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RECEIVED 18 January 2025

ACCEPTED 19 May 2025

PUBLISHED 17 July 2025

CITATION

Iliasova L, Nekrasova I, Mena J and
Estrada-Molina O (2025) Microteaching on
pre-service teachers' education: literature
review. *Front. Educ.* 10:1562975.
doi: 10.3389/feduc.2025.1562975

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Microteaching on pre-service teachers' education: literature review

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Teaching is a complex profession that requires a balance of knowledge, pedagogical skills, and classroom management. As educators work to create engaging and inclusive learning environments, innovative approaches are needed to enhance teaching skills and support continuous professional development. Microteaching is a widely used training method that enables teachers to refine techniques, test strategies, and receive feedback in a controlled environment. This paper explores microteaching's concept, theoretical foundations, and practical implications for teacher training. Through a review of literature and empirical evidence from 2006 to 2023, the study highlights microteaching's benefits, challenges, and future directions, emphasizing its potential to transform teacher education and improve educational outcomes. A quantitative meta-analysis of studies from Web of Science and Scopus databases was conducted using the Prisma protocol and VoSViewer to synthesize findings and construct clusters, which actually differs our research from previous ones. The research concludes that microteaching is associated with positive outcomes in teacher education, helping aspiring teachers practice pedagogical skills effectively. The limitations of this review include selection bias, the focus on English-only studies, and the time period chosen. Further research is recommended to understand pre-service teachers' perspectives on microteaching and to empirically assess whether microteaching foundations enhance the student learning process and boost enthusiasm for their future profession.

KEYWORDS

microteaching, pre-service teachers, teacher education, microteaching skills, systematic literature review

1 Introduction

Microteaching, first introduced by Dwight W. Allen in the 1960s, has evolved into a cornerstone of teacher education and training. This technique deconstructs complex teaching skills into manageable components, offering educators the opportunity to practice and refine their instructional methods within a controlled environment. In contemporary teaching practices, microteaching plays a pivotal role in improving teacher effectiveness and enhancing student learning outcomes. This paper explores the scientific literature on microteaching and highlights its necessity in contemporary education.

Effective teaching is fundamental to shaping future generations, equipping them with the knowledge and skills required to navigate an increasingly complex world. As educational demands continue to evolve, teachers must adapt to diverse student needs, integrate innovative instructional methods, and leverage emerging technologies. To meet

these challenges, teachers must consistently enhance their teaching practices, reflect on their pedagogical approaches, and advance professional development opportunities (Hawraz and Ulker, 2021; Gürol and Akti, 2010).

Traditional teacher education programs have long recognized the importance of practical experience in preparing teachers for the classroom. However, according to Kourieos the conventional model of teacher training, often centered around lectures and theoretical discussions, may not sufficiently equip educators with the skills needed to excel in real-world teaching scenarios (Kourieos, 2016). Recognizing this gap, educational researchers and practitioners have turned to microteaching as an effective method to bridge the divide between theory and practice in teacher education (Yesilbursa, 2011; Park, 2022).

Microteaching, as the name suggests, involves breaking down the teaching process into smaller, manageable components that can be observed, practiced, and perfected in a controlled setting. Originally introduced by Dwight W. Allen in the 1960s, microteaching revolutionized teacher education by providing aspiring educators with opportunities to experiment with teaching techniques, receive immediate feedback, and refine their instructional strategies. Ögeyik underscores that over the years, microteaching has gained traction as a valuable tool for enhancing teaching skills, promoting reflective practice, and fostering professional growth among both novice and experienced teachers (Ögeyik, 2009; Arsal, 2015; Kirsch and Sarmento, 2021).

Although microteaching is recognized as an effective teacher training technique, some research gaps still remain. Upon reviewing the literature, there is a need to explore microteaching not just as a pre-service teachers' skill development strategy, but also as a means to improve teaching practice. Furthermore, previous studies frequently employed mixed methods approaches, often without triangulating with quantitative measures of evidence-based teaching practices.

This study aims to provide a comprehensive examination of microteaching, exploring its theoretical foundations, practical applications, and its influence on teacher training and professional development. By reviewing relevant literature and drawing upon empirical evidence, we aim to examine the benefits and challenges associated with microteaching and its potential to transform traditional teacher education programs. Furthermore, the ways in which microteaching can promote effective teaching practices, improve student learning outcomes, and contribute to the broader goals of educational reforms would be explored. While a structured micro teaching activities offer valuable opportunities for skill development of future teachers, it is also important to consider the limitations such as the potential anxiety among pre-service teachers, differences from real classroom environments, and their inflexibility to new teaching methods to accommodate different student learning styles. Balancing these approaches with authentic practice and supportive mentorship can optimize the preparation of pre service teachers.

Overall, this paper intends to contribute to the existing body of knowledge on microteaching, offering insights and recommendations for educators, teacher trainers, and policymakers who are invested in improving teaching quality and fostering the continuous development of teachers. Through a comprehensive

analysis of the concept of microteaching, in order to prepare teachers for the challenges of the twenty-first century classroom learning and teaching process of high quality, ultimately benefiting both educators and learners alike.

2 Literature review

2.1 History and evolution of microteaching

The concept of microteaching originated at Stanford University in 1963 as a method to assist aspiring teachers to practice their skills or smaller part of a lesson prior to the “real” experience in schools. Microteaching has been favored as an effective teaching strategy focusing on future teachers' behavior and skills to foster the professional development. Generally, microteaching involves the cycling process of certain steps such as Plan, Teach, Observe, Feedback, Re-plan, Re-teach, Re-observe, and Re-feedback i.e., “Teach-re-Teach” loop. In fact, microteaching creates simulating conditions to bridge theory and practice helping sense teacher's identity increasing self-confidence and motivation (Feng, 2020; Reddy, 2019).

Originally introduced by Dwight W. Allen in the 1960s, microteaching revolutionized teacher education by providing aspiring educators with opportunities to experiment with teaching techniques, receive immediate feedback, and refine their instructional strategies.

