Visual Analysis of Research Process and Trends of Education Leadership in China from 2004-2023

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Abstract – **The research on leadership is an important part of improving teaching quality and promoting teaching management. To deeply understand the development trend of leadership in the field of education in China, this paper analyzes 1514-related literature from the Core journals of the Peking University and Chinese Social Sciences Citation Index collected by China National Knowledge Infrastructure (CNKI) in the past 20 years by using bibliometrics, citation analysis method and content analysis methods. Citespace(6.1.6) is adopted as the main analysis tool. The study shows that in the past two decades, the overall research on China's leadership in education has shown a steady upward trend. However the density of cooperation between institutions and authors is on the low side, and the cooperation should be strengthened; The research orientation has shifted from theoretical studies to applied research; The research theme has gradually indigenization, and it is gradually beginning to find the Chinese characteristics based on international comparative researches; The research object is gradually manifesting decentralization and transfers from principals to teachers; And the research focus keeping abreast with the time changed into "Informatization" and "Artificial Intelligence".**

Keywords – **Leadership; Education; China; Citespace;**

I. INTRODUCTION

Leadership is a widely discussed and popular topic with significant managerial implications (John, 1993). Each country has a different social system, different historical traditions, and different cultural backgrounds, any management method cannot adapt to the country's social system, historical traditions and cultural background, and it is impossible to get a good application. Under the background of economic globalization, how to carry out local management research on Chinese leadership based on the global vision, create a Chinese school of leadership management, and make Chinese contributions to the enhancement of management knowledge of mankind has become a major issue of common concern for Chinese management scholars. To be more conducive to domestic scholars to carry out the localization of leadership research, this paper reviews and analyzes the main achievements of domestic leadership research by using Citespace

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visualization and analysis software, describes the current situation of domestic leadership research, the main process and trends then puts forward specific suggestions on how to carry out the localization of leadership research in the future.

II. RESEARCH OBJECTIVES

This article aims to conduct an in-depth exploration of the academic development, key themes, and research trends in the field of educational leadership in China through the visualization of literature using Citespace. By utilizing the Citespace tool, we will focus on the following key issues: Temporal and Spatial Distribution of Academic Research: Through the temporal and spatial analysis feature of Citespace, we will trace the development trends of educational leadership research in China during different periods and geographical locations. This will help identify academic hotspots and development focal points in the field. Collaboration Networks and Knowledge Dissemination: Using the collaboration network map in Citespace, we will analyze the collaborative relationships among researchers in the field of educational leadership in China. This analysis will contribute to understanding the pathways of knowledge dissemination, key collaborators, and the structure of academic communities within the field.

Key Themes and Research Frontiers: Through Citespace's thematic evolution analysis, we will investigate the evolution of key themes in the field of educational leadership in China. Additionally, we will identify current research frontiers and explore intersections with other disciplines, revealing the interdisciplinary nature of educational leadership research in China. This will provide insights into the focus and trends of research within the field. Through the aforementioned analyses, we aim to offer profound insights for researchers, policymakers, and practitioners in the field of educational leadership in China. This, in turn, is expected to facilitate further development and innovation in the field.

III. METHOD

China National Knowledge Infrastructure (CNKI) was selected as the data source, and literature was selected through the advanced search interface, with "leadership" and "education" as the themes to limit the research topic. The period was set as January 1, 2004, to November 31, 2023. To ensure the credibility and reliability of the journals, the source of the journals was set as Core journals of the Peking University and Chinese Social Sciences Citation Index (CSSCI) and obtained 1587 pieces of literature. Information, manually eliminated advertisements, book reviews, textbook

profiles, numbers and other irrelevant literature were artificially removed. Then converted and de-emphasized the data through the Citespace software, and finally obtained 1,514 pieces of valid literature. Since the data exported from CNKI is in Refworks format, it cannot be directly analyzed by CiteSpace, so the data exported from CNKI is input into CiteSpace for data conversion to obtain a format that can be analyzed.

Document analysis method was adopted to analyze and sort out 1514 related literature. Citespace(6.1.6), a visualization software developed by Dr Chen Chaomei, was used to draw keyword co-occurrence maps, keyword mutation maps, keyword clustering maps, author co-occurrence maps, and issuing institution co-occurrence maps in terms of keywords, authors, and institutes to show the focus and the trend of the evolution of leadership in education of China from 2004 to 2023.

