Academic Characteristics of Mathematics Education Research in China

—Based on Bibliometric Analysis of Core Journals from Peking University, 1992-2024

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Abstract: *As global educational reforms deepen and national educational policies continue to be adjusted, mathematics education is undergoing significant changes. This article takes the papers published in core journals of Peking University included in CNKI over the past 30 years as the research object, and uses bibliometric methods, among others, to conduct research and analysis from various aspects such as the number of publications, keywords, author groups, and research institutions.*

Keywords: Mathematics education; Bibliometrics; Mathematical culture; Educational reform.

Bradford's law of scattering suggests that most high-level literature tends to be concentrated in a few core journals. Based on this, this article selects papers published in Peking University's core journals as the research subject, reviews the research progress in the field of mathematics education in recent years, and analyzes the relevant literature through bibliometric methods. Through bibliometric analysis of relevant literature, the main research directions and current research gaps in mathematics education were summarized, and future research directions were proposed.

I. Literature Review

Many scholars in our country have conducted inductive research and analysis on educational aspects, which are mainly divided into two situations: analysis from a single perspective and analysis from multiple perspectives.Song Heng published "A Bibliometric Review of Internationalization of Higher Education Curriculum - Based on SSCI Sources" in 2019, which utilized bibliometric methods to analyze the current status and trends of internationalization in higher education curricula, emphasizing the role of international exchange and cooperation in enhancing curriculum quality.Liu Yan published the "Review of Research Literature on the Modernization of Vocational Education Governance" in 2018, which reviewed relevant literature on the modernization of vocational education governance and proposed suggestions such as constructing multiple governance entities and improving governance mechanisms. Zhang Yanjie published "A Review of Studies on the Curriculum System of International Chinese Language Education Master's Programs" in 2022, using the literature review method, proposed that the curriculum system of international Chinese language education master's programs should pay more attention to practicality and intercultural communication skills. Liu Yang and Zhou Cen, in their "Review of Chinese International Education Literature Since 2021" written in 2022, utilized a literature review method to illustrate that Chinese international education has experienced rapid development in recent years, yet cultural differences and issues with teaching quality still persist.

II. Research Design

(I) Research sample

Through CNKI (China National Knowledge Infrastructure), using the advanced search function of the CNKI database, with the subject keyword "mathematics education", and at the same time limiting the document source category to Peking University core journals, a visual analysis was conducted on the 5,166 documents retrieved, using this as the research sample.

(II) Research Method

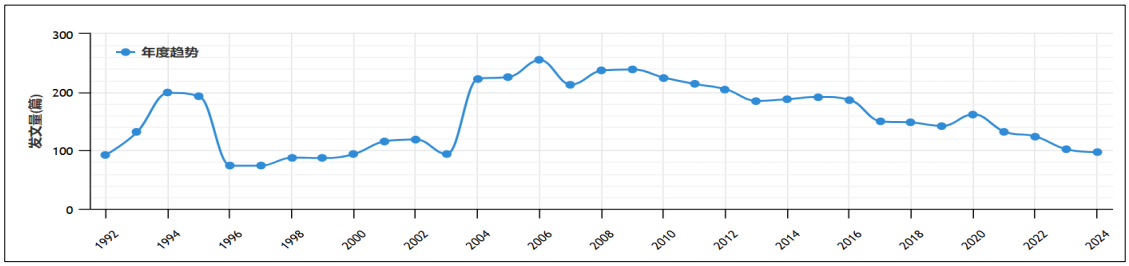
Employing bibliometric methods, quantitative descriptions and statistical analyses are conducted on the number of publications, keywords, author groups, and research institutions to visually demonstrate the research foci and development trends within the field of mathematics education in China, revealing the quantitative characteristics and inherent patterns contained within these indicators.

III. Research Results and Analysis

(I) Analysis and Research on the Annual Number of Documents Issued

In summary, as shown in Figure 1, the number of research documents in the field of mathematics education from 1992 to 2024 has exhibited a fluctuating upward trend.

