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Leaving No One Behind- Teacher Peer Mentoring Before and After the Pandemics: A Mixed-Methods Systematic Review of Spanish and English Literature

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Abstract: This paper examines how peer mentoring strengthens teaching practices in Regular Basic Education considering the changes undertaken since the COVID-19 pandemics. Peer mentoring is an in-service teacher training strategy that includes mutual collaboration, learning and monitoring. In this systematic review, we retrieved 24 articles since 2020 from Scopus (8), Web of Science (8), Dialnet (5), Google Scholar (2) and SciELO (1) to find out about the benefits of peer mentoring. Our review was guided by the PRISMA criteria. We found that educational companionship has a positive impact on reducing knowledge gaps regarding new technologies through the exchange of experiences, promotes openness to criticism, as well as the interest in learning and unlearning, supporting learning self-regulation, and guarantees consultation, reflection, and agreement between members of the teaching communities. We conclude that peer mentoring fulfilled, to a large extent, its purpose of improving teacher performance as one of the keys to educational quality.

Keywords: *Instructional supervision, pandemic, peer mentoring, teacher competencies, teacher training.*

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Introduction

Peer mentoring is a promising teacher training methodology that enables mentors and mentored teachers to identify problems and incorporate improvements into their own practices (Guzmán Rios et al., 2023; Vásquez Custodio et al., 2020). Although literature from the last 10 years offers a diversity of definitions, they also demonstrate the beneficial contribution of peer-based mentoring, especially underlining the pivotal role of the feedback-providing mentor, guide or tutor. Latin American researchers have shown that teacher performance improves when supported, trusted, and monitored by experienced colleagues, as observed in Tomalá et al. (2023), who also provide a comprehensive peer-mentoring model. In fact, according to the sociocultural learning standpoint adopted by the United Nations Educational Scientific and Cultural Organization (UNESCO), peer-mentoring is a culturally mediated process that can be further strengthened by inclusive, intercultural-critical, and reflective-critical approaches (UNESCO, 2019).

Teaching as a professional activity demands that certain knowledge, attitudes and procedures must be systematized and, therefore, that they be communicated to others as the main content of mentoring. However, this conviction confronts a fairly widespread idea that to be a teacher it is enough to master a field of scientific knowledge. On the contrary, the evidence shows that good teaching performance is also the consequence of actively and collectively building and rebuilding the culture of the educational system for which the teacher works. Learning to convert disciplinary knowledge into knowledge that can be assimilated by the student in a classroom is not an easy thing. It demands not only the ability to do so, but the mobilization of various agents of an educational system to guide the teacher in that direction. If each teacher teaches as she can and as she wants, then achieving institutional objectives will be difficult.

Peer mentoring before the outbreak of the pandemic was one of the most used strategies for teacher training. Like other in-person activities, it was restricted during the pandemic. Therefore, it had to adopt other means and/or supports for

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its resumption. Technological tools ensured its continuity. In this regard, various studies have pointed out the limitations of a considerable number of teachers. For example: teachers rarely used their social networks for training purposes (Coutinho Campos & Pereira, 2020; Jiménez-Parra, 2023; Rahmadi, 2021; Rambay Tobar & Lozado, 2020) or they did not show confidence or preparation for the case to assume entry into much more frequent online education (Ahmmed et al., 2022; Chan Chi & Rodríguez Pech, 2022; Cueva Betancourt & Mosquera Rodríguez, 2021; Nikolopoulou, 2022; Sari & Nayır, 2020; Winter et al., 2021), little familiarity with the use of virtual platforms, to which is added precarious access to educational technology in low and middle-income regions (Abad-Vázquez & Cuenca-Tapia, 2021; Carcausto et al., 2021; Larrea Centurion, 2021).

This training strategy, often used in the educational field, is important because it promotes professional development in a context of autonomy and cooperative learning. However, the number of publications related to this topic is small, especially studies interested in knowing what results were produced by the use of quantitative and qualitative methods for their implementation as part of pedagogical support.

But the emergence of the COVID-19 pandemic and subsequent global lockdowns prompted the unprecedented shift to exclusively virtual education for the first time in history (Assadi & Kashkosh, 2022; Haenilah et al., 2022; Musodza et al., 2020). In-service training, understood as the set of actions contributing to the professional development of teachers around the world, was no exception. Training activities aimed at teachers, which were traditionally conducted face-to-face, had to adapt to new supports and possibilities (Altynbekov et al., 2023; Henriques et al., 2021; Karomani et al., 2021). As a result, studies started increasingly noticing the difficulties, informal strategies, and chronic capability gaps among teachers and their mentors, especially the most disadvantaged (e.g., Rodríguez-Torres et al., 2020).

Recines-Padilla et al. (2022) highlight the achievements and limitations of virtual peer mentoring by reviewing literature published between 2019 and 2021. They study the gradual development of teaching competencies, disciplinary knowledge, and guidance in both quantitative and qualitative literature written mainly in English. Virtual peer-mentoring usually has a positive impact on developing teacher competencies and fostering autonomous, collaborative learning with trust, equity, and diversity. Mentoring, according to the authors, is a privileged window into the teacher's practical concerns and issues. However, challenges like time management, internet accessibility, and organizational aspects in online teaching are identified, highlighting the need for effective pedagogical strategies and structural improvements. Additionally, the engagement of school directors as pedagogical leaders is deemed crucial for favorable teaching performance outcomes.

