A Bibliometric Review of Teachers' Motivating Style Studies in China (1983-2023)

Wu Lin[1], Qin Xia[2]

[1,2]Hubei University of Technology, Wu Han, 430068, China
[1]29884365@qq.com, [2]2575673973@qq.com

Abstract: *Teachers' motivating style constitutes a pivotal factor in the sphere of students' learning and has been the subject of extensive research endeavors. With the objective of unraveling the research hotspots and prognosticating the forthcoming research trends therein, this present paper avails itself of the bibliometrics visualization analysis software CiteSpace-6.2. R6 and adopts CNKI as the data source for the purpose of conducting an in-depth analysis of the literature pertaining to teachers' motivating style published in China within the time frame of 1983-2023. The bibliometric outcomes divulged that over the past four decades, a plurality of academic collaborations centered around teachers' motivating style have been instituted among Chinese scholars. The analyses of citation information manifested that learning motivation, motivation enhancing strategy, teaching strategy, and teacher autonomy support emerged as the preponderantly concerned topics. Besides, self-determination theory, basic psychological needs, academic emotion and learning engagement were the research trends in recent years. These research findings are anticipated to proffer profound and illuminating insights to educational researchers and practitioners, thereby facilitating the efficacious augmentation of students' learning from the vantage point of teachers' motivating style.*

Keywords: Teachers' motivating style, Research hotspots, Research trends, Bibliometrics, CiteSpace.

1. Introduction

Intrinsic motivation is of central importance in education [1], [2]. Students with intrinsic motivation usually show a sincere interest in the subject, actively participate in discussions, and willingly devote time and effort to their learning tasks [3]- [5]. Teachers' motivating style is one of the primary factors influencing students' learning motivations [6], [7].

In the field of teaching practice, teachers may utilize various strategies and methods to stimulate students' learning motivation and enthusiasm, which precisely reflects their different motivating style. Teachers' motivating style refers to the incentive strategies that teachers purposefully and habitually employ to arouse and maintain students' intrinsic learning motivation during the instructional process [8]. Autonomy-supportive and controlling are two types of motivating style identified by Reeve [9], [10] and have been used in most related studies. An autonomy-supportive teaching style is defined as having an interpersonal tone that values, nurtures, and activates students' intrinsic motivational resources. This can be manifested through teaching behaviors such as taking students' perspectives, acknowledging and accepting students' expressions of negative emotions, and providing explanations to students regarding learning arrangements and various tasks [9]- [11]. On the other hand, the controlling style is characterized by an interpersonal tone of pressure that requires students to think, feel, perform, and behave in a teacher-determined way. Controlling instructional behaviors usually manifest as directives, commands, pressuring language, or the offering of extrinsic rewards/punishments for desired/unwanted student behaviors [9], [10].

Upon a preliminary review of the relevant literature, it becomes evident that Chinese scholars initiated their focus on teachers' motivating style in the early 1980s. In the current international research panorama concerning teachers' motivating style, the contributions made by Chinese scholars are not only prominent but also highly significant. Their assiduous endeavors have augmented the diversity of research findings and instilled novel impetus into the amelioration of global educational quality. With the aim of facilitating international scholars and education practitioners to comprehensively understand the research status and trend of teachers' motivating style and enhancing the practical application of related research outcomes in education, this paper carried out an exhaustive literature review of teachers' motivating style since its emergence in the Chinese academic community.

2. Methods

CiteSpace is a tool that was developed for visualizing patterns and trends in scientific literature by Prof. Chaomei Chen from Drexel University (USA) in 2003 [12]. It possesses the particular and significant function of mapping the dynamic reference co-citations network, by integrating the citations burst detecting technique [13], turning points identification method, network clustering approach and clusters labelling strategies [14].

This paper collects and organizes all the relevant studies on teachers' motivating style from China National Knowledge Internet (CNKI). With respect to the research theme, the subject words for the search in CNKI were "Teachers' motivating style", "Motivation", "Teacher Autonomy Support", and "Teacher Control", and the time range was ultimately determined to be from 1983 to 2023. Based on the aforementioned conditions, a manual screening was carried out on the search results to eliminate the irrelevant papers.

