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## MAPPING RESEARCH ON PHYSICAL EDUCATION TEACHERS IN CHINA: A BIBLIOMETRIC ANALYSIS USING CITESPACE

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### Abstract

This study aims to systematically map and analyse research trends on physical education (PE) teachers in China using bibliometric methods. Literature data were retrieved from the China National Knowledge Infrastructure (CNKI) database, covering publications from 2014 to 2024, and analysed using CiteSpace V. A total of 1,660 journal articles were examined to identify publication trends, core journals, influential authors, key research institutions, funding characteristics, and research hotspots based on keyword co-occurrence analysis. The results show that the overall number of publications on PE teacher research in China has exhibited a declining trend over the past decade, with studies mainly concentrated in sports-related journals. Author analysis indicates a broad distribution of researchers but a relatively small group of core authors, including Zhao Fuxue, Yin Zhihua, Wang Jian, and Dong Guoyong. East China Normal University, Central China Normal University, and Beijing Sport University emerged as the most influential research institutions. In addition, the proportion of funded studies remains relatively low and is dominated by national-level projects. Keyword analysis reveals that research has primarily focused on college and primary and secondary school PE teachers, professional development, physical education teaching, and job burnout, reflecting sustained academic attention to teacher professionalisation within the context of educational reform. This bibliometric analysis provides an overview of the knowledge structure and evolution of PE teacher research in China and offers a reference for future studies seeking to expand research perspectives and strengthen interdisciplinary collaboration.

## INTRODUCTION

In recent years, the reform of China's education system has placed increasing emphasis on the comprehensive development of students, with physical education (PE) recognised as a key component in achieving this goal. In 2014, the Ministry of Education of China formally introduced the concept of core literacy through the Opinions on Comprehensively Deepening Curriculum Reform and Implementing the Fundamental Task of Cultivating Moral Education, marking a significant shift in educational philosophy from knowledge transmission to holistic competency development (Zhong, 2017). Within this reform context, school physical education has been entrusted with the dual responsibility of enhancing students' physical health and cultivating values, character, and lifelong exercise habits.

Physical education teachers play a central role in translating educational policies into teaching practice and are widely regarded as a decisive factor influencing the quality and effectiveness of school physical education (Kirk, 2010). As key practitioners in curriculum implementation, PE teachers are required not only to master professional knowledge and teaching skills but also to continuously adapt to evolving curricular standards, assessment systems, and societal expectations. Consequently, research on PE teachers has expanded to encompass topics such as professional development, teacher identity, instructional competence, job burnout, and educational reform adaptation. In China, scholarly attention to PE teacher research can be traced back to the early 1950s, with early studies focusing primarily on teacher training models and pedagogical experiences (Sokolov & Ximen, 1951). Since then, the field has grown substantially in both volume and thematic diversity.

With the rapid accumulation of research outputs, traditional narrative reviews have become increasingly insufficient for systematically capturing the intellectual structure and developmental trajectory of PE teacher research. Bibliometric analysis offers a quantitative and visual approach to identifying research trends, core contributors, collaboration networks, and thematic evolution within a specific field (Zupic & Čater, 2015). Among available bibliometric tools, CiteSpace has been widely applied in education and sport science research due to its capacity to construct knowledge maps, detect research frontiers, and analyse the temporal dynamics of scientific literature (Chen, 2017). Previous studies have demonstrated the effectiveness of bibliometric methods in revealing disciplinary development patterns and informing future research directions (Donthu et al., 2021).

Although several studies have examined specific aspects of PE teacher development in China, such as professionalisation, curriculum reform, and teacher training, there remains a lack of systematic

bibliometric analysis that integrates publication trends, author and institutional networks, funding characteristics, and research hotspots within a single analytical framework. Moreover, existing reviews tend to focus on limited time spans or specific subtopics, making it difficult to obtain a comprehensive understanding of the field's overall evolution.

