EasyChair Preprint

№ 15502

An Analysis of the Progress and Hotspots of International Research on the Relationship Between Emotional Intelligence and Teacher Leadership in the Last 20 Years Based on Citespace Bibliometrics

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November 29, 2024

An analysis of the progress and hotspots of international research on the relationship between emotional intelligence and teacher leadership in the last 20 years based on citespace bibliometrics

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Abstract

This study explores the international trend of research on the relationship between emotional intelligence and teacher leadership, taps into the research hotspots in this field, and provides feasible references and insights for subsequent research. This study utilized citespace software to conduct bibliometric analysis of 632 relevant documents in the Web of Science Core Collection database in the past 20 years. The analysis was focused on publication trends, research institutions, authors, keyword co-occurrence, keyword clustering, timeline visualization and keyword mutation. The results showed a general upward trend in studies on emotional intelligence and teacher leadership over the past 20 years. The United States has the most publications, and the University System of Ohio leads among institutions, but its low centrality indicates weak global connectivity. The international research hotspots on emotional intelligence and teacher leadership in the last two decades are mainly in the areas of emotional intelligence and

educational leadership, emotional intelligence and transformational leadership, emotional intelligence and social intelligence, and higher education. Through the keywords clustering visualization analysis, eight clusters were obtained: emotional intelligence, higher education, job satisfaction, teachers, competences, thematic analysis, social intelligence, and essential competencies. This suggests that the current research field is revolving around the themes of emotional intelligence, leadership, innovative approaches to education, and digital tools. The epidemic has had a major impact on research in the areas of emotional intelligence and educational methods. The study helps to learn about the progression, hotspots, and future directions for in-depth research on the relationship between emotional intelligence and teacher leadership, and provides a comprehensive understanding of the current status and development trends of research in this field.
Keywords: Emotional Intelligence; Teacher Leadership; CiteSpace; Bibliometric Analysis

1 Introduction

Globally, emotional intelligence (EI) has emerged as a critical factor in enhancing organizational efficiency, with numerous studies linking its significance to organizational effectiveness and productivity (Davies *et al.,* 1998). The concept of emotional competence is rooted in Goleman's (1998) framework, which includes self-awareness, social awareness, self-management, and relationship management. Researchers have identified self-management, time management, influence, decision-making, commitment, communication, and empathy as fundamental components of leadership effectiveness (Sun *et al.,* 2014). High EI motivates individuals to take proactive actions and align their goals with the overarching objectives of the organization (Mustafa *et al.,* 2020).Some scholars have highlighted the importance of teachers' EI and its appropriate application in enhancing cognitive and managerial capabilities (Asrar, 2017; Meshkat *et al.,* 2017). The complexity of schools requires leaders to possess diverse skills and abilities, not only to improve academic outcomes but also to address resistance stemming from environmental challenges, health crises, and even hazards. A positive correlation has been observed between EI and various educational leadership styles (Yildizbas, 2017). Indeed, numerous studies have confirmed that teachers with high EI are better equipped to manage and guide students effectively and to handle the routine challenges inherent in the teaching process (Jennings & Greenberg, 2009). The relationship between EI and teacher leadership has gradually become a focal point of research in recent years. By systematically reviewing the relevant literature from the past 20 years, this study aims to provide a comprehensive and in-depth analysis of this domain, particularly exploring the interplay between emotional intelligence and teacher leadership.

2 Research Methods and Literature Statistics

2.1 Data Source

The Web of Science Core Collection database was selected as the data source for this study's visual analysis. The search query included the terms "Emotional Intelligence or EI or EQ or Emotional Quotient or Social Intelligence" combined with Leadership and "teacher or education". The search period was set from January 1, 2001, to January 1, 2024, yielding a total of 632 records. These records were exported as plain text files for analysis.

2.2 Research Tools and Methods

This study employed bibliometric analysis and visualization techniques, utilizing CiteSpace software to graphically present the data. Bibliometric analysis, a quantitative research method applied to academic literature, centers on "the application of mathematical and statistical methods to books and other communication media", aiming to uncover the evolutionary trends, intrinsic characteristics, and future directions of a discipline through written material analysis (Pritchard, 1969, p348–349). Its core value lies in providing fresh perspectives for academic exploration, technological progress, and scientific research (White & McCain, 1989, p119). Notably, terms such as bibliometrics, scientometrics, and informetrics are often used interchangeably to describe certain facets or the entirety of this discipline (Hood & Wilson, 2001).