Microteaching also enhances teaching effectiveness by offering teachers an opportunity to practice specific teaching skills and receive immediate feedback. The research findings suggest that micro teaching has a beneficial effect on teachers' instructional techniques, leading to improved student understanding, engagement, and achievement (Remesh, 2013; Kokkinos, 2022).

Several educational theories underpin the effectiveness of microteaching, enhancing its theoretical depth by focusing on Reflective Practice, Experimental Learning, and Social Learning theories. Some researchers figure out that reflective practice is central to microteaching experiences, enabling pre-service teachers to critically analyze their teaching and continuously improve their professional skills. Next, pre-service teachers become active participants, promoting deeper understanding of their teaching and experimenting with new strategies through the process of critical reflection. Additionally, Bandura's Social Learning Theory (SLT) and microteaching are interconnected, emphasizing learning through observation, practice, feedback, and reflection. Thus, microteaching becomes a practical application of SLT principles in the context of teacher education (Firmansyah and Saepuloh, 2022; Bandura, 1997).

Microteaching helps teachers identify their strengths and areas for improvement through reflective practice. This effective tool supports pre and in service teachers' professional growth by enabling them to experiment with various teaching strategies, receive feedback, and implement changes to enhance student engagement and learning outcomes (Joshi, 2018; Gödek et al., 2012).

Using different skills, tasks, and techniques, microteaching could help in determining and examining a teacher's performance.

In addition, microteaching is outlined as a way to enhance instructional skills, boosting teacher confidence, and improving classroom management strategies (Brown, 2010; Danday, 2021; Yan and He, 2017).

2.2 Fundament of microteaching

Here are the following basic aspects of microteaching as an effective learning experience to the pre-service teachers as well as in-service teachers:

1. **Skill Development:** Language teaching encompasses various skills such as pronunciation, grammar instruction, vocabulary acquisition, and language fluency. Microteaching enables educators to concentrate on specific language skills and practice them intensively, leading to enhanced proficiency and accuracy in language instruction.
2. **Error Correction:** Error correction is a critical component of language teaching. Microteaching offers a controlled environment where educators can identify common learner errors and develop effective correction strategies. By practicing these techniques, language teachers can improve their ability to provide timely and constructive feedback to students (Murphy Odo, 2021).
3. **Teaching Methodologies:** Language instruction employs a range of methodologies, including communicative language teaching, task-based learning, and content-based instruction. Microteaching serves as a platform for educators to experiment with various methodologies, allowing them to identify which approaches are most effective for specific language learning objectives and student needs (Ledger and Fischetti, 2020; Murtafiah et al., 2022; Marhaban et al., 2023).
4. **Classroom Management:** Effective classroom management in a language learning context requires organization, clear instructions, and student engagement. Microteaching allows educators to practice techniques such as setting expectations, managing transitions, and maintaining a positive learning environment, which are essential for creating a classroom atmosphere conducive to language acquisition (Prabowo et al., 2022; Koech and Mwei, 2019).
5. **Authentic Language Use:** Exposure to authentic language is vital for language learners to develop their skills. Microteaching enables educators to design and deliver lessons incorporating authentic materials, such as real-world texts, audio recordings, and video clips (Perihan, 2021). This approach exposes learners to natural language use and cultural nuances, thereby enhancing their language proficiency.
6. **Differentiation and Individualization:** Language learners often exhibit diverse needs and learning styles. Microteaching provides an opportunity for educators to experiment with differentiated instruction, tailoring lessons to accommodate individual learners' abilities, interests, and preferences. Practicing individualized instruction enables teachers to offer targeted support, thereby maximizing student learning outcomes (Cubukcu, 2010; Arslan, 2021; Adnyana and Citrawathi, 2019).

7. **Assessment and Feedback:** Effective assessment of language proficiency and the provision of meaningful feedback are integral to language teaching. Microteaching allows educators to develop assessment tasks, evaluate learner performance, and provide constructive feedback. This practice improves language assessment techniques and ensures that feedback is accurate, specific, and supportive (Murphy Odo, 2023).

2.3 Research gaps

However, microteaching activities have certain challenges for pre-service teachers. Some may experience anxiety related to teaching and learning, while others complain that microteaching does not reflect the "real world context" (Bakir, 2014). Since micro-teaching sessions are frequently shorter than actual teaching lessons, a thorough study of teaching procedures and techniques might not be possible. Finally, microteaching requires additional preparation and planning, which can be time-consuming, particularly for prospective teachers (Ögeyik, 2016).

Microteaching strategies are indispensable in language teaching as they enable inexperienced teachers to develop and refine a range of necessary skills (Danday, 2019; Reynolds et al., 2022). From skill development and error correction techniques, constructive feedback to teaching methods and assessment practices, microteaching empowers language teachers to enhance their instructional techniques and create engaging and effective language learning environment. By utilizing microteaching, educators can contribute significantly to language proficiency and academic success of their students. The following explanation explores the skills developed in microteaching, in the context of the SLR scientific papers.

All in all, according to the study, microteaching has a significant impact on teacher candidates' instructional skills, such as lesson planning, classroom communication, and effective use of teaching aids. Consequently, it positively affects their self-confidence, leading to improved teaching performance in real classroom settings.

3 Materials and methods

A systematic literature review (SLR) is an intentional method that allows to identify and evaluate relevant publications and studies related to the research needs and questions in a certain field. In the light of the existing scientific research papers, the terms such as explicit, transparent, objective, standardized, structured, and stimulating could be employed to describe a systematic literature review and minimize bias. There are different kinds of literature reviews, and multiple efforts have been made to develop a taxonomy facilitating judgement of reviews quality. Hence, the advantages of a critical review and an exhaustive search are combined in a systematic literature review to generate a selection of reliable evidence (García-Peñalvo, 2022; Xiao and Watson, 2019; García-Peñalvo, 2022).