Therefore, this study aims to conduct a bibliometric analysis of PE teacher research in China from 2014 to 2024 using CiteSpace V and literature data retrieved from the China National Knowledge Infrastructure (CNKI) database. By analysing publication outputs, journal distribution, author and institutional collaboration, funding support, and keyword co-occurrence, this study seeks to map the knowledge structure of Chinese PE teacher research, identify major research themes and trends, and provide a systematic reference for future studies and policy-oriented research in physical education.

## **Data source and research method**

### ***Data collection and processing***

This study used the China National Knowledge Infrastructure (CNKI) database as the primary source of literature data. CNKI is the largest and most authoritative academic database in China and is widely used in bibliometric studies of education and sport science research. To ensure the representativeness and relevance of the retrieved literature, journal articles related to physical education teachers were selected as the research sample.

The literature retrieval time span was set from January 2014 to December 2024. The search was conducted using the title field with the keyword “physical education teacher” to minimise ambiguity and ensure topic relevance. A total of 1,660 journal articles were retrieved. After data screening and duplication checking, all retrieved records were retained for analysis, as they met the inclusion criteria of topic relevance and publication type. The bibliographic records, including author information, institutional affiliations, keywords, journal sources, and funding information, were exported in a format compatible with CiteSpace V for subsequent analysis..

### ***Research methods and tools***

This study adopted bibliometric analysis as the primary research method and employed CiteSpace V as the analytical and visualisation tool. CiteSpace is a widely used software for scientific knowledge

mapping that integrates co-occurrence analysis, clustering analysis, and network visualisation based on scientometric theory (Chen, 2017). By analysing citation relationships and co-occurrence networks, CiteSpace can effectively reveal the knowledge structure, research hotspots, and evolutionary trends within a specific research field.

In this study, CiteSpace V was used to conduct co-occurrence analyses of journals, authors, research institutions, funding sources, and keywords related to physical education teacher research in China. The parameter settings were as follows: the time span was set from 2014 to 2024 with a time slice of one year; the selection criteria were set to Top 50 per slice; and the pruning method adopted the Pathfinder algorithm to simplify network structures and highlight key relationships. Different node types, including Author, Institution, and Keyword, were selected according to the analytical objectives of each section.

Through keyword co-occurrence and time-zone visualisation analysis, this study identified major research themes and emerging trends in the field of physical education teacher research. The combined use of bibliometric indicators and visual knowledge maps allowed for a systematic examination of research development patterns, providing a quantitative and intuitive basis for understanding the evolution and focus of PE teacher research in China.

## **Bibliometric Analysis of Physical Education Teacher Research in China**

### ***Trends in Publication Output***

From 2014 to 2024, a total of 1,660 journal articles related to physical education (PE) teachers were retrieved from the CNKI database. Among these publications, 186 articles were published in Peking University core journals, 125 in CSSCI journals, 35 in AMI journals, and 5 in CSCD journals, indicating that a proportion of studies appeared in recognised academic outlets. The annual distribution of publications is presented in Figure 1.

As shown in Figure 1, the number of studies reached its peak in 2014, with 272 articles published. From 2014 to 2017, the annual publication output showed a continuous decline, with an average annual decrease of 36.3 articles. A slight rebound occurred between 2017 and 2018, when the number of publications increased to 185, representing an increase of 32 articles compared with 2017. However, after 2018, the overall number of publications continued to decline, with an average annual reduction of 25.1 articles and an average annual decrease rate of 16.7%. These trends reflect fluctuations in scholarly attention to PE teacher research in China over different periods and provide a basis for further analysis of changes in research focus and academic priorities..

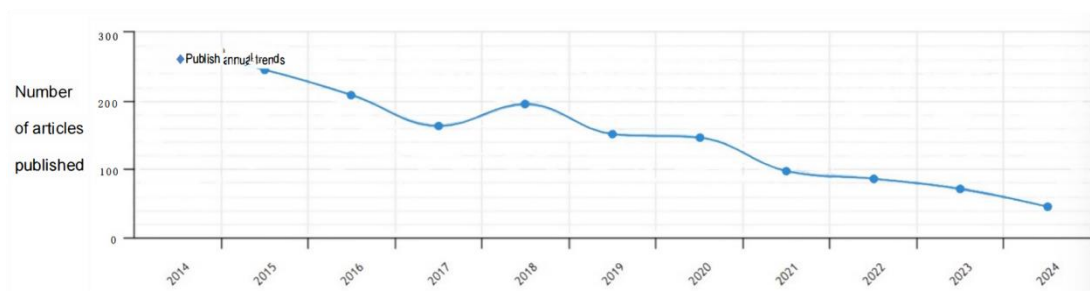


Figure 1 2014.1-2024.6 Domestic physical education teacher research literature published annual trends