IV. FINDINGS

Analysis of Annual Changes in the Number of Articles on Leadership of Education in China

The distribution of annual research papers published on leadership in Chinese education is shown in Figure 1. Since entering the 21st century, the quality of education has become a strategic theme in the reform and development of basic education in all countries, and student learning and development have received extensive attention from educators, researchers and policymakers (Zhao,2013). The research on leadership in education in China from 2004 to 2023 is in a process of gradual increase shown in Figure 1. Specifically, it can be divided into two phases: Phase I is a rapid development phase of almost geometric growth from 2004 to 2010. The second phase of steady development from 2010-2023. China's Ministry of Education released the Outline of the National Medium- and Long-Term Education Reform and Development Plan (2010-2020), which points out the need for a sound education management system. During this phase, the number of articles issued shows some ups and downs, but the trend of change is not large, and the overall number of articles gradually rises 100/year up and down and reaches a peak of 129 articles in 2020. In 2022, the trend of articles will fall back temporarily, and the number of articles will be lower than the average value of 79 articles in the past 20 years. In 2023, the research on leadership will show an upward trend, and the number of articles will gradually rebound, which is expected to be more than 110 articles.
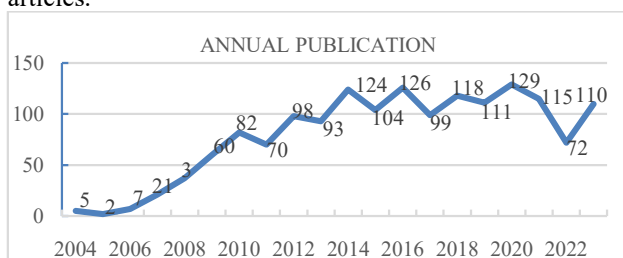

Figure 1 The Annual Publication Of Leadership In Education In China

Co-occurrence Analysis of Research Authors And Institutions.

a) Analysis of core authors and number of publications

Author co-occurrence analysis can reflect the cooperation between authors and research institutions in this field, which helps to understand the current status and process of research in this field. Since the data exported from CNKI is in Refworks format, it cannot be directly analyzed by CiteSpace, so the data exported from CNKI is input into CiteSpace for data conversion to obtain a format that can be analyzed, input into CiteSpace again, select Node Types as Author, and run to get the visualization map of educational leadership The visualization of authors of educational leadership is shown in Figure 2. According to the data in the map, it is found that the number of nodes N=508 (authors), the number of connecting lines E=261 (collaborations), and the network density Density=0.002. It indicates that there are some collaborations among the authors in this research field, but the concentration is low, and each researcher mostly focuses on self-research and lacks mutual cooperation.

The more connecting lines represent more cooperation between authors, the circle on the node represents the number of publications of each author, the more publications the larger the node, the darker the outer circle in the circle indicates that the related institutions have published more in recent years. It can be seen that the four core authors, Cheng Jinkuan and Wei Xiaoyu, Zhang Liguo and Zhou Buoyu, are more closely connected in recent years. Cheng and Wei focus on the development of principal leadership in the U.S., coaching models, etc. Zhang and Zhou focus on the development of principal leadership. Zhang and Zhou also focus on the evaluation and measurement of principal leadership in primary and secondary schools and the impact of the Internet on the development of educational leadership. It is also worth noting that 16 authors, including Zhou Sheng, Zhang Meng, Liu Jing, et al. form a close consortium, but the number of publications is low, and their focus is on the research theme of the impact of school health leadership on the promotion of students' physical and mental health development.
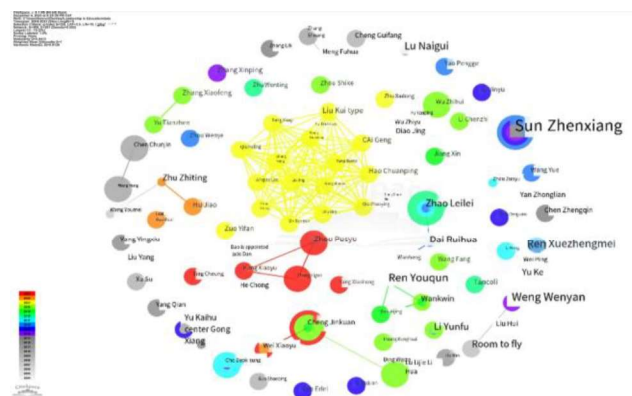