Table 1 presents the principal information regarding the literature on teachers' motivating style. Over the course of the past 40 years, a total of 1,844 pertinent papers concerning teachers' motivating style have been published, with an average annual publication rate of 46. Eventually, all of these valid documents were retained to serve as the bibliometric

data source for this particular study.

Table 1: Main information about data

Description	Results
Timespan	1983.1.1-2023.12.31
Documents	1,844
Authors	2,211
Institutions	1,607
Sources	716
STATISTICS OF FIELDS	
AB	1,772 (96.09544%)
DOI	459 (24.89154%)
DE	1,620 (87.85249%)
DOCUMENT TYPES	
article	1,450
dissertation	394

3. Results and Discussion

3.1 Publication Status of Teachers' Motivating Style
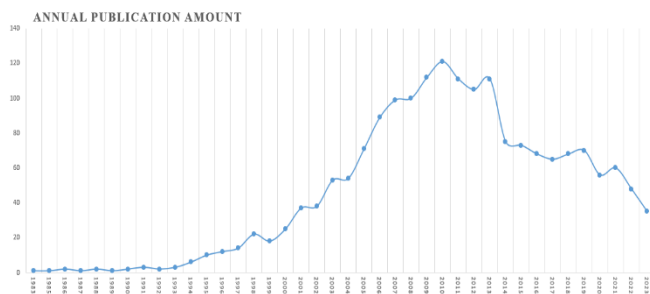
3.1.1 Annual publication amount

Figure 1: Annual Publication Amount (1983-2023)

Figure 1 illustrates the annual publication volume of literature on teachers' motivating style. It is apparent that there has been a continuously ascending trend in the incorporation of teachers' motivating style literature within the CNKI database since 1983. Zheng Qigong [15] released an article titled "Let Students Enter Learning with Interest: Stimulating Students' Learning Interest and Motivation" in the Journal of Educational Development, which explored the approaches adopted by teachers to arouse students' learning interest. Nevertheless, during that period, scholars had not yet formally demarcated a specific domain related to teachers' motivating style. It was not until 2002 that this concept was systematically defined and investigated under the framework of self-determination theory [8]. Since then, teachers' motivating style, as a formally designated field name, has emerged in the research of numerous scholars, and its profound significance and practical application value are progressively coming to light. As depicted in Figure 1, research on teachers' motivating style in China during the period from 1983 to 1997 was in its nascent stage. The quantity of relevant publications was relatively scant, yet the development was exhibiting a marginally ascending trend. The period spanning from 1998 to 2013 constituted a flourishing stage, with the number of research endeavors surging until 2013. Notably, within this time frame, the volume of publications on teachers' motivating style even peaked at over 120 in 2010. Subsequently, the research enthusiasm entered a relatively stable phase during the ensuing period from 2014 to 2023, with the average annual total publication volume remaining at a relatively high level

of 62, signifying that Chinese scholars' exploration of teachers' motivating style has essentially taken form and gradually entered a consolidation period. Overall, throughout the related studies over the past 40 years, Chinese scholars have been progressively intensifying their focus on the research of teachers' motivating style.

3.1.2 Most relevant authors

Statistics regarding the authors of the literature were also produced with the utilization of the CiteSpace software. Among the 1,844 studies under examination, a total of 2,211 authors were implicated, encompassing both those who published independently and those who were involved in co-authorship. In terms of the publication frequency, four scholars have each published five related papers to date, and six scholars have respectively published three papers. The specific data is presented in Table 2 and Figure 2.