### ***Distribution Characteristics of Published Journals***

The distribution of journals publishing PE teacher research from 2014 to 2024 is shown in Table 1, which lists the top 10 journals by publication volume. The results indicate that Contemporary Sports Science and Technology published the highest number of articles (254), followed by Sports (107), Sports Products and Science and Technology (91), Sports Science and Technology Literature Bulletin (75), and Sports World (Academic Edition) (57).

Overall, PE teacher research is mainly concentrated in sports-related journals, while publications in education, psychology, and health-related journals remain relatively limited. This distribution suggests that research on PE teachers in China is still largely confined within the disciplinary boundary of sports science. However, PE teacher development involves pedagogical theory, educational psychology, health promotion, and curriculum studies. Therefore, future research could benefit from greater interdisciplinary integration and expanded publication channels across education and health-related journals..

Table 1 Main publishing journals of PE teachers from 2014 to 2024

Journal	Number	Journal	Number
Contemporary sports technology	254	Sports	107
Sports and sports products and science and technology	91	Sports science and technology literature bulletin	75
Sports World (Academic Edition)	57	Sports science and technology	49
track and field	30	Youth sports	29
Journal of Physical Education	23	Journal of Chifeng University (Natural Science Edition)	22

### ***Author Productivity and Collaboration Analysis***

Authors constitute the primary contributors to PE teacher research, and highly productive authors

often play a leading role in shaping research directions within the field. Using CiteSpace V, the node type was set to Author to generate an author co-occurrence network. The analysis revealed that ten authors published more than four articles on PE teacher research during the study period.

As shown in Figure 2, Yin Zhihua ranked first in terms of publication output with 21 articles, followed by Zhao Fuxue (11), Sun Mingzhu (11), and Wang Xiaozan (10). These authors represent the most productive researchers in the field over the past decade.

Figure 3 further illustrates the author collaboration network in PE teacher research. The results show that Zhao Fuxue, Yin Zhihua, Wang Jian, and Dong Guoyong occupy central positions within the collaboration network and can be regarded as core authors in the field. Several relatively stable research teams have formed around these scholars, indicating a certain degree of academic collaboration. However, the overall collaboration density remains moderate, suggesting that cooperation among researchers could be further strengthened to promote knowledge integration and innovation

