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Trends in Kindergarten Teachers' Professional Development Research: A Comparative Bibliometric Analysis of China and Global Contexts (2015–2025)

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Abstract. Kindergarten teachers play a critical role in enhancing early childhood education (ECE), as their professional competence impacts children's learning, educational equity and classroom quality. Despite the increasing academic focus on the professional development of kindergarten teachers, systematic comparative studies across China and other international context remain limited. This study presents a comparative bibliometric analysis of Kindergarten Teachers' Professional Development (KTPD) research in China and global contexts from 2015 to 2025, using the Web of Science (WoS) Core Collection and CiteSpace. A

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systematic search identified 94 peer-reviewed publications from China and 712 from global context, with the terms: ("kindergarten teacher*" OR "preschool teacher*" OR "early childhood teacher*" OR "early childhood educator*") AND ("professional development" OR "professional learning" OR "continuing professional development" OR "professional growth" OR "in-service training"). Analyses of publication trends, keyword co-occurrences, thematic clusters, and temporal evolution revealed research hotspots. Chinese studies focus on mechanisms, teacher beliefs, classroom interaction, and digital competencies, whereas international studies emphasize evidence-based interventions, instructional coaching, child outcomes, and technology integration. Both contexts highlight teacher well-being and sustainable professional growth. The results call for it to be necessary to transform the framework of professional development and advocate inclusive, collaborative, and long-term strategies to cultivate a high-quality and stable teacher workforce.

Keywords: Early Childhood Education; basic education; Kindergarten Teachers; Professional Development; Comparative Study

1. Introduction

The worldwide modernization and digitization process of education that has been carried out puts emphasis on the fact that ECE is "the root of all education" and "the core of the nation's education system" (UNESCO, 2015). The research shows that there are significant long-term impacts of children's learning and development in the early years of life on their personal physical and mental health (Phillips et al., 2020; Taddese et al., 2025). Moreover, these early experiences directly affect the accumulation of a country's human capital and thus influence the social cohesion and sustainable economic growth of the country in the future (Arthi et al., 2024; Attanasio et al., 2022).

Therefore, improving the quality of ECE has become a major objective of educational governance in the world. The professional competence of ECE educators is recognized as the pivotal factor determining educational quality, making their professional development a central focus of global educational policy and research (Melhuish et al., 2016). Kindergarten teachers' professional competence can be used to improve the quality of education, and it can also affect students' learning outcomes, classroom quality, and education fairness (Sandilos et al., 2018; Wu et al., 2018). As more and more nations have expanded their investments in ECE, there has been a large amount of research on teachers' professional growth. However, there is still a great deal of variation across nationalities in terms of research focus, development pathway, and contextual issues.

As a centrally coordinated ECE infrastructure of unprecedented scale, China represents a critical comparative case, particularly as its rapid policy evolution and unique cultural-institutional context intersect. In this setting, the deepening of ECE reform in the new era has provided a solid institutional guarantee for professional teacher development. With significant policy documents like

the Kindergarten Teacher Professional Standards (Ministry of Education of the People's Republic of China [MoE], 2012) and the Preschool Education Law of the People's Republic of China (MoE, 2025). Under the guidance of policy, the rapid growth of the teaching staff and the upgrading of the kindergarten governance structure have raised the requirements for kindergarten teachers. Especially, the implementation of the Second Three-Year Action Plan (MoE, 2014) marked a transformative shift. A series of National Teacher Training Programs (NTTP) has significantly accelerated the professionalization of the kindergarten teachers. With the deepening of China's education modernization, the global digital transformation of education, and the developments in the post-pandemic era, preschool education has gradually changed from the traditional "skill training" to other topics (Shorouk et al., 2025; Yang et al., 2024; Xiong et al., 2025). Such as professional identity construction, professional learning communities, emotional labor, mental health, Urban and rural or regional disparities (Jiang et al., 2025; Yang & Rao, 2021; Zhang et al., 2025).

However, although there have been many empirical studies on the professional development of kindergarten teachers. One major gap is the lack of comprehensive bibliometric analyses that systematically contrast the research trajectories and thematic evolutions between the Chinese and global context. Although people who do research in China and international community are worried about similar issues, they have different ways and analyses of data. International studies commonly using longitudinal Design, mixed methods, context-specific analysis, and a policy assessment framework. Chinese studies tend to use documents, questionnaires, and cases more.

Therefore, comparative research can make the development path of global teacher professional development research clear and provide a theoretical and practical basis for improving China's teacher professional development policy and training system. Moreover, a conventional literature review is based on the author's own understanding; there will be a certain failure to uncover the structural characteristics of research cross different countries. Also, without analyses like visualized keyword clustering, collaboration networks, theme evolution, etc. making it is hard to find research hot spots and new trends. Use scientometric tools like CiteSpace to show how knowledge is organized, where research goes, and give new paths for the future.

Therefore, the current study utilizes the WoS Core Collection and CiteSpace to conduct a systematic review and comparison of research on KTPD in China and global contexts from 2015 to 2025. The goal is to synthesize key findings and identify areas that require further research. The specific research objectives of this study are as follows: first, to map publication trends and identify research hotspots based on keyword co-occurrence; second, to analyse the divergence and convergence between Chinese and international paradigms; and finally, to forecast future changes using burst detection and time zone views, thereby providing systematic insights into the field of teacher professional growth.

2. Literature Review

The KTPD is not only an inherent necessity of educational reforms in a country but also one of the important ways to realize the United Nations Sustainable Development Goals (SDGs)(United Nations Department of Economic and Social Affairs, 2015). Within the global scholarly landscape, the professional development is not isolated. The professional growth of kindergarten educators is no longer just about passing on knowledge; instead, it has become a multi-dimensional and dynamic process. This development profoundly influenced by multiple factors such as individual teacher characteristics, work environment, cultural background, and policy support, presenting a complex landscape (Anghelache, 2014; Zhang & You, 2020).

Traditional teacher professional development usually uses one-time, lecture-style intensive training, which has limited effect and is hard to change teachers' daily practice (Sheridan et al., 2009; Tuerah, 2025; van Veen et al., 2012). International research is moving toward a more practice-oriented, reflexive, cooperative and enduring model (Ruming & McFarland, 2022). The collaborative learning model based on practical communities have become more popular (Guerra et al., 2024). A number of studies conclude that Online learning, with its flexibility, accessibility, and cost-effectiveness, has emerged as a key pathway for professional development (Bourke et al., 2024; Bruijns et al., 2022a; Howe et al., 2025). These studies highlight the importance of kindergarten teachers' professional development and explore related promotion strategies. However, most existing literature is cross-sectional, which limits longitudinal analysis. Comprehensive reviews are rare and findings are scattered. Thus, a systematic literature review is appropriate to integrate the knowledge base and identify overall research trends in this field.