Table 2: Top 10 authors and research affiliations in the number of publications

No.	Authors	Articals	Affiliations
1	Lai Danfeng	5	Beijing Normal University
2	Wu Xinchun	5	Beijing Normal University
3	Wang Zhimin	5	Changzhou Vocational Institute of Textile and Garment
4	Chen Yan	5	China Three Gorges University
5	Yu Jiangling	3	Xi'an International Studies University
6	Zhang Ling	3	Tianjin Normal University
7	Sun Dengyong	3	Wuhan University of Technology
8	Gao Wenyan	3	North China University of Science and Technology
9	Ma Xiaojuan	3	Yingkou Vocational and Technical College
10	Li Tao	3	Changchun Institute of Education

Figure 2: Visual Map of Co-occurrence by Authors

Among these authors, Lai Danfeng and Wu Xinchun from Beijing Normal University, Wang Zhimin from Changzhou Vocational Institute of Textile and Garment, and Chen Yan from China Three Gorges University are the leading four in terms of the number of papers published. Concurrently, Lai Danfeng and Wu Xinchun have a close academic partnership and have jointly authored a total of 5 papers since the beginning of 2010. Their papers retrospectively analyzed the relevant research on teachers' motivating style from 1999 to 2010 in terms of concept connotations, measurement methods, action mechanisms, and influencing factors [16]. Wang Zhimin [17] employed a comprehensive approach integrating questionnaire surveys, classroom observations, and interviews to conduct a study on the practical impact and efficacy of teachers' motivation stimulation strategies from the dual perspectives of both teachers and students. His research outcomes indicated that, in order to arouse students' learning motivation, teachers ought to first formulate scientific and rational teaching objectives and subsequently implement diversified incentive strategies for students at different levels. Chen Hong and Chen Yan [18] from China

Three Gorges University selected left-behind children as the research subjects. Their study demonstrated that teachers' autonomy support exerts an influence on the learning motivation of left-behind children, and that psychological resilience plays a significant mediating role in the relationship between foreign language teachers' autonomy support and the autonomous learning motivation of left-behind children in ethnic minority areas. Overall, Chinese scholars' exploration of teachers' motivating style has basically taken shape, and a stable academic community has emerged. An increasing number of scholars are joining this community and making their unique contributions to the research within this field.

3.1.3 Most relevant affiliations

CiteSpace was utilized to dissect the institutional affiliations associated with the literature. Table 3 presents the top 26 affiliations ranked by frequency and the year of initial publication. Evidently from the table, the preponderant part of the literature data is sourced from universities, among which are Central China Normal University, Nanjing Normal University, Shandong Normal University, Liaoning Normal University, Shanghai Normal University, and Shanghai International Studies University. A meager fraction of the literature data stems from middle schools and technical secondary schools, such as Xinxiang Medical College, Xinyang Normal College, and Shanghai No. 15 Middle School. Notwithstanding that the first publication by Central China Normal University was relatively belated in contrast to other affiliations, it secures the leading position among affiliations in terms of publication volume, with a total tally of 26 publications.

Table 3: Most relevant affiliations

Freq.	Affiliation name	Year of first publication
26	Central China Normal University	2005
22	Liaoning Normal University	2001
16	Northeast Normal University	2004
16	Shandong Normal University	2006
16	Nanjing Normal University	2006
16	East China Normal University	2003
14	Shanghai Normal University	2009
12	Fujian Normal University	2001
12	Hunan Normal University	2003
10	Soochow Univesity	2006
10	Hebei Normal University	2006
9	Harbin Normal University	2010
9	Southwest University	2006
9	Shaanxi Normal University	2006
9	Northwest Normal University	2005
8	Inner Mongolia Normal University	2004
7	Yunnan Normal University	2006
7	Capital Normal University	2006
6	Xi'an International Studies University	2013
6	Shenyang Normal University	2014
6	Guangxi Normal University	2015
6	Huaibei Normal University	2016

3.2 Research Topics of Teachers' Motivating Style

3.2.1 Keyword co-occurrence analysis

The keywords in the academic field are dynamic. As the majority of scholars' research is predicated on the discoveries of their predecessors, these keywords are carried forward and further developed over the passage of time [19]. The keywords in literature can be culled and harnessed to encapsulate research objects and core tenets. The frequency of occurrence and co-occurrence of keywords have the capacity to disclose research hotspots and central themes within a particular domain [20]. In this paper, the literature data was exported into CiteSpace-6.2.R6 software, and the "Node

Types" was configured as "Keywords" to extract the keywords for research in the arena of teachers' motivating style in China. The specific situation enumerated in accordance with the frequency of occurrence are presented in Table 4.