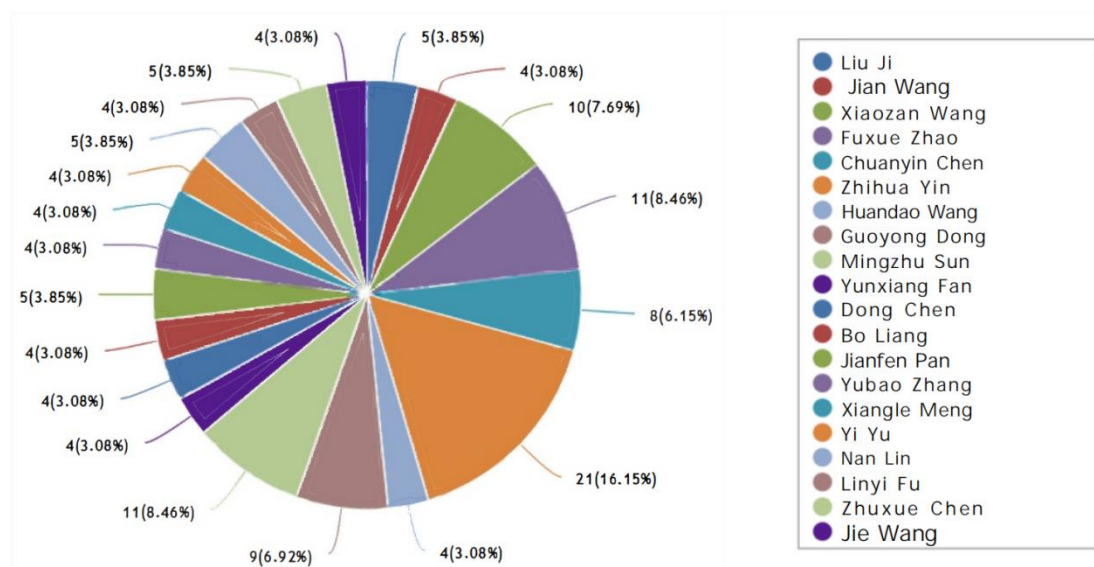


Figure 2 Main author of physical education teachers in 2014-2024

At the same time, Figure 3 also shows the core authors in the field of domestic physical education research and their cooperation with other authors. As can be seen from Figure 3, Zhao Fuxue, Yin Zhihua, Wang Jian, and Dong Guoyong are the core authors in the whole research field of physical education teachers, forming the largest author cooperation network in the visual analysis. As can be seen from the structure of the map, the research on the field of physical education teachers has formed several core academic leaders and relatively stable research teams and gradually derived new relevant authors on their basis.

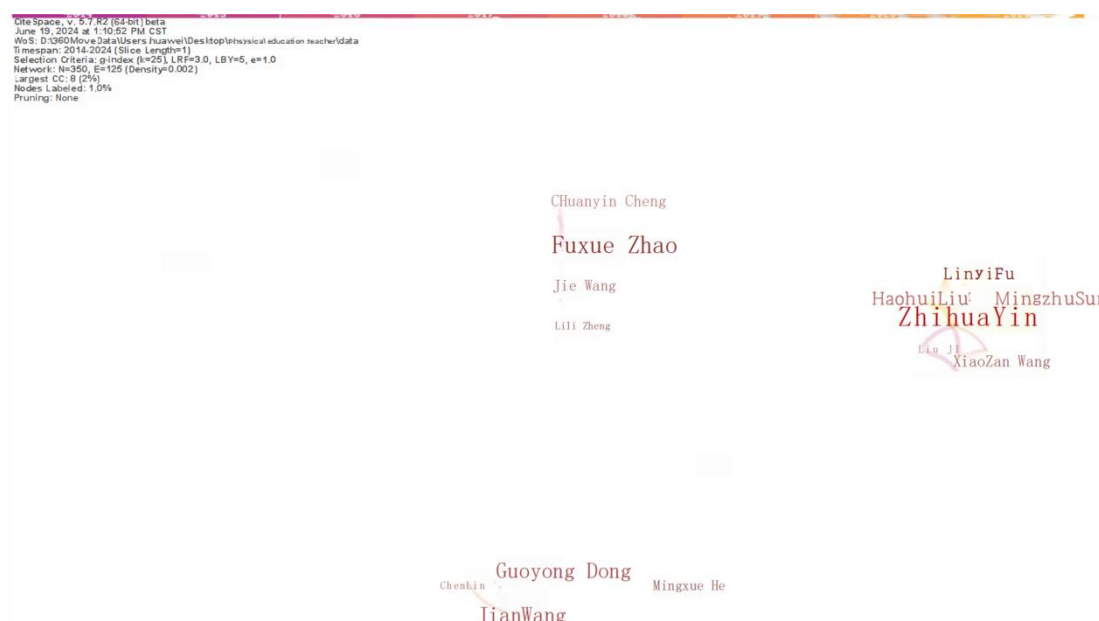


Figure 3 Co-present map of the research on physical education teachers from 2014 to 2024

### ***Institutional Distribution and Collaboration Characteristics***

Research institutions reflect the sources of knowledge production and dissemination in PE teacher research. Using CiteSpace V with the node type set to Institution, an institutional co-occurrence network was generated. The results show that the 1,660 articles were produced by researchers from 314 different institutions, indicating a wide institutional distribution.

