Kindergarten Teachers' Self-Efficacy: A Bibliometric Analysis and Literature Review

Jie Yao

Universiti Sains Malaysia School of Educational Studies USM, 11800 Gelugor, Penang, Malaysia
Email: yaojie@xmphdds.cn

Abstract
In recent years, the self-efficacy of kindergarten teachers has garnered significant attention from scholars. To gain a comprehensive understanding of the current research landscape in this area, a review of relevant literature is essential. This study used bibliometric methods to analyze 158 publications on kindergarten teachers' self-efficacy sourced from the Scopus database. Findings reveal a steady increase in research on this topic, with particular focus on teachers' attitudes. Key areas of interest in this field include professional development, job satisfaction, teacher training, pre-service education, and school climate. Emerging themes include the impacts of teacher training, and psychological well-being. Citation analysis identified 27 h-classic publications in this field, with nearly half originating from the United States. These publications primarily emphasize professional development, motivation, school climate, and science teaching methods. This bibliometric analysis offers researchers valuable insights into the current status, key areas, and emerging trends in kindergarten teacher self-efficacy research. It can serve as a reference for future studies, helping researchers understand the field's developmental trajectory and propose effective strategies to strengthen kindergarten teachers' self-efficacy.
Keywords: Kindergarten Teachers, Self-Efficacy, H-Classics Publications, Bibliometric Review

Introduction
The concept of self-efficacy derives from the social cognitive theory which proposed that efficacy beliefs play a central role in human motivation, thought, and action (Bandura, 1997, 2001). Individuals use self-efficacy as a guide to organize and execute the courses of their actions to achieve prospective goals (Yin et al., 2022). According to social cognitive theory, self-efficacy is considered the central mechanism of human agency for handling environmental challenges, and it plays a significant role in shaping individuals' motivation, thinking patterns, emotional states, and behaviors (Bandura, 1986, 1997, 2006). Self-efficacy is a psychological concept concerning an individual's belief in their ability to influence events in their own life (Duong et al., 2024). Self-efficacy is defined as a person's belief or confidence in their ability to complete tasks or achieve goals (Farmer et al., 2022). Self-efficacy is regarded as an essential skill for success in both work and life in the 21st century (Lamb et al.,

2017). Due to the awareness of the importance of self-efficacy, there have been many studies on self-efficacy so far, however, these literatures are scattered in different disciplines and journals, which makes it difficult for future researchers to access and utilize these research results.

The concept of self-efficacy has been extensively studied in different fields (Balci et al., 2019; Cansoy et al., 2020), especially in the educational context, has consistently emphasized the important role of self-efficacy beliefs (Mossafaie et al., 2024).In recent decades, interest in the concept of self-efficacy has increased within the field of education, with a primary focus on studying teachers (eg.,Wolstein et al., 2021; Yin et al., 2022), as teachers encounter numerous challenges that demand creativity, resilience, and motivation (Narayanan et al., 2023). According to Fathi et al. (2020), teacher self-efficacy is defined as teachers' confidence in their ability to effectively plan, organize, and carry out essential tasks to meet specific educational objectives. Teacher self-efficacy (TSE) has become a significant factor in evaluating the quality of teachers (Narayanan et al., 2023). Since Tschannen-Moran et al.'s (1998) landmark review on teacher efficacy research, extensive evidence has shown that teachers who possess a high level of self-efficacy are more likely to teach effectively, stay engaged in their work, and experience higher job satisfaction (Yentür, 2023), while also being less susceptible to occupational burnout (Amasha & Assadi, 2024).

In recent years, the significance of teacher self-efficacy in early childhood education (ECE) has also gained recognition (Lipscomb et al., 2022). Due to the particularity of preschool education, kindergarten teachers' self-efficacy deserves attention (Le et al., 2023). Kindergarten teachers serve as role models for children, directly influencing their motivation to learn, personality development, and academic performance (Oppermann et al., 2019). Empirical studies in early childhood education (ECE) settings have consistently highlighted the valuable role of teacher self-efficacy (TSE). These studies show that TSE contributes to high-quality classroom instruction and positive teacher-child interactions (Wolstein et al., 2021), reduces teacher stress and emotional exhaustion (Jeon et al., 2018；Hu et al., 2019), enhances work engagement (Lipscomb et al., 2022) and organizational commitment (Chung, 2019), and supports the effective implementation of play-based learning (Yin et al., 2022). Teachers who possess a high level of self-efficacy are more confident in their ability to foster children's development through their interactions. This confidence leads them to engage in more positive, supportive, and sensitive interactions with their students (Barni et al., 2019). Kindergarten teachers' self-efficacy has an important influence on both teachers and children. However, the research literature on kindergarten teacher self-efficacy remains somewhat dispersed, and the number of related studies has surged in the past five years. There is a need for a systematic and comprehensive review and analysis of the current state of kindergarten teacher self-efficacy research.

There are many methods for conducting literature reviews, and bibliometric analysis is a systematic examination of scientific literature aimed at identifying patterns, trends, and the impact within a specific field (Passas, 2024). Bibliometric analysis is a widely used and robust approach for examining and interpreting large sets of scientific data. This method allows researchers to trace the development of a particular field and to identify emerging areas within it (Donthu et al., 2021). Therefore, researchers can use bibliometric analysis for various purposes, such as identifying emerging trends in article and journal performance, examining

collaboration patterns, analyzing research components, and exploring the intellectual structure of a field within the existing literature (Verma & Gustafsson, 2020; Ragazou et al., 2022). In recent years, bibliometrics has become a trend in academic research (Khan et al., 2021; Donthu et al., 2021), and thorough bibliometric research can offer a solid foundation across all fields (Passas, 2024).

In preparation for the formal research, key search queries used in this study included titles such as "kindergarten or preschool teacher," "self-efficacy or sense of efficacy," and "bibliometric analysis." The search results indicated a lack of existing studies on this topic, highlighting the timeliness and necessity of conducting a bibliometric analysis and literature review on kindergarten teachers' self-efficacy. This study aimed to address the following research questions:

RQ1: What are currently published trends on kindergarten teacher self-efficacy?
RQ2: Which articles have a significant influence on kindergarten teacher self-efficacy ?
RQ3: Which authors have a significant influence on kindergarten teacher self-efficacy?
RQ4: Which themes related to kindergarten teacher self-efficacy are most popular among scholars?
RQ5: What areas involving kindergarten teacher self-efficacy need further research?
RQ6: What are the main research topics of h-classics publications in the field of kindergarten teachers' self-efficacy research?