Figure 1: Annual Trend of Articles Published in Peking University Core Journals from 1992 to 2024



Between 1992 and 2000, the number of publications remained relatively stable with a moderate growth rate. During this period, research in the field of mathematics education may not have yet formed distinct hot spots and trends, and research methods and theoretical frameworks were still in the exploratory and establishment phases.

The number of documents began to significantly increase after 2000 and reached a peak in 2008. This reflects the rapid development and widespread recognition of research in the field of mathematics education, as well as the in-depth exploration and active contributions of researchers in this area. The rapid development and application of educational technology have brought new research perspectives and methods to the field of mathematics education, promoting in-depth and extensive research.

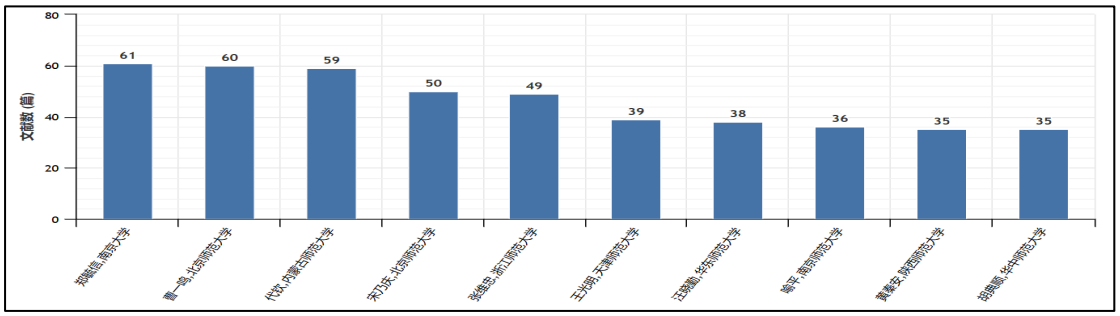
In 2008, the number of publications reached a peak, during which the government introduced a series of policies to encourage mathematics education research, providing researchers with more financial and resource support.

Since 2008 to the present, despite fluctuations in the number of publications, the overall trend remains upward. This indicates that research in the field of mathematics education continues to be active and in-depth, with a continuous emergence of new academic achievements.

(II) Analysis of the Author Group

Based on Price's theory, authors who have published five or more articles are defined as core authors. Subsequently, statistics were conducted on the top 10 core authors ranked by the number of publications, and the results are shown in Figure 2.

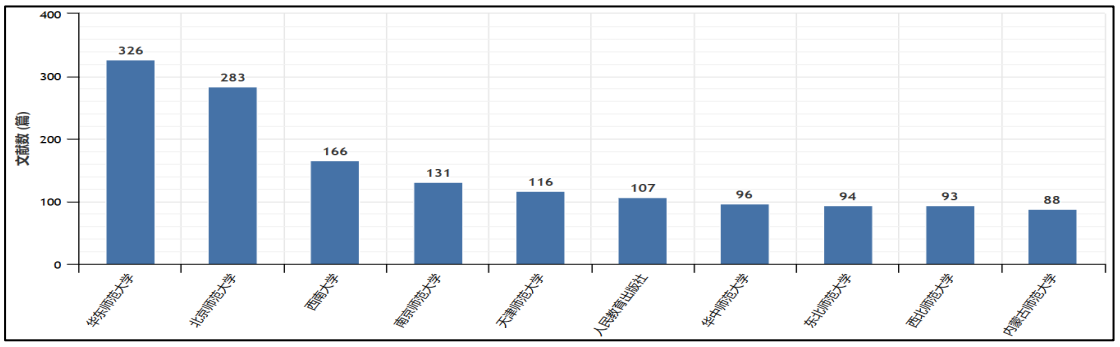
Figure 2: Core Authors Statistics Chart for Mathematics Education Topics from 1992 to 2024



As can be seen from the chart, authors such as Zheng Yuxin, Cao Yiming, and Dai Qin have a high level of research output in the field of mathematics education; their number of papers is relatively large, demonstrating profound accumulation and extensive influence in this area. As renowned scholars in the field of mathematics education, their research findings are of significant importance in promoting the development of this discipline.