Table 4: List of High-frequency Keywords that appear more than 8 (inclusive) times

No.	Freq.	High-frequency keywords	Centrality	Year
1	1,197	Learning Motivation	1.28	1993
2	558	Motivating	0.24	1995
3	344	Student	0.18	1999
4	234	Learning	0.08	1999
5	207	Motivation Enhancing Strategy	0.19	1997
6	182	Teaching	0.06	1993
7	144	Teaching Strategy	0.05	1997
8	118	Teacher Autonomy Support	0.19	2009
9	69	Intrinsic Motivation	0.03	1996
10	66	Learning Interest	0.05	1999
11	51	Influencing Factor	0.02	1998
12	37	Teacher	0.04	2000
13	31	Extrinsic Motivation	0.02	1996
14	23	Learning Engagement	0.02	2014
15	21	Self-determination Theory	0.04	2011
16	16	Learning Achievement	0.03	2005
17	16	Teacher Control	0.01	2004
18	15	Basic Psychological Needs	0.01	2011
19	12	Learning Goals	0.01	2003
20	12	Teaching Quality	0.00	2000
21	12	Teachers' Motivating Style	0.01	2005
22	11	Learning Effect	0.00	2002
23	9	Learning Strategy	0.01	2006
24	9	Autonomous Learning	0.00	2006
25	9	Learning Emotion	0.00	2017
26	8	Mediatory Role	0.01	2007

The frequency of keywords is capable of reflecting the degree of attention. In addition to frequency, CiteSpace can also present the centrality of keywords. The centrality of a node represents a graph-theoretical property that measures the importance of the node's position within a network. A prevalently used metric for centrality is betweenness centrality [21], which computes the fraction of shortest paths in a network that incorporate a specific node. Nodes possessing high betweenness centrality are typically located on paths interconnecting different clusters. This feature has been exploited in community detection algorithms to distinguish and segregate clusters [22]. Ordinarily, the keywords characterized by high frequency and prominent centrality denote the concerns and trends that a large number of researchers jointly explore within a specific time frame, which are precisely the research hotspots and cutting-edge aspects. Table 4 enumerates the keywords with frequencies no less than 8. The top-positioned keywords are "learning motivation" (centrality 1.28), "motivating" (centrality 0.24), "motivating enhancing strategy" (centrality 0.19), and "teacher autonomy support" (centrality 0.19). These keywords constitute the current research foci and are highly interconnected. It is remarkable that a certain degree of correlation exists between frequency and centrality. For instance, the keyword "learning motivation", which has the highest frequency, also possesses the highest centrality, implying that it has a relatively elevated co-occurrence frequency with other keywords. However, there is not a strictly positive correlation. For instance, as can be observed from the data, teacher autonomy support, which has the eighth-highest keyword frequency, ranks third when ordered according to the centrality strength. This suggests that this keyword serves as a crucial hub within the entire keyword network, playing an essential role in linking and governing other keywords in the domain of related research.

The co-occurrence relationship and centrality of keywords are visually presented in accordance with the size, color, and connection quantity among nodes in the visualization map. The display setting of nodes is configured as "By Freq", and