Figure 2 Author Co-Occurrence Map

The author co-lineage allows us to know the core authors in the field, which allows us to measure the cooperation relationship between scholars. Core authors are scholars who have higher academic levels and more research achievements in a certain field. According to Price's Law can be calculated whether a scholar is a core author in the field. The formula is $M=0.749\sqrt{N_{max}}$, (M is the minimum number

of publications of core authors, and Nmax is the cumulative number of publications of the authors with the most publications from 2004-2023). Bringing 1514 relevant literature into Price's law, it was concluded that M=2.7. So that authors with 3 or more publications can be considered as core authors in the field. The number of core authors was obtained as 27 with a total of 123 publications. According to Price's law, the core authors form a core author group when the number of their articles exceeds 50% of the total number of articles, but the calculated number of the core authors' articles accounted for 8.12% of the total number of articles, which is less than 50%, indicating that the core group of authors in the field of educational leadership has not yet been formed, and the core authors' researches in the field are more dispersed.

As can be seen from Table 1, the core authors in the field of educational leadership mainly include Sun Zhenxiang, Zhao Leilei, Cheng Jinkuan, Weng Wenyan, Lu Naigui and so on. Among them, Prof. Sun Zhenxiang of Zhejiang Normal University has issued the most articles of 13, which mainly researched the development of an informatization leadership model for principals and teachers, evaluation standards, and generation mechanisms. Prof. Zhao Leilei of Jiangnan University published 10 articles, mainly studying the mechanism and influencing factors of informatization leadership effectiveness. Prof. Cheng Jinkuan from Nanjing Normal University is also an important core author, with 8 articles, mainly researching teacher leadership, especially the comparative study of teacher leadership in countries.

TABLE 1 NUMBER OF PUBLICATIONS BY CORE AUTHORS

ID	AUTHOR	YEAR OF FIRST PUBLICATION	PUBLICATIONS
1	Sun Zhenxiang	2010	13
2	Zhao Leilei	2016	10
3	Cheng Jinkuan	2019	8
4	Weng Wenyan	2007	6
5	Lu Naigui	2010	5
6	Wankwin	2019	5
7	Zhang Shuang	2007	5
8	Wanheng	2009	5
9	Cho Deok-sung	2014	5
10	Ren Youqun	2009	4
11	Dai Ruihua	2011	4
12	Hu Zhongyi	2010	4
13	Wang Youmei	2006	4
14	Wei Xiaoyu	2022	4
15	Li Yunfu	2016	4
16	Fang Yufei	2007	4
17	Zhu Zhiting	2007	3
18	Wang Hong	2010	3
19	Yu Kai	2012	3
20	Zhang Liguo	2023	3
21	Li Hua	2020	3
22	Wu Zhihui	2020	3
23	Zhou Fuyu	2023	3
24	Gong Xiang	2010	3
25	Chen Chunjin	2010	3
26	Zhou Zuoyu	2013	3
27	Yu Ke	2010	3

    b)   Analysis of core organizations and cooperative networks

Based on the data in the mapping, it was found that the number of nodes N=445 (issuing institutions), the number of connectivity E=197 (collaborative relationships), and the network density Density=0.002. suggests that there is a