However, as the number of publications increases, the number of contributing institutions decreases sharply, suggesting that PE teacher research in China is concentrated within a limited number of institutions. Table 2 lists the institutions that published more than 10 articles during the study period. East China Normal University, Central China Normal University, and Beijing Sport University emerged as the most productive institutions.

Table 2. Statistics published by PE teachers' research institutions

Research Institute	umber o Posts	Research Institute	umber o Posts	Research Institute	umber o Posts
Huazhong Normal University	34	Beijing Sport University	30	East China Normal University	26
Wuhan Institute Of Sport	24	He'nan University	21	Zhengzhou University	18
Fujian Normal University	18	Fujian Normal University	17	fujian Normal University	15
Nantong University	15	Liaoning Normal University	12	Liaoning Normal University	11
Shenyang Institute of Physical Education	11	Beijing Normal University	11	Shanghai University Of Engineering Science	11



Nanjing Institute of Physical Education	10	Northwest Normal University	10	Nanjing Normal University	10
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The institutional collaboration network shown in Figure 4 further indicates that these three institutions occupy core positions within the network. On this basis, institutions such as Wuhan Institute of Physical Education, Beijing Normal University, Zhengzhou University, and Shanghai University of Engineering Science have formed secondary collaboration nodes. Overall, PE teacher research is mainly conducted within normal universities and specialised sports institutions, while participation from comprehensive universities and science and engineering institutions remains relatively limited. Strengthening inter-institutional collaboration may help promote resource sharing and enhance research quality.

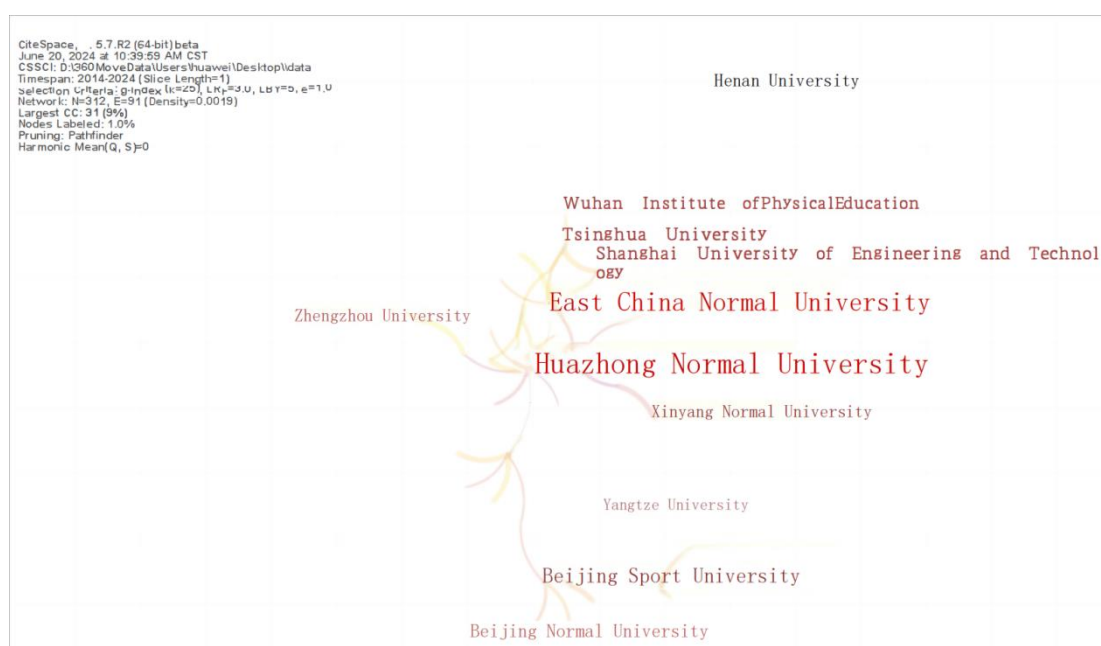


Figure 4 Co-occurrence map of PE teachers' research institutions

### ***Funding Support Characteristics***

Research funding is an important indicator of academic recognition and research value. An analysis of funding information in the CNKI database shows that, among the 1,660 articles analysed, 202 studies were supported by research funding, accounting for 12.16% of the total publications.