As the world's largest early childhood education system, KTPD research in China exhibits a distinct logic. The influence of teachers' internal psychological resources on the quality of instruction has been highly valued in research on Kindergarten Teacher Professional Development (KTPD). Zhang et al. (2025) indicated that the teacher-child relationships act as a mediating factor between rural teachers' psychological capital and their self-efficacy. Additionally, the establishment of Professional Learning Communities (PLCs), which in turn influences teachers' views of whole-child development, depends on principal leadership(Keung et al., 2020). According to Xiong et al.(2025) and Wang et al.(2025) research on AI literacy and Augmented Reality (AR) integration has replaced earlier studies of online social media interactions in the course of digitalization (Liu & Cheng, 2017).

Additionally, studies concentrate on teaching methods and "micro-crises" in particular fields like physical education, STEM, mathematics, and music and movement(Bautista & Ho, 2021; Mullick et al., 2025). In the pursuit of educational equity, China's systemic care and compensatory logic are reflected in the investigation of inclusive education, ethnic minority education, and rural teacher attrition(Nalliah et al., 2025; Ng et al., 2020). The stability of assessment instruments across a range of teacher backgrounds has also been highlighted by research, offering solid quantitative support for later large-scale empirical studies(

Budiman et al., 2025; Deng et al., 2023). However, it is important to note that current Chinese research on KTPD is mostly limited to single cultural backgrounds or specific regions. This reveals a critical research problem: the lack of systematic comparison of publishing trends and research paradigms from a global perspective. Therefore, this study fills this gap by using the WoS Core Collection to conduct a bibliometric and comparative content analysis of recent KTPD literature. It provides a descriptive report on the current state of global research, the evolution of hot topics, and future trends in this field.

3. Methodology

CiteSpace is a scientific literature visualization tool developed by Professor Chaomei Chen of Drexel University. This approach primarily generates knowledge graphs through citation networks and keyword co-occurrence analysis, helping researchers identify academic hotspots, emerging trends, and the evolving pathways of academic development. Most scholars explain the current state of their research field and predict the trends by analyzing the science knowledge graphs. Compared with other bibliometric software such as VOSviewer and HistCite, CiteSpace is particularly suitable for detecting emerging trends and identifying pivotal turning points in a research field through burst detection, timeline visualization, and centrality analysis (Chen, 2006; Markscheffel & Schröter, 2021). Given that this study aims not only to map the knowledge structure of KTPD research but also to compare its evolutionary trajectories between China and global contexts, CiteSpace (Version 6.4 R1) was selected for its strengths in temporal visualization and critical path analysis.

3.1 Data Collection

To maintain constant and high standards for international benchmarking, data for both China and global contexts were collected from the WoS Core Collection. It is a well-known comprehensive database with a large number of scholarly publications. Unlike broader platforms like Scopus or Google Scholar, the WoS Core Collection provides a refined citation architecture. Its selective indexing process focuses on authoritative, highly-cited literature, which is essential for identifying the most significant trends in the KTPD field (Levine-Clark & Gil, 2021).

3.2 Data Screening

To ensure the accuracy and reliability of the dataset, this study implemented a systematic screening process that followed the PRISMA 2020 guidelines (Figure 1). First, CiteSpace's built-in deduplication function to did data deduplication and collation. Then, the authors' names and institutions were standardized, the keywords were standardized in format, and the abstracts and keywords were manually read to confirm research relevance. The initial records showed remarkable thematic alignment with the KTPD field, especially considering the highly refined search strings used in the WoS Core Collection. Therefore, the core dataset was kept in its entirety to minimize subjective selection bias and preserve the maximum breadth of the global research evolution. This method offers a solid and thorough basis for the mapping of knowledge domains that follows.

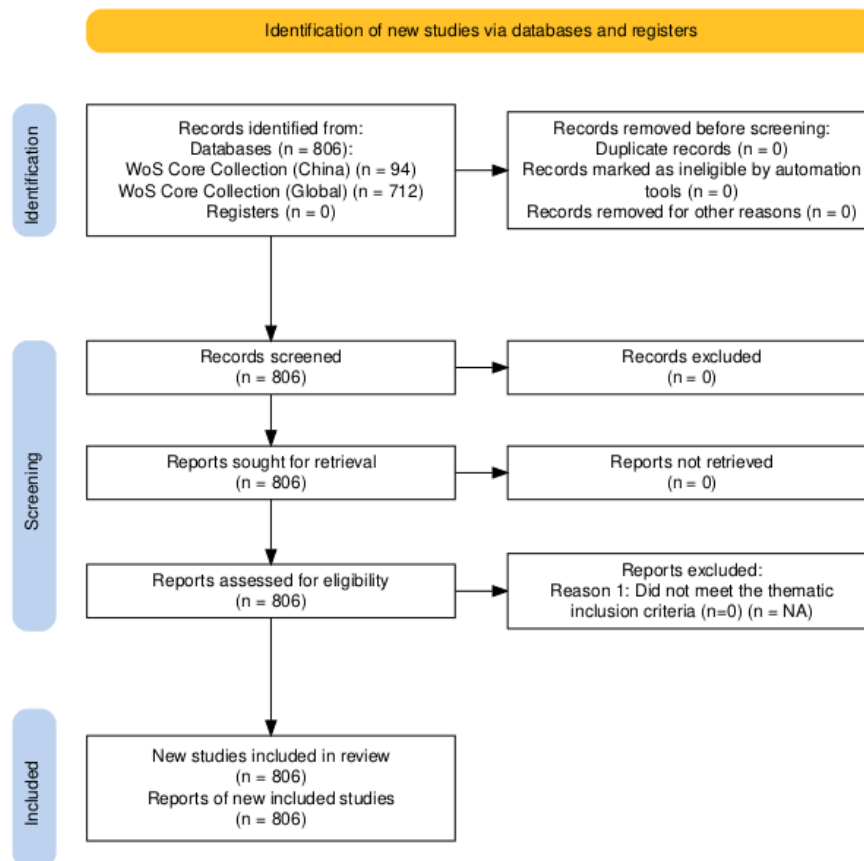


Figure 2: PRISMA flowchart of study selection

3.3 Data Analysis

This study employs bibliometric techniques to analyse current status, prominent trends, and relationships in literature. It takes five bibliometric techniques. First, an annual publication analysis was made to get the publication tendency of KTPD research between China and global context. Then, keyword co-occurrence analysis was used to find the main ideas in KTPD research from different countries and to show how these ideas are related to each other.

Next, the keyword clustering map clusters high-frequency co-occurring terms into theme clusters, and the theme can be visually presented as a knowledge structure, research hotspots, and thematic distribution of the field. Based on this, the study further integrates keyword burst analysis and time zone view analysis to examine the temporal evolution of research on KTPD. Using these two methods together makes it possible to find important turning points and areas of potential growth in the field. This will give us a lot of evidence to know how research is done what new things will happen and where it will go in the future.