However, the review avoids studying many of the limitations found earlier in Latin America by UNESCO (2019). Often, those in charge of monitoring and supporting teachers fail to understand or improve the teaching process. This limitation negatively affects their role as educational advisors. Additionally, leaders do not place enough emphasis on creativity and critical thinking as key aspects to strengthen teacher training. Finally, administrators sometimes lack sufficient knowledge about the educational level they oversee, making it difficult to address current educational and training demands effectively. Additionally, no review exists about the current body of knowledge regarding peer-based mentoring analyzing cases solely located in Latin America.

These needs are the foundation of an urgent need for an evidence review for policymakers, university researchers and future practitioners. However, we currently see a lack of literature reviews that validate the institutional understanding of peer mentoring. Hence, we ask ourselves, how does pedagogical support strengthen teaching practices in regular basic education?

Methodology

Study Type

A systematic review is defined as a clear and structured evaluation of the literature, commencing with a research question and subsequently presenting a critical overview of various instruments and the corresponding evidence (García-Perdomo, 2015).

Methodological Approach

This research adheres to the guidelines of the PRISMA Statement, particularly in terms of transparency and rigor. It commences with a comprehensive search in open-access and previously subscribed databases. Subsequently, studies are selected through screening and eligibility criteria (Fernández-Sánchez et al., 2020).

Research Questions

It is worth mentioning that the articles are based on answering these questions:

Table 1. Research Questions

Code	Research Questions
RQ1	How many studies meet the design requested by the inclusion criteria on the addressed topic?
RQ2	What was the situation of teachers regarding digital competencies before the pandemic?
RQ3	What digital tools were used for teacher support during the pandemic?
RQ4	What programs or pedagogical support strategies were implemented during the pandemic? What were their effects or outcomes? How much time did they require?
RQ5	What were the perceptions and experiences of teachers regarding online learning and digital competencies developed through the support that enabled coping with virtuality?

Selection Criteria

These criteria facilitated the filtering of results, eliminating articles that did not meet the research objectives, as well as duplicate articles. The web application Rayyan was used to expedite the initial article selection through a semi-automated process and later imported into the bibliographic manager Mendeley. The details of these criteria are presented in Table 2.

Table 2. Selection Criteria

Criteria	Code	Description
Inclusion	IC1	Papers from both open-access and restricted or institutional databases.
	IC2	Scientific articles associated with the research topic.
	IC3	The sample comprises teachers.
	IC4	Programs, perceptions, and experiences of teachers related to pedagogical support, mentoring, online learning, and the development of digital competencies in teachers during the pandemic.
	IC5	The publication year falls within the range of 2020 to 2023.
Exclusion	EC1	Publications predating the year 2020.
	EC2	Research not related to the topic of interest.
	EC3	Publications that do not include teachers as the study sample.
	EC4	Incomplete or unavailable articles.

Data sources

The databases used for the search of relevant research studies include freely accessible and institutional access databases such as Scopus, Web of Science, ScienceDirect, and ERIC.

Search Strategy

Articles were selected using keywords such as *Estrategias de acompañamiento pedagógico*, Acompañamiento *docente, Competencias digitales, Pandemia, Docentes, Aprendizaje en línea, Educación a distancia, Capacitación en TIC y Apoyo pedagógico en línea.* We included English keywords such as *Pedagogical support strategies, Teacher support, Digital competences, Pandemic, Teachers, Online learning, Distance education, ICT training, online pedagogical support, teacher mentoring, teacher tutoring, teacher guidance, improves teaching practice, teaching action, teaching progress*. We further included combinations using Boolean operators such as AND, OR, and AND NOT. Additionally, publication year and search filters were considered.

Table 3. Used Search Strings

Database	Search strategy
ScienceDirect	Pedagogical support and basic education teacher: 2.656 Teacher support and digital competences: 2.507 Teacher mentoring or teacher tutoring and online learning:196
SciELO	Acompañamiento pedagógico docente (Teacher pedagogical support): 18 Mentoría al docente OR tutoría al docente (Teacher mentoring): 33
ERIC	Teacher mentoring and school teacher and online learning: 42.017 Pedagogical support strategies and digital competences: 839
Scopus	TITLE-ABS-KEY (teacher AND mentoring) OR TITLE-ABS-KEY (teacher AND tutoring) OR TITLE-ABS-KEY (teacher AND guidance) AND TITLE-ABS-KEY (improves AND teaching AND practice) OR TITLE-ABS-KEY (teaching AND action) OR TITLE-ABS-KEY (teaching AND progress): 166 TITLE (pedagogical support strategies) OR TITLE (teacher support) AND TITLE-ABS-KEY (digital competences) OR TITLE-ABS-KEY (online learning): 128 TITLE-ABS-KEY (strategies) OR TITLE-ABS-KEY (programs) AND TITLE (teacher mentoring) OR TITLE (teacher tutoring): 118 TITLE-ABS-KEY (strategies) OR TITLE-ABS-KEY (programs) AND TITLE (teacher AND mentoring) OR TITLE (teacher AND tutoring): 100
Web of Science	(((TI=(pedagogical support)) OR TI=(teacher support)) AND TS=(digital competences)) OR TS=(online learning): 48.159 ((TI=(teacher mentoring)) OR TI=(teacher tutoring)) AND TS=(basic education teachers): 6
Dialnet	Acompañamiento pedagógico al docente escolar (Pedagogical support for school teachers): 54 Apoyo pedagógico al docente y TIC (Teacher pedagogical support and ICT): 67

Literature Selection Process

This Systematic Literature Review (SLR) followed a PRISMA approach, encompassing four distinct phases: identification, screening, eligibility, and inclusion.