García-Peñalvo (2022) emphasizes that to determine protocol, many methodological frameworks such as the

Cochrane Guidelines, SALSA (Search, Appraisal, Synthesis and Analysis), PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), PSALSAR (Protocol, Search, Appraisal, Synthesis, Analysis and Report), or PICOC (Population, Intervention, Comparison, Outcome, and Context) are served. Moreover, a documented protocol (published independently or as an integral part) can improve the quality of literature review significantly (García-Peñalvo, 2022; Xiao and Watson, 2019).

3.1 Study selection and criteria

The exclusion of non-English studies has significant implications for the comprehensiveness of the research. In our study, we evaluated and analyzed the sources within the last 10 years (2006–2023) in order to develop a proper understanding of the research subject, theoretical and practical issues, current research practices, and existing problems. Specifically, the literature search was conducted using bibliographic databases such as Scopus and Web of Science which employ selective indexing criteria and high methodological standards. So, to identify influential authors and key trends these databases were used in our study. Next, restricting studies to the English language was caused by the choice of the relevant publications in English we, as international team of researchers, were able to deal with. Respectively, to optimize our communication, only English-language sources were included. This review was based on our own criteria, it is worth noting that excluding studies in languages other than English or only theoretical studies might lead to potential limitations and research bias.

According to Toronto and Remington, systematic review and meta-analysis are scientific studies involving the search results, their critical evaluation and an objective data synthesis on a particular problem (Toronto and Remington, 2020). For this reason, the flow PRISMA diagram and its protocol checklist were used in the study to outline inclusion and exclusion criteria in addition to a meta-analysis of quantitative studies.

This specific SLR was conducted in the following steps:

The objective of this systematic review is to analyze the body of research related to the role of microteaching in building the foundational knowledge of future teachers. To achieve this objective, the following research questions were formulated:

- RQ1. What are the trends in scientific publications on microteaching methodologies from 2006 to 2023?
- RQ2. Which countries have published research articles on microteaching performance?
- RQ3. What are the key author keyword networks, including the primary terms and their core connections?
- RQ4. Groups of authors dominate the theoretical and practical foundations of microteaching research in terms of references and co-citation within the analyzed studies?
- RQ5. Which teaching skills are most effectively developed and acquired by future teachers through the use of microteaching techniques?

3.2 Review protocol and criteria

Systematic Review Protocol specifies the objectives, methods, and summarizes the outcomes of research studies. Both internal and external validity should be taken into the consideration to be sure whether the results of the study have meaning. To provide proper answers to research questions, conclusion validity requires a reasonable evaluation of the data and adequate use of statistical methods and strategies (Whittemore and Knafl, 2005). Referred to the conducted research the validities were emerged as follows:

Internal validity depends on the study methods and accuracy and includes the analysis of the keywords, articles content, and research design.

External validity refers to the generalizability of the results and the studies that do not support and validate their findings are disregarded.

Conclusion validity assesses the methodological quality, replicability, transparency of the study applying meta-aggregation findings addressing the Joanna Briggs Institute's (JBI) criteria (Russell, 2005).

3.3 Data extraction and analysis

Inclusion criteria:

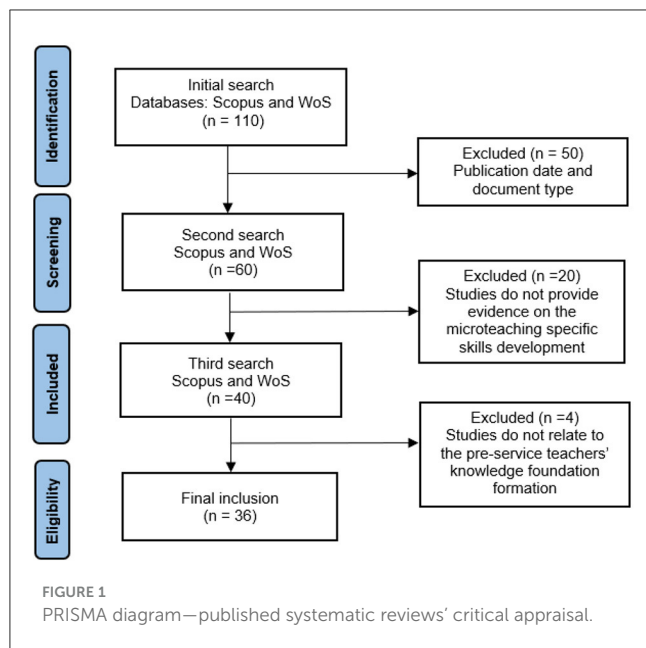
- (a) publication period 2006–2023;
- (b) abstract and citation databases Scopus and Web of Science (WoS);
- (c) the language of articles English;
- (d) studies related to microteaching in teacher education and teaching skills.

Exclusion criteria:

- (a) date of publication;
- (b) type of research (essays, tutorials, blogs, not original research papers);
- (c) theoretical studies not related to practical aspects according to the research goals and objectives.

3.4 Search string

- (a) The databases Scopus and Web of Science were used to select articles.
- (b) The following key words were identified combining the Boolean operators AND/OR for more productive search: microteaching, pre-service teachers, teacher education, teacher development, teacher training, teaching skills, microteaching skills, reflection.
- (c) The following words and expressions having a common semantic pattern that refers to the specific subject microteaching were established: pre-service, development, model, skills, technology-enhanced microteaching, reflective practice.



- (d) The search string: (“microteaching”) AND (“pre-service” OR “inexperienced”); (“teacher”) AND (“educat*” OR “training” OR “development”); (“microteaching” AND “skills”); (“preservice” AND “teachers”) AND PUBYEAR > 2006 AND PUBYEAR < 2023 AND PUBYEAR < 2023.

3.5 Statistical methods and tools

To analyze co-occurrence data and to visualize bibliometric networks, a VOSviewer software tool was used in this literature review. The data was organized in a way that included the information such as titles, authors, databases, cited references, and so on to make the maps.

An analytical system, SciVal, designed to analyze publication activity in the bibliographic database, allowed to process considerable amounts of statistical data and visualize the results, was used for cluster representation. The graphics were developed using web pages and programming languages HTML, CSS, and Javascript (Hopia et al., 2016).