However, it should be noted that although CiteSpace software enables macro-level visual analysis of research fields, its automated data processing mode makes it difficult to deeply explore the content differences between literature and capture unique academic insights in specific research context. In view of this, on the basis of quantitative analysis, this study further emphasizes the necessity of manual in-

depth reading and comparative analysis, to make up for the limitations of tool-based analysis and enhance the depth and reliability of research conclusions.

3.4 Search String

On December 11, 2025, we conducted an exhaustive exploration of the WoS Core Collection database with the "TOPIC" search field to identify relevant titles, abstracts, and keywords. The retrieval period was restricted to the years 2015–2025 (specifically from January 1, 2015, to December 1, 2025). To enhance the comprehensiveness of the search, we selected keywords related to KTPD, guided by methodological insights from previous bibliometric studies. Boolean operators (e.g., "OR", "AND") and wildcard symbols (e.g., "Teacher*") were used to ensure a broad yet precise dataset. The detailed search parameters and criteria are summarized in Table 1.

To ensure data consistency and enhance international comparability, this study limits its analysis to English-language literature, while recognizing the value of research published in other languages. Future studies could include multilingual sources for more regional perspectives and developments. After careful data cleaning, bibliographic references which have all the document information as well as cited references were exported to plain text files. The final dataset had 94 valid publications from China and 712 valid publications from global contexts.

Table 1: Search strategy and inclusion criteria

| Parameter | Description |
|--------------------|---|
| Database | Web of Science (WoS) Core Collection |
| Search Field | "TOPIC" (searching in titles, abstracts, and keywords) |
| Search Terms | ("kindergarten teacher*" OR "preschool teacher*" OR "early childhood teacher*" OR "early childhood educator*") AND ("professional development" OR "professional learning" OR "continuing professional development" OR "professional growth" OR "in-service training") |
| Publication window | January 1, 2015, to December 1, 2025 |
| Document Types | Articles and Reviews |
| Language | English |
| Categories | Education Educational Research |

4. Results and Findings

4.1 Publication trend and descriptive analysis

As shown in Figure 3, research output around the world is steadily rising. By analysing the number of related articles and the increase in literature, the publication volume in China is growing quickly and has a clear growth trend, even though it started from a low base.

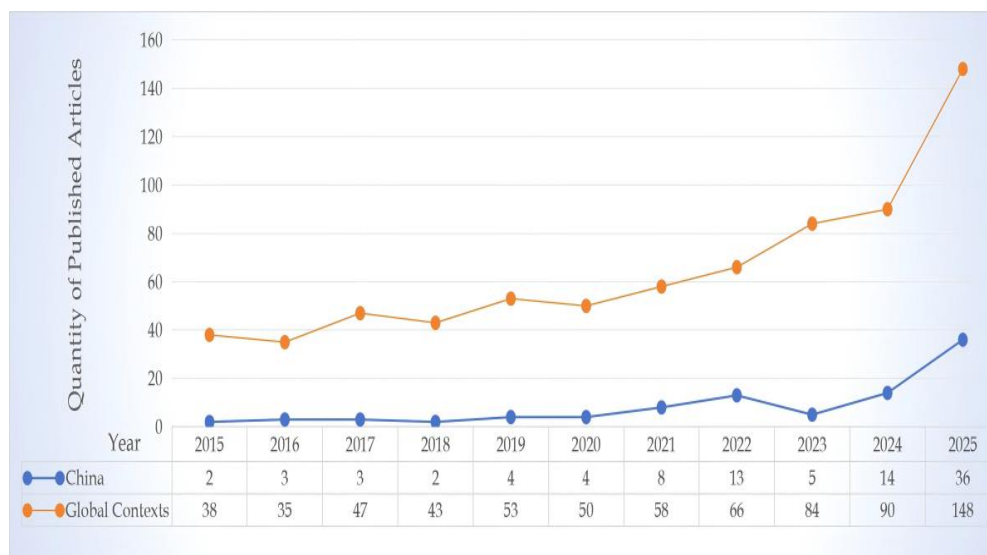


Figure 3: Distribution of research literature on kindergarten teachers' professional development in China and Global Contexts from 2015 to 2025.

From 2015 to 2020, the number of publications in China remained relatively stable, with no more than five articles published each year. In 2015, only 2 articles were published, but by 2025, that number had risen to 36, marking a 17-fold increase. While China's overall publication volume still lags that of global context, its growth rate is much faster. This upward trend became particularly evident after 2020, and 2022 (13 articles) and 2025 (36 articles) were significant. From this growth we can see that the Chinese public is getting increasingly interested in KTPD.

In contrast, there were publications from global contexts that remained at a high level for more than a dozen years. They grew from 38 in 2015 to 148 in 2025. There were only two minor dips, in 2018 and 2020. Growth was steady from 2015 to 2019, but it became more obvious after 2020. The publications went up from 84 to 148 in the period of 2023-2025, increasing trend can be observed. This trend shows that the global academic community is increasingly concerned about the development of early childhood education teachers, which promotes the development of educational equity and early childhood education after the pandemic.

Although there is still a gap in the absolute quantity of publications, both China and global contexts show continuous growth, suggesting that the research on KTPD is increasingly of concern to the international community. With the continuous reform of the policy and the development of research, China is gradually closing the gap and has great academic potential for further development.

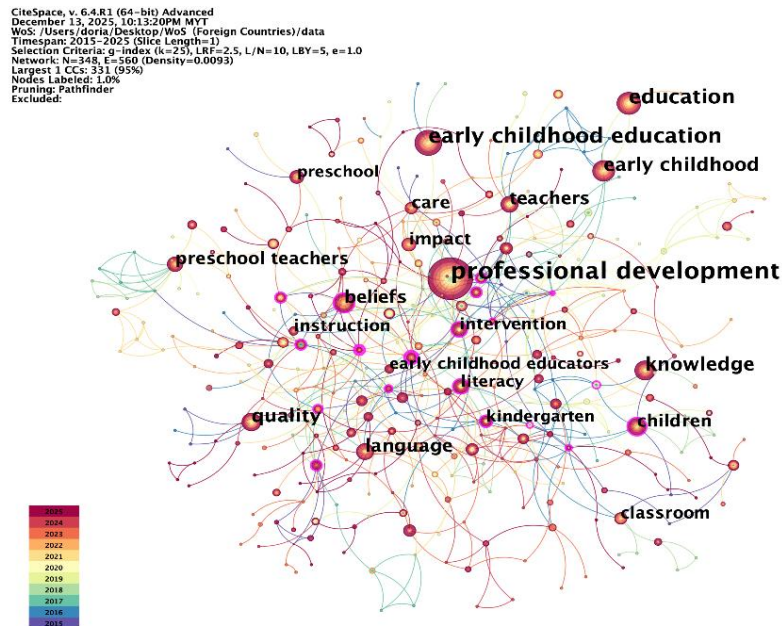


Figure 5: Co-occurrence map of kindergarten teachers' professional development research in Global Contexts

