its degree of attention to that direction. According to Figure 2, we can see that there are 12 journals that publish 5 or more articles on the topic of women's education, with a total of 106 articles, accounting for 30% of all the articles, which shows that the articles published on the topic of women's education are more dispersed and not concentrated. Among them, Journal of China Women's College has published the most literature, totaling 24 articles, so it can be seen that Journal of China Women's College has shown greater interest in women's education, and it is the most important journal that publishes women's education. The subsequent publications were successively “Modern Communication”, “Educational Review”, “Theory and Practice of Education” “Journal of Higher Education” and so on. They are also journals that pay more attention to women's education.

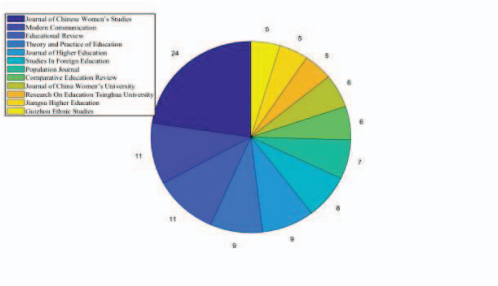


Figure 2. The Publication of Literature Related to Female Education.

C. Analysis of The Volume of Institutional Publications and Partnerships

Analyzing the publishing institution can reveal the geographical distribution of the author group of a specific study to a certain extent, and understand the main research institutions in this field. As can be seen from Figure3 and Table 1, Nanjing Normal University has published 14 articles about female education, ranking first. Xiamen University published 12 articles, ranking the second. Beijing Normal University, Peking University and Northeast Normal University tied for third place with 11 articles. This shows that these five institutions have explored this field deeply in the past three decades and made great contributions in this field. A total of 8 institutions published 5 or more articles on female education, and a total of 13 institutions published 106

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articles on female education. Female education has become the focus of attention of many institutions.

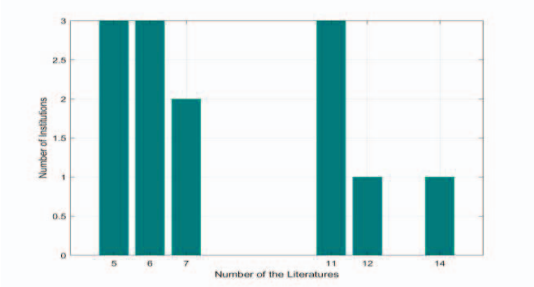


Figure 3. Number of Papers on Female Education Published by Different Institutions.

Table1.Number of Specific Papers on Female Education Published by Different Institutions.

Sort	Institution	Count
1	Nanjing Normal University	14
2	Xiamen University	12
3	Beijing Normal University	11
3	Peking University	11
3	Northeast Normal University	11
6	East China Normal University	7
6	WuHan University	7
8	Nanjing University	6
8	Central China Normal University	6
8	Shaanxi Normal University	6
11	Yunnan University	5
11	Zhejiang University	5
11	Renmin University of China	5

In addition, the co-occurrence mapping of publishing institutions can show the mutual communication and cooperation among various research institutions in this field. According to Figure 4, it can be seen that 313 articles on female education have been published by 233 research institutions, with an average of 1.34 articles published by each institution, but only the Department of Statistics and Data Science, School of Economics, Xiamen University, and the Wang Yannan Institute of Economics, Xiamen University, and so on, have a close cooperation, and the other female education The clustering of research institutions is very loose and there is less communication between them. This shows that there is a need to further strengthen the communication and cooperation among various organizations in research on women's education.



Figure 4 Spatial Distribution Mapping of Female Educational Research Institutions.

D. Keyword Graph Analysis

Keywords can reflect the key information of a piece of literature, and they are the elements that reflect the research hotspots of the literature in a more direct way. Using the keyword frequency and centrality algorithm function of CiteSpace software, and the generated keyword co-occurrence, clustering and convex word knowledge map, it can reflect the research hotspots in certain fields.

1）Keyword Co-occurrence Mapping

Keyword co-occurrence mapping is to count the number of times co-occurring words appear in the same type of literature, and the higher the number of co-occurrences, the closer the two are in terms of research areas and topics. Keyword co-occurrence mapping was drawn by importing 313 sample documents through CiteSpace software.



Figure 5. Keyword co-occurrence map of female education research.