Methods
This study utilized a bibliometric approach, leveraging the Scopus database to visually present and analyze literature on kindergarten teachers' self-efficacy. The search strategy, depicted in Figure 1, involved the query ((TITLE ("self-efficacy" OR "sense of efficacy") AND TITLE-ABS-KEY ("kindergarten" OR "pre-school" OR "early childhood" AND teacher*)), which, as of November 6, 2024, yielded 158 relevant and representative documents. Data visualization and bibliometric analyses were conducted using VOS viewer and Microsoft Excel to illustrate patterns and trends in the field.
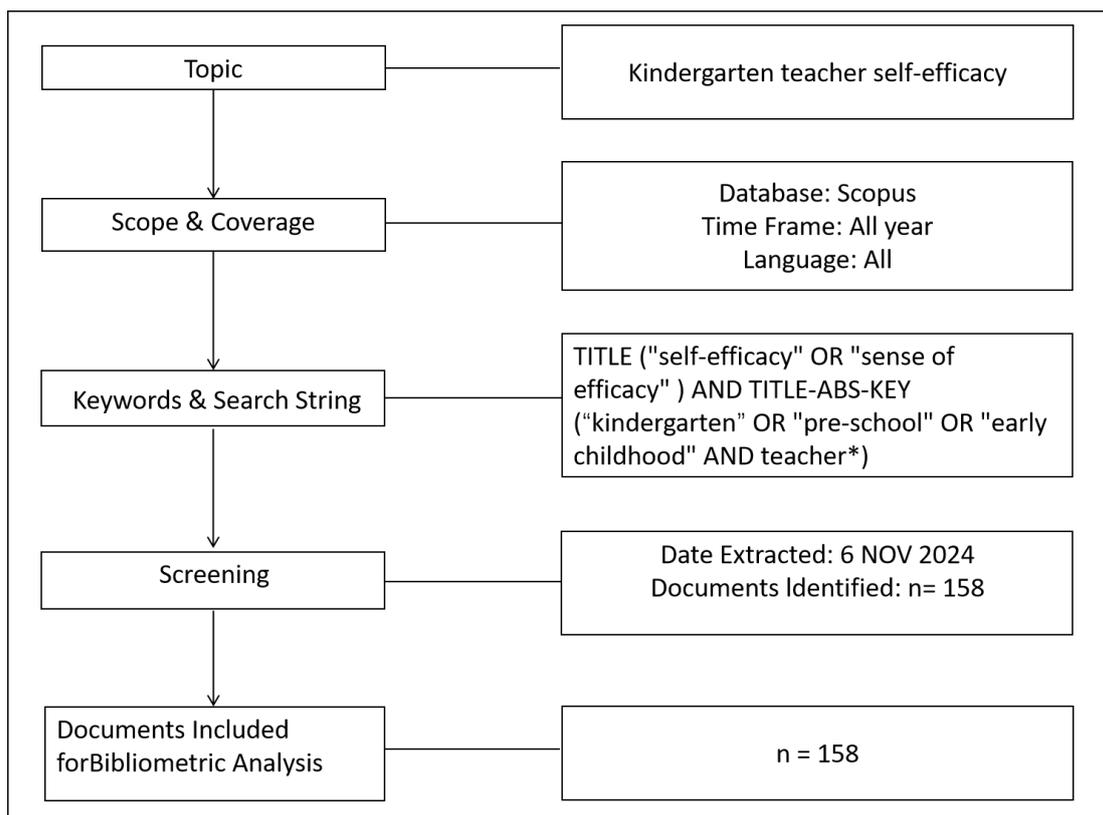
Figure 1. Flowchart of the search methodology (modified from PRISMA).

This study conducted a comprehensive analysis of 158 publications on kindergarten teacher self-efficacy through a literature review. The content was summarized and categorized by publication year, source, abstract, research purpose, and theoretical perspective, enabling an in-depth examination of current trends in kindergarten teacher self-efficacy research. The literature review covered publication years, geographical distribution, and subject areas to illuminate recent research trends in this field. Key authors and influential articles were identified through citation analysis, while co-citation analysis shed light on the foundational concepts of kindergarten teacher self-efficacy research. Bibliographic coupling highlighted significant findings, and an analysis of co-occurring author keywords revealed popular topics and potential future research directions.

This study also conducted a narrative review of h-classics, identifying the most frequently cited works on kindergarten teacher self-efficacy. H-classics are defined as the most cited publications within a field that have received at least *h* citations, reflecting a significant impact in that area (Martinez et al., 2015). In this study, the h-index of the reviewed literature is 27, indicating there are 27 papers with a minimum of 27 citations each. Reviewing h-classics in bibliometric research provides valuable insights into the academic landscape, highlights influential works and contributors, and serves as a reference point for guiding future research directions.

Results and Discussion
Overview of the Publication
Annual and Cumulative Publications
This study analyzes the chronological progression of literature on kindergarten teacher self-efficacy. Data compilation reveals a clear upward trend in publications on this topic within the Scopus database, as shown in Figure 2. Notably, the most significant increase occurred between 2020 and 2024, with a record high of 25 publications in both 2023 and 2024 as of November 6. Citation statistics further highlight that the total number of citations peaked in 2010, reaching 1,293, indicating a high level of interest in kindergarten teacher self-efficacy research during that year (see Figure 2). The earliest article on kindergarten teacher self-efficacy was published in 1998 by Sugawara, Ruder, and Burt from Oregon State University in the Journal of Early Childhood Teacher Education. Titled "Relationships Between Teaching Self-Efficacy, Work Environment Autonomy, and Teacher Competency Among Early Childhood Preservice Teachers" (Sugawara et al., 1998), this foundational study has been cited three times and set the stage for future research, laying the groundwork for new directions in understanding and enhancing self-efficacy among kindergarten teachers.
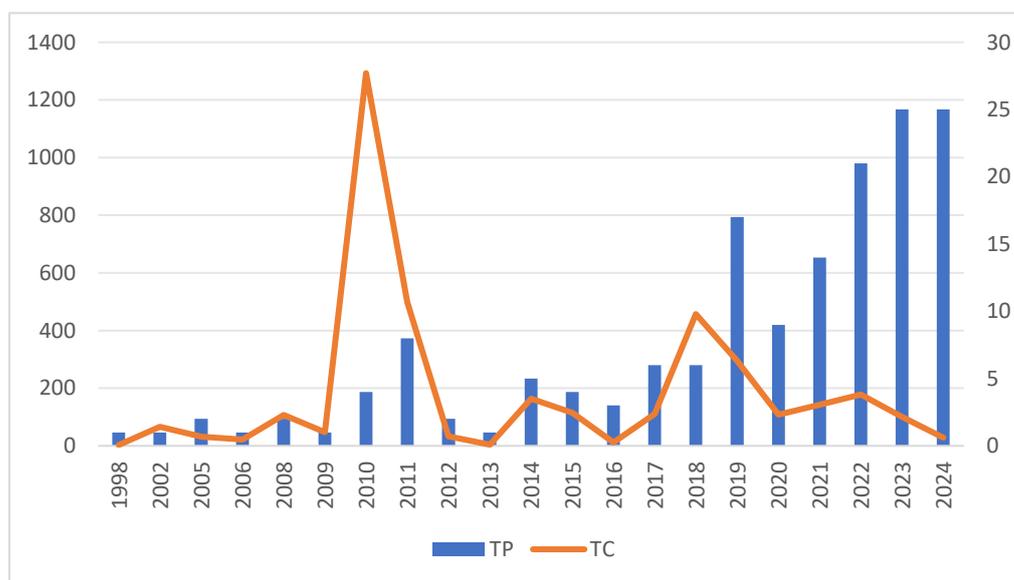

Figure 2. Annual count of publications and citations of kindergarten teacher self-efficacy research.
Notes: TP=total number of publications; TC=total citations.