2.3 Data Transformation and Processing

The CiteSpace software version 6.3.R1 Basic was used to analyze the imported literature (Chen Yue et al., 2015). The exported plain text files were imported into CiteSpace, and the analysis focused on countries, institutions, and authors. The minimum number of publications was set to 1, with the default minimum citation count set to 0, generating charts. For keyword analysis, the minimum occurrence frequency was set to 16, and the keyword co-occurrence map was drawn. The exported plain text files were renamed as "download_xxx" and imported into CiteSpace for processing and transformation to create a dataset that the software could recognize for analysis. When performing keyword analysis, the parameters were set as follows: time range "2001-2024", time slicing "1 year", scale factor k was set to 5, and the Pruning options selected were Pathfinder, Pruning sliced networks, and Pruning the merged network. Keyword clustering was performed, and the cluster names were examined. The Burstness function was used with the parameter $\gamma[0,1]$ set to 0.4 to generate the keyword burst map.

3 Results and Analysis

3.1 Annual Publications

The publication volume of research on the relationship between emotional intelligence and teacher leadership over the past 20 years is shown in Figure 1. The overall trend is upward, with the highest number of publications in 2024, totaling 81 papers. The values of y and R^2 indicate a rapid growth relationship between the two variables, and this model has high accuracy in explaining the data.

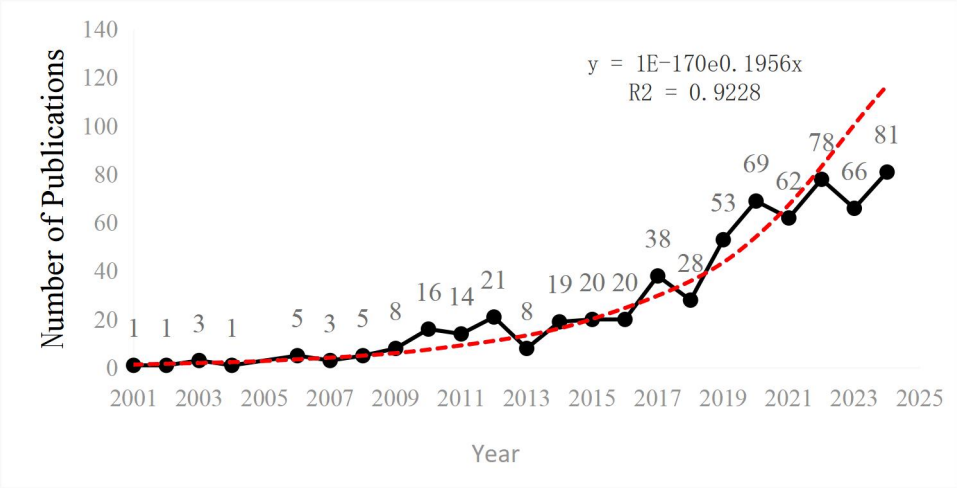

Figure 1: Annual Publication Volume

3.2 Countries of Literature Source

Statistics were conducted with "countries" as the node, and the top ten countries by publication volume are shown in Table 1. Centrality reflects the relative influence or connectivity of a country in this research field; the higher the value, the more important the country's position in the global research network (Eck, N. J., & Waltman, L., 2014). The United States (USA) has a publication volume far exceeding other countries, with 626 papers, demonstrating its dominant position in this research area. The United Kingdom (ENGLAND) ranks second, with 82 publications. Although this is fewer than the USA, it remains an important source of research in this field. The United Kingdom (ENGLAND) has the highest centrality (0.4), indicating that its research in this field is not only abundant but also has significant connectivity in the global research collaboration network.

Count	Centrality	Country
626	0.28	USA
82	0.4	ENGLAND

30	0	ISRAEL
21	0.05	CANADA
19	0.05	AUSTRALIA
15	0.23	FRANCE
15	0.21	GERMANY
11	0.12	NETHERLANDS
7	0.14	SINGAPORE
7	0	INDIA

Table 1: Top Ten Countries by Publication Volume

3.3 Institutions of Literature Source

Statistics were conducted with "Institution" as the node, and the ten institutions with the highest number of publications are shown in Table 2. The University System of Ohio has the highest publication volume in this field (14 papers), but its centrality is relatively low (0.07), indicating that although it has a large number of publications in this field, its connectivity in the global research network is relatively low. The institutions listed are mainly concentrated in the United States, such as University System of Ohio, Harvard University, University of Texas System, etc., indicating that the United States dominates research in this field. Additionally, institutions from Europe and other regions, such as University of Oslo, University of Toronto, Open University Israel, etc., also have a certain degree of influence.