Collection

We conducted a thorough search in databases such as Scopus, Web of Science, ScienceDirect, SciELO, Eric, and Dialnet, using the Mendeley software and the Rayyan app. The purpose was to identify relevant studies that contribute to the scope and purposes of the SLR**.**

Screening

This stage involved a detailed review of titles and abstracts to determine their initial relevance based on pre-established inclusion and exclusion criteria. This process facilitated the elimination of studies that did not meet the research requirements and the selection of those potentially aligned with the goals of the SLR.

Eligibility

Studies identified and screened were subjected to a more in-depth evaluation. The complete content of selected articles was reviewed to ensure alignment with predefined criteria. This eligibility process ensured that the included studies were relevant and pertinent to the research objectives, as well as accessible.

Final Decision

A final decision was made to incorporate studies into analysis. The inclusion of these studies in the analysis contributes to the generation of robust conclusions and answers to the research questions.

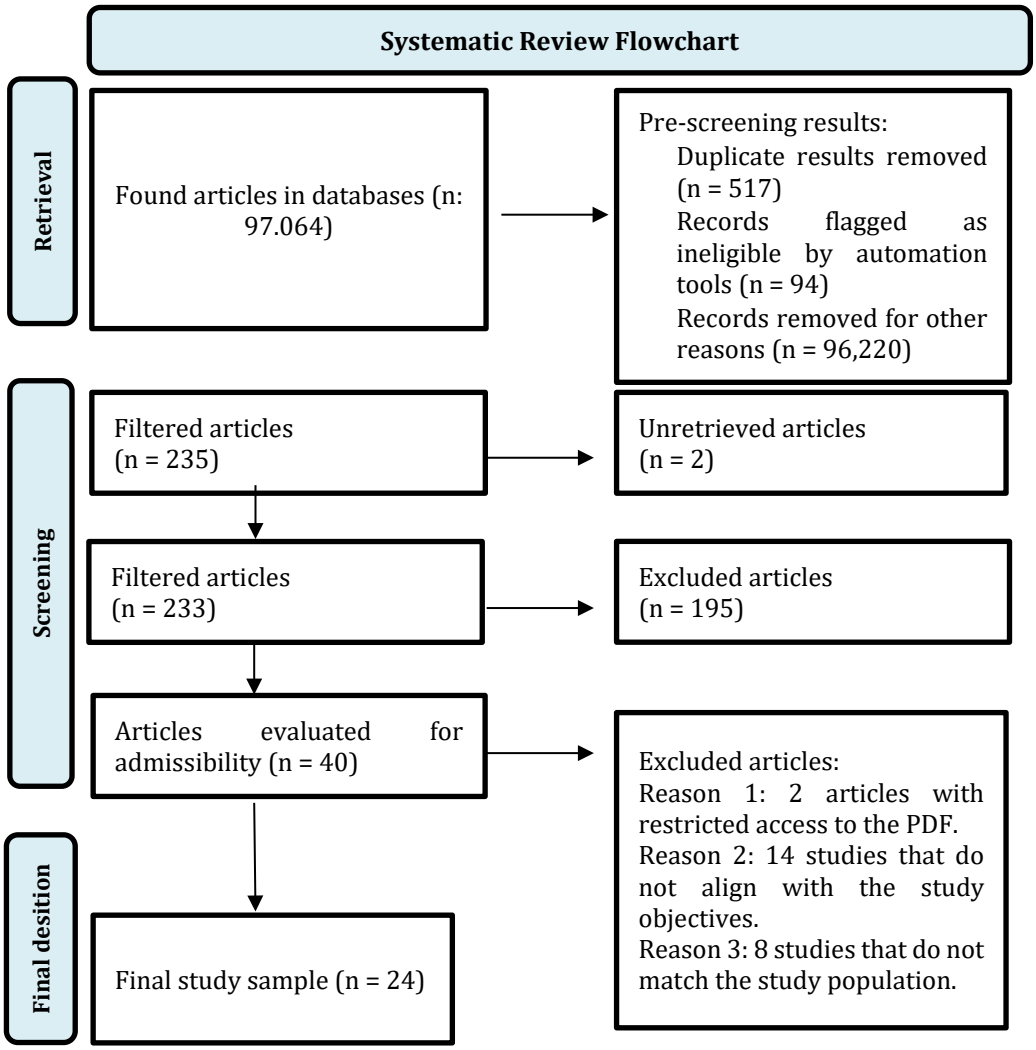

Figure 1. Literature Selection Process Flowchart

Complex search strategies were designed, employing a combination of relevant keywords and Boolean operators, tailored specifically for each database to capture the full spectrum of available literature related to our research questions.

Articles were initially evaluated by their titles and abstracts, applying meticulously defined inclusion and exclusion criteria to ensure the relevance and quality of the studies. The criteria included the range of years of publication (2020 to 2023), focus on mentoring among teaching peers, and the development of digital competencies during the pandemic. This allowed results to be refined, eliminating duplicates and irrelevant articles.

To ensure the reliability of data analysis:

Independent Review: Two reviewers independently analyzed each article selected in the screening phase, with a third reviewer resolving any discrepancies, ensuring an unbiased and thorough evaluation of each study.