Country or Territory Contributions and Collaborations
The bibliometric analysis of literature on kindergarten teacher self-efficacy reveals a broad geographical scope, with contributions from scholars across 44 countries and territories. Table 1 highlights the top 10 countries or territories contributing the most to this field. The United States leads with 45 publications (28.5%), followed by Turkey and China with 25 (15.8%) and 14 (8.86%) publications, respectively. Notably, Asian countries or territories represent nearly half of the top contributors, underscoring Asia's significant focus on kindergarten teacher self-efficacy research. Figure 3 provides a visual comparison of publication counts and citation totals from the top 10 contributing countries or territories. Among these, the United States ranks highest in citations, with a total of 2,418, reflecting its substantial influence in this field. Figure 4 displays a citation map, visualizing the contributions and interconnections

of countries or territories in kindergarten teacher self-efficacy research (minimum citation threshold per country = 3).

Table 1
Top 10 countries or territories contributing to the kindergarten teacher self-efficacy research.

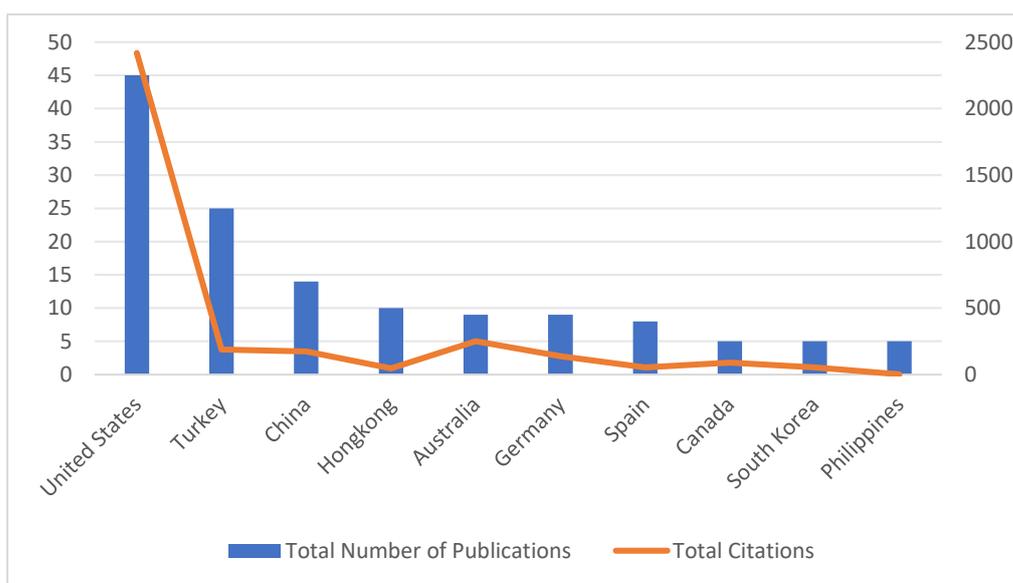| Country or Territory	Total Number of Publications	%	Total Citations	Average Citations Per Publication	Continent
United States	45	28.5%	2418	53.7	North America
Turkey	25	15.8%	189	7.56	Asia
China	14	8.86%	175	12.5	Asia
Hongkong	10	6.33%	46	4.6	Asia
Australia	9	5.7%	251	27.9	Oceania
Germany	9	5.7%	138	15.3	Europe
Spain	8	5.06%	55	6.88	Europe
Canada	5	3.16%	91	18.2	North America
South Korea	5	3.16%	54	10.8	Asia
Philippines	5	3.16%	2	0.4	Asia

Figure 3. Number of publications and citations by the top 10 countries or territories

Figure 4. Visualization map of kindergarten teacher self-efficacy research citations by country or territory.
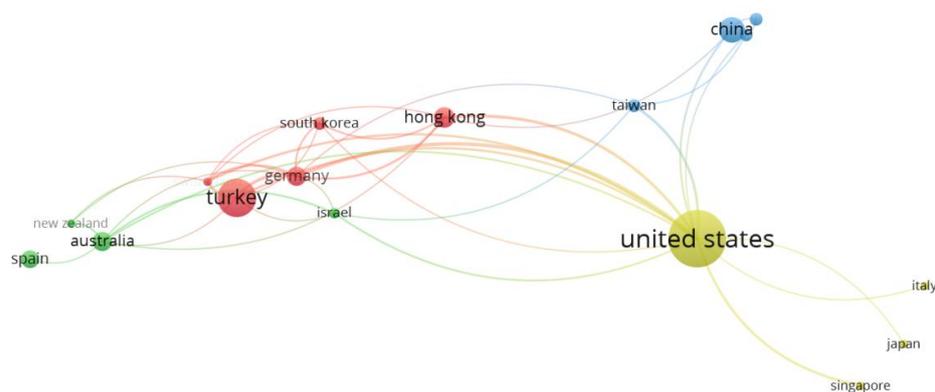
Figure 4. Visualization map of kindergarten teacher self-efficacy research citations by country or territory.

Subject Area

Based on the literature collected from the Scopus database, research on kindergarten teachers' self-efficacy spans 18 subject areas, underscoring the diversity of topics related to this field. As shown in Figure 5, from 1998 to 2024, studies on kindergarten teacher self-efficacy were primarily concentrated in the social sciences (47.4%) and psychology (22.6%). Over the past five years, the volume of research papers on this topic has continued to grow, reflecting an increasing interest in this area. Social sciences remain the primary focus, followed by psychology, indicating that kindergarten teachers' self-efficacy has become a prominent research area within the social sciences.
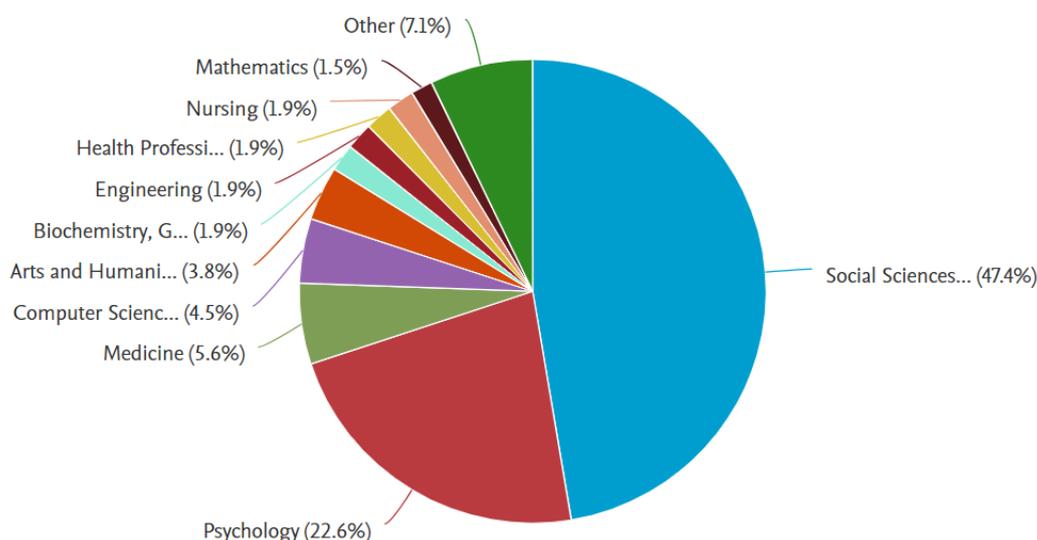