As shown in Figure 5, national-level funding sources dominate funded PE teacher research. Specifically, 116 funded studies were supported by national projects, including the National Social Science Foundation, the National Education Science Planning Project, and the Humanities and Social Science Research Projects of the Ministry of Education, accounting for 57.42% of all funded publications. The remaining 86 studies (42.57%) were supported by provincial or other funding sources. Overall, the proportion of funded research remains relatively low, indicating that PE teacher research still has considerable potential for increased support from competitive research funding schemes.



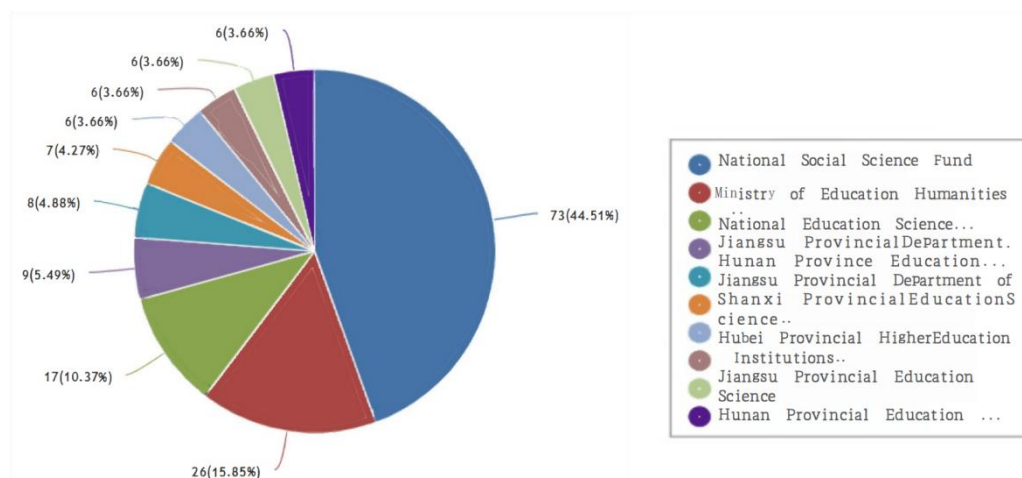


Figure 5 Distribution of research funds for PE teachers

### Distribution characteristics analysis of keywords

Keywords represent the core content of academic literature, and their frequency and co-occurrence patterns can effectively reflect research hotspots and thematic evolution within a field (Qiu & Wu, 2011). In this study, CiteSpace V was used to conduct keyword co-occurrence analysis on PE teacher research literature from 2014 to 2024. The time span was set to one year per slice, and the node type was selected as *Keyword*. After data processing, a total of 229 keywords were identified in the analysed journal articles.

The keyword co-occurrence network is presented in Figure 6. High-frequency keywords include *universities*, *primary and secondary schools*, *professional development*, *specialisation*, *school physical education*, *physical education teaching*, *job burnout*, *sports*, *higher vocational colleges*, *information literacy*, *evaluation*, and *retired athletes*. These keywords demonstrate relatively long half-life characteristics, indicating that they have maintained sustained academic attention over an extended period and constitute the core research concerns in the field of PE teacher studies.

To enhance analytical clarity, synonymous and closely related keywords were merged and standardised. For example, terms such as *teacher specialisation*, *professionalisation*, *professional development*, and *teacher professional development* were integrated into a unified thematic category centred on PE teachers' professional development. After consolidation, keywords related to *college PE teachers*, *primary and secondary school PE teachers*, and *professional development* appeared 565 times, accounting for 34.03% of the total keyword frequency. This finding indicates that teacher professional development across different educational stages represents the dominant research theme in Chinese PE teacher studies.

Further analysis shows that research on PE teachers can be broadly divided according to educational stages, with a strong emphasis on college PE teachers and primary and secondary school PE teachers. This classification reflects differences in teaching objectives, curriculum requirements, and professional development pathways across educational contexts. With the continuous advancement of educational reform and knowledge innovation, universities have become key nodes connecting education and society. Consequently, research on college PE teachers has gradually shifted from

focusing on social status and professional skills to issues such as professional identity, subjectivity, teaching reflection, and lifelong professional growth. Similarly, research on primary and secondary school PE teachers has evolved from an emphasis on technical proficiency to a broader concern with pedagogical competence, educational values, and holistic student development.