Data Verification and Validation: Subsequently, detailed data extraction was carried out, using a standardized form to ensure consistency in information collection. Each step of the process was carefully documented, allowing for replicability of the study and independent verification of the findings.

Study Quality Assessment: The quality and validity of the selected studies were assessed using standardized tools, which provided a solid basis for reliably interpreting the results.

In summary, the recommendations of Naufal et al. (2021), the objective, indicators of methodological rigor, search sources and inclusion and exclusion criteria of the study were established. Keywords were used to configure the search equations in the databases (see table 1), applying filters to refine the results (see tables 2 and 3).

40 articles that met the pre-established inclusion criteria were included. When the exclusion criteria were applied, duplicate articles were deleted. In the initial phase, articles are selected by reviewing the title and abstract and in the second phase the full text was analyzed. With this procedure, 16 articles were eliminated, resulting in a sample of 24 documents considered for this review (see Figure 1).

Through a process of inductive thematic analysis, the content of the publications was carried out. This type of analysis is defined as a method for identifying and organizing the themes and subthemes that emerge as relevant categories. As such, this is a basically descriptive method to identify the most salient themes that emerge from the descriptive data (Vaismoradi et al., 2013).

Results

This section presents the outcomes derived from the systematic literature review.

RQ1: How many published studies met the inclusion criteria?

Twenty-four articles with quantitative, qualitative, mixed, non-experimental, pre-experimental, descriptive, and cross-sectional designs were identified. The selected papers were further categorized according to the following properties: publication year, authors, journal, database, and sample size.

The sample mostly originated from Latin America (12) and Asia (7), and they employed mixed (12), qualitative (7) or quantitative (7) methodological approaches. Furthermore, 14 out of the 24 articles have a sample size of less than or equal to 100 subjects.

Table 4. Papers Reviewed (n=24)

No.	Author(s) (Year)	Country	Journal	Database	Research method	Sample
1	Coutinho Campos and Pereira (2020)	Portugal	Dialogia	Web of Science	Qualitative descriptive	109 teachers, principals, and coordinators
2	Abad-Vázquez and Cuenca-Tapia (2021)	Ecuador	Dominio de las Ciencias	Dialnet	Mixed methods	232 teachers
3	Barreno Flores (2022)	Peru	Ciencia Latina Revista Científica Multidisciplinar	Google Scholar	Pre-post study	31 teachers
4	Carcausto et al. (2021)	Peru	Advances in Science, Technology and Engineering Systems Journal	Scopus	Qualitative descriptive	13 teachers
5	Torrato et al. (2021)	Philippines	Education Sciences	Web of Science	Mixed methods	33 teachers and administrators
6	Ahmmed et al. (2022)	Bangladesh	Education Research International	Web of Science	Mixed methods	116 professors
7	Rahmadi (2021)	Indonesia	Turkish Online Journal of Distance Education	Web of Science	Quantitative, descriptive	572 professors
8	Prieto-Ballester et al. (2021)	Spain	Education Sciences	Web of Science		177 professors
9	Zhindón-Calle and Ávila-Mediavilla (2021)	Ecuador	Revista Arbitrada Interdisciplinaria Koinonía	Dialnet	Quantitative, descriptive	24 teachers
10	González-González et al. (2020)	Ecuador	Revista Arbitrada Interdisciplinaria Koinonía	Dialnet	Mixed methods	115 teachers
11	Cueva Betancourt and Mosquera Rodríguez (2021)	Ecuador	Dominio de las Ciencias	Dialnet	Quantitative, descriptive	117 teachers
12	Nikolopoulou (2022)	Greece	Education Sciences	Scopus	Qualitative, descriptive	14 professors
13	Winter et al. (2021)	Ireland	Irish Educational Studies	Web of Science	Mixed methods	38 professors
14	Chan Chi and Rodríguez Pech (2022)	Mexico	Revista de Investigación en Tecnologías de la Información	Dialnet	Qualitative, descriptive	25 professors
15	Larrea Centurion (2021)	Peru	Revista Peruana de Investigación Educativa	Google Scholar	Mixed methods	75 teachers
16	Sari and Nayır (2020)	Turkey	Qualitative Research in Education	Web of Science	Qualitative, descriptive	65 professors

Table 5. Continued

No	Author(s) (Year)	Country	Journal	Database	Research method	Sample
17	Pérez-Sánchez et al. (2022)	Peru	International Journal of Environmental Research and Public Health	Scopus		347 teachers
18	Rojas-Ospina et al. (2023)	Colombia	Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud	Scopus	Mixed methods	5 teachers
19	Wulandari and Arifin (2020)	Indonesia	Journal of Physics: Conference Series	Scopus	Quantitative, descriptive	15 teachers
20	Lara Reimundo et al. (2022)	Ecuador	Revista Venezolana de Gerencia	Scopus	Quantitative, correlational	50 teachers
21	Erdoğan et al. (2022)	Turkey	Education and Information Technologies	Scopus		16 teachers
22	Top et al. (2021)	Turkey	Computers & Education	Scopus	Qualitative, descriptive	48 teachers
23	Taveras-Sánchez (2023)	Dominican Republic	Revista mexicana de investigación educativa	SciELO	Quantitative, correlational	301 teachers
24	Figueira and Dorotea (2022)	Brazil	Educação & Formação	Web of Science	Quantitative, descriptive	15 teachers

Most keywords in the literature either made reference to teaching methods or frameworks (online distance learning, teacher leadership, academic vitality) and specific peer-mentoring practices (assessment, ongoing training, asesoramiento [*mentoring*]).