Table 2: Top 10 high-frequency keywords of kindergarten teachers' professional development research in China and Global Contexts

| Rank | China | | | Global Context | | | |
|------|-----------|------------|---------------------------|----------------|-----------|------------|---------------------------|
| | Frequency | centrality | Keywords | Rank | Frequency | centrality | Keywords |
| 1 | 23 | 0.2 | professional development | 1 | 298 | 0.05 | professional development |
| 2 | 23 | 0.58 | education | 2 | 148 | 0.02 | early childhood education |
| 3 | 20 | 0.19 | early childhood education | 3 | 112 | 0.01 | education |
| 4 | 16 | 0.25 | beliefs | 4 | 86 | 0.03 | quality |
| 5 | 14 | 0.32 | impact | 5 | 81 | 0.05 | early childhood |
| 6 | 13 | 0.08 | quality | 6 | 79 | 0.02 | knowledge |
| 7 | 10 | 0.24 | preschool teachers | 7 | 72 | 0.14 | beliefs |
| 8 | 10 | 0.02 | knowledge | 8 | 71 | 0.06 | language |
| 9 | 9 | 0.12 | classroom | 9 | 61 | 0.09 | teachers |
| 10 | 8 | 0.02 | technology | 10 | 59 | 0.11 | children |

Through secondary literature review and comparison of keyword co-occurrence maps and frequency tables across China and Global Context, we identified distinct hot topics. A comparison of the keyword co-occurrence maps between China and global contexts reveal that "professional development", "early childhood education", "quality", and "impact" have emerged as shared focal themes in research on KTPD across context.

In China's research, "education" exhibits the highest betweenness centrality (0.58) and is closely connected with keywords such as "early childhood education", "quality", "impact", and "classroom". This pattern indicates that Chinese studies consistently position the improvement of ECE quality at the heart of the sector's development. On the one hand, these studies emphasize how professional development through training programs, teaching-research activities and institutional support. It can be translated into observable classroom improvement and enhanced educational quality (Siraj & Huang (2024) reported that the research-informed "Leadership for Learning" professional development programme significantly enhanced classroom quality in Chinese preschools.

By establishing school-based professional learning communities (PLC), teachers are enabled to learn from one another, refine instructional practices, improve student learning outcomes, and jointly promote school improvement (Yin et al., 2019). Moreover, Knowledge about the relationship between the qualifications of staff and their perceptions toward PLC practices will contribute to discussions about necessary policies to promote professionalism in ECE context (Ho et al., 2016). Empirical evidence also suggests that teachers' educational attainment is closely associated with the quality of classroom interactions, and that the diversity and frequency of professional development activities indirectly influence children's development through improvements in early childhood education quality (Yang et al., 2024).

On the other hand, Chinese scholars highlight the role of teachers as active agents, emphasizing how their personal attributes shape their professional growth. In particular, "beliefs" (frequency=16; centrality=0.25), along with related nodes such as "self-efficacy", "preservice teachers", "teacher education", and "implementation", highlights a strong research focus on the transition from pre-service preparation to in-service practice (Bruijns et al., 2022b; Hu et al., 2022) and on the application of teachers' beliefs and self-efficacy in educational context (Li & Li, 2019). In addition, technology has entered the top 10 keywords (frequency = 8) and is linked with terms such as "early childhood teachers", suggesting that technology-supported learning and pedagogical innovation have become emerging growth points in Chinese research. Recent studies increasingly focus on the development of kindergarten teachers' digital teaching competencies and literacy, such as the construction of artificial intelligence literacy scales for early childhood teachers (Xiong et al., 2025).

In Global Contexts' research datasets, "professional development" ranks first in keyword (frequency =298) and occupies a central position in the co-occurrence map. This indicates that studies also place strong emphasis on KTPD and have generated a substantial body of related research. Meanwhile, the frequent use of words like "knowledge," "beliefs," "language," "teachers," and "children" shows that research focuses on teachers' professional knowledge, pedagogical beliefs, and their influence on children's learning and development. Among these keywords, "beliefs" exhibits the highest centrality (0.14), suggesting that teachers' beliefs play a critical bridging role in linking professional development, instructional practices, and child development outcomes (Castle et al., 2016; Egert

et al., 2018; Sandilos et al., 2018; Tsangaridou, 2017). Self-efficacy beliefs, enthusiasm and science-specific content knowledge take a positive position in in-service professional development courses (Barenthien et al., 2020). Moreover, several tightly connected clusters emerge around key terms like "instruction", "intervention", "classroom", and "literacy", reflecting a clear emphasis on evidence-based research. Many international studies rely on empirical methods to explore how professional development interventions, such as "instructional coaching" and "targeted training programs", influence the quality of classroom practices, as well as children's language, literacy, and social-emotional development (Edwards & Steed, 2021; Page & Eadie, 2019).

In contrast, different policy backgrounds have shaped the developmental paths of China and global contexts. Global studies place its highest value on offering empirical evidence to protect educational equity, guided by the UNESCO Education 2030 Framework for Action (UNESCO, 2015). Conversely, the central position of "quality" and "classroom" in Chinese research reflects the implementation of strategic initiatives such as the Three-Year Action Plans for Early Childhood Education and the Kindergarten Quality Assessment Guide (MoE, 2022). Chinese research has shifted from "external monitoring to internal self-assessment," viewing teachers' professional agency and internal motivation as the crucial connection between macro-level policy and ECE quality. This makes it easier to move from quantity to quality in early childhood education, giving the global knowledge base a systemic model for significant sector improvement.

4.2.2 Keyword cluster map analysis

After completing the keyword co-occurrence map, we used the automatic clustering function of CiteSpace software, adopted the LLR (Log-Likelihood Ratio) algorithm to conduct cluster analysis on the keywords of research related to KTPD in China and global context, and extracted cluster labels by means of the K (keyword) value. Finally, we obtained the keyword cluster maps of kindergarten teachers' professional development research as shown in Figures 6 and 7.