In terms of research content, keyword analysis reveals that studies on PE teachers' professional development mainly focus on value orientation, current status, developmental challenges, and improvement strategies. These studies are closely linked to education reform contexts and address issues such as unclear role positioning, insufficient professional identity, job burnout, and limitations in external support mechanisms, including performance evaluation and welfare systems. At the same time, increasing attention has been paid to internal driving factors, such as teaching reflection, professional beliefs, and intrinsic motivation. However, the convergence of research topics also suggests a relative lack of theoretical innovation and in-depth exploration of underlying mechanisms. In addition, keywords such as *new curriculum*, *core literacy*, *new era*, and *Healthy China* frequently appear in the literature, indicating that PE teacher research is strongly influenced by national education and health policies. Educational reform is a dynamic and long-term process, and the development of PE teachers must remain closely aligned with policy orientations and curriculum reform trends. From quality education to three-dimensional curriculum goals and, more recently, to the core literacy framework, the expectations placed on PE teachers have continued to expand. As a result, the connotation and extension of PE teacher professional development have gradually evolved from surface-level skill enhancement to deeper value-based and reflective professional growth.

Overall, the keyword distribution and co-occurrence analysis reveal both continuity and change in Chinese PE teacher research. While professional development remains the central theme, future studies should move beyond descriptive analyses and policy-driven discussions to explore more diverse research perspectives, theoretical frameworks, and interdisciplinary approaches.