Count	Centrality	Institution
14	0.07	University System of Ohio
7	0.05	State University System of Florida
7	0	Ministry of Education&Science of Ukraine
6	0	Harvard University
5	0	University of Oslo
4	0	Bucharest University of Economic Studies
4	0	Open University Israel
4	0	University of Toronto
4	0	Case Western Reserve University
4	0	University of Texas System

Table 2: Top Ten Institutions by Publication Volume

3.4 Core Authors

Statistics were conducted with "authors" as the node, and the ten authors with the highest number of publications are shown in Table 3, with the most publications being by Bang, H (5 papers). The ten authors whose papers have been cited the most are shown in Figure 2.

Count	Author
5	Bang,H
4	Shafait,Zahid
4	Eyal,Ori
4	Berkovich,Izhak
3	Anwar,Sadia
2	Gerli,Fabrizio
2	Nilsen,F.A
2	Ankit,Ahmed
2	Toprak,Mustafa
2	Ruble,Melissa.J

Table 3: Top Ten Authors by Publication Volume

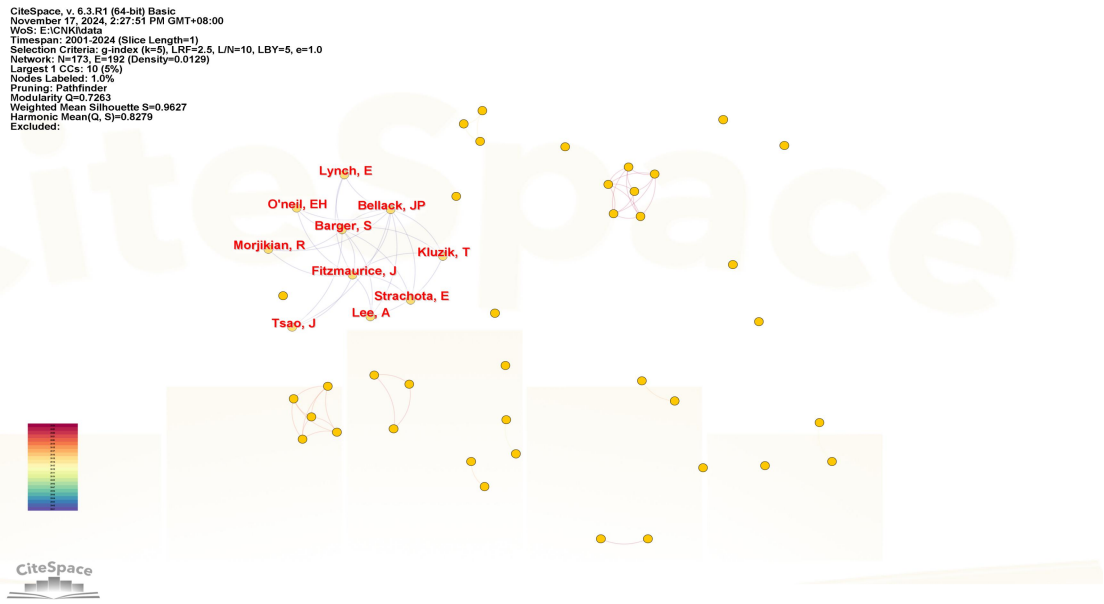

Figure 2: Author Visualization Map

3.5 Keyword Co-occurrence

Based on CiteSpace software, statistics were conducted with "keywords" as the node, and co-occurrence analysis was performed on keywords that appeared more than 15 times. The ten most frequent keywords are shown in Table 4, and the keyword co-occurrence visualization map is presented in Figure 3.