certain amount of collaborative relationships among the research institutions in the research field. The circles on the nodes represent the number of publications from each institution, the more the number of publications the larger the node. The darker the colour of the outer circle in the circle indicates that the relevant institutions in recent years, the more the number of articles issued. From the figure, it can be seen that the Department of Education of Beijing Normal University (51), the Department of Education of East China Normal University (29), the College of Educational Sciences of Nanjing Normal University (23), the Department of Education of Northeast Normal University (17), and the College of Education of Shanghai Normal University (14) have the greatest number of publications. It can be seen that among the many research organizations, teacher-training colleges and universities pay significantly more attention to educational leadership than other types of colleges and universities. There are many lines between institutions in the figure, indicating that the academic links between institutions in the study of educational leadership are relatively close, with the Department of Education of Beijing Normal University, the Department of Education of East China Normal University, and the Department of Education of Northeast Normal University having the most lines, and it can be found that a common feature is that they are all the six teacher training colleges under the direct supervision of the Ministry of Education, which indicates that teacher training colleges under the direct supervision of the Ministry of Education are more concerned with the study of leadership.
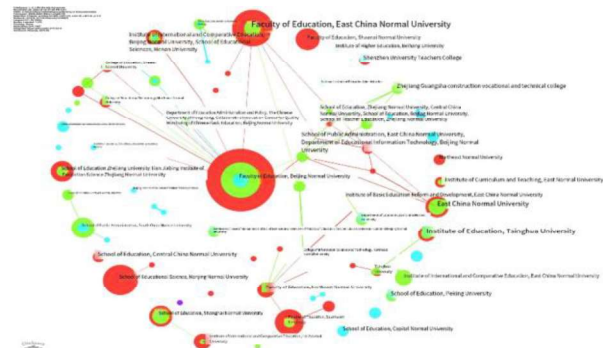

Figure 3 - Co-Occurrence Mapping Of Issuing Organizations

Analysis of the Research Focus and Dynamic Evolution of Leadership in Education

Keywords are highly condensed and summarize the research content of the article, through keyword analysis, the essence of the paper can be obtained, and the high-frequency keywords of the research literature can be sorted out to summarize the hot issues and research trends in a certain research field. Using CiteSpace software for analysis, the higher the intermediary centrality of a keyword, the higher the frequency of the keyword appearing simultaneously with other keywords in the research field, based on which it can indicate the research hotspots in the field (Chen,2009).

From the perspective of word frequency, the analysis is carried out by CiteSpace software, selecting the node type as Keyword, setting Years per slice to 1 year, Text Processing to the default value, Node Types to Keyword, and

Node Thresholds to the default value. Selection Criteria) set to the default value, and finally select the pathfinder network algorithm Pathfinder and Pruning the merged network, after running the merger of similar keywords, such as: "general colleges and universities" into the "colleges and universities", "excellent principal" into the "principal", to get the keyword co-occurrence map (Figure 4), the size of the circle in the map and the keyword frequency is proportional to the circle, that is, the larger the circle, the more frequently the keyword appears. The larger the circle, the higher the keyword frequency. From the figure, it can be seen that the keywords appeared in a total of 468 nodes (N=468), and the number of connecting lines totalled 331 (E=331). The keywords leadership, principal, America, college students, and curriculum leader appeared most frequently, which is a hot research topic in this field.
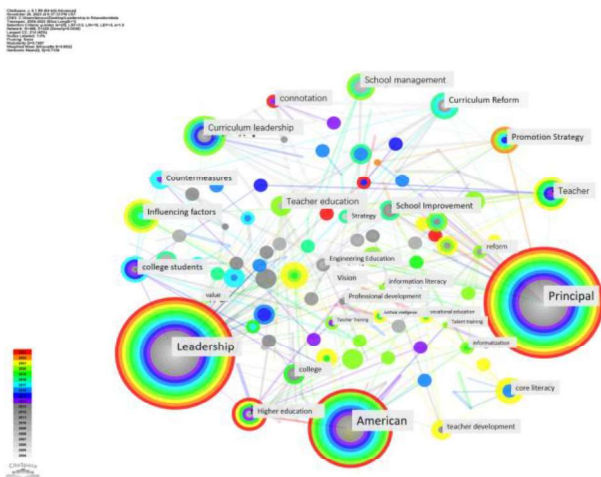

Figure 4- Keyword Co-Occurrence Diagram

To express the relationship between keywords more clearly, the top 20 keywords are selected, and their word frequency and centrality statistics (Table 2), from the centrality point of view, leadership (0.30), principals (0.11), the United States (0.05) ranked in the top three in the field is an important intermediary pivot node. The word frequency of "principal" is 78 but the centrality is only 0.11, indicating that there is a relationship between the word frequency and the centrality, but it is not proportional. In CiteSpace analysis, the key nodes are the nodes with intermediary centrality > 0.1, removing the non-important key nodes such as primary and secondary schools, school management, teacher leadership, etc., and the only key nodes with centrality > 0.1 are leadership (0.30) > principal (0.11). It can be seen from the key nodes mentioned above that the construction of China's educational leadership pays more attention to the research on the leadership of principals.