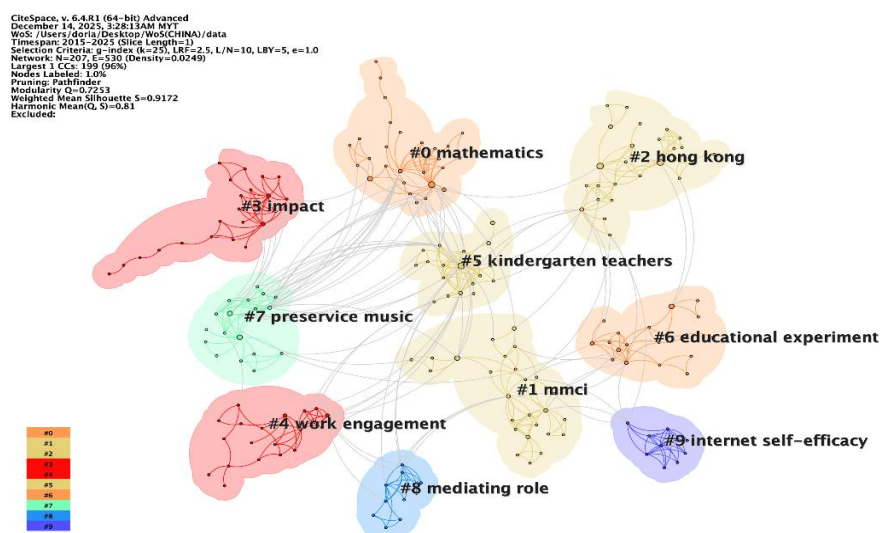


Figure 6: Cluster map of kindergarten teachers' professional development research in China

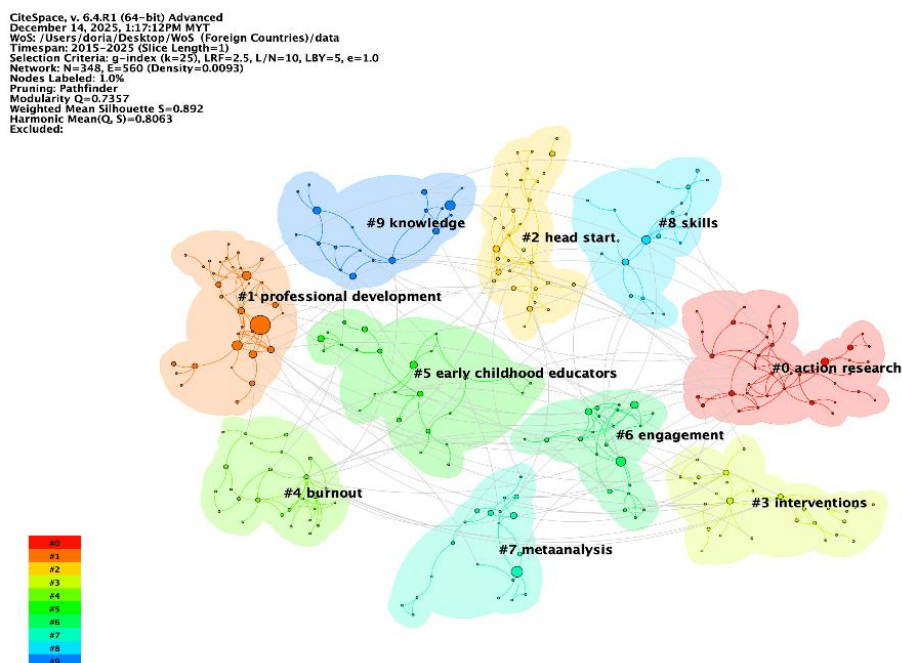


Figure 7: Cluster map of kindergarten teachers' professional development research in Global Contexts

According to Figures 6 and 7, the study on KTPD in China and global contexts have formed 10 closely connected keyword clusters (ranker 0-9). After sorting out the cluster information, Excel was used to sort the specific information of clusters in the research on KTPD in China and global contexts according to cluster names, as shown in Table 3.

Table 3: The cluster information of kindergarten teachers' professional development research in China and Global Contexts

| Cluster ID | China | | | Global Context | | |
|------------|-------|------------|--|----------------|------------|--|
| | Size | Silhouette | Keywords | Size | Silhouette | Keywords |
| 0 | 29 | 0.905 | work engagement; organizational resources; preschool teacher; occupational stigma consciousness kindergarten teachers; cultural diversity; | 39 | 0.896 | action research; culturally relevant pedagogy; teacher learning; professionalism |
| 1 | 26 | 0.812 | non-Chinese speaking; ethnically diverse children educational experiment; | 34 | 0.899 | professional development; language; training; tpack |
| 2 | 26 | 0.984 | conceptual play world; stress-is- enhancing mindset; trends | 32 | 0.909 | head start; aggressive behavior; positive psychology; character strengths |

| | | | | | | |
|---|----|-------|--|----|-------|--|
| 3 | 23 | 0.991 | preservice music; teacher efficacy; creativity; kindergarten teacher mediating role; beliefs about children; | 27 | 0.785 | interventions; early childhood; motor skills; literature review |
| 4 | 20 | 0.876 | teacher-child interactions; Chinese kindergarten internet self-efficacy; self-directed learning readiness; approaches to learning; | 26 | 0.92 | burnout; stress; job satisfaction; student |
| 5 | 19 | 0.864 | professional development work engagement; organizational resources; preschool teacher; occupational stigma consciousness kindergarten teachers; | 25 | 0.951 | early childhood educators; translanguaging; professional learning; physical education |
| 6 | 18 | 0.932 | cultural diversity; non-Chinese speaking; ethnically diverse children educational experiment; | 22 | 0.909 | engagement; literacy; language development; methods |
| 7 | 18 | 0.898 | conceptual play world; stress-is- enhancing mindset; trends | 21 | 0.87 | meta-analysis; implementation; coaching; reflection |
| 8 | 11 | 1 | preservice music; teacher efficacy; creativity; kindergarten teacher | 21 | 0.808 | Skills; children; self-regulation; teacher beliefs |
| 9 | 9 | 0.984 | | 20 | 0.928 | knowledge; practice; teacher education; early care and education |

Through an analysis of relevant literature and clustering information, we found that China's research on KTPD mainly focuses on the following three categories. First, the construction of disciplinary and digital competencies (#0, #2, #9). Second, the coach-style development integrating pre-service and in-service training and the improvement of interaction quality (1, #8). Third, the exploration of teacher engagement, performance, and occupational experiences as shaped by organizational and psychological mechanisms, with an emerging focus on multiculturalism and group differences (#4, #5, #6).

The research hotspots of KTPD in global contexts present a multi-centered structure comprising the following five categories. First, the promotion of practice-based professional learning through action research as a core pathway for constructing teacher professionalism (#0)(Aras, 2024; Baldacchino et al., 2015; Brown & Weber, 2016). Second, international research prioritizes the design of evidence-based interventions (#3) and their systemic evaluation through meta-analysis (#7) to bridge the gap between theoretical design and classroom practice

(Ciesielski & Creaghead, 2020; Muir et al., 2024). Third, child development outcome-oriented thematic professional development links teachers' learning to specific domains such as SEL, language/literacy, translanguaging, and self-regulation (#2, #5, #6, #8). Fourth, teacher well-being and risk-related issues, including burnout, stress, and job satisfaction (#4)(Demirci-Unal & Olgan, 2025). Fifth, knowledge to practice transfer across the pre-service to in-service continuum, with a strong emphasis on technology integration and professional development experiences (e.g., TPACK) (#1, #9).