Count	Centrality	Keywords
293	0.38	emotional intelligence
115	0.36	leadership
79	0.24	performance

74	0.19	education
54	0.23	intelligence
43	0.2	transformational leadership
42	0.14	job satisfaction
38	0.12	higher education
30	0.12	model
24	0.12	teachers

Table 4: Top 10 Keywords by Frequency

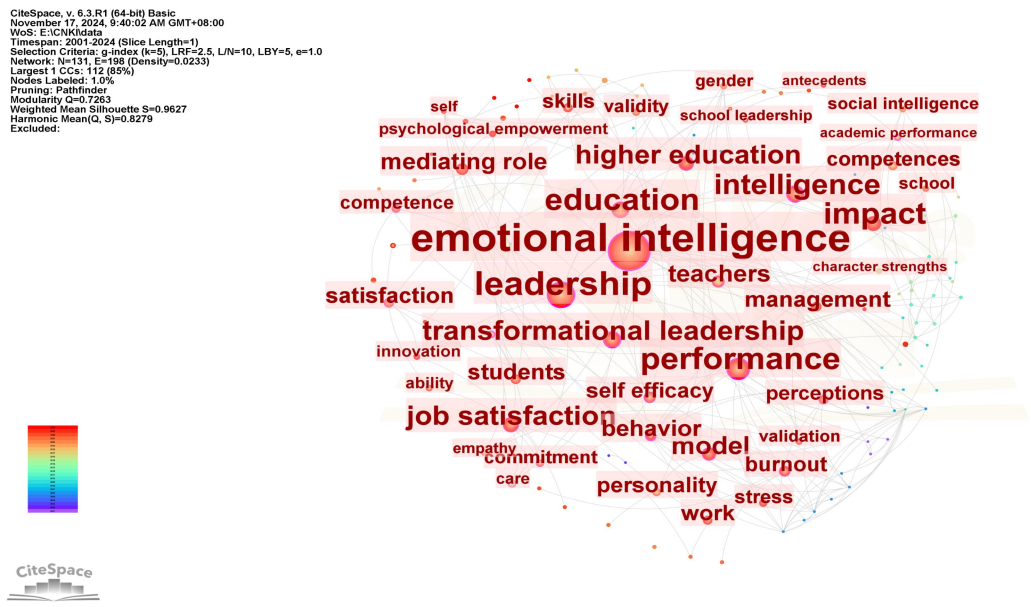

Figure 3: Keyword Co-occurrence Map

Through the above statistical analysis, it was found that emotional intelligence (293 occurrences, centrality 0.38) is the most frequently appearing keyword, followed by leadership (115 occurrences, centrality 0.36). Performance (79 occurrences in 2006, centrality 0.24) and education (74 occurrences, centrality 0.19) are important keywords following emotional intelligence and leadership. Keywords such as teacher (24 occurrences, centrality 0.12) and self-efficacy (16 occurrences, centrality 0.16) indicate that the role of teachers and their confidence are becoming increasingly significant in the research on emotional intelligence and leadership. Based on these data, it can be seen that research on emotional intelligence and teacher leadership has gradually moved from studying emotional intelligence itself to exploring how emotional intelligence influences teacher leadership styles, job performance, job satisfaction, and teachers' mental health. In recent years, researchers have begun to focus on the mediating role between emotional intelligence and teacher leadership, with teacher self-efficacy and occupational burnout becoming new hotspots, especially in the field of higher education.

3.6 Keyword Clustering

To accurately grasp the research hotspots, the LLR algorithm of CiteSpace software was used for keyword clustering analysis, as shown in Table 5. All keywords were clustered into a total of 8 clusters: emotional intelligence, higher education, job satisfaction, teachers, competences, thematic analysis, social intelligence, and essential competencies. The values following each keyword, such as (19.76, 1.0E-4), consist of two parts: the value (e.g., 19.76) indicates the strength of the association between the keyword and a certain topic or field, with a higher value representing a stronger association. The significance level (e.g., 1.0E-4 or 0.05) indicates the statistical significance of the test; results are generally considered statistically significant when the value is less than 0.05. The lower the significance level (e.g., 1.0E-4), the higher the importance of the keyword. The two parameters used to measure clustering effectiveness are Q=0.7263 and S=0.9427, which indicate that the clustering results are significant and reliable (Chen, C., 2006). The visualization map of the keyword clustering is shown in Figure 4.