the frequency threshold is set at 8, meaning that only nodes emerging more than 8 times (inclusive) will be exhibited, thereby generating the visualization map of keyword co-occurrence in the domain of teachers' motivating style in China (as shown in Figure 3). The number of nodes (N) amounts to 1038, and the number of lines (E) reaches 2586. The darker the color of the connecting line between nodes, the stronger the degree of their association.
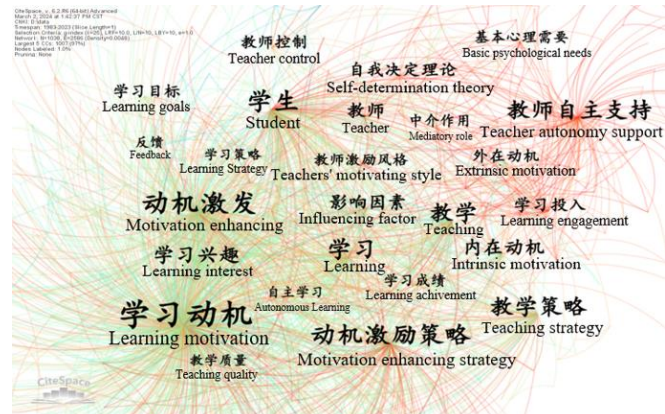

Figure 3: Keyword co-occurrence network

3.2.2 Keyword clustering analysis

The principle underlying keyword clustering analysis is to consider the frequency (co-occurrence rate) of two keywords within the same literature as the analytical subject. Through the application of cluster statistical methods, closely related keywords are grouped together to form clusters. Based on the aforementioned analysis, keyword cluster analysis further elaborates on the research theme of teachers' motivating style. The cluster number exhibits a negative correlation with the quantity of members encompassed within the cluster. In other words, the lower the cluster number, the greater the volume of literature it contains. Owing to spatial limitations, the keyword clustering visualization map only exhibits the first 11 keyword clusters and is presented in Figure 4. These clusters are as follows: #0 learning motivation, #1 motivation enhancing, #2 teacher autonomy support, #3 ARCS model of motivation, #4 motivating, #5 English learning, #6 English teaching, #7 teaching strategy, #8 learning interest, #9 influencing factor and #10 teacher control. Among them, learning motivation, motivation enhancing and teacher autonomy support represent the three most significant hotspots, which further corroborates the close interrelation among these keywords.
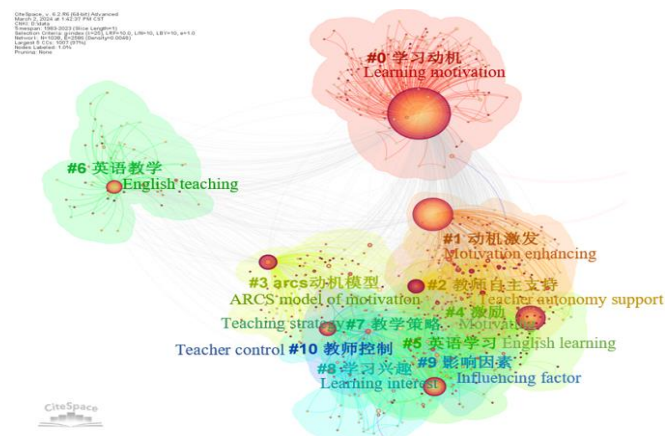

Figure 4: Visualization of Keywords Clustering

3.2.3 Keyword timeline clustering analysis

The keyword clustering unveils the comprehensive research hotspots within the period from 1983 to 2023. In order to further dissect the internal vicissitudes in the popularity of pertinent research topics over the past four decades, the timeline clustering analysis function predicated on the terms furnished by CiteSpace was harnessed to explore the textual information in a more profound and exhaustive manner. From the timeline perspective of keyword clustering depicted in Figure 5, it is patent that the topics of learning motivation and motivation enhancing in the context of teachers' motivating style are presently garnering substantial attention. Conversely, the clusters positioned at the lower echelons, such as influencing factors and teacher control, imply that the associated research is still in its nascent stage yet harbors prodigious potential for prospective advancement.
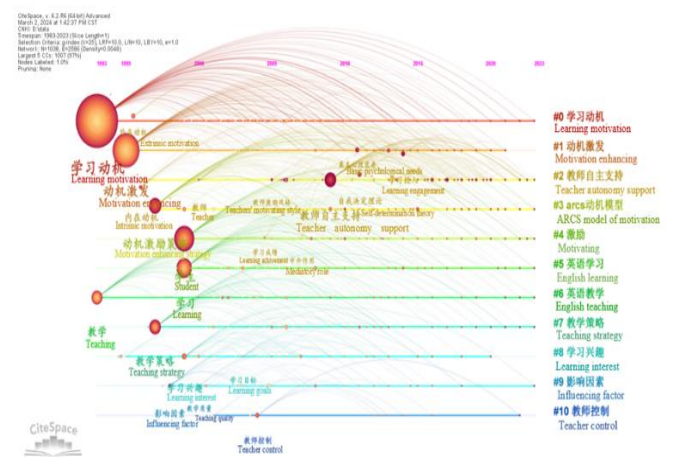