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As can be seen from Figure 5, the number of keyword nodes is 207, the number of connections(E) is 176 and the network density is 0.0083 in the related literature. In addition, the keywords with the most predominant frequency of occurrence are women's education, female, education and development, all of which appear more than 10 times. The frequency and Centrality of keywords are shown in Table 2.

Table 2 High-frequency keywords in female education, February 1998-2024.

Sort	Keyword	Count	Centrality
1	Women's education	46	0.26
2	Woman	41	0.18
3	Feminism	23	0.06
4	Higher Education	16	0.29
5	Education	8	0.03
6	Gender equality	6	0.03
7	Female talent	5	0.02
8	Women's	5	0.25
9	Rural women	5	0.02
10	Labor participation	4	0.01
11	International comparison	4	0.00
12	Women's employment	4	0.04

As can be seen from Table 2, there are 9 keywords with more than 5 occurrences in total. In addition to female Education (46 times), women (41 times), Feminism (23 times) , the topics of education, gender equality, female talents, women's studies and rural women also received great attention, reflecting the research hotspots in this research field.

2) Keyword cluster graph analysis

Keyword clustering mapping is mainly in the form of visual knowledge map to reflect the core research groups that have been formed in a certain field of research. Then using the keyword mapping clustering function in CiteSpace, the LLR algorithm is used to extract the clustering labels, and the K keywords are selected to extract the objects, and finally the keyword clustering map of feminist literature is generated. From Figure 6, Modularity Q is 0.8362 and its value is greater than 0.3, And the Weighted Mean Silhouette is 0.9727 and its value is greater than 0.7, then it shows that the keyword clustering mapping of feminist literature is very important and effective. From the keyword clustering mapping, it can be seen that women's education, higher education, women and feminism, and feminist studies are the key and hot areas of women's education research. The crossover between clusters of clusters that appears in the mapping indicates that there is cross-fertilization between the hot areas of research.

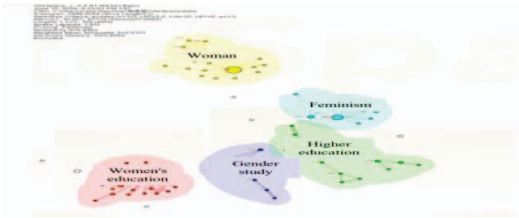


Figure 6. Keyword clustering map of female education research.

3) Keyword emergent word detection map

Sudden words refer to words that appear more or use more frequently in a short period of time. According to the change of word frequency of sudden words, the frontier and trend of there search field can be judged. [4]In this paper, the burst detection algorithm is processed by CiteSpace software after clustering all the keywords of the data literature, and the Y value is set to 0.5, 10 frontier keywords in the field of women's education in the period of 1998-2024 are selected, and the knowledge map of the burst words in this field of research is drawn (as shown in Fig. 7). Strength denotes the strength, begin denotes the beginning year of the emergent word, and end denotes the end year of the emergent word. The greater the strength, the more important the keyword is.

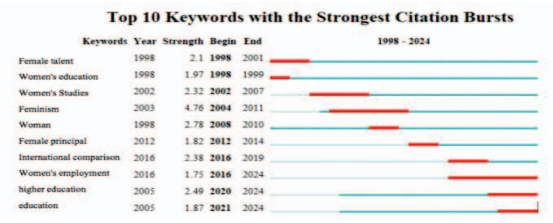


Figure 7. Detection map of emergent keywords in female education research.

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The World Conference on Higher Education, held in Paris in October 1998, proposed that women's active participation in higher education and social decision-making should be strengthened, and that research on women's issues should be taken as a subject of great significance to the reform of higher education and social change. It can be seen that linking women's development, women's education and the sustainable development of society, and establishing education that harmonizes both sexes, is the direction of the world's higher education efforts in the 21st century[5].In this context, the terms "female talent" and "female education" first stand out, and with the change of national tasks, this trend has not lasted for a long time. From 2003 to 2011, according to the current situation of China's pedagogy theory, in the understanding of "people", the main missing is the consciousness of "concrete individuals", and the theoretical transformation that needs to be realized is from "abstract people" to "concrete people"[6].Traditional female role stereotypes and the orientation of exclusion of women in high-tech and high-level social occupations have greatly affected women's motivation, values, outlook on life and happiness, and impeded the harmonious development of men and women. During this period, "feminism" and "feminism" are more prominent. Therefore, the introduction of a feminist perspective in the university classroom can help us to re-examine the symbolic construction of the humanities and social sciences and even the history of the natural sciences, especially the differences caused by gender, so as not to fall into a rigid ideology and mode of thinking that oppresses the disadvantaged groups.