Count	Centrality	LLR
21	0.972	emotional intelligence(19.76,1.0E-4);transformational leadership(15.8,1.0E-4);educational leadership(7.3,0.01);emotional intelligence(ei)(5.56,0.05);psychological empowerment(5.44,0.05)
19	0.956	competences(9.88,0.005);soft skills(9.63,0.005); primary school(6.58,0.05);nursing (6.58,0.05);student(6.58,0.05)
18	0.947	thematic analysis(6.88,0.01); patient safety(6.88,0.01);cultural intelligence(6.88,0.01); nurses(6.88,0.01);covid-19(6.23,0.05)
15	0.974	higher education(5.47, 0.05);positive youth development(5.35,0.05); well-being (4.77,0.05);salary(4.47,0.05);teique(4.47,0.05)
13	0.951	job satisfaction(9.88,0.005);higher education(5.58,0.05);school administrator(4.43,0.05);knowledge(4.43,0.05);charismatic leadership(4.43,0.05)
11	0.994	social intelligence(18.22,1.0E-4);problem-based learning (16.51,1.0E-4);design education(16.51,1.0E-4);social learning(16.51,1.0E-4);vds(16.51,1.0E-4)
6	0.953	higher education (31.73,1.0E-4);essential competencies(6.18,0.05);workplace experiences(6.18,0.05);staff engagement(6.18,0.05); e-learning methodology(6.18,0.05)
5	0.986	teachers (12.88,0.001);validity(12.01,0.001);emotional intelligence(ei)(8.43,0.005);educational institution(6.16,0.05);sustainable wellness(6.16,0.05)

Table 5: Eight Keyword Clusters

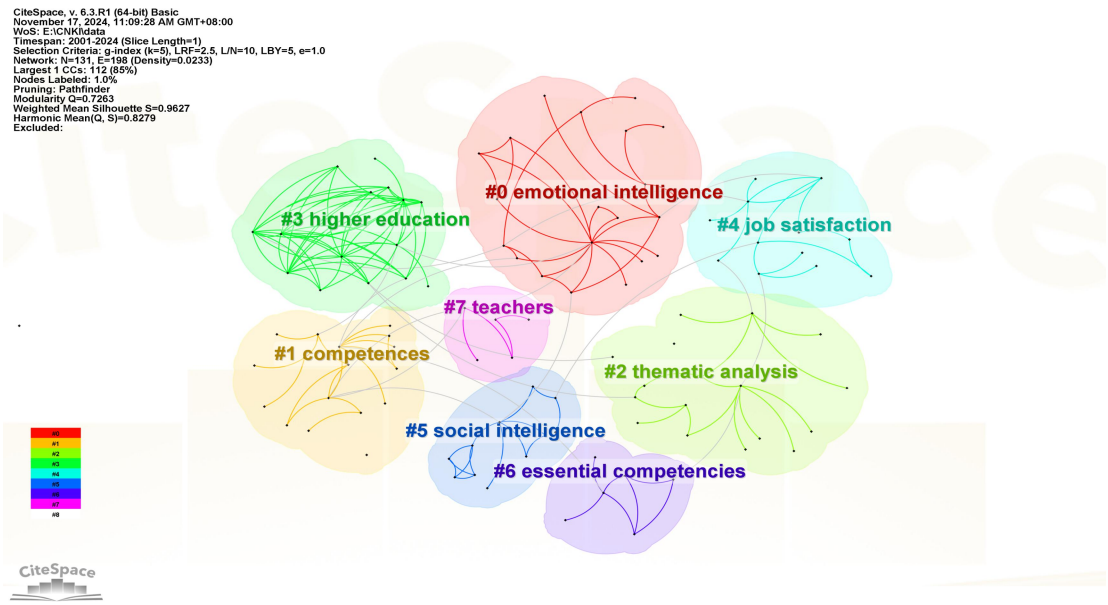

Figure 4: Keyword Clustering Map

Through the above analysis, the research on the relationship between emotional intelligence and teacher leadership is expanding from traditional educational leadership themes to interdisciplinary directions. High-frequency keywords, such as "emotional intelligence" and "transformational leadership," highlight the central role of emotional intelligence in transformational leadership. Transformational leaders, by inspiring and enhancing teachers' emotions and motivation, can significantly improve students' learning outcomes (Leithwood et al., 2020 ; Robinson et al., 2008). Keywords such as competences, soft skills, and cultural intelligence suggest that research is deeply developing in interdisciplinary fields (e.g., nursing and cultural intelligence). This trend reflects that emotional intelligence is not only confined to the educ action sector but is also closely linked to cross-industry competency building (Sun & Leithwood, 2015). The high centrality of keywords like social intelligence and job satisfaction indicates that the synergy between emotional intelligence, social intelligence, and job satisfaction may have a profound impact on teachers' professional development and the educational environment of schools. Research by Berkovich & Eyal (2015) also supports this view, emphasizing that reshaping emotional frameworks helps enhance teachers' commitment and motivation. Core terms in the keyword network, such as emotional intelligence, transformational leadership, and social intelligence, occupy an important position in the literature and are key pillars of theoretical development. These findings suggest that further exploration is needed into the role of emotional intelligence in cross-cultural and interdisciplinary contexts, especially its application in educational leadership and its impact on teaching outcomes.