Figure 5: Keyword clustering timeline view

3.3 Future Trends of Studies on Teachers' Motivating Style

Chen [23] posited that, in contradistinction to the employment of high-frequency keywords, the application of emergent keywords for analysis is more conducive to discerning novel trends and alterations in the progression of the subject domain. Through scrutinizing the temporal distribution of word frequency, keywords with a more pronounced rate of frequency variation can be ascertained by means of the "Burst" analysis function within the CiteSpace software, thereby explicating the developmental trajectory and research frontier of this subject. In addition to isolating emerging keywords and their inaugural appearance year (Year), the CiteSpace software also proffers data regarding keyword emergence potency (Strength) as well as its commencement and termination years (Begin, End). The more substantial the emergence strength and the longer the duration, the more pronounced the research interest in these keywords within this time span, thereby more precisely mirroring the developmental trend and research frontier of this field.
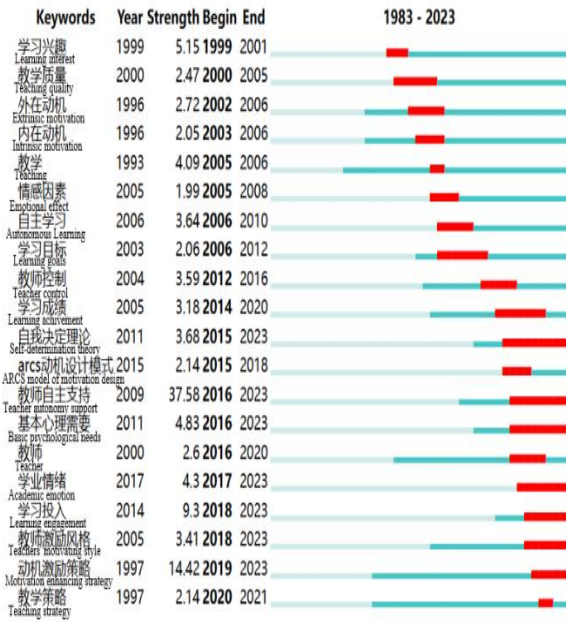
Figure 6: Keyword Surge

As illustrated in Figure 6, 20 keywords with elevated emergence rates during the period from 1983 to 2023 are presented, encompassing learning motivation, teaching quality, extrinsic motivation, and intrinsic motivation, among others. It is worthy of note that teacher autonomy support (2016-2023: 37.58) manifested an extended duration of mutation accompanied by the highest intensity over an eight-year span. Given that teacher autonomy support constitutes a critical facet of teachers' motivating style, the examination of teacher autonomy support demands a comprehensive and in-depth analysis. The second and third most potent keywords were motivation enhancing strategy (strength: 14.42) and learning engagement (strength: 9.3). Niemiec & Ryan [24] contended that teacher support, as a vital constituent of social support, has the capacity to enable students to perceive enhanced autonomy and a stronger sense of belonging, thereby internalizing students' motivational behaviors and rendering them more actively engaged in learning activities. Liu Xiaohong and Guo Jidong [25] selected Chinese foreign language learners as their research subjects and delved into the relationship between teacher's autonomy support and student's engagement in online classroom settings, and the outcomes indicated that teacher's autonomy support was conspicuously correlated with student's engagement. Remarkably, both teacher autonomy support (2016-2023) and basic psychological needs (2016-2023) display comparable commencement times for the completion of mutation, thereby intimating their emergence within corresponding epochs in conjunction with other nascent research hotspots such as academic emotion (2017-2023) and learning engagement (2018-2023). Additionally, the outcomes of data analysis denote that self-determination theory, basic psychological needs, academic emotion, study engagement, and motivating strategy constitute emerging hotspots in contemporary research. The research timeframe extends from 2015 to 2023, accompanied by relatively elevated values (strength ranging from 3.41 to 37.58) of research intensity, which signifies that the research enthusiasm of Chinese scholars regarding teachers' motivating style has been persistent.