To generate the first graph (amount per year), we started with the data, grouping the number of records per year putting it in a line graph. For the second graph (quantity by country), it follows the same logic. It was grouped by country, but with a pie chart. For the third graph (quantity per university), followed the same logic as the graph above. For the fourth graph (skillset occurrences), the logic changed a bit. We needed to account for the repetition of the skillsets, so we had to group and account using a bar chart. For the last chart (world map), it was to plot a graph in Excel and to change some chart settings to achieve the expected result.

The selection of studies for SLR was carried out in several stages, as can be seen in Figure 1.

In the first stage of the review, publications were selected based on their titles and abstracts. They were evaluated for relevance to the research questions and adherence to the

inclusion and exclusion criteria. Studies that were clearly irrelevant or addressed microteaching but did not meet one or more inclusion criteria (e.g., Scopus or Web of Science database coverage, publication date) were excluded. This preliminary screening yielded a total of 110 scientific papers ($n = 110$).

In the second stage, the selected articles were analyzed in detail according to the inclusion criteria. Each author (LI, IN, JM, OM, AA, MS) independently reviewed each research article and then shared their evaluations with the other authors to reach a consensus through data triangulation, thereby enhancing the reliability of the decision-making process. This research was the result of the collaboration of all the authors, and in the process, any discrepancies between reviewers were resolved.

After excluding non-full-text versions of publications that were not accessible for a comprehensive examination of their results, 60 studies ($n = 60$) were independently evaluated, followed by group discussion.

Ultimately, a total of 36 studies ($n = 36$) fully met the inclusion criteria and were deemed suitable for in-depth analysis and synthesis in the subsequent stages of the review.

4 Results

4.1 RQ1. What is the trend of scientific publications on microteaching methodology from 2006 to 2023?

In our study, 36 scientific publications from 2006 to 2023 on the microteaching methodology were analyzed. As outlined in the following graph (Figure 2), the number of articles on our topic has increased every year, but the trend toward studying this topic has remained, which shows its relevance. Although the peak of popularity occurred in 2021, there are currently few articles that qualitatively reflect the degree of research on the problem. In our opinion, the quantity of the articles on the topic of microteaching is increasing as these days teaching process requires constant improvement of methods and strategies to teach.

4.2 RQ2. What countries are the research articles on the microteaching performances published in?

The country analysis reveals the distribution of publications related to the microteaching, pre-service teachers, and teaching skills according to countries (Figure 3). For various reasons, articles from countries such as Turkey, Indonesia, China, South Korea, Greece, Philippines, Oman, Iraq, Australia, Cyprus, Canada, Russia, Nepal, Malaysia, South Africa, Kuwait, Bangladesh, Brazil, UK, Kenya, Nigeria, Tanzania are represented on the map above. According to the literature review, the largest number of published articles, meeting the study criteria, are from Turkey ($n = 12$), followed by Indonesia ($n = 5$), South Korea ($n = 4$) respectively.

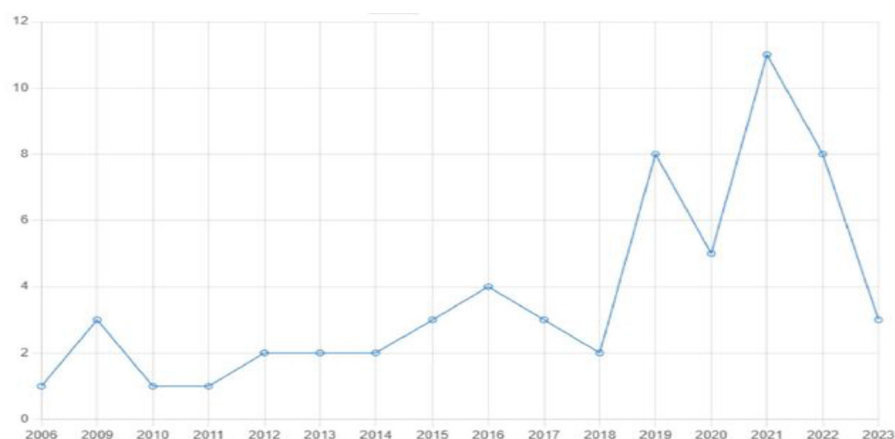


FIGURE 2
Quantity of the microteaching papers by years.

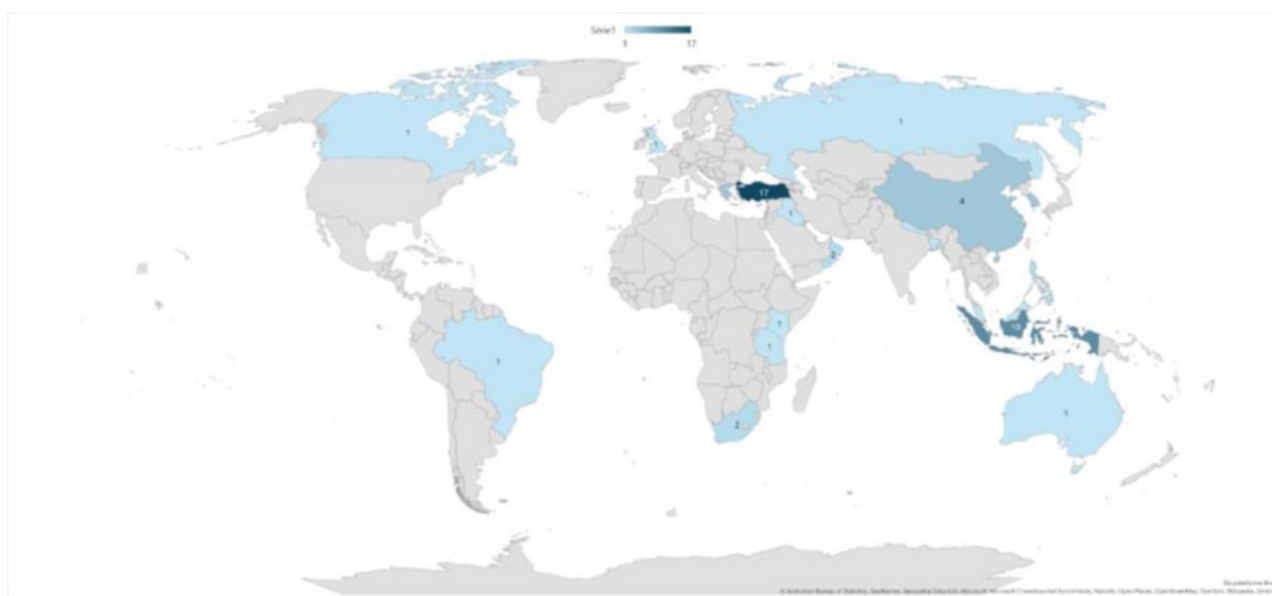


FIGURE 3
Publication map.