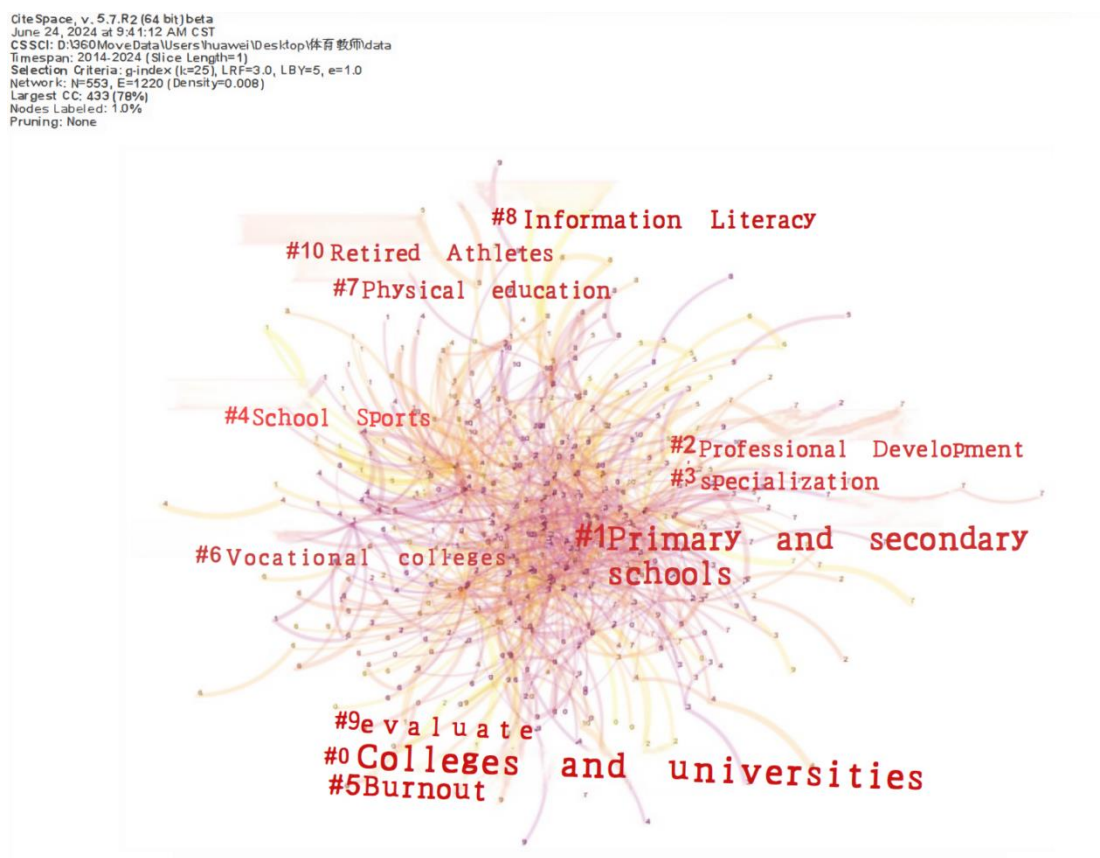


Figure 6 Physical education teachers research keyword distribution

## Conclusion

This study employed bibliometric analysis and CiteSpace V to systematically examine the research landscape of physical education (PE) teacher studies in China from 2014 to 2024. By analysing publication trends, journal distribution, author and institutional collaboration networks, funding characteristics, and keyword co-occurrence patterns, the study provides a comprehensive overview of the knowledge structure and evolutionary trajectory of PE teacher research in China. The findings indicate that although research output peaked in the early part of the study period, the overall number of publications has shown a declining trend in recent years, suggesting a possible shift in research priorities, publication channels, or academic evaluation mechanisms within the field. Similar publication fluctuations have been observed in other education-related research areas undergoing policy-driven transitions (Hicks et al., 2015).

In terms of publication outlets, PE teacher research in China remains highly concentrated in sports-related journals, with relatively limited representation in broader education, psychology, and health journals. This disciplinary concentration reflects the traditional positioning of PE research within sport science but also highlights the need for greater interdisciplinary integration. Previous studies have emphasised that interdisciplinary approaches can enhance theoretical innovation and practical relevance in education research, particularly in areas related to teacher development and

curriculum reform (Kirk, 2010; Darling-Hammond et al., 2017). Expanding publication channels may therefore contribute to the diversification and enrichment of PE teacher research perspectives.

The analysis of authors and institutions reveals a wide distribution of researchers but a relatively small group of core authors and leading institutions. East China Normal University, Central China Normal University, and Beijing Sport University play central roles in knowledge production and academic collaboration, forming relatively stable research networks. However, the overall density of collaboration remains moderate, indicating untapped potential for cross-institutional and cross-regional cooperation. Strengthening academic collaboration has been shown to improve research quality, knowledge diffusion, and innovation capacity in education and social science fields (Wagner et al., 2011).

Funding analysis shows that the proportion of funded studies in PE teacher research is relatively low, with national-level projects accounting for the majority of funded publications. Research funding is widely recognised as an important driver of research quality and sustainability (Bornmann, 2013). The limited funding coverage observed in this study suggests that PE teacher research may benefit from stronger alignment with national education, health, and social development agendas to enhance competitiveness in research funding applications.

Keyword co-occurrence analysis indicates that PE teacher professional development remains the core research theme, with sustained attention to college PE teachers and primary and secondary school PE teachers. Topics such as professionalisation, teaching practice, job burnout, and policy-driven reforms (e.g., core literacy and Healthy China) continue to shape the research agenda. While these themes demonstrate continuity and policy relevance, the convergence of keywords also suggests a tendency toward repetitive research topics. Future studies should therefore move beyond descriptive analyses and policy interpretation to incorporate stronger theoretical frameworks, longitudinal designs, and interdisciplinary perspectives, as recommended in previous bibliometric research (Zupic & Čater, 2015; Donthu et al., 2021).

Several limitations of this study should be acknowledged. First, the analysis was based solely on CNKI-indexed journal articles, which may exclude relevant international publications and limit global comparability. Second, due to database constraints, citation-based frontier detection was restricted. Despite these limitations, this study provides a systematic and visualised overview of PE teacher research in China and offers a valuable reference for researchers seeking to understand existing research patterns and identify future research directions. By highlighting structural characteristics, research hotspots, and developmental gaps, this bibliometric analysis contributes to the strategic advancement of PE teacher research in the context of ongoing educational reform.

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