(III) Analysis of the Issuing Organization

Figure 3: Statistical chart of the top ten publishing institutions in core journals of mathematics education from 1992 to 2024



Based on the chart information, it is not difficult to see that teacher education institutions are highly active in the field of mathematics education research. Among them, East China Normal University leads with a total of 326 papers, far ahead of others, becoming a major research hub in this field. Beijing Normal University follows closely, having published 283 papers, also demonstrating strong research capabilities.

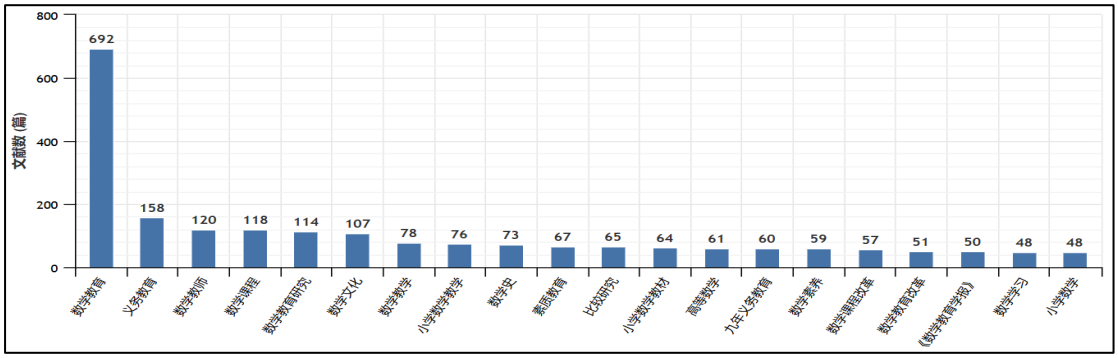
Compared to normal universities and higher education institutions, research institutions have a relatively smaller number of studies in the field of mathematics education.

However, this does not mean that research institutions have made no contribution in the field of mathematics education. Compared to theory, they are more focused on the exploration and innovation of cutting-edge technologies, aiming to provide new ideas and directions for the development of mathematics education.

(IV) Keyword research

Keywords can quickly and accurately reflect the theme and focus of a paper, and their frequency of appearance in the literature of a particular research field can reflect the topics of common concern to researchers within a certain period of time, which are also the hot topics of the entire research field. Upon organizing the keywords from over 5,000 papers published in core journals of Peking University indexed in CNKI from 1992 to 2024, it was discovered that the content of these keywords exhibits a tendency towards concentration. The explanation for this concentration is as follows:

Figure 4: 1992-2024 Peking University Core Journal Paper Keyword Statistics Chart



The core theme "mathematics education" remains a continuous hot topic. "Mathematics education" as the core keyword of the entire research field, its frequency of appearance remains high, which fully demonstrates the sustained popularity and importance of mathematics education as a research field.

The trend of equal emphasis on teachers, courses, and instruction. The frequent appearance of keywords such as "math teacher," "math course," and "math instruction" not only indicates their significant status in the field of mathematics education but also reflects researchers' in-depth studies and attention to these three aspects. Research on math teachers mainly focuses on teachers' professional competence, teaching philosophy, and teaching methods.

The current situation of elementary mathematics education attracting attention. Keywords such as "elementary mathematics" and "elementary mathematics teaching" reflect the important status of elementary mathematics education in the field of mathematics education research.

The background of the rise of mathematical literacy education. The emergence and growth of keywords such as "mathematical literacy" and "mathematical literacy education" indicate that with the development of the times, mathematical literacy has become one of the important goals of mathematics education.

The trend of advancing educational research and reform together. Keywords such as "Mathematics Education Research" and "Mathematics Education Reform" indicate that the field of mathematics education not only focuses on theoretical research but also actively promotes the reform and innovation of educational practice.

IV. Conclusion

Mathematics education research has made significant progress, but it also faces new challenges and opportunities. Through continuous exploration and practice, we believe that future mathematics education will play a more important role in promoting the overall development of students and cultivating innovative talents.

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