RQ2. What was the state of teachers' digital competencies before the COVID-19 pandemics?

According to some papers, before the pandemics, teachers seldom used social networks, online communication platforms, and YouTube for personal purposes (study 1). However, these tools were not usually integrated into their educational practices in a pedagogical manner. Additionally, it was noted that some teachers used devices and applications for remote instruction, indicating a degree of familiarity with technology, although not within further pedagogical frameworks (study 7).

However, we found that teachers were ill-equipped for the shift to online education (studies 1, 6, 11, 12, 13, 14, 16) since their proficiency in managing platforms and technology, in general, was deficient. The common challenge identified was the lack of familiarity with the use of platforms and technological tools (studies 2 and 15). Furthermore, many teachers faced a shortage of adequate technological resources, limiting their engagement in virtual teaching environments (study 4). Overall, teachers exhibited a generally low level of digital competence. The realization of this deficiency in preparation, knowledge, and competencies in handling technological tools became apparent with the onset of the pandemic.

RQ3. What digital tools were employed for teacher support during the pandemic?

From the start of the pandemic, teachers predominantly used video conferencing platforms such as Zoom, Microsoft Teams, Skype, Google Meet, and Google Classroom (studies 1, 2, 5, 6, 7, 8, 9, 13, and 14). Other frequently used digital tools included email, text messaging, Facebook Messenger, and chat (studies 1, 2, 4, 9, 10, 13, and 14); WhatsApp (studies 1, 2, 4, 7, 10, and 14); learning platforms (studies 1, 6, and 12); and YouTube (studies 2, 8, and 13).

RQ4. Which formal strategies or programs were implemented during the pandemics, and what were their effects or outcomes? What was the timeframe involved?

Table 5. The Formal Strategies or Programs, Their Effects or Outcomes, and the Timeframe Involved

No.	Strategies/Programs	Effects or results	Timeframe
1	"*Formación para la enseñanza digital y en red*" Coutinho Campos and Pereira (2020)	Most teachers stated that there was positive-level learning in students during quarantine. Then, 80% applied what they learned in training in their classes.	June 29 - July15 2020
2	"*Asistencia pedagógica virtual*" Barreno Flores (2022)	The program significantly improved the teacher's planning tasks, as well as their ability to foster good virtual coexistence, didactic strategies, and assessment strategies in remote work.	Month and a half
3	"*Aprendo en casa*" Carcausto et al. (2021)	Teachers realized that it is possible to use technology at the early childhood level, and it is not necessary to implement a technological classroom. Early childhood education teachers showed certain negative emotions and attitudes due to the lack of digital resource management.	No data
4	STAR (Sustaining Teacher Leadership and Academic Vitality through Research) Torrato et al. (2021)	Teachers introduced changes in their way of acting, doing, planning, and studying their teaching work, improving their leadership skills and vitality.	9 weeks
5	"*Programa de formación de profesores*" Ahmmed et al. (2022)	Most teachers (68.1%) strongly agreed that the overall training session experience was positive. 54.1% of teachers strongly agreed that the training program met their expectations.	Days (no data)
17	"*Plan de capacitación*" Pérez-Sánchez et al. (2022)	Pedagogical and socioemotional limitations, as well as the lack of resources and poor connectivity, partially affected the plan's implementation. Although acceptance was satisfactory, there was uncertainty, dissatisfaction, and an obligation to attend all courses.	90 days
18	"*Implementación de un programa de formación docente enfocado a mejorar sus interacciones en aula*" Rojas-Ospina et al. (2023)	There was a notable strengthening of pedagogical support provided to students and in facilitating an environment that fosters teacher autonomy. This autonomy, in turn, was positively associated with a higher perception of cognitive and affective engagement by teachers.	Two 12-hour workshops
19	"*Estrategias para mejorar la competencia pedagógica de los docentes*" Wulandari and Arifin (2020)	The implemented strategies demonstrated a significant impact on teachers' ability to organize learning tools and use pedagogical resources effectively. Participation in seminars, training activities, and group work provided valuable opportunities for professional development.	
20	"*Monitoreo de actividades programadas y ejecutadas del acompañamiento pedagógico*" Lara Reimundo et al. (2022)	The results revealed a significant increase in Pedagogical Support values in all dimensions. Productive supervision showed improvements in observation and effective feedback. Stimulation of personal development stood out in supporting individual growth for teachers.	
21	"*Programa e-MENTE*" Erdoğan et al. (2022)	In terms of content knowledge, it is observed that the e-MENTE: PT Program has had a significant impact on preschool teachers. Modules related to the recognition and evaluation of the child, learning centers, and the teacher's role, as well as planning, implementation, evaluation, and family participation, have experienced notable improvements.	12 modules
22	"*Tutoría tecnológica*" Top et al. (2021)	The study results reveal that when teachers are given enough flexibility in their context during the "technological mentoring" program, a teacher-centered ICT integration process emerges.	Two semesters
23	"*Programa de acompañamiento pedagógico*" Taveras-Sánchez (2023)	Most teachers participating in the study exhibited a favorable attitude toward mentoring, identified as a crucial factor for their successful development. This positive predisposition was directly related to teachers' willingness to actively participate in the process.	
24	"*Capacitación competencias digitales*" Figueira and Dorotea (2022)	Initial results indicated that teachers were in an early stage of exploring the potential of technology, especially regarding educational assessment. Low levels of digital competence were observed, highlighting the need for intervention and development in this specific area.	November 2020 – May 2021

Despite their results, the identified programs generally received satisfactory acceptance from most teachers, as indicated by studies (1), (3), (4), (5), (6), and (17). This positive reception suggests that teachers valued the support provided and acknowledged its positive impact on their teaching practices and students' learning.