4.3 RQ3. What are author keyword networks: basic terms and their core connections?

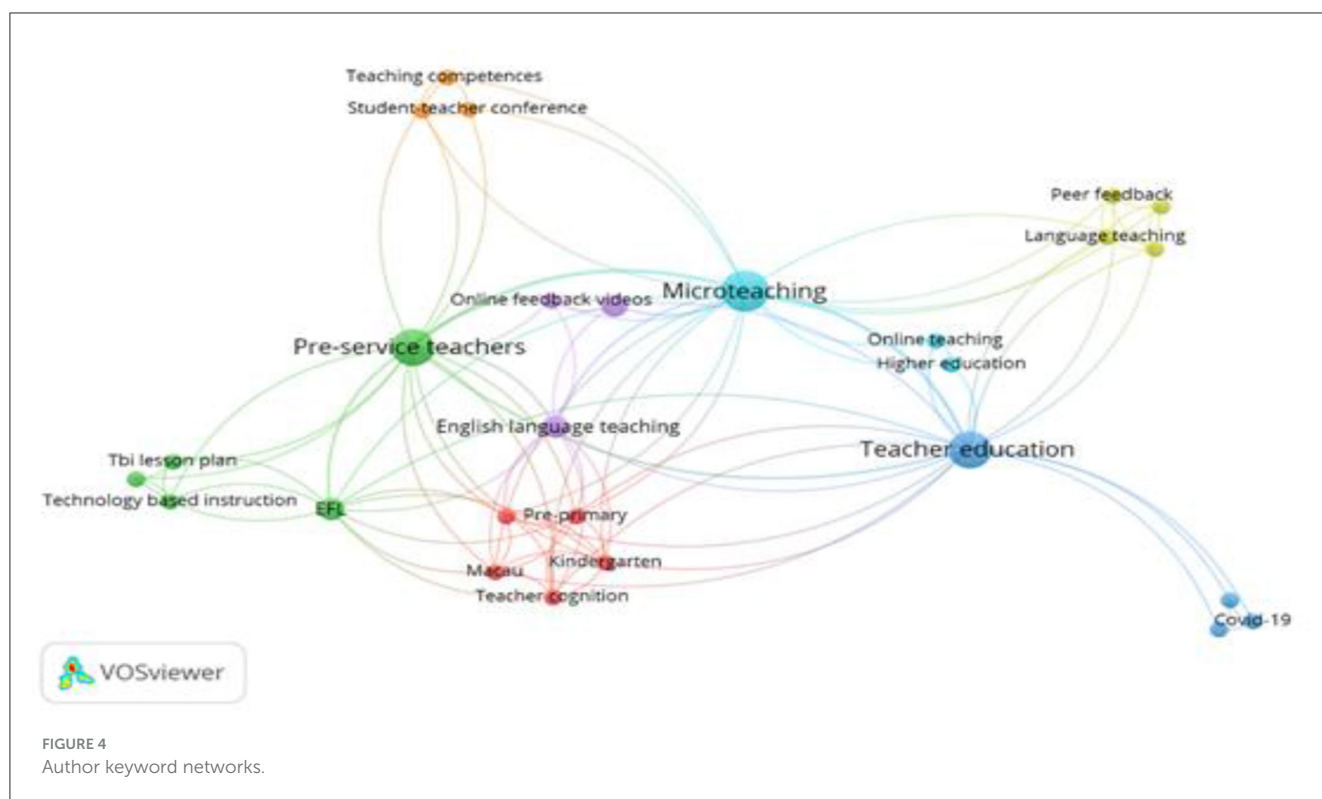
Regarding the author keyword networks, seven clusters are identified, and the details can be seen in Figure 4:

- Kindergarten, Macau, Pre-primary, teacher beliefs, teacher cognition;
- EFL, Pre-service teachers, Tbi lesson plan, Technology based instruction, tpack self-efficacy;
- Covid-19, online practice, teacher education, technology-enhanced microteaching;

- Language teaching, online video feedback, peer feedback, web 2.0 technologies;
- English language teaching, online feedback videos, reflective practice;
- Higher education, microteaching;
- Student-teacher conference, teaching competences, video.

These seven clusters were then classified into three groups based on their similarities.

The first group includes clusters unifying nodes on teacher education strategies and language competency: teacher cognition, microteaching, pre-service teachers, teaching competences, reflective practice, and language teaching.



The second group establishes a strong connection with the first one through nodes of technologies, for instance, tpack self-efficacy, technology-enhanced microteaching, and web 2.0 technologies.

The third group focuses on the interconnected clusters between online practice and the use of videos (to be specific, three clusters).

It can be seen that significant keywords were identified, resulting in new keywords the connection between which is highly clustered.

4.4 RQ4. What groups of authors are prevailed in theoretical and practical foundations in terms of references and co-citation in the analyzed studies?

Figure 5 illustrates the analysis of the references and co-citation of the analyzed Scopus and Web of Science studies on the microteaching topic focus on two clusters. This implies that the theoretical and practical foundations of the research in this systematic review focus on the following groups of authors:

- Agbayahoun J.P., Bogdan R.C., Biklen S.S., Creswell J.W., Eroztuga B., Gungor M.N., Koc M., Kourieos S., Lichtman M., Okumus K., Yurdakal I.H., Savas P., Serdar Tuluze H., Cecen S., Setyaningrahayu I., Widhi P.R., Murtisari E.T.