3.7 Keyword Burst

To identify particularly prominent research directions and hotspots in the period from 2001 to 2024, the Burstness function of CiteSpace software was used to mine keywords and identify those that were frequently cited in specific time periods. The parameter γ[0,1] was set to 0.4, resulting in a total of 22 burst terms, as shown in Figure 5.

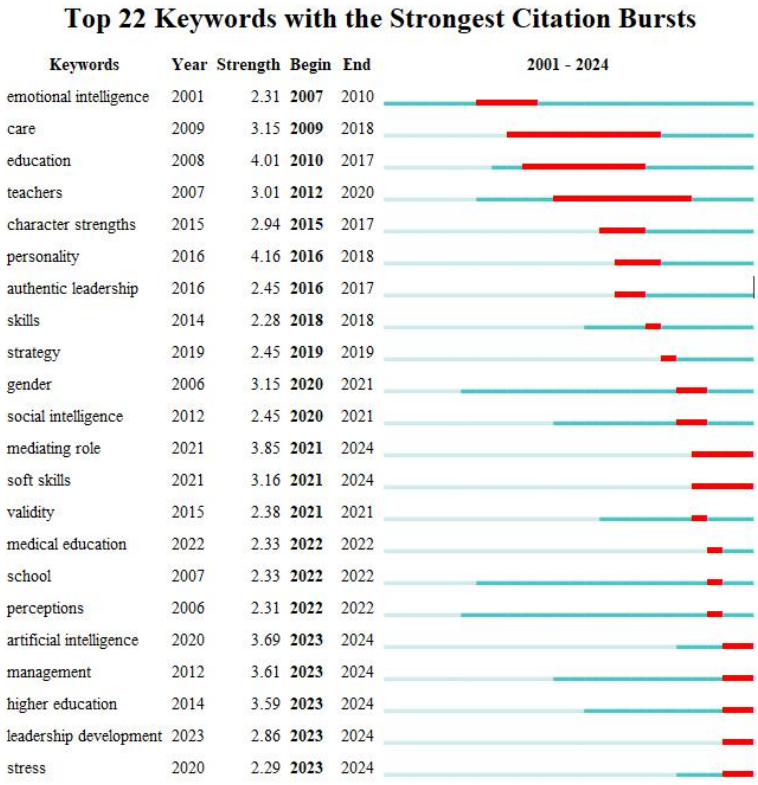

Figure 5: Burst Term Visualization Map

Emotional intelligence became a research hotspot between 2007 and 2010, likely focusing on its applications in education, leadership, and individual performance. This phase marked the first time emotional intelligence became the focal point in academic research, establishing its significant position in the fields of psychology and education.The high burst intensity of education between 2010 and 2017 (3.87) suggests that related research may have expanded to broader fields such as education system reforms and teacher-student relationships. The continuous bursts of teacher between 2012 and 2020 indicate a deepening of research into the relationship between emotional intelligence and teachers' teaching practices, job satisfaction, and career development. Innovation became a significant theme after 2022, possibly related to educational technology innovations and digital learning in the post-pandemic era.

3.8 Keyword Timeline

To gain a deeper understanding of the changes, development trajectory, current status, and future trends in the research on the relationship between emotional intelligence and teacher leadership, the Timeline function of CiteSpace software was used to generate a visual keyword timeline, as shown in Figure 6. The timeline arranges the 8 major clusters of keywords according to time, allowing a clear view of the development of each research direction within the discipline.