Figure 5. Subject area of kindergarten teacher self-efficacy research

The Most Influential Authors and Papers

To further understand the research landscape of kindergarten teacher self-efficacy, the most influential authors and articles in the Scopus database were analyzed. Among the 158

documents retrieved, the top three authors based on citation impact were Chiu, M.M., Garvis, S., and Pendergast, D. (see Table 2). Chiu, M.M., affiliated with the Education University of Hong Kong, is the most cited author, with 2 publications amassing 1,245 citations. His research interests include educational interactions and learning processes, big data and educational assessment, and the intersection of artificial intelligence and social issues. Garvis, S., with 5 publications and 232 citations, focuses on early childhood education, particularly quality improvement, teacher education, and the professional development of early childhood educators. Pendergast, D., who published 4 papers from 2011 to 2016—all co-authored with Garvis—has accumulated 231 citations, underscoring the impact of their collaborative work in this field.

Table 2
Top 3 most Influential Authors of Kindergarten Teacher Self-Efficacy Research

Author	Affiliation	Country	Publication Years	Total Number of Publications	Total Citations	Average Citations Per Publication
Chiu, M.M.	The Education University of Hong Kong	China	2010~2022	2	1245	622.5
Garvis, S.	Griffith University	Australia	2011~2016	5	232	46.4
Pendergast, D.	Griffith University	Australia	2011~2016	4	231	57.8

To identify the most influential articles in the field of kindergarten teacher self-efficacy, a citation analysis was conducted. This analysis led to the compilation of a list of the ten most-cited articles on the topic (see Table 3). Among them, the article titled "Effects on Teachers' Self-Efficacy and Job Satisfaction: Teacher Gender, Years of Experience, and Job Stress," authored by Klassen & Chiu and published in the Journal of Educational Psychology in 2010, stands out as the most cited. Focusing on kindergarten teachers, this article has been cited 1,239 times, with an impressive annual citation rate of 88.5, making it the most influential article in the field to date.

Table 3
Top 10 most highly cited articles of kindergarten teacher self-efficacy research

Rank	Authors	Title	Year	Total Citations	Average number of citations per year
1	Klassen R.M.; Chiu M.M.	Effects on Teachers' Self-Efficacy and Job Satisfaction: Teacher Gender, Years of Experience, and Job Stress	2010	1239	88.5
2	Herman K.C.; Hickmon-Rosa J.; Reinke W.M.	Empirically Derived Profiles of Teacher Stress, Burnout, Self-Efficacy, and Coping and Associated Student Outcomes	2018	341	56.8
3	Gerde H.K.; Pierce S.J.;	Early Childhood Educators' Self-Efficacy in Science, Math, and Literacy Instruction and Science Practice in the Classroom	2018	88	14.7

	Lee K.; Van Egeren L.A.				
4	Lim E.M.	The effects of pre-service early childhood teachers' digital literacy and self-efficacy on their perception of AI education for young children	2023	14	14
5	Lipscomb S.T.; Chandler K.D.; Abshire C.; Jaramillo J.; Kothari B.	Early Childhood Teachers' Self-efficacy and Professional Support Predict Work Engagement	2022	27	13.5
6	Kong C.; Yasmin F.	Impact of Parenting Style on Early Childhood Learning: Mediating Role of Parental Self-Efficacy	2022	25	12.5
7	Chen Y.-L.; Huang L.-F.; Wu P.-C.	Preservice Preschool Teachers' Self-efficacy in and Need for STEM Education Professional Development: STEM Pedagogical Belief as a Mediator	2021	37	12.3
8	Geraci A.; Di Domenico L.; Inguglia C.; D'Amico A.	Teachers' Emotional Intelligence, Burnout, Work Engagement, and Self-Efficacy during COVID-19 Lockdown	2023	12	12
9	Yang W.; Wu R.; Li J.	Development and validation of the STEM Teaching Self-efficacy Scale (STSS) for early childhood teachers	2023	11	11
10	Bautista N.U.; Boone W.J.	Exploring the Impact of Teach ME™ Lab Virtual Classroom Teaching Simulation on Early Childhood Education Majors' Self-Efficacy Beliefs	2015	96	10.7

Knowledge Foundations Through Co-Citation Analysis

Bibliometric analysis is used to assess the current state of research and explore potential future directions within specific fields. One key technique in this analysis is co-citation analysis, which tracks pairs of publications cited together in source articles to identify research clusters formed by multiple researchers co-citing the same pairs of publications (Karanam et al., 2024). Co-cited documents often share similar research topics, methods, or theories, and the frequency with which two papers are co-cited reflects the strength of their relationship (Shiau et al., 2023). As such, co-citation analysis is an essential tool for identifying the knowledge structure within scientific disciplines (Shiau et al., 2017).

As shown in Figure 6, the results of the co-citation analysis reveal that research on kindergarten teacher self-efficacy is built upon five primary clusters. The purple nodes, which represent the most frequently cited works, are primarily focused on Bandura's research on self-efficacy, including its theoretical foundation and broad applications. A key document in this cluster is Bandura's seminal 1977 work on self-efficacy theory, in which he discusses the concept of self-efficacy and its extensive implications. The subsequent nodes represent different areas of focus within the field: the red node addresses teacher self-efficacy in education; the blue node explores the social foundations of teacher self-efficacy; the green

node examines the relationship between self-efficacy and teaching practice; and the yellow node looks into the influence of teacher self-efficacy. Together, these clusters form the knowledge base of research on teacher self-efficacy.
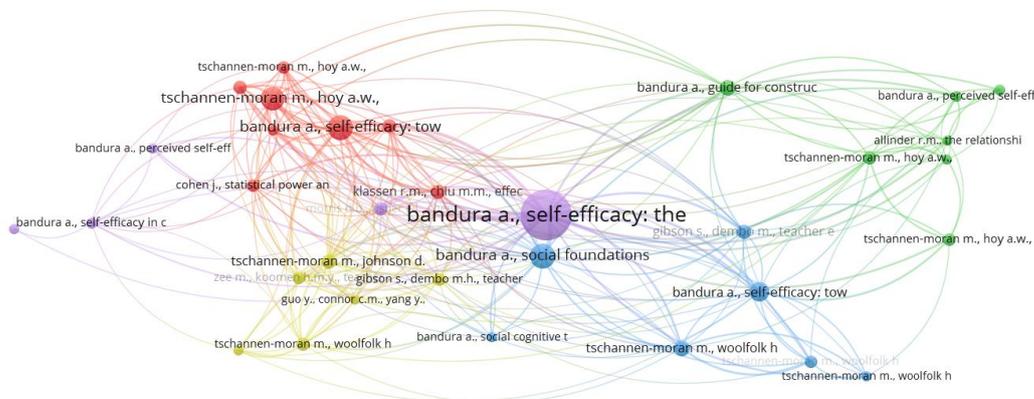

Figure 6. Co-citation of kindergarten teacher self-efficacy research references cited by documents (minimum number of citations of a document = 5).