Comparing the keyword clustering structures and reviewing the associated literature suggest that although both Chinese and international studies link teacher professional development with instructional practice and child outcomes, their underlying orientations differ in several ways. China-based research tends to investigate complex psychological and organizational processes in education. By modelling variables such as teachers' knowledge and beliefs (Hu et al., 2017), professional commitment and work engagement (Leung & Lam, 2025), and organizational climate and teacher morale (Zhou et al., 2025) collectively shape teacher-child interaction quality, work performance, and engagement.

By contrast, international research tends to display a stronger evidence-based and outcome-oriented approach. High-frequency themes such as interventions, video feedback, coaching, meta-analysis, and implementation are more closely related to the idea of evidence-based research (Hemmeter et al., 2021; Schachter et al., 2025). The existing literature increasingly places child development indicators at the center of professional development inquiry and paying consistent attention to areas like behaviour issues, language/literacy, Social-Emotional Learning (SEL) and self-regulation. Arda Tuncdemir (2025) points out that early childhood educators perceive play as a vital and developmentally appropriate vehicle for embedding social-emotional learning (SEL). However, the study notes that its integration is often hindered by systemic barriers like curriculum pressure and insufficient training.

When it comes to the thematic, differences can also be observed. Chinese studies frequently situate professional development within specific social and institutional contexts. For instance, researchers have examined professional development in inclusive education, culturally responsive teaching, and rural education. They aim to foster the competencies needed to navigate multi-ethnic classrooms and resource-constrained rural settings (Lin et al., 2025; Xu et al., 2025). These topics reflect a broader concern with issues of educational equity in the domestic context. In contrast, clustering results from global contexts reveal a distinct modernization of educational content, characterized by a heightened focus on STEM, computational thinking, and literacy (Assaf & Justice, 2025; Yigit-Gencten & Ozen Uyar, 2025). Besides, well-being interventions increasingly test whether improving educators' well-being reduces burnout and enhances related educational processes (Vatou et al., 2025).

Methodological preferences also differ to some extent. Chinese research often relies on macro-level theoretical models and large-scale survey designs to investigate teachers' professional conditions. In contrast, international scholars frequently adopt more detailed and diversified research strategies. In the language and literacy strand, interventions such as interactive book reading are often paired with professional supports and evaluated using classroom observation or video coding to capture changes in children's participation and interaction quality (McMahon-Morin et al., 2025). Research on self-regulation similarly draws on pathway analytic approaches to examine associations among teacher beliefs, instructional strategies, and children's skills (Gardner-Neblett, 2023).

In addition, with the rapid advancement of information technology, studies conducted in both China and global contexts address the theme of "digitalization and technology integration", albeit with differing focal points. Research in China concentrate more on internet self-efficacy, digital and AI literacy for self-directed online learning, often examining technology-enabled in-service learning (e.g., online workshops) and teachers' capacity for digital professional learning (Vatou et al., 2025). In contrast, global contexts more frequently foreground TPACK, technology integration, and professional development experiences, with a common research question examining how technology-integration training influences teachers' actual classroom use of technology. This divergence stems from China's emphasis on teacher readiness and digital empowerment under top-down policy initiatives, while global research prioritizes the pedagogical translation of these technologies into classroom practice.

4.3 Research Trends on Kindergarten Teachers' Professional Development in China and Global Contexts

In this study, CiteSpace software was used to perform a citation burst analysis, which produced a Top 20 keywords with the Strongest Citation Bursts for KTPD research in China and global contexts (Figure 8). By identifying keywords that showed significant frequency changes over different time periods, the main research directions were identified. When combined with the Keyword Time zone Views (Figures 9 and 10), this approach provided a deeper insight into the development and emerging trends in this field.

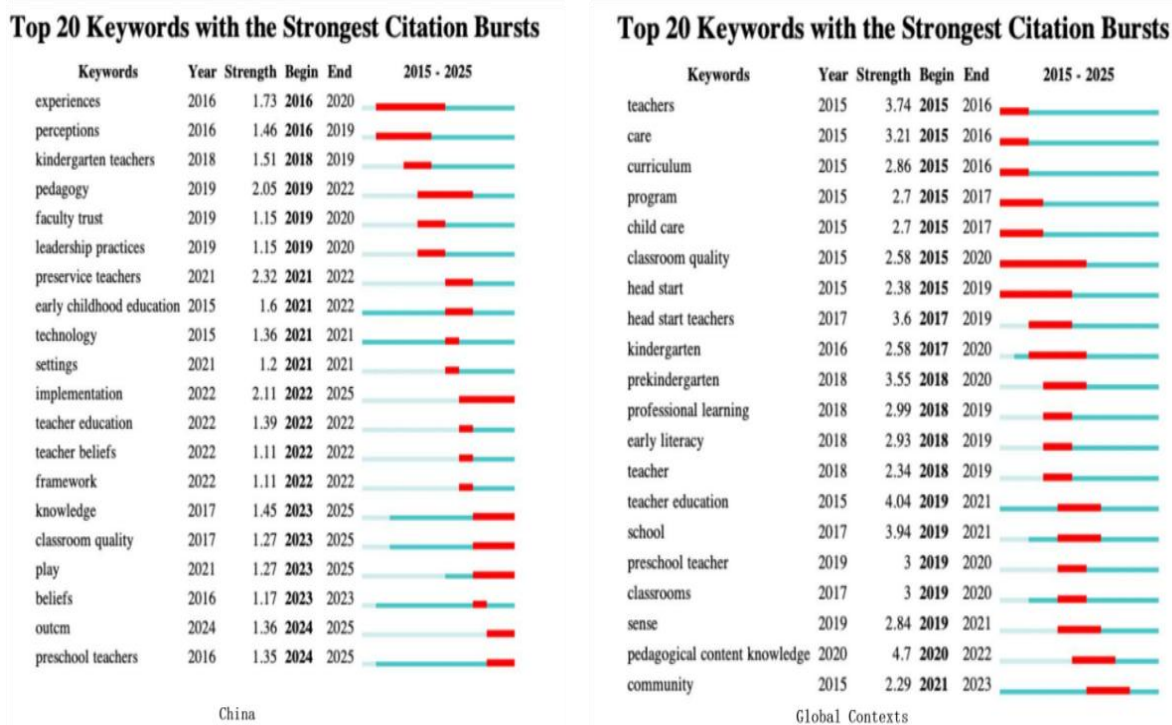


Figure 8: Top 20 Keywords with the Strongest Citation Bursts of kindergarten teachers' professional development in China and Global Contexts