4. Conclusions

This paper, with the CNKI serving as the database, carried out a scientometric review of the domestic studies in China on teachers' motivating style over the past four decades (1983-2023). CiteSpace 6.2.R6 was employed for the visual analysis of related studies. The research findings reveal that the majority of the related authors hail from educational institutions, and relatively stable academic communities have been formed among them due to their shared interest in teachers' motivating style. In terms of research foci, self-determination theory, basic psychological needs, academic emotion, and learning engagement represent the research trends and hotspots in this field in recent years.

On the whole, Chinese scholars have carried out a vast quantity of research on teachers' motivating style with respect to diverse research subjects, such as primary school students [26], [27], secondary school students [28], [29], higher vocational school students [30], [31], college students [29], [32], postgraduates [33], [34], network distance learners [35], [36], deaf students [19], [37], and left-behind students [18], [38]. However, due to the limitations of time, manpower and material resources, the subject samples were relatively limited in scale, which might lead to the conclusions derived from these studies lacking high generalization or representativeness. Furthermore, prior studies encompassed a broad spectrum of research disciplines, including English [32], [39], Mathematics [40], [41], Chinese [42], [43], Physics [44], [45], Physical Education [46], [47] and Chemistry [48], [49]. Finally, the research methods adopted in the extant literature are principally questionnaire [50] or interview-based [17], [51]. Additionally, the preponderance of the reviewed prior empirical studies has been implemented with cross-sectional research designs [52], [53]. Therefore, it is anticipated that forthcoming empirical studies in this field will be carried out with a considerably more comprehensive research design that has the potential to yield both quantitative and qualitative data.

This paper can make significant contributions to the international research domain of teachers' motivating style. Firstly, this review expands the scope of the relevant studies on teachers' motivating style by presenting a rather comprehensive Chinese case. It offers a bibliometric analysis of research on teachers' motivating style based on an extensive examination of the research carried out by Chinese scholars, incorporating information about literature sources, key authors, and emerging hot topics. The literature coverage of this paper spans a period of 40 years, facilitating a comprehensive and in-depth report of the relevant studies on teachers' motivating style over time. Secondly, the present study discloses that the majority of Chinese scholars at present are centering on the impact of teachers' motivating style on students. However, inadequate attention has been devoted to how teachers can foster and develop their appropriate motivating style. Moreover, scant attention has been given to the individual factors that influence the outcomes of autonomy supportive teaching from a qualitative perspective. In addition, there is a paucity of studies regarding the structure type of motivating style. Relevant research has

demonstrated that the impact of structure on students' learning motivation is equally significant and essential [54]. The elements that constitute a stimulating learning environment vary considerably for students from different cultural backgrounds. For instance, certain studies have ascertained that when teachers exhibit the same controlling behavior, Chinese students' perception of control is lower than that of American students, while their motivation level is higher [55]. In comparison with Western individualist culture, Chinese collective culture has a tendency to emphasize students' deference towards teachers, and students are more prone to passively adhere to teachers' viewpoints. In this regard, research on teachers' motivating style within the context of Chinese culture is required to effectively differentiate between structure and control, thereby enabling the organic integration of autonomy support and structure in a manner that maximizes their respective positive motivational effects [56]. Research carried out from these perspectives is relatively scarce, which calls for considerably more efforts by domestic scholars to explore.

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