Thematic Clusters through Bibliographic Coupling
Bibliographically coupled articles are those that cite the same sources, with publications sharing references considered to be bibliographically coupled (Zhao & Strotmann, 2015). This concept, introduced by Kessler in 1963, suggests that articles with strong bibliographic coupling often form distinct groups (Kessler, 1963). The number of shared references between articles indicates their degree of similarity, facilitating the emergence of clusters of closely related publications (Fauzi, 2023). Unlike co-citation analysis, which considers all citations within a document, bibliographic coupling focuses exclusively on shared references to establish the conceptual relationships between articles. Figure 7 illustrates the main thematic groups within the knowledge structure of research on kindergarten teacher self-efficacy, identified through bibliographic coupling. The size of each node represents the total number of citations in the literature. The largest cluster, composed of blue nodes, includes 17 articles related to the influencing factors of kindergarten teacher self-efficacy. One of the most cited articles in this cluster is the study by Klassen and Chiu (2010), titled "The Influence of Teacher Self-Efficacy and Job Satisfaction: Teacher Gender, Years of Work, and Job Stress," which has been cited 1,239 times.

The purple node group is represented by Herman et al. (2018), whose influential study, "Empirically Derived Profiles of Teacher Stress, Burnout, Self-Efficacy, and Coping and Associated Student Outcomes," has been cited 341 times. This study examined the relationship between teacher stress, burnout, self-efficacy, coping abilities, and student outcomes. The cyan node group is represented by Gerde et al. (2018), whose study, "Early Childhood Educators' Self-Efficacy in Science, Math, and Literacy Instruction and Science Practice in the Classroom," has been cited 88 times. The green node group is represented by Bates et al. (2011), whose study, "Linking Preservice Teachers' Mathematics Self-Efficacy and Mathematics Teaching Efficacy to Their Mathematical Performance," has been cited 87 times.
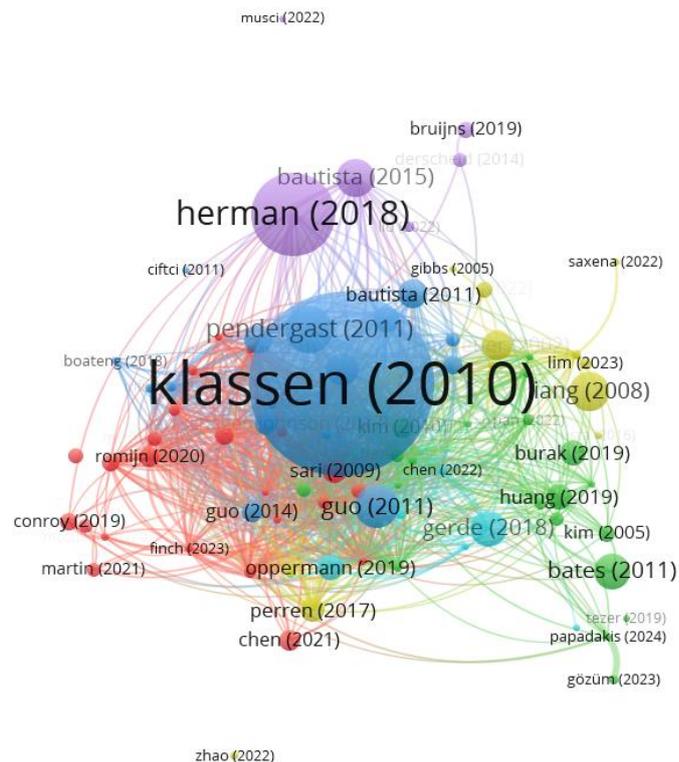
Figure 7. Network visualization of kindergarten teacher self-efficacy research citations by document (minimum number of citations of a document = 5).

Thematic Trends through Co-Occurrence Analysis
Co-word analysis examines the co-occurrence of keywords to identify groups of related terms (Mangalaraj et al., 2023). This approach explores the associations and connections between concepts that contribute to the development of a research area. It is based on the assumption that keywords effectively summarize a research article, enabling the analysis of relationships between research concepts (Sarsenbayeva et al., 2023). By focusing on the interactions among individual keywords, co-word analysis uncovers the conceptual structure and evolution of research topics within a specific field (Giannakos et al., 2020). In this study, the analysis was configured to focus on "author keywords," resulting in the identification of 393 unique keywords, of which 75 met the minimum threshold of at least two occurrences. Notably, the keyword "self-efficacy" appeared most frequently, with 56 occurrences.

After excluding core search-related keywords such as "kindergarten teacher," "preschool teacher," "early childhood teacher," "early childhood education," "teacher beliefs," "teaching efficacy," "teacher self-efficacy," "teacher efficacy," and "self-efficacy," a co-occurrence analysis was conducted on the remaining keywords to examine their relationships. Figure 8 illustrates the themes in the literature on kindergarten teacher self-efficacy over time. These themes are closely linked to the concept of kindergarten teacher self-efficacy. The co-occurrence analysis revealed seven major clusters, with the most prominent theme being the connection to teacher attitudes. This theme is associated with keywords such as special education, inclusive education, and physical education, suggesting that much of the research on kindergarten teachers' self-efficacy focuses on inclusive and physical education. Notably, teacher training, and psychological well-being are represented as yellow nodes in the co-

occurrence network, highlighting that these topics have become central to recent research on kindergarten teachers' self-efficacy.
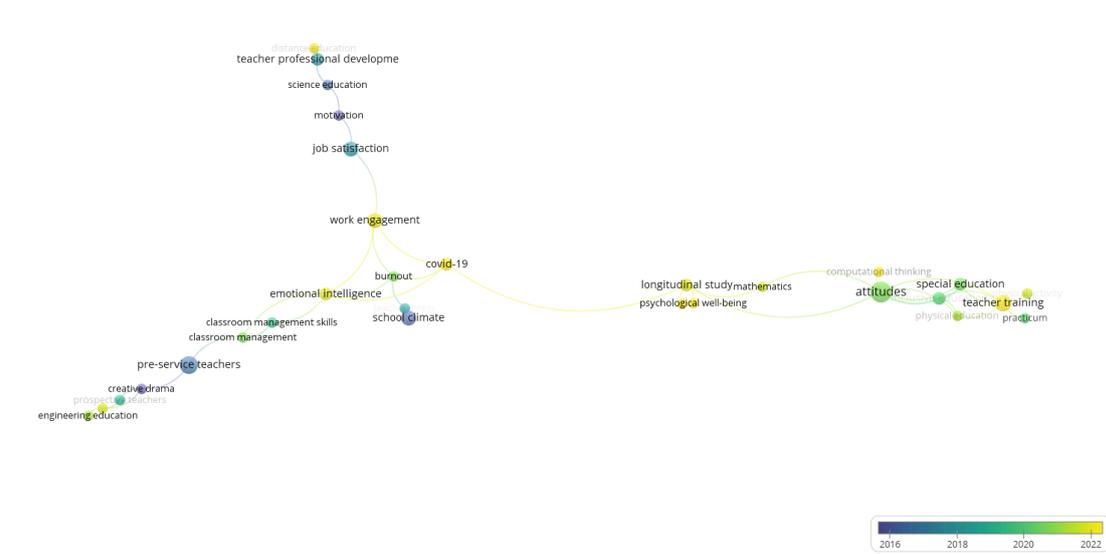

Figure 8. Network visualisation of the author keywords co-occurrence of kindergarten teacher self-efficacy research (minimum number of citations of a document = 2).