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 WoS: /Users/doria/Desktop/WoS(CHINA)/data
 Timespan: 2015-2025 (Slice Length=1)
 Selection Criteria: g-index (k=25), LRF=2.5, L/N=10, LBY=5, e=1.0
 Network: N=207, E=530 (Density=0.0249)
 Largest CCs: 199 (96%)
 Nodes Labeled: 1.0%
 Pruning: Pathfinder
 Excluded:

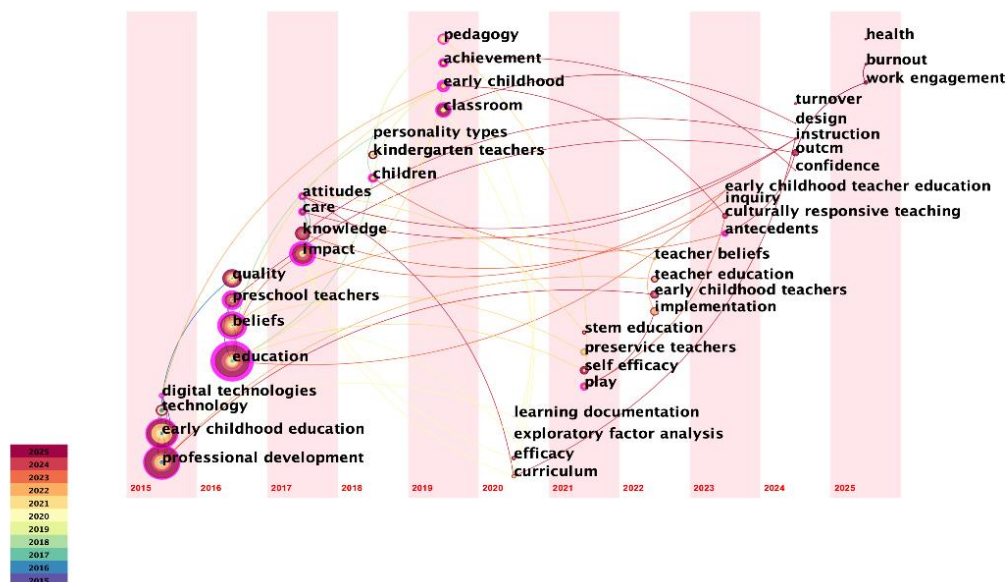


Figure 9: Keyword Timezone View of kindergarten teachers' professional development research in China

CiteSpace, v. 6.4.R1 (64-bit) Advanced
 December 14, 2025, 5:26:02PM MYT
 WoS: /Users/doria/Desktop/WoS (Foreign Countries)/data
 Timespan: 2015-2025 (Slice Length=1)
 Selection Criteria: g-index (k=25), LRF=2.5, L/N=10, LBY=5, e=1.0
 Network: N=348, E=560 (Density=0.0093)
 Largest 1 CCs: 331 (95%)
 Nodes Labeled: 1.0%
 Pruning: Pathfinder
 Excluded:

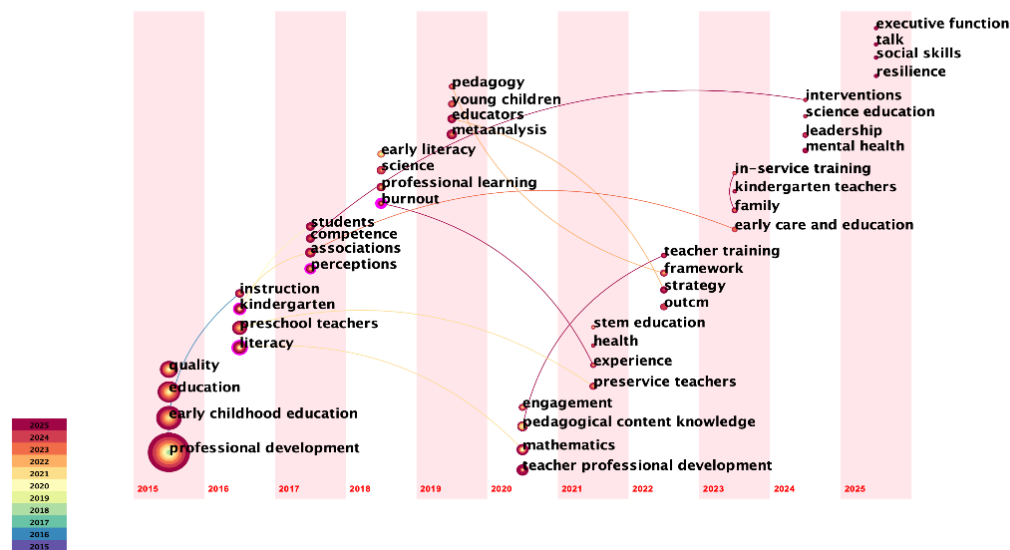


Figure 10: Keyword Timezone View of kindergarten teachers' professional development research in Global Contexts

Comparing with the keyword burst detection map and time zone views of research in both China and global contexts, it is clear that they share a basic framework. This logic consistently links teacher professional development, instructional practice and child development results. But there are significant differences in their temporal development patterns and research orientations. In China, the burst keyword analysis reveals a gradual expansion and diversification of research themes over time, as reflected in the increasing number and variety of burst keywords across different periods.

In the early stage (2015–2017), only a relatively small number of burst keywords appeared, mainly including general terms such as "professional growth", "early childhood education". Then began to expand into "belief", "quality", "preschool teachers", and "technology". Burst terms like "experiences" and "perceptions" indicate that the focus was on teachers' personal experiences and cognition, exploring the role of teacher beliefs in professional development and teaching practice, setting the stage for future mechanism analysis (Chen, 2016; Hu et al., 2017; Yang & Tsai, 2017).

In the mid-phase (2018–2022), the number and diversity of burst keywords increased noticeably. Keywords like "kindergarten teachers", "pedagogy", "children", and "achievement" were frequently seen. Research showed the connection of leadership, professional learning communities and teacher efficacy. Explores kindergarten teachers' beliefs about and practices of learning with a focus on the mediation of teachers' capacity building with designing a curriculum. Then, gradually linking teacher professional development with children development goals (Keung et al., 2020). Between 2021 and 2022, burst terms like

"preservice teachers", "self-efficacy" and "implementation" emerged, indicating research point from "why is it effective" to "how to implement and apply". This phase placed greater focus on the connection between pre-service and in-service training, curriculum reform, and the implementation of practices (Cheung et al., 2022; Luo et al., 2021).

In the later period (2023–2025), new burst keywords such as "knowledge", "classroom quality", "play", and "outcomes" reflect that Chinese research is increasingly focusing on classroom process quality and child development outcomes. Teacher well-being and digital competence became emerging hot topics, with terms like "burnout", "work engagement", and "AI literacy" appearing, indicating that the research agenda is extending towards sustainable teacher development and technological transformation (Leung & Lam, 2025; Wang et al., 2025; Xiong et al., 2025). By contrast, research in global contexts show a somewhat different temporal trajectory. During the early period (2015–2017), high-frequency and burst keywords were mainly included "teachers", "care", "curriculum", "childcare", and "classroom quality". This reflects that research in the initial stage of the project implementation and classroom quality evaluation focused on the development of teachers' professional competence in the early childhood education project (Nasser et al., 2015).