A subsequent cluster analysis revealed the interrelationships between a co-citation cluster's members and their citers based on the microteaching concept in relevant literature. Algorithmically

the most cited authors were identified among the three co-citation networks/co-authorship network.

- Higgins A., Nicholl H., and Schon D. A.

This implies that in relation to the microteaching ideas, topics, and specific references to the cited articles and research papers, these authors are the main authorities influencing on the study field.

4.5 RQ5. What teaching skills of future teachers are developed and acquired most through microteaching techniques?

But more important for us is to reflect the skills that student teachers acquire after becoming familiar with the methodology. Each study gave us different results, and all the skills were combined by definition and similarity.

On the first stage, we conducted a thorough search of the literature where different types of teaching skills, database, mediation, stages of microteaching, sample, investigation design were distinguished. In the frame of this research, student teachers' key skills (namely 48 teaching skills) were defined, then grouped and tabularized (category bottom-up) (Table 1).

Table 1 reflects the various essential skills and components involved in microteaching based on the systematic literature review conducted.

The second stage implied further categorization of the teaching skills pre-service teachers acquired during microteaching practice

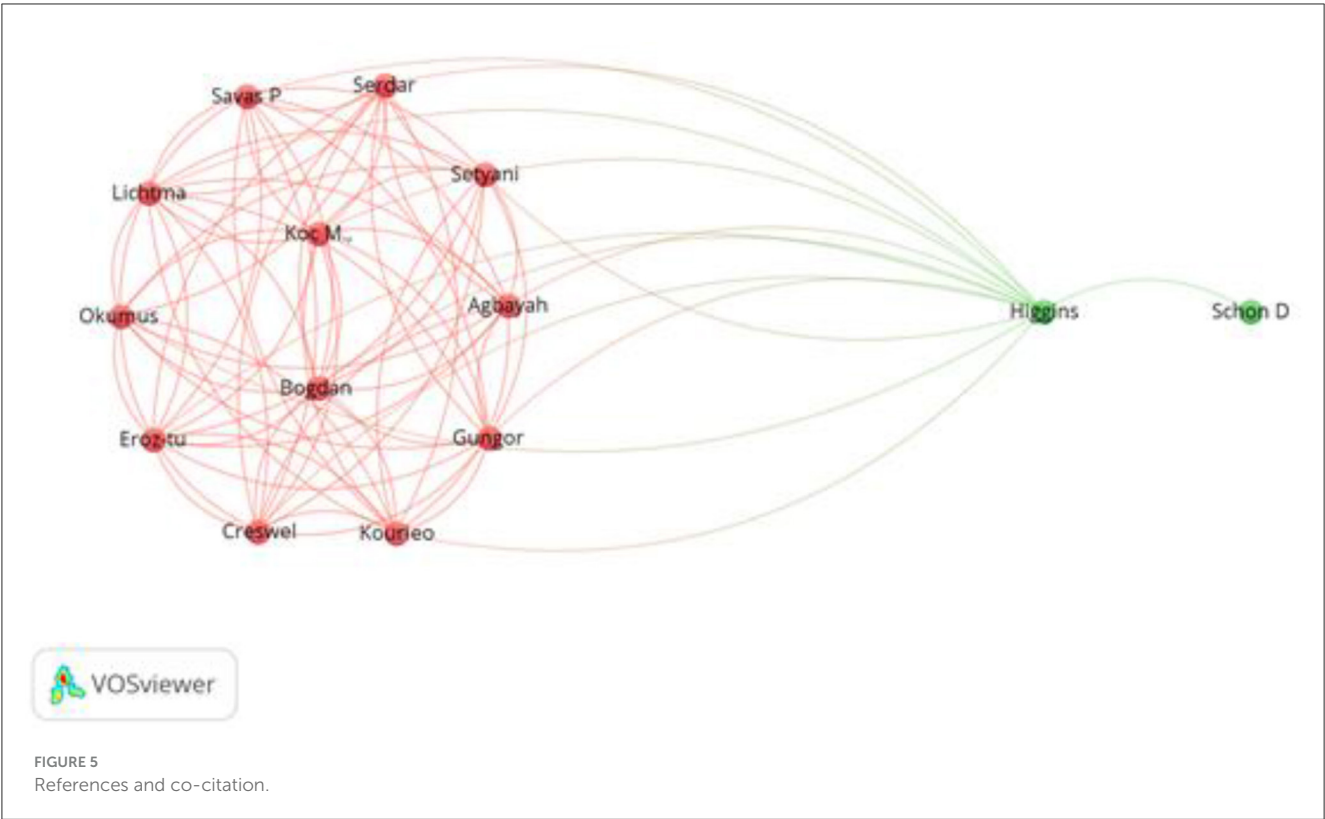


TABLE 1 Skill groups and definitions (stage 1).

Group teaching skills (category bottom-up)	Definitions
Methodology skills	The skills help to reflect on teaching practice, seek feedback, and strive for excellence in teaching and learning
Language skills; self-improvement in subject	The skills of a good understanding of the teaching subject
Classroom management skills	The skills involve managing the classroom effectively by setting clear expectations, monitoring student behavior, and responding appropriately to disruptions
Personal skills	The skills help to develop primarily self-improvement, personal growth, and increased self-confidence
Social skills	The skills help to communicate and interact with other people, to build relationships with pupils, parents and colleagues

in order to build a “tree” of characteristics and the results are presented as follows (Table 2).

Table 2 provides information on how the identified skills were classified and consolidated into two main groups:

- (a) Personal Skills: These are personal attributes that develop over time through experience and self-reflection, enabling

TABLE 2 Teaching skills developed by micro-teaching sessions (stage 2).