Review of the H-Classics Publications
A citation analysis was conducted on 158 publications. As of November 6, 2024, these publications have received a total of 3,832 citations from Scopus-indexed sources, with an average of 24 citations per publication. The h-index is 27, meaning that 27 of the retrieved papers have been cited 27 or more times. This study reviewed 27 h-classic publications to highlight key research topics in the field. Among the 27 h-classics, 23 were quantitative studies, and 4 were mixed-method studies. Of the quantitative studies, three employed a longitudinal approach. In terms of geographic distribution, these papers originated from various countries, with the highest number coming from the United States (13), followed by China (2), Australia (2), Taiwan (2), Germany (2), Turkey (2), Canada (1), Italy (1), South Korea (1), and Estonia (1). Notably, nearly half of the publications originated from the United States. The research findings of these h-classics were categorized and summarized based on their primary focus. Using VOS viewer software, the author conducted a co-occurrence analysis of the keywords, identifying 13 keywords that met the minimum threshold of at least two occurrences. After removing core search-related keywords such as "early childhood education" and "teacher self-efficacy," the remaining keywords were further analyzed for co-occurrence. The main focuses of the h-classic publications include professional development, motivation, school climate, and science methods courses, as shown in Figure 9.

Figure 9. The main focus of h-classics publications (minimum number of occurrences = 2).

Discussions

This study employed bibliometric analysis to quantify the development of literature on kindergarten teacher self-efficacy. Using the Scopus database, a bibliometric analysis was conducted on 158 publications in this field. The study mapped current research trends in kindergarten teacher self-efficacy by examining publication patterns over time, geographic distribution, and subject areas. It identified key authors and influential publications, as well as illustrated the knowledge structure and primary research focuses within the field. Bibliometric and visual analyses were performed using VOS viewer software to highlight the research status, trends, and main topics in this area. This analysis provides valuable insights for future researchers, helping them identify potential research topics, gain a deeper understanding of current trends, and contribute to the further development of the knowledge base in the field of kindergarten teacher self-efficacy.

The first research question of this study aimed to explore the current research trends in kindergarten teachers' self-efficacy. Analyzing the Scopus database revealed that the earliest literature on this topic appeared in 1998. Over time, the number of publications on kindergarten teachers' self-efficacy has steadily increased, with the most significant growth occurring in the past five years. The United States, Turkey, and China are the leading contributors to research in this area, with Asian countries and territories making up nearly half of the top ten contributing regions. The level of collaboration between scholars across different countries and territories varies. Research on kindergarten teachers' self-efficacy is predominantly concentrated in social science disciplines. Overall, the literature retrieved from the Scopus database demonstrates a continuous rise in publications over the past two decades, reflecting growing global interest in this field. Previous studies have also shown that kindergarten teachers with higher self-efficacy are more confident in their ability to foster

children's development through positive interactions (Barni et al., 2019). Given these findings, kindergarten teachers' self-efficacy remains an important area of research.

In response to the second and third research questions of this study, citation analysis was conducted on the 158 retrieved publications to identify the most influential authors and publications in the field of kindergarten teacher self-efficacy research. The analysis revealed that the most influential author in this field is Chiu, M.M., from the Education University of Hong Kong. His research interests include interaction and learning in the educational process, big data and educational assessment, and artificial intelligence in relation to social issues. His paper, *"Effects on Teachers' Self-Efficacy and Job Satisfaction: Teacher Gender, Years of Experience, and Job Stress,"* published in 2010, emerged as the most cited article in the field, with a total of 1,239 citations and an average of 88.5 citations per year.

To address the fourth research question, the most popular research topics in the field of kindergarten teacher self-efficacy were explored using co-citation analysis and literature coupling analysis. The references of 158 publications were analyzed through co-citation, revealing that the research in this field draws on five primary clusters. As noted earlier, the most frequently co-cited references are those discussing the theoretical foundation and wide application of self-efficacy. Additionally, the relationship between self-efficacy and teaching practices, as well as the influence of teacher self-efficacy, have garnered significant attention from scholars. The literature coupling analysis further revealed that recent research on kindergarten teacher self-efficacy has built on previous studies, with an emphasis on empirical investigations that confirm the impact of self-efficacy on teaching attitudes, teacher-student relationships, and classroom practices.

The co-occurrence analysis of author keywords addressed the fifth research question of this study, highlighting the research directions for future scholars from a temporal perspective. Currently, attitudes are a central focus in research on kindergarten teacher self-efficacy. In recent years, topics such as teacher professional development, job satisfaction, teacher training, pre-service teachers, and school climate have gained significant attention and emerged as prominent research directions in this field. Finally, in response to the sixth research question, citation analysis revealed 27 h-classic publications in the field. Co-occurrence analysis of author keywords in these publications identified professional development, motivation, school climate, and science methods courses as the primary areas of focus within these influential studies.

Teachers with higher self-efficacy are more effective in capturing students' attention, addressing challenges, promoting democratic behavior, adhering to rules, and fostering positive student interactions (Kayabaşi et al., 2017). Teacher self-efficacy has become a central focus in educational research, particularly for kindergarten teachers, where high self-efficacy is considered crucial for enhancing both teaching quality and job satisfaction (Wang, 2024). In early childhood education, teacher self-efficacy, as a key psychological factor, has garnered significant attention due to its profound impact on teaching practices, children's development, and even teachers' personal well-being (Reyhing & Perren, 2021). Given these considerations, the importance of self-efficacy among early childhood educators is clear (Agbaria, 2021).

Professional training is crucial for enhancing early childhood educators' knowledge, skills, motivation, and self-efficacy (Hyseni et al., 2022). A supportive, resource-rich work environment can further strengthen teachers' self-efficacy by offering professional development opportunities, a manageable curriculum workload, effective school management, and positive interactions with colleagues. Encouragement and support from colleagues and school leaders, especially when addressing teaching challenges, are vital for building teachers' confidence (Huang, 2022). Additionally, parental involvement and feedback can positively influence kindergarten teachers' self-efficacy; constructive cooperation and support from parents can boost teachers' enthusiasm for their work. Teachers' personal professional beliefs, educational philosophies, and passion for teaching also play a significant role in developing a strong sense of self-efficacy. Moreover, collaboration and peer support are key factors in fostering higher self-efficacy among kindergarten teachers (Wang, 2024).