TABLE 2- KEYWORD FREQUENCY AND CENTRALITY STATISTICS TABLE

Id	Frequency	Centrality	Year	Keyword
1	131	0.30	2007	leadership
2	78	0.11	2006	principal
3	41	0.05	2007	America
4	15	0.01	2008	College student
5	14	0.03	2006	Curriculum leadership
6	13	0.02	2010	Higher education
7	12	0.03	2006	Curriculum reform
8	12	0.01	2008	Promotion strategy
9	12	0.01	2017	Influencing factor
10	11	0.02	2014	Teacher
11	10	0.01	2019	New Era
12	10	0.01	2009	School improvement
13	10	0	2010	Primary and secondary school
14	9	0	2009	School management
15	9	0.01	2006	connotation
16	7	0.01	2009	star
17	7	0.01	2018	Artificial intelligence
18	7	0.01	2008	Teacher Education
19	7	0	2012	Teacher leadership
20	7	0.03	2011	High school

Through the CiteSpace software using the log-likelihood ratio algorithm (LLR), the keywords of the literature were analyzed by clustering, the more the number of keywords in the clusters, the larger the size of the clusters, the larger the area of the clusters in the clustering diagram, which also indicates that the clusters are the hotspots in the field of research. The 10 clusters of #0 leadership, #1 principals, #2 curriculum reform, #3 higher education, #4 teachers, #5 colleges and universities, #6 core literacy, #7 entrepreneurship education, #8 vision, and #9 Higher vocational colleges are developed. The module value of the cluster Q=0.7487>0.3 indicates that the cluster structure is significant. The average contour value S=0.9311>0.7 indicates that the clustering is reliable.
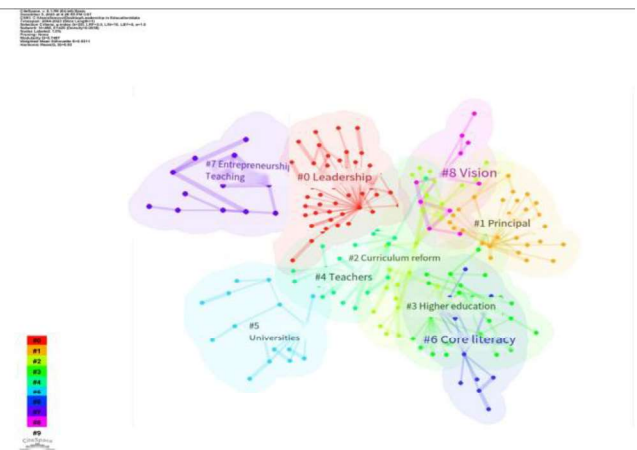

Figure 5-Keyword Clustering Map

To have a more intuitive understanding of the keyword clusters, based on the clustering knowledge map, we run the Cluster Explorer function to get the keyword covariance network clustering table, as shown in Table 3, the relevant keywords in the table are the other high-frequency keywords in the clustering, and the bigger the corresponding value of the keyword, the higher the frequency of the keyword. Combined with the clustering map and the clustering keyword statistics table, it can be concluded that the five major research hotspots in the field of educational leadership in China are the leadership development model; Principal leadership; Leadership development in the U.S.; Higher education; Teacher leadership

TABLE 3 - KEYWORD COVARIANCE NETWORK CLUSTERING TABLE

ID	Size	Silhouette	Term	LLR
#0	49	0.949	Leadership	Leadership (45.12,1.0E-4); Principal (16.87,1.0E-4);