RQ5. What were the perceptions and experiences of teachers regarding online learning and their new digital competencies?

Digital tools were a crucial support for learning by teachers during the pandemics, with over 80% of the reported resources needing an Internet connection (study 7). However, only 50% of teachers had received training on ICT use during their teacher training (studies 8 and 9). While most teachers claimed to have a regular level of knowledge about digital competencies, many evaluated digital competencies learning resources positively (studies 2 and 11).

This shows that, despite limitations, teachers adapted to available resources for online learning. Regarding support, one study showed that during the initial year of online education, many teachers reported minimal or no assistance in developing their digital competencies. However, in the second year, improvements were observed with the implementation of seminars, support teams, and rapid training by official bodies (study 12). Despite these advances, areas for improvement were identified. Another study found that, post-mentoring, around 30% of surveyed teachers rarely or never designed or developed innovative learning materials, and only 23.5% explored new technological systems or collaboration networks (study 15).

In terms of teachers' experiences, many reported that students faced challenges due to the lack of technological resources and connectivity issues in their homes (studies 4, 12, and 14). Regarding teaching online, teachers expressed a mix of satisfaction and dissatisfaction. The first year of the pandemics brought about anxiety and irritation due to the abrupt shift to online teaching. However, during the second year, more positive sentiments were reported, demonstrating a resilient ability to face challenges (studies 6, 12, and 14).

Nevertheless, the lack of proficiency, insufficient technological support, and training in distance education contributed to the lack of confidence. Additionally, a persistent feeling of insecurity stemmed from the absence of autonomous learning strategies that ensured success (studies 6, 12, 13, 14, 16, and 17). Those with strengths in knowledge, skills, and values related to technology use adapted more effectively to the online environment and achieved positive results in virtual teaching (studies 4, 6, 14, and 17). Finally, nearly all teachers reported technical difficulties, including internet access problems, inadequate infrastructure, and challenges in virtual classroom management (studies 6, 12, 13, 16, and 17).

Conclusion

The paper reviewed 24 articles employing various methodological designs, categorizing them based on properties such as publication year, authors, and sample size. The majority of the sample originated from Latin America and Asia, utilizing mixed, qualitative, or quantitative approaches, with 14 articles having a sample size of less than or equal to 100 subjects. The bibliometric analysis revealed keywords focusing on teaching methods, frameworks, and specific peer-mentoring practices.

Findings indicated limited use of technology in educational practices, deficiencies in proficiency, and a generally low level of digital competence among teachers before the COVID-19 pandemic. During the pandemic, challenges in adapting to online education persisted, including deficiencies in platform management and a shortage of technological resources. Video conferencing platforms and other digital tools were predominantly used for teacher support, generally receiving satisfactory acceptance. Despite challenges, teachers adapted to available resources for online learning, with improvements observed in the second year of the pandemic. However, challenges persisted, including the lack of confidence in technology use, insufficient support, and technical difficulties. Despite these challenges, the review highlights the resilience and adaptability of teachers during the evolving landscape of online education.

This review shows that pedagogical mentoring has generally been assessed positively in non-experimental descriptive publications. It is undeniable that as a strategy for in-service teacher training, it yields positive results. However, it is uncommon to find a critical assessment that points out errors in its implementation and the challenging conditions in which educational leaders expect it to solve problems on its own. Ghefaili (2003) considers that mentoring conceived from the cognitive learning paradigm demands tasks of variable complexity and based on problems that, in turn, will put cognitive and metacognitive processes into practice. Especially when the apprentice is modeled by the mentor when the latter organizes and communicates the mental sequence that follows for the diagnosis and resolution of problems according to how it occurs.

It has been observed that pedagogical mentoring is a recurrent strategy in developing regions such as Latin America. Its impact may be limited unless the context in which it operates substantially improves. Our review constantly finds mentions to the digital capabilities gap among teachers. This reality could be grounded in limited budgets, difficulties in implementing enduring public policies across changing administrations, vague theoretical frameworks, challenges in proposing indicators and monitoring mechanisms, and the training of trainers itself, which, unfortunately, remains a

source of enthusiasm but lacks systematization and consensus. Mentoring is an opportunity to accumulate social capital, because mentors help their apprentices learn knowledge, attitudes and procedures. With all this, the one who receives the mentoring is inserted into a network of relationships typical of the teaching career. In this way, he accesses resources and information that will have a certain influence on his opportunities for advancement throughout his professional progress (Ramírez Plasencia, 2005).