In summary, kindergarten teachers' self-efficacy plays a crucial role in influencing teachers, students, and overall teaching quality. Professional training, a supportive work environment, and active cooperation and encouragement from parents can enhance teachers' self-efficacy. This, in turn, promotes the well-being of kindergarten teachers, improves teaching quality, and supports the sustainable development of early childhood education.

Conclusions

In recent years, there has been growing attention to teacher self-efficacy, particularly in the field of early childhood education. Enhancing kindergarten teachers' self-efficacy contributes to their overall well-being and improves the quality of early education. The findings of this study show that research on kindergarten teachers' self-efficacy has steadily increased in both volume and geographic reach over time. As the scope of this research continues to expand, the content will become more comprehensive, and the range of research fields and topics will diversify.

This study has some limitations and areas for further improvement. First, regarding the data source, the bibliometric analysis was based solely on the Scopus database. Future research could expand the literature search to include multiple databases, providing a broader perspective on kindergarten teachers' self-efficacy. This would help identify additional key references in the field and enhance the comprehensiveness of the bibliometric analysis. In terms of methodology, this study employed bibliometric methods such as co-citation analysis, literature coupling, and co-occurrence analysis to depict statistical trends in the retrieved literature, illustrating the current status and future research directions in this field. Future studies could integrate additional methods (e.g., systematic literature reviews) to offer a more systematic and comprehensive examination of kindergarten teachers' self-efficacy. Additionally, cultural differences may influence the level of kindergarten teachers' self-efficacy. Although this study acknowledges the varying research on this topic across countries and territories, it did not explore how self-efficacy differs across geographical and cultural contexts. Future research could conduct cross-cultural comparative analyses to further explore the similarities and differences in kindergarten teachers' self-efficacy across cultures, and develop effective support strategies tailored to diverse cultural backgrounds.

Based on the Scopus database, this study employs bibliometric methods to systematically analyze the publication trends, key authors, high-impact literature, and research topics

related to kindergarten teacher self-efficacy. By doing so, it fills critical gaps in the understanding of the field's overall academic trajectory, research hotspots, and classic literature (h-classics). Unlike previous studies that primarily relied on questionnaire surveys or case studies, this research utilizes co-citation analysis, collaborative network analysis, and keyword co-occurrence analysis to identify the core contributors, assess their academic influence, and quantify global research collaboration patterns. Furthermore, it highlights key themes shaping the discourse on kindergarten teacher self-efficacy, including teacher attitudes, professional development, job satisfaction, and teacher training. The findings indicate that while research in this area continues to expand, significant gaps remain, particularly in cross-cultural comparisons, long-term developmental trends, and the influence of educational policies—areas that future studies could further explore. Additionally, this study provides a systematic review of h-classics literature, distilling its major themes and offering a robust theoretical foundation for subsequent research. Unlike earlier studies that focused narrowly on the effects of isolated variables on teacher self-efficacy, this study takes a broader perspective, mapping out the field's intellectual landscape and key research trajectories. By doing so, it not only provides scholars with a comprehensive framework for understanding the evolution of research in this domain but also equips policymakers and educational practitioners with data-driven insights to support the continued professional development of kindergarten teachers.

References

Agbaria, Q. (2021). Classroom Management Skills among Kindergarten Teachers as related to Emotional Intelligence and Self-Efficacy. International Journal of Instruction,14(1),1019-1034. https://doi.org/10.29333/iji.2021.14160a

Amasha, M., & Assadi, N. (2024). Teaching styles and self-efficacy as burnout predictors among teachers in Arab schools in Israel. International Journal of Instruction, 17(2), 163-184. https://doi.org/10.29333/iji.2024.17210a

Balcı, Ö., Şanal, F., & Üğüten, S. D. (2019). An Investigation of pre-service English language teachers' self-efficacy beliefs. International Journal of Modern Education Studies, 3(1), 41-53. http://www.ijonmes.net dergipark.gov.tr/ijonmes

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, NJ, 1986(23-28), 2.

Bandura, A. (1997). Self-efficacy: The exercise of control (Vol. 604). Freeman.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. Annual review of psychology, 52(1), 1-26. https://doi.org/10.1146/annurev.psych.52.1.1

Bandura, A. (2006). Toward a psychology of human agency. Perspectives on psychological science, 1(2), 164-180. https://doi.org/10.1111/j.1745-6916.2006.00011.x

Barni, D., Danioni, F., & Benevene, P. (2019). Teachers' self-efficacy: The role of personal values and motivations for teaching. Frontiers in psychology, 10, 1645. https://doi.org/10.3389/fpsyg.2019.01645

Cansoy, R., Parlar, H., & Türkoğlu, M. E. (2020). A predictor of teachers' psychological well-being: Teacher self-efficacy. International Online Journal of Educational Sciences, 12 (4), 41-55. https://doi.org/10.15345/iojes.2020.04.003

Chung, M. S. (2019). Teacher efficacy, collective self-esteem, and organizational commitment of childcare teachers: A moderated mediation model of social support. Frontiers in psychology, 10, 955. https://doi.org/10.3389/fpsyg.2019.00955

Donthu, N., Kumar, S., Pandey, N., & Lim, W. M. (2021). Research constituents, intellectual structure, and collaboration patterns in Journal of International Marketing: An analytical retrospective. Journal of International Marketing, 29(2), 1-25. https://doi.org/10.1177/1069031X211004234

Duong, C. D., & Vu, N. X. (2024). Entrepreneurial education and intention: fear of failure, self-efficacy and gender. Journal of Small Business and Enterprise Development, 31(4), 629-654. doi:10.1108/JSBED-02-2023-0057

Farmer, H., Xu, H., & Dupre, M. E. (2022). Self-efficacy. In Encyclopedia of Gerontology and Population Aging (pp. 4410-4413). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-22009-9_1092

Fathi, J., Derakhshan, A., & Saharkhiz Arabani, A. (2020). Investigating a structural model of self-efficacy, collective efficacy, and psychological well-being among Iranian EFL teachers. Iranian Journal of Applied Language Studies, 12(1), 123–150. https://doi.org/10.22111/IJALS.2020.5725

Fauzi, M. A. (2023). Social media in disaster management: review of the literature and future trends through bibliometric analysis. Natural Hazards, 118(2), 953-975.https://doi.org/10.1007/s11069-023-06079-7

Giannakos, M., Papamitsiou, Z., Markopoulos, P., Read, J., & Hourcade, J. P. (2020). Mapping child–computer interaction research through co-word analysis. International Journal of Child-Computer Interaction, 23, 100165. https://doi.org/10.1016/j.ijcci.2020.100165

Huang J.(2022). Analysis of the Current Status and Influencing Factors of Kindergarten Teachers' Self-Efficacy in Applying Educational Research Methods. Shanghai Education Research, (09),46-51.doi:10.16194/j.cnki.31-1059/g4.2022.09.008.