				School management (9.93,0.005); Culture mode (7.44,0.01); Female (7.44, 0.01)
#1	30	0.857	Principal	Principal (71.91, 1.0E-4); school improvement (20.08, 1.0E-4); Primary and secondary school (13.33,0.001); Leadership in Teaching (9.98, 0.005); upgrade strategy (9.98, 0.005)
#2	28	0.945	Curriculum reform	curriculum reform (16.18, 1.0E-4); curriculum leadership (16.18, 1.0E-4); strategy (12.73, 0.001); Teacher education (12.27, 0.001); Leadership (12.15, 0.001)
#3	28	0.905	Higher education	Higher education (33.38,1.0E-4); America (31.4, 1.0E-4); talent cultivation (16.51, 1.0E-4); revolution (12.35,0.001); innovation (8.21, 0.005)
#4	21	0.916	Teacher	Teachers (18.88, 1.0E-4); Big data (14.37, 0.001); Professional development (14.37, 0.001); College students (10.06, 0.005); Influencing factors (8.01, 0.005)
#5	16	0.985	High school	Universities (18.7, 1.0E-4); Tissue strength (17.61, 1.0E-4); New era (11.68, 0.001); University party organizations (11.68, 0.001); Value leading (11.68, 0.001)
#6	13	0.935	Core literacy	Core literacy (20.58, 1.0E-4); High-quality balance (12.6, 0.001); Vocational education (12.6, 0.001); Faculty development (12.6, 0.001); Text analysis (6.27, 0.05)
#7	13	0.985	Entrepreneurship education	Entrepreneurship education (14.46, 0.001); Self-leadership (14.46, 0.001); Core competitiveness (7.17, 0.01); Value (7.17, 0.01); Logic of value (7.17, 0.01)
#8	11	0.936	Vision	Vision (14.7, 0.001); Rural areas (14.7, 0.001); Strategy (10.93, 0.001); Australia (7.29, 0.01); Future Engineers (7.29, 0.01)
#9	5	0.995	higher vocational college	Higher vocational colleges (16.58, 1.0E-4); Connotation development (16.58, 1.0E-4); Professional construction (8.19,0.005); Safeguard elements (8.19, 0.005); Vocational belt (8.19, 0.005)

Mutation words refer to words that appear more or are used more frequently in a short period. According to the change in word frequency of emergent words, the frontier and trend of the research field can be determined (Wang,2022). After running Citespace, select Burstness, keep the default parameters, click View, and get the keyword emergence graph (Figure 6). In the graph, "Strength" stands for the emergence intensity, "Begin" stands for the start research year of related research, "End" stands for the end year of related research, and the red block stands for the keyword emergence period. The blue block is the time slice

of the population. To further show the evolution trend of educational leadership research, the keyword time chart of educational leadership research was drawn through the Timeline View function in CiteSpace software (Figure 7). Based on the analysis of the keyword time plot and keyword salience map, four research trends of educational leadership research were summarized.

a) Connotation of leadership and professional development

Based on the chart, it is evident that from 2004 to 2010, leadership research primarily focused on the essence of leadership and strategies for improvement. However, starting in 2015, with the rapid development of information technology, leadership development began to intersect with technology-related disciplines. Keywords and research topics such as Internet+, big data, and educational technology started to emerge, marking the rise of research on information technology leadership. The state attaches more and more importance to the development of education informatization. Education informatization is the commanding height of education reform and an important means to innovate and change the way of education (). School informatization construction and school informatization leadership are inseparable. (Huang,2012) Simultaneously, research on educational leadership shifted its focus towards the professional development of school leaders aiming to cultivate leaders equipped with advanced educational concepts and management skills. In 2006, research on principal leadership became prominently featured and has continued to develop since then. This trend indicates that educational leadership research is actively responding to the challenges of contemporary information technology and is dedicated to nurturing school leaders with enhanced professional competence.

b) School-based leadership and education management

Scholars widely believe that emphasizing leadership and management within the school is crucial for enhancing overall school effectiveness. Research is focused on the roles of principals and middle-level leaders in the internal organization, decision-making, and interpersonal relationships within schools. The study of principal leadership has been ongoing since its emergence in 2006, with a primary focus on principals of primary and secondary schools. Researchers' interests have evolved from how to enhance principal leadership to understanding how principal leadership can internally drive school reform. Before 2010, there was considerable attention and publications on research related to school improvement, followed by a period of relative silence. However, in 2015, there was a renewed interest among researchers. The current research hotspot revolves around the application of grounded theory for a systematic and in-depth study of principal leadership. This approach aims to comprehensively understand the contributions of principals to improving school effectiveness. Scholars are actively using grounded theory to

explore principal leadership, emphasizing a systematic and in-depth research approach (Zhao,2022).