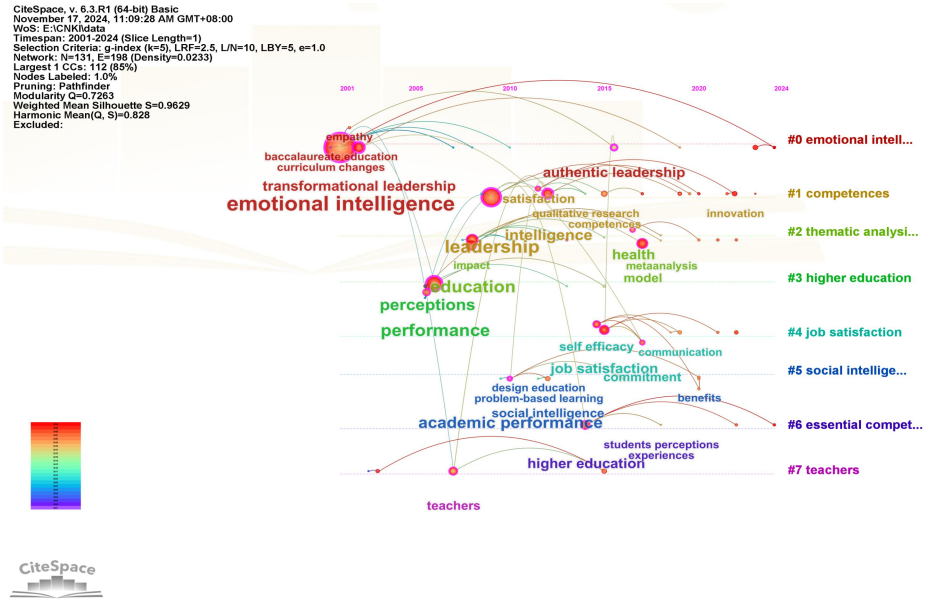

Figure 6: Keyword Timeline Visualization Map

From the timeline, the research on the relationship between emotional intelligence and teacher leadership has generally gone through three stages. The early exploration period (2007–2010): Emotional intelligence began to attract attention as an independent research topic. The expansion period (2010–2020): Focused on the application of emotional intelligence in education, academic performance, teacher management, and leadership. The recent peak period (2021–2024): Soft skills, mediating effects, and innovation became new research hotspots, especially in the cross-disciplinary areas of education and the workplace. This indicates that research on emotional intelligence has gradually evolved from basic theory to practical application, especially demonstrating continuous research value in education and leadership.

4 Conclusion

To comprehensively understand the progress and emerging trends in the study of emotional intelligence and teacher leadership, it is crucial to analyze the global research landscape over the past two decades. By employing bibliometric methods and visual analysis tools like CiteSpace,

we can identify significant developmental stages, current hotspots, and future research directions in this field.The main findings are as follows:

1．Overall, research on the impact of university teachers' emotional intelligence on teacher leadership over the past 20 years can be divided into three main stages: 2004–2010 as the theory construction stage, where research mainly focused on the theoretical connection between emotional intelligence and leadership, exploring the basic role of emotional intelligence in education and the preliminary definition of teacher leadership; 2011–2015 as the mechanism exploration stage, where the research focus shifted to the influence mechanism of emotional intelligence on specific dimensions of teacher leadership, such as transformational leadership and distributed leadership; and 2016 to the present as the application deepening stage, where research began to combine the context of higher education reform, focusing on the role of emotional intelligence in teacher career development, educational change, and team collaboration, showing a trend of balancing theory and practice.

2．Through visual analysis, it was found that recent research hotspots mainly focus on the role of emotional intelligence in teacher leadership dimensions, the emotional regulation role in teacher team collaboration, and the relationship between teacher burnout and emotional intelligence. In addition, emotional intelligence shows high research potential in areas such as teacher leadership adaptability in higher education management and cultural diversity contexts, as well as leadership enhancement in digital education scenarios. However, research on emotional intelligence in enhancing self-efficacy among university teachers, improving student learning outcomes, and promoting educational equity is still in the preliminary stage, and there has yet to be broad consensus among scholars.

3．Based on research trends, future research in this field may focus on: the promoting effect of emotional intelligence on the cross-cultural adaptability of university teacher leadership, optimization of university teacher leadership development models, and the practical application of emotional intelligence in the context of educational digital transformation. In addition, the long-term relationship between emotional intelligence and university teachers' mental health, job satisfaction, and leadership performance will become a continuing hotspot. Future research can strengthen the diversification of theoretical models, explore specific pathways for emotional intelligence in higher education leadership reform, and propose innovative interventions and development strategies from a multidisciplinary perspective.

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