Suggested grouping	Personal skills	Professional skills
Traits	personal, interpersonal, social and communication skills, unquantifiable	on-the-teaching training, teachable, learnable, honed, quantifiable

teachers to communicate effectively with students, parents, and colleagues.

- (b) Professional Skills: These refer to the technical abilities that teachers acquire through formal training, such as lesson planning, classroom management, and assessment.

Overall, the reviewed scientific literature provides empirical evidence on the enhancement of specific skills through microteaching. Engaging in microteaching allows educators to improve their classroom management, instructional delivery, communication, differentiated instruction, assessment, and reflective practice skills. Integrating these competencies into their teaching practices can result in increased student engagement, enhanced learning outcomes, and overall teaching effectiveness.

The following graph shows the frequency of occurrence of a particular skill in articles, and after the graph, a decoding of each skill group is given (Figure 6).

Figure 6 indicates the numbers of skill groups that correspond to the following skill sets:

1. Assessment, evaluation, observation & analysis, giving feedback, grading skills, reflection on feedback;

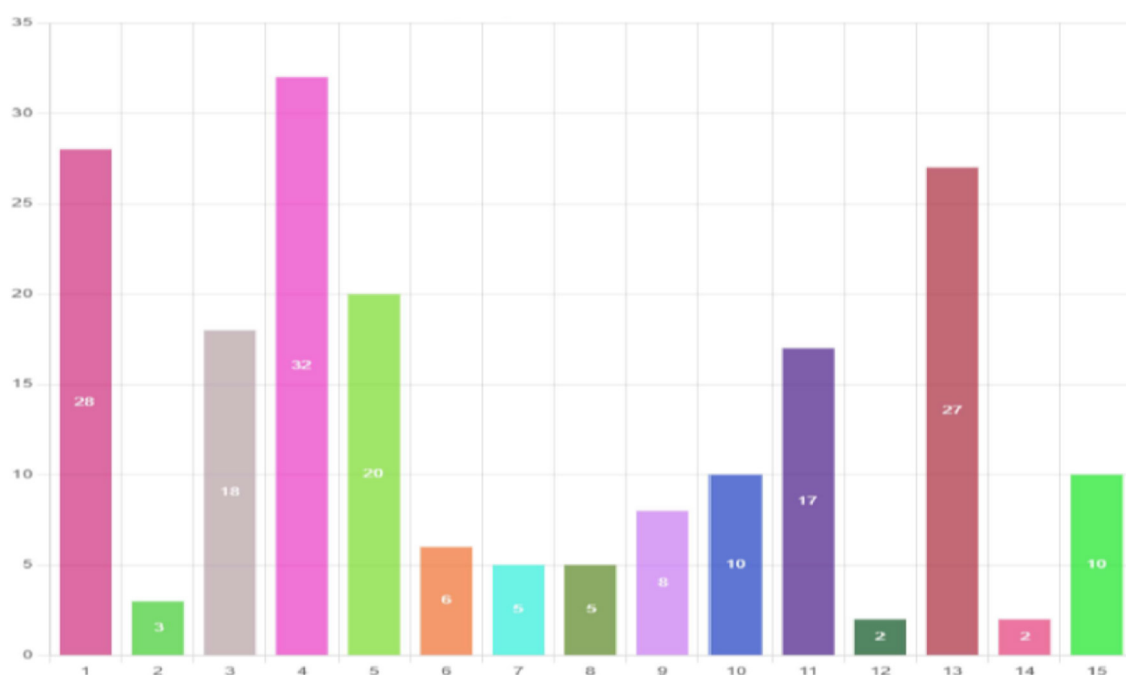


FIGURE 6

Quantity of skills, trained by microteaching method.

2. Body language;
3. Classroom management;
4. Lesson planning, opening/closing the lesson, lesson conclusion, developing materials;
5. Communication, cooperation & interaction, attention, giving instructions, questioning, rapport building;
6. Critical thinking, learning curiosity;
7. Leadership, leading the discussion, encouraging students, motivation, guiding a group;
8. Implementing ICT;
9. Being proactive to the development, attitude, teacher's autonomy, creativity, problem-solving, decision-making;
10. Implementing innovative methods and techniques;
11. Self-efficacy, self-confidence, reducing anxiety, self-analysis, self-assessment;
12. Social learning;
13. Teaching, presentation, performance, experience adaptability to students' needs, explaining the subject, integration of metacognition strategies;
14. Recognizing weaknesses, error correction;
15. Time management.

These skills are crucial for future teachers, enhancing their professional success in various ways: for example, understanding assessment methods enables teachers to evaluate student progress accurately. Strong classroom management skills lead to a productive learning atmosphere. Future teachers who master these techniques can minimize disruptions, maximize learning time, and foster a respectful environment. Thorough lesson planning ensures that objectives are met and materials are relevant.

Skills in structuring lessons help maintain student engagement from start to finish, ensuring effective learning experiences. Integrating technology in the classroom prepares students for a digital world (Azrai et al., 2020; Zalavra and Makri, 2022). Future teachers skilled in ICT can enhance learning through interactive tools, catering to diverse learning styles and needs (Merç, 2015; Kelleci et al., 2018; Seo, 2020). Effective time management ensures that lessons are productive and that all material is covered. Future teachers who excel in this area can balance curriculum demands with the individual needs of their students. The other qualities are also highly important for the future teachers.

By honing these skills, future teachers will be well-equipped to create engaging, inclusive, and effective learning environments that foster student success and their own professional growth.

5 Discussion

The aim of this systematic literature review is to identify relevant studies on microteaching as a method for pre-service teacher preparation and practical skills development, and to assess the quality and synthesize the findings of these studies. In the previous systematic literature reviews connected with microteaching, for example, what Darling-Hammond, L., and Bransford, J. explains insights on microteaching within the broader context of teacher education and its impact on developing effective teaching practices. Another SLR by Khan, M. A., and Iqbal, M., called A Systematic Review of Microteaching: Trends, Challenges, and Future Directions, examines the trends and

challenges associated with microteaching and its effectiveness in teacher training.