c) Education reform and leadership

Curriculum reform has always been the guiding force in the direction of educational research in China. Since 2006, the concept of leadership has also been introduced into curriculum reform. From 2006 to 2015, the main focus of research was on the impact of curriculum leadership on reform. Subsequently, the research emphasis shifted mainly to teacher education and training to better facilitate curriculum reform. In addition, researchers have also paid attention to international comparative studies, with the United States, the United Kingdom, and Canada being hotspots for comparison. Particularly, leadership research in the United States has consistently been a focal point for domestic researchers. A global perspective has prompted the alignment of China's educational leadership research with international standards, absorbing and applying international leadership theories. However, there is still a lack of localization in Chinese content, and currently, it remains in the stage of referencing models and policies of other countries. There is a need for deepening the localization of models and training policies in China. Despite drawing on models and policies from other countries, there is relatively little localization content. However, at present, the research on teacher leadership has not formed a mature theoretical system, which hinders the in-depth development of teacher leadership research to some extent. Future research should deepen discussions on Chinese localized models and training policies to better adapt to the practical situation of Chinese education. This includes making localized adjustments to leadership theories and training methods to ensure they align with the cultural, educational system, and social background characteristics of China. Through deepening local research, China's educational leadership theory and practice will better suit the national context, effectively driving curriculum reform and educational development."

d) Develop Teacher Leadership

In 2012, the study of teacher leadership was introduced, building upon the foundation of principal leadership research. By 2014, researchers began to concentrate on investigating teacher leadership, with a primary focus expanding on the professional development of teachers. Initially drawing insights from research on leadership among university students, the exploration gradually evolved into a more in-depth examination of teacher leadership. Research in this domain has primarily delved into the establishment of training systems, as well as exploring mediating effects and influencing factors between student and teacher leadership. However, there remains a notable gap in our understanding of the intrinsic developmental processes and models of teacher leadership. In recent years, the focal point of teacher leadership research has shifted towards the exploration of leadership among university counsellors. This trend indicates scholars' attention to leadership traits in different educational contexts and roles, offering a more diverse and enriched perspective in the research landscape.
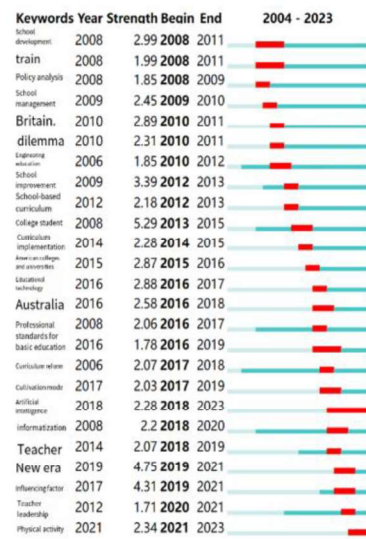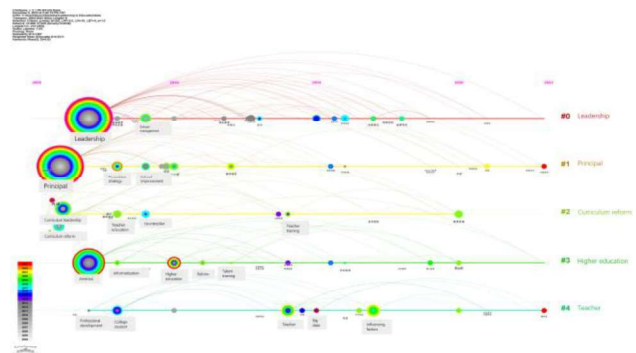

Figure6-Keyword Emergence Graph

Figure7-Keywords Timeline Graph

V. CONCLUSION

Based on the visualisation function in CNKI and the information visualisation software CiteSpace, this paper analyses the literature related to the study of "educational leadership" included in the Chinese core and CSSCI databases of Peking University in the past two decades, draws the relevant knowledge map and tables, and draws the following conclusions.