For example, Esteban Rivera et al. (2013) identified unresolved logistical limitations. In Huánuco, Peru, mentoring for Intercultural Bilingual Education teachers required dangerous, poorly compensated travel with delays of two to three months. It is also important to consider the implicit theories underlying their prior training, which may lead teachers to adhere to pedagogical models rather than acknowledging their limitations and adapting them more effectively to local realities. Taveras-Sánchez (2023) indicated that in the Dominican Republic, pedagogical mentoring is perceived as having little impact on significant improvements in teaching, focusing on collaborative pedagogical activities, resource design, organizational climate, and advising on student discipline. Arellano et al. (2022) gathered critiques from Chilean teachers participating in pedagogical mentoring, highlighting sporadic contact, insufficient feedback, poor coordination, and non-compliance with planned activities. Likewise, González-Díaz et al. (2021) suggested, after assessing the perceptions of Colombian teachers, that a mistake to avoid is continuing pedagogical mentoring without developing control mechanisms for result verification. They emphasized the importance of respect and equity among peers.

Pedagogical mentoring involves the creation of a trusting and respectful environment, rooted in intercultural and inclusive principles (UNESCO, 2019). It also operates under a participatory leadership style, fostering a comfortable setting for educational empowerment through collaborative efforts, innovative strategy execution, and teamwork that enhances awareness of diverse educational opportunities. However, our review also shows that in Latin America and the Caribbean, the professional teaching activity tends to be individualistic, less inclined towards innovation and metacognitive skills. In some cases, authoritarian regulations negatively impact teacher education. Pérez Medina et al. (2018) noted that in Zulia, Venezuela, mentoring took on an autocratic supervisory nature, lacking dialogue and with few preventive activities.

Nonetheless, the review also found that peer mentoring is increasingly drawing the interest of educational systems and its actors in Latin America. Given the lack of effective overarching systems and processes, teachers and educational authorities build endogenous support systems through methodologies like peer support and mentoring (De la Rosa Ochoa et al., 2023); this includes the case of Peru (Santos Meza, 2023). We have tried to show that peer mentoring seems to be one of the most effective ground-up strategies to date. However, half of the studies reviewed for this research have relatively small sample sizes. Despite the bias, a lower sample size could indicate self-funded investigations.

Terrasa et al. (2019) argues that the concept enunciated by Vygotsky of the zone of proximal development is applied in mentoring processes. This term refers to the distance between the actual level of development and the level of potential development that occurs when a problem is solved based on the guidance of a more capable peer. In the case of peer mentoring addressed in this research, the mentor ensures that the apprentice teacher faces challenges in accordance with her current capabilities, that is, at the current moment of her professional training, no more and no less. To make the path clearer, the mentor uses some support or support structure, what is called scaffolding, which makes it easier for the learner to continue with tasks that she could not do individually. In this scaffolding, cognitive (skills and knowledge) and emotional (increased motivation and self-confidence) elements have been synthesized.

Prior to the COVID-19 pandemic, many teachers possessed basic digital competencies, infrequently applied in collaborative meetings or monitoring teaching performance standards. The shift to remote learning significantly increased the use of technological resources for sessions, prompting teachers to enhance their digital skills. Support from educational institutions or self-financing facilitated this improvement. Some educators, however, still face challenges in fully leveraging the potential of new educational technologies, especially those enabling remote collaboration and feedback, showing signals of unprecedented socio-emotional difficulties.

During the first two years of the pandemic, predominant digital tools included Zoom, Microsoft Teams, and Whatsapp, while others like Google Classroom or Google Drive, though known, were not commonly used by teachers, students or parents. Frustration, discouragement, and skepticism about the utility of virtual classes were commonly found among teachers and students. Weak connectivity in underdeveloped areas helped to foster these feelings. But peer-based teacher mentoring is effective to foster these new digital capabilities in experienced teachers, as shown by literature spanning over a decade (Torres Retamozo et al., 2021). On the other hand, it also supports newcomers in adapting to the school culture and offers personalized training through transparent communication, ensuring a seamless transition into the teaching profession, as shown by the study of Rodríguez-Torres et al. (2020) in Ecuador.

Analyzing the effectiveness of various educational programs is essential in adapting to the evolving educational landscape. Noteworthy studies, including *"Formación para la enseñanza digital y en red"* and *"Programa de formación de profesores,"* highlight positive outcomes and high satisfaction among participating teachers. However, lessons can be drawn from challenges faced by programs like *"Aprendo en casa"* and *"Plan de capacitación",* shedding light on issues such as limited digital resource management and implementation challenges. These examples underscore the importance

of considering contextual factors, resource availability, and connectivity in designing effective teacher training programs in the changing educational landscape.

If approached as part of sociocultural learning, peer mentoring also involves social interactions based on the culture and the historical moment in which they occur and are transmitted. In such circumstances, learning is never separated from experience, quite the opposite: it is produced and multiplied in interaction with others through reflection, discussion and negotiation of meanings (Terrasa et al., 2019).

While it is true that the presentation of results may give the impression that pedagogical mentoring has solved all issues related to in-service teacher training, that is not the case. In Ecuador, Cedeño Zambrano and Arroyo Vera (2022) emphasized the need for continuous pedagogical mentoring, recognizing that its virtual mode overlooks certain technical challenges, including internet speed, computer conditions, and familiarity with handling new educational technologies (p. 49). Similarly, Colazzo Duarte and Cardozo-Gaibisso (2021) found that in Uruguay, several novice teachers participating in pedagogical mentoring for the first time were able to do so because the mentoring's scope was not limited to a local or provincial geographic demarcation but rather national (p. 18). It's possible that if the coverage had been more restricted, they might never have been invited to receive mentoring from more experienced teachers.