This review employs a comprehensive search strategy to select research papers that meet specific inclusion criteria, which were then subjected to detailed analysis. This analysis addressed research questions related to *bibliometric indicators* (including author mapping, countries of origin, and databases), *methodological aspects* (such as study design and data collection techniques), and *conceptual analysis* (including topics, objectives, results, mediation, microteaching stages, and skills).

Regarding the trends in scientific publications, a significant number of articles were published on microteaching models and the development of future teachers' skills and competencies in pedagogical content during the study period. The peak years for scientific output were 2019 and 2021; however, interest in this area declined sharply by 2023, with the number of publications dropping to levels comparable to those of 2009, 2015, and 2017. This decline suggests that microteaching is currently underdeveloped and not widely implemented in pre-service teacher training.

In terms of geographical distribution, the study found a strong focus on microteaching research in the Middle East, East Asia, and East Africa. In contrast, studies from European countries and the United States were less frequently documented or limited in scope.

Through a systematic review, we analyzed keyword networks, formed from published research articles, and identified important keywords and their relationships with each other. These are key findings: keyword networks demonstrated a high degree of clustering, which means that specific keywords with higher frequencies are more likely to be chosen by new researchers and featured in their subsequent studies. Moreover, the development of technology has led both to the emergence of new methods in future teacher education and to the emergence of many new keywords and terms (see Figure 4, group 2).

The author-nodes analysis of the articles in the Scopus and Web of Science databases indicated a link through the process of referencing and citation of studies on microteaching. The following link is important because it focuses the theoretical foundations on certain authors as maximum exponents at the level of citations. Two clusters in relation to co-citation authors and analysis of references among all authors are used when a document we analyzed cites two others, making clear the probability that both cited sources are related by their content.

Some researchers claim that microteaching allows inexperienced teachers to practice and refine their skills before genuine teaching sessions (Iksan et al., 2014). The skill bar graph (Figure 6) provides information about the diversity of skills with a particular focus on future teachers' training by analyzing 36 scientific articles. In detail, skill group four (4) stood at just over 30, which means that set skills (namely lesson planning, opening/closing the lesson, lesson conclusion, developing materials) have a significant impact on long-term teaching strategy development. According to the results of our study, it is apparent that microteaching skill sets, one (1) and thirteen (13), are essential in today's pre-service teachers' educational landscape. Set skills three (3), five (5), and eleven

(11), when harmonized, create a dynamic educational setting conducive to both teaching and learning in accordance with a wide-ranging corpus of studied literature. On the contrary, group skills elements body language (2), social learning (12), and recognizing weaknesses (14) received less attention in the referred study sources.

6 Conclusion

Overall, teachers must continuously strive to enhance their skills, as these are crucial for creating meaningful and impactful learning experiences for students. Microteaching strategies play a pivotal role in language instruction by facilitating the development of essential pedagogical skills among novice teachers (Karçay and Sanli, 2009). This review successfully addressed the research questions, which focused on the trends in scientific publications on microteaching from 2006 to 2023, the countries where research articles on microteaching performance were published, author keyword networks, dominant groups of authors contributing to theoretical and practical foundations, and, most importantly, the teaching skills that future educators acquire and develop most effectively through microteaching techniques.

A comprehensive review of the scientific literature from 2006 to 2023 highlights the evolving trends and contributions of microteaching methodologies. Although research interest peaked in 2021, the topic remains pertinent despite a decline in recent high-quality studies. The analysis identifies Turkey, Indonesia, and South Korea as the leading contributors to the literature on microteaching, with additional contributions from various other countries.

The review demonstrates that microteaching significantly enhances diverse teaching competencies, including classroom management, instructional delivery, communication, differentiated instruction, assessment, and reflective practice. These skills are further refined through the integration of technological tools such as TPACK self-efficacy and Web 2.0 technologies. The study underscores the importance of these competencies in improving student engagement and learning outcomes. The most significant aspect of our investigation lies in the "Skills Section," which identifies two primary clusters: (1) teacher education strategies and language competency, encompassing teacher cognition, microteaching, pre-service teachers, teaching competencies, reflective practice, and language teaching; and (2) the use of technologies, including TPACK self-efficacy, technology-enhanced microteaching, and Web 2.0 technologies.

The analysis utilized Scopus and Web of Science databases, with contributions from scholars such as Agbayahoun J.P., Bogdan R.C., Biklen S.S., Creswell J.W., and Eroz-Tuga B. Subsequent citations frequently reference the works of Higgins A., Nicholl H., and Schön D.A. These studies provide empirical evidence on the development of specific skills through microteaching. By practicing microteaching, educators can enhance their abilities in classroom management, instructional delivery, communication, differentiated instruction, assessment, and reflective practice. Integrating these skills into their teaching practices can lead to improved student

engagement, enhanced learning outcomes, and overall teaching effectiveness. This comprehensive examination underscores the necessity of ongoing professional development in microteaching to foster effective teaching practices and improve pedagogical efficacy (Muslimin Ikhwanul et al., 2022; Caner and Aydin, 2021).

7 Limitations

The limitations of this review include selection bias, the focus on English-only studies, or the time period chosen. This research was finalized in 2023; consequently, studies undertaken in 2024 could significantly expand the data presented. Moreover, non-English literature could have had a positive effect on overall conclusions about the research topic. This review hopes to contribute to previous studies about microteaching technique to prepare future teachers for real professional activities by adapting their teaching strategies and skills. This study suggests that implementing microteaching in teacher education and training could play a significant role in empowering inexperienced teachers to reach their full potential. Lastly, more research should be conducted regarding how to prepare future teachers to improve and master their basic skills to keep the teacher-training process productive.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: <https://docs.google.com/spreadsheets/d/12ACdHYTchgWnvVwbiBEKYUuIP1Ugs-iIqGeZAaaPFU/edit?usp=sharing>.

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Author contributions

LI: Writing – original draft, Writing – review & editing. IN: Writing – original draft, Writing – review & editing. JM: Writing – review & editing. OE-M: Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

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