Examining the overall publication trends in educational leadership research reveals a consistent upward trajectory. The field has witnessed the emergence of numerous influential scholars and authoritative institutions. However, it is noteworthy that the publication output of core authors falls short of constituting 50% of the total, indicating the absence of a clearly defined core authorship group. Furthermore, the top three institutions by publication output are all directly affiliated with the Ministry of Education, which may signify their significant influence in the field of educational leadership research. However, collaboration among researchers and institutions appears relatively limited, as stable core research collaboration groups and institutional partnerships have not yet been established. This suggests that fostering broader and more robust collaborations among scholars and institutions remains a critical consideration in the field of educational leadership research. In future research endeavours, emphasis should be

placed on enhancing communication channels within and beyond the academic community, increasing the formation rate of core authorship, and facilitating the establishment of more resilient research collaboration networks. This will contribute to advancing both the depth and breadth of educational leadership research, thereby better serving the developmental needs of the education sector.

The co-occurrence patterns of keywords reveal a pronounced focus among Chinese scholars on the leadership of school principals, positioning it at the core of research hotspots. In terms of keyword clustering, Chinese research in educational leadership demonstrates a heightened interest in leadership development models, principal leadership, and leadership development in U.S. higher education. This signifies a discernible shift from a predominant emphasis on school principal leadership toward a decentralized perspective on power, progressively directing attention to the leadership role of teachers. This transition suggests an ongoing expansion of academic inquiries into more diverse realms within the field of educational leadership. The shift from a singular focus on school principal leadership toward a more dispersed examination of power structures underscores a growing interest in exploring leadership at various levels and roles within the educational system. Such evolution may reflect a pursuit of diversity in the study of educational leadership, aiming for a more comprehensive and balanced perspective on the management and leadership of educational institutions. Future research endeavours can delve deeper into the understanding of power distribution and the development of teacher leadership, contributing to the advancement of educational leadership studies in China in both depth and breadth.

Examining the transition in research focus through the evolution of key terms reveals a discernible paradigm shift in scholarly inquiry. Historically, the emphasis was on keywords such as "principal," "United States," and "curriculum reform," whereas the current trajectory is marked by a conspicuous pivot towards keywords like "new era," "teacher leadership," "information technology," and "artificial intelligence." Each chronological epoch exhibits a pronounced problem-consciousness, progressively aligning with the nuanced phases of development within the Chinese educational landscape. Regarding research focal points, the salient keywords encompassing "artificial intelligence," "new era," and "physical activity" intricately interlace with technological advancements and global informatization. These represent the vanguard themes presently captivating scholarly investigation. This thematic preoccupation signifies a scholarly zeal for unravelling the confluence of technology and education, addressing the exigencies of educational leadership in the contemporary era, and comprehending the pedagogical implications of physical activity. This evolving research landscape not only underscores the academic community's acumen in gauging societal metamorphosis but also accentuates researchers' imperative to grapple with the exigent challenges pervading contemporary education. The trajectory of trending keywords delineates a strategic roadmap for prospective scholarly inquiry, affording the academic fraternity a nuanced and targeted approach to engaging with the dynamic challenges embedded in societal and educational progress.

In summary, the trajectory of educational leadership research in China reflects a discernible upward trend in publication output. Nevertheless, a critical observation reveals a notable lack of cohesion in collaborative endeavours among scholars and institutions. This underscores a compelling imperative for the reinforcement of collaborative frameworks. The thematic evolution of research has traversed from foundational theoretical inquiries to a discernible shift towards applied research methodologies, necessitating a more profound synthesis of theoretical frameworks and pragmatic applications. A noteworthy phenomenon is the increasing indigenization of research themes, wherein the scholarly discourse is transitioning from a reliance on international comparative frameworks towards the identification and elucidation of distinctly Chinese attributes. This paradigmatic shift underscores the need for a nuanced and culturally resonant understanding of educational leadership dynamics within the Chinese context. Further, an intriguing transformation is evident in the object of scholarly scrutiny, manifesting as a gradual decentralization from a principal-centric to a teacher-centric paradigm. This nuanced evolution in focus denotes a maturation in the scholarly exploration of educational leadership dynamics. While the research landscape demonstrates an atonement to the zeitgeist and developmental epochs, there persists an exigency for deeper explorations within extant research domains. Consequently, a dual mandate emerges: to fortify collaborative networks among scholars and institutions and to propel educational leadership research towards heightened profundity, aligned with the exigencies and metamorphoses intrinsic to the dynamic landscape of China's educational milieu.

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