In the middle stage, from 2018 to 2022, research divided into an expansion stage, from 2018 to 2020, and a deepening stage, from 2020 to 2022. In the first phase, burst terms like "professional learning", "early literacy", "prekindergarten", "classrooms", and "preschool teacher" increased significantly, shifting the focus to professional learning formats for teachers and their effects on specific areas of child learning (Lippard et al., 2019). At the same time, terms like "teacher education", "school", and "sense" highlighted the increasing focus on the role of teacher training systems, school culture, and professional identity in professional development (Marinsek & Kovac, 2019). In the second phase, key themes such as "pedagogical content knowledge", "engagement", "STEM education", and "pre-service teachers" indicated a stronger emphasis on discipline-specific professional development and the continuity between pre-service and in-service training. During this period, methods like meta-analysis and systematic reviews became more common (Brunsek et al., 2020; Wan et al., 2021; Yucelyigit, 2021).

In the most recent stage (2023–2025), research increasingly emphasizes on implementation science and child development outcomes. Burst keywords like "interventions" and "in-service training" reflected the growing emphasis on the effectiveness of interventions and their implementation conditions and sustainability (Chow et al., 2024; Watson et al., 2025). At the same time, terms like "executive function", "social skills", "resilience", and "mental health" became more prominent, showing a distinct outcome-oriented feature in global context' research. Additionally, terms like "burnout", "health", "leadership", and "family" pointed to the increasing recognition of teacher well-being and systemic support environments as key factors influencing the success of professional development (Cadima et al., 2025; Vatou et al., 2025).

5. Discussion

The bibliometric profile of KTPD illustrates trends and knowledge sets within the field. Based on the results of bibliometric analysis, it can be found that China and global context's studies on KTPD share certain commonalities in their overall theoretical premise. These studies regard teacher professional development as a key path to improving the quality of teaching practice and promoting children's development (Egert et al., 2018; Melhuish et al., 2016). However, their epistemologies, themes, and methods for constructing evidence all vary immensely.

In China, research is more about the conditions and factors related to the development of teachers. Many studies examine variables such as teachers' professional beliefs, teaching self-efficacy, organizational support, and psychological resources, with particular attention to how these factors relate to teachers' instructional practices and professional growth (Hu et al., 2017; Jiang et al., 2025; Zhang et al., 2025). Within such a body of literature, the teacher belief is often talked about as a vital part of connecting professional learning with classroom practice (Li & Li, 2019).

In contrast, teacher professional development research in a global context has different trajectories, the majority of which are systematically synthesized from program design and implementation evidence to the end evaluation (Brunsek et al., 2020; Schachter et al., 2025). In this light, teacher professional development would be something that works in a way that could be measured. Experimental or quasi-experimental design, instructional guidance, or systematic analysis with meta-analysis to examine the efficacy of these interventions in terms of practice, as well as children's learning (Egert et al., 2018; Hemmeter et al., 2021).

These differences might be due to differences in educational settings and research traditions. Chinese research frequently situates teacher improvement inside broader institutional and social circumstances, including rural schooling, inclusive schooling, and educational equality as well (Ng et al., 2020; Nalliah et al., 2025; Xu et al., 2025). Compared with this, international studies show a greater focus on domain-specific learning areas such as STEM education, early literacy, and computational thinking (Wan et al., 2021; Assaf & Justice, 2025). Despite these differences, recent studies indicate increasing convergence in several emerging topics, particularly teacher well-being and technology integration in professional learning (Cadima et al., 2025; Vatou et al., 2025; Yang et al., 2024).

These findings also provide several implications for policy and educational practice. Building up an evidence-backed and circumstance-responsive teacher professional growth system is still a main point of focus (Sheridan et al., 2009; Van Veen et al., 2012). Improve systematic integration of pre-service and in-service training, promote the formation of professional learning communities in preschool, give priority to and safeguard teachers' professional well-being, incorporate the cultivation of digital literacy into a unified professional standard system, and promote the all-around quality and long-term sustainable

development of preschool teachers' professional growth (Keung et al., 2020; Xiong et al., 2025).

Future research across both China and global contexts should place greater emphasis on theoretical constructions, which is equally important as the practical research direction. In the context of China, KTPD studies can build upon existing mechanism-oriented analyses by expanding intervention research and longitudinal study designs (Hu et al., 2017; Leung & Lam, 2025). This approach makes the causal explanations stronger with some real data and outcome results. Regarding international research, there is a need to incorporate more context-sensitive and mechanism-oriented analytical perspectives, particularly focusing on non-Western or culturally diverse early childhood education settings (Ng et al., 2020). Moreover, the limited number of cross-national comparative studies suggests the need for collaborative research frameworks to examine teacher development models across different institutional and cultural contexts (Cadima et al., 2025).

6. Conclusion

Based on 809 publications indexed by the WoS database, this study provides a systematic survey of the research landscape of KTPD. The results clearly show that the number of publications is consistently rising, with especially quick growth more recently; this indicates that there is a lot more scholarly interest in this topic. This study maps the knowledge structure, research trends, and thematic distribution of KTPD in both Chinese and international academia using bibliometric methods. The findings suggest that both sides conceptualize teacher professional development as a crucial vehicle for improving instructional quality and promoting child development.

However, there are still significant differences in research orientation. Chinese studies focus more on the contextual and psychological precursors of teacher development, while international studies emphasize intervention-oriented frameworks and measurable child development outcomes. In short, this study provides a valuable contribution to literature by providing a systematic taxonomy of the knowledge structure and research evolution of KTPD. By comparing Chinese and international perspectives, it offers critical insights for future theoretical integration, productive cross-cultural dialogue, and the sustainable, evidence-based improvement of global professional development practices.

7. Limitations

Though its contribution was made, it also had some limitations. First, the bibliometrics method focuses on publishing patterns and research trends; but they cannot provide detailed information about the specific social and cultural contexts of teacher development. Second, only data from the WoS database are included, which consist of only English-language publications.

Second, the data were collected only from the WoS database and include only English-language publications. It might exclude some research in other languages or some data in regional databases (such as CNKI), which can result in some

deficiency in the representativeness of the research. Third, the results of clustering depend on certain settings of software tools such as CiteSpace, which can be limited in terms of detail. Finally, it does not measure the actual success of those professional development programs in real classrooms. The next wave of studies should include more data sources and qualitative approaches to gain a better understanding of the practicality of kindergarten teacher professional development.

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Conflict of Interest

No potential conflict of interest was reported by the author(s).

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