In conclusion, the review of literature underscores the generally positive assessment of pedagogical mentoring as an effective strategy for in-service teacher training. However, critical assessments highlighting errors in implementation are lacking, hindering the realization of its full potential. The digital capabilities gap among teachers in developing regions, logistical challenges, and individualistic tendencies within the teaching profession pose significant hurdles. Peer mentoring emerges as a promising ground-up strategy, gaining traction in Latin American educational systems. The COVID-19 pandemic accentuated challenges in leveraging digital tools, prompting a shift towards effective peer mentoring for enhancing digital skills. While some programs showed over 50% effectiveness, lessons from initiatives addressing connectivity issues provide valuable insights. Continuous improvement, especially in virtual modes, is crucial, with an emphasis on nationwide coverage for inclusive educational support. In essence, while pedagogical mentoring holds promise, addressing challenges and embracing innovative strategies are imperative for its sustained efficacy in Latin American educational landscapes.

During the literature review, some key dimensions were discovered that could attract the attention of researchers. Although it is true that the peer mentoring studied here takes place in school education, the findings show an attractive potential if the case of higher education is analyzed. Future explorations on the topic could emphasize the systematization of experiences, the analysis of their foundations and the professional training models implicit in the implementation of peer mentoring in university teachers. It would be interesting to note if behind numerous names such as accompaniment, tutoring or mentoring, trends are identified not so much associated with formative evaluation or the autonomous and collegial development of teachers, but rather with the standardization and control of the teaching profession (Vezub, 2011).

In addition, the study deals with mentoring by a manager or an experienced teacher who is in charge of a younger teacher or one with some limitations in their performance. Part of its value is to encompass the experiences produced about mentoring before and after the pandemic. This would invite further research into the results or perceptions of mentoring among managers. That is, between those who usually occupy management positions and those who will assume them for the first time. How does this gradual learning occur? Is the mistrust between teaching peers or between directors and university teachers diluted or aggravated in school education?

Some countries have successfully incorporated peer mentoring into public policy. According to the Ministry of Education of Peru (Minedu), pedagogical support (also known in English as peer mentoring or educational companionship) is an important set of practices focused on primary and secondary education and materializes through three interventions: classroom visits, micro-workshops led by pedagogical supporters and teacher coordinators, and teacher update workshops led by a trainer providing pedagogical support (Minedu, 2019). Santos Meza's (2023) systematic review illuminates a robust and positive correlation between peer mentoring and teaching performance in higher education post-2014 university reform, which emphasized teaching autonomy (Minedu, 2018). This result is important for countries that face teacher training issues that start in higher education (UNESCO, 2019) and are still prevalent due to the lack of induction processes for future teachers in most schools, with a resulting unpreparedness towards change (Rodríguez-Torres et al., 2020; Siccha-Cuisano, 2021).

Specifically, UNESCO (2019) notes that Peru lacks an institutional theoretical framework to support its importance and guide potential adaptations to other forms of educational services (p. 8). Additionally, it highlights the lack of awareness among those responsible for pedagogical mentoring regarding the need for spaces dedicated to strengthening disciplinary and pedagogical content, such as courses and workshops. Furthermore, it emphasizes the importance of ensuring the availability of adequately trained mentors with socio-emotional competencies essential for building effective relationships with the teachers they support (p. 23). Peer-mentoring needs to keep being consistently implemented with the same human effort and principles. When going virtual, it should continue strengthening the capabilities of teachers in the country, as well as considering inequalities in connectivity, and providing, when possible, working computers, along with qualified trainers and teachers.

This review is valuable to understand the peer mentoring process in Peruvian basic education, carried out by a manager or an experienced teacher. It presents findings regarding the origin of the majority of studies, the methodological approach assumed in a sample of 24 articles, the level of digital competence of teachers, the insufficient technological support received in the majority of educational institutions and the resilient adaptation that occurred. in several of these cases. However, it is imperative that some of the more obvious limitations be recognized. The basically mixed nature of the research covered on peer mentoring also generates the possibility of contrasting and deepening results, both from the perspective of students and managers. Furthermore, it was also evident that the majority of studies came from Latin America, so their geographical scope is limited. This represents an opportunity to expand the reach to other latitudes. In part, this also restricts the generalizability of the findings. Therefore, other research with a greater intercultural component is demanded to expand the understanding of how peer mentoring was implemented during the pandemic. Likewise, the time frame included was reduced, 2020 to 2023, which would omit a certain number of subsequent investigations or from the years 2018 and 2019. It would be interesting if longitudinal studies could provide relevant information in this regard.

In summary, while it is true that this study on peer mentoring provides outstanding knowledge, it also has aspects that can be explored and refined. When these limitations are addressed and a more holistic and broader stance is adopted, then researchers will be able to contribute to a much more inclusive understanding of peer mentoring and the improvement of teacher education and successful pedagogical practices globally.

The authors declare that they are responsible for this educational content. It is noted that Juan Santos-Rico was in charge of the search and selection of information, as well as the writing of the theoretical framework. Likewise, Roberto Bellido-García was in charge of the methodology, data analysis and everything related to the PRISMA Declaration, while Gerardo Rejas-Borjas was in charge of reviewing the wording, APA 7 citations and references and the final presentation of the manuscript.

Authorship Contribution Statement

Santos-Rico: Concept and design, data acquisition. Bellido-García: Data analysis / interpretation, supervision, final approval. Rejas-Borjas: Drafting manuscript, critical revision of manuscript.

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