4) Keywords Map of co-present area

Keyword time zone map can be used to reflect the main research content of a certain research topic over time, and can also reflect the research trend in a certain period of time to a certain extent. Keywords are taken as nodes, the time interval is set from 1998 to 2024, and the time slice is set to 1 year. After processing by CiteSpace, on the basis of the keyword clustering graph, the keyword "TimeLine View" is clicked to generate the time line graph, and the common current area graph of female education research keywords is obtained. The graph is shown in Figure8.

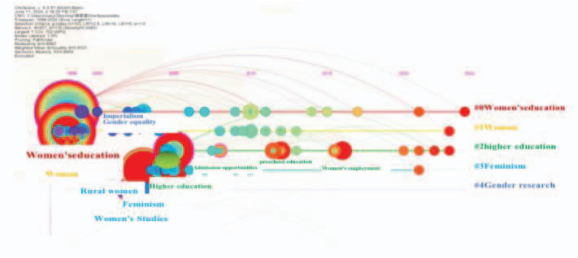


Figure 8.Mapping of co-occurring time zones of keywords in women's education research.

As shown in the figure, female education research presents a trend of attention from concentration to diversity, while combining with the previous chart of the volume of publications, the migration process of hotspots for researching female education can be observed more carefully and clearly. It can be roughly divided into three stages: First, the rapid start stage (1998-2005). In this stage, the research hotspots of female education mainly focused on female education, women, gender equality, enrollment rate and so on. Second, to further enrich the development stage (2005-2015). During this period, the research on women's education showed a trend of diversification and multi-point attention, and the hot topics mainly focused on rural women, higher education, feminism, social gender, women's studies and so on. Third, the stage of deepening development (2015-2024). After years of exploration, relevant researches in this stage have gradually matured, and women's employment has become a new research hotspot in this stage.

IV. Problems and Future Trends in Female Education Development

A. Problems

- Insufficient research depth. Existing research often stops at descriptive analysis and lacks deep exploration of the socio-cultural drivers behind female education. For example, indicators such as enrollment and graduation rates are analyzed, but there is insufficient analysis of the deep-level causes of educational inequality, such as social roots, cultural traditions, and policy formulation.
- Limitations of geographical and cultural perspectives. Research tends to focus on education issues in western countries or specific

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regions, lacking a global perspective. This limitation may result in policies and interventions that are not adapted to the needs of different cultural and social environments.

- Challenges of interdisciplinary integration. Although female education research has begun to introduce a multidisciplinary perspective, how to effectively integrate the theories and methods of different disciplines to form a comprehensive understanding of female education issues remains a challenge. More innovative research designs and theoretical frameworks are needed to facilitate dialogue between different disciplines.

B. *Future Trends*

- Deepening cross-cultural research. Future research should focus more on cross-cultural perspectives, revealing the universal and specific factors of educational inequality through comparative analysis of female education practices and policies in different countries and regions. This will provide a basis for formulating more inclusive and adaptive policies.
- Focusing on the complexity of educational practice. Future research needs to delve into the obstacles encountered in the implementation of female education, such as gender stereotypes and uneven distribution of educational resources, and explore effective solutions to promote the improvement and innovation of educational practice.
- Innovating research methods and theoretical frameworks. To better understand the complexity of female education, future research needs to adopt more diversified research methods, such as case studies, ethnographies, mixed methods research, etc.

V. CONCLUSION

Using the CiteSpace software as a research tool, 313 eligible journal articles were selected from CSSCI journals in Chinese National Knowledge Infrastructure (CNKI), and a series of maps of women's studies were constructed. According to the analysis, research on female education has been a hot topic in the humanities and social sciences since 1998 and continues to be so today. Derived topics such as gender equality, female subjectivity, female labor participation rate, high-quality development of women's careers, and women's participation in new productive forces have gradually been incorporated into national development strategies.

Currently, the level of education largely determines the opportunity structure and resources available to women in the labor market[7]. “ Education is the foundation of people's livelihood, and employment is the foundation of people's livelihood[8]. ” The improvement of female education enables women to better participate in the labor force, increasing the employment rate of women and further enriching and developing the subject content of female education research. In recent years, the development of productivity has required the infiltration of female education research and other disciplines. The emergence of these interdisciplinary fields urgently requires women to continuously improve their education level and personal qualities to promote their comprehensive and free development.

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