Hyseni Duraku, Z., Blakaj, V., Shllaku Likaj, E., Boci, L., & Shtylla, H. (2022). Professional training improves early education teachers' knowledge, skills, motivation, and self-efficacy. In Frontiers in Education (Vol. 7, p. 980254). Frontiers Media SA. doi: 10.3389/feduc.2022.980254

Jeon, L., Buettner, C. K., & Grant, A. A. (2018). Early childhood teachers' psychological well-being: Exploring potential predictors of depression, stress, and emotional exhaustion. Early education and development, 29(1), 53-69. https://doi.org/10.1080/10409289.2017.1341806

Karanam, M., Krishnanand, L., Manupati, V. K., & Nudurupati, S. S. (2024). Emerging themes and future research directions in the cold supply chain: a bibliometric and co-citation analysis. Benchmarking: An International Journal. doi:10.1108/BIJ-11-2023-0771

Kayabaşı, Y., Yeniceli, E., Ataman, E., Şahin, S., & Nacar, N. (2017). Ortaokul Öğretmenlerinin Sınıf Yönetimi Becerileri İle Özyeterlik İnançları Arasındaki İlişki: Ankara İli Örneği. Kuramsal Eğitimbilim Dergisi, 10(2), 298-319.

Kessler, M. M. (1963). Bibliographic coupling between scientific papers. American documentation, 14(1), 10-25. https://doi.org/10.1002/asi.5090140103

Khan, M. A., Pattnaik, D., Ashraf, R., Ali, I., Kumar, S., & Donthu, N. (2021). Value of special issues in the journal of business research: A bibliometric analysis. Journal of business research, 125, 295-313. https://doi.org/10.1016/j.jbusres.2020.12.015

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. Journal of educational Psychology, 102(3), 741. doi: 10.1037/a0019237

Lamb, S., Maire, Q., & Doecke, E. (2017). Key skills for the 21st century: An evidence-based review.

Le X, Yan S, Zheng S.(2023).A study on the relationship between kindergarten teachers' self-efficacy and classroom management ability. Journal of Guilin Normal College, (01),102-106. doi:10.16020/j.cnki.cn45-1302/z.2023.01.012.

Lipscomb, S. T., Chandler, K. D., Abshire, C., Jaramillo, J., & Kothari, B. (2022). Early childhood teachers' self-efficacy and professional support predict work engagement. Early childhood education journal, 50(4), 675-685. https://doi.org/10.1007/s10643-021-01182-5

Mangalaraj, G., Singh, A., & Taneja, A. (2023). Probing the past to guide the future IT regulation research: Topic modeling and co-word analysis of SOX-IS research. Information Systems Management, 40(4), 302-315. https://doi.org/10.1080/10580530.2022.2140368

Martínez, M. Á., Herrera, M., Contreras, E., Ruíz, A., & Herrera-Viedma, E. (2015). Characterizing highly cited papers in Social Work through H-Classics. *Scientometrics*, *102*, 1713-1729. https://doi.org/10.1007/s11192-014-1460-y

Mossafaie, M., Alibakhshi, G., & Tabrizi, H. H. (2024). Iranian EFL teachers' self-efficacy: structural equation modeling of the consequences. Asian-Pacific Journal of Second and Foreign Language Education, 9(1), 42. https://doi.org/10.1186/s40862-024-00264-2

Narayanan, M., Ordynans, J. G., Wang, A., McCluskey, M. S., Elivert, N., Shields, A. L., & Ferrell, A. C. (2023). Putting the self in self-efficacy: Personal factors in the development of early teacher self-efficacy. Education and Urban Society, 55(2), 175-200. https://doi.org/10.1177/00131245211062528

Passas, I. (2024). Bibliometric analysis: the main steps. Encyclopedia, 4(2). https://doi.org/10.3390/encyclopedia4020065

Ragazou, K., Passas, I., Garefalakis, A., & Dimou, I. (2022). Investigating the research trends on strategic ambidexterity, agility, and open innovation in SMEs: Perceptions from bibliometric analysis. Journal of Open Innovation: Technology, Market, and Complexity, 8(3), 118. https://doi.org/10.3390/joitmc8030118

Reyhing, Y., & Perren, S. (2021). Self-efficacy in early childhood education and care: What predicts patterns of stability and change in educator self-efficacy?. In Frontiers in Education (Vol. 6, p. 634275). Frontiers Media SA. https://doi.org/10.3389/feduc.2021.634275

Sarsenbayeva, Z., van Berkel, N., Hettiachchi, D., Tag, B., Velloso, E., Goncalves, J., & Kostakos, V. (2023). Mapping 20 years of accessibility research in HCI: A co-word analysis. International Journal of Human-Computer Studies, 175, 103018. https://doi.org/10.1016/j.ijhcs.2023.103018

Shiau, W. L., Dwivedi, Y. K., & Yang, H. S. (2017). Co-citation and cluster analyses of extant literature on social networks. International Journal of Information Management, 37(5), 390-399. https://doi.org/10.1016/j.ijinfomgt.2017.04.007

Shiau, W. L., Wang, X., & Zheng, F. (2023). What are the trend and core knowledge of information security? A citation and co-citation analysis. Information & Management, 60(3), 103774. https://doi.org/10.1016/j.im.2023.103774

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. Journal of the American Society for information Science, 24(4), 265-269. https://doi.org/10.1002/asi.4630240406

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. Review of educational research, 68(2), 202-248. https://doi.org/10.3102/00346543068002202

Verma, S., & Gustafsson, A. (2020). Investigating the emerging COVID-19 research trends in the field of business and management: A bibliometric analysis approach. Journal of business research, 118, 253-261. https://doi.org/10.1016/j.jbusres.2020.06.057

Wang, Y. (2024). Research on the Importance and Strategies of Cultivating Self-Efficacy in Kindergarten Teachers. Advances in Educational Technology and Psychology, 8(2), 51-57.doi: 10.23977/aetp.2024.080208

Wolstein, K., Ehm, J. H., Peters, S., & Mischo, C. (2021). Preschool teachers' self-efficacy beliefs and interaction quality in the domain of instructional support – do professional vision competencies moderate this relation? European Early Childhood Education Research Journal, 29(4), 617–632. https://doi.org/10.1080/1350293X.2021.1941171

Yentür, M. M. (2023). The Effect of geography teachers' Self-efficacy perceptions and attitudes toward teaching on their motivation. International Journal of Educational Research Review, 8(2), 360-367. https://doi.org/10.24331/ijere.1255100

Yin, H., Keung, C. P. C., & Tam, W. W. Y. (2022). What facilitates kindergarten teachers' intentions to implement play-based learning?. Early Childhood Education Journal, 50(4), 555-566.https://doi.org/10.1007/s10643-021-01176-3

Zhao, D., & Strotmann, A. (2015). Analysis and visualization of citation networks. Morgan & Claypool Publishers. doi:10.2200/S00624ED1V01Y201501ICR039