

Analytical reasoning and evidence-based decision-making in initial teacher training: A systematic review (2014-2024)



Sergio Sepúlveda-Vallejos^a  | Alexis Lizana-Verdugo^b   | Karla Valdebenito^a  |
Alejandro Almonacid-Fierro^a 

^aDepartment of Education Sciences, Universidad Católica del Maule, Talca, Chile.

^bDepartment of Education Sciences, Universidad Autónoma de Chile, Talca, Chile.

Abstract Reflective processes based on scientific evidence represent a challenge for teacher training, which must adopt a critical and transformative approach to address this. These processes enable future teachers to construct their professional identities, appreciate the value of informed decision-making, and improve their work. The objectives of the study are to analyse reflective processes in initial teacher training and their relationship with scientific evidence, identify the mediators of reflection, and characterise the evidence that drives reflective processes. This review examined studies published between 2014 and 2024 in English and Spanish, obtained from the Scopus, Web of Science (WoS) and ERIC (Education Resources Information Centre) databases. Through the study selection process in accordance with the PRISMA protocol, 12 studies were identified that could be relevant to the objectives of this work. The results allowed us to identify three thematic trends and argue that mediation and reflection devices allow reflective teaching practice to be oriented towards the situated, the relational and the critical. Likewise, this reflection is enriched by integrating classroom records, studenvoices, literature and critical questions for a conscious and accurate professional analysis that allows a transition from the technical-instrumental-descriptive to the critical and emancipatory aspects of teaching. Finally, the study confirms that teacher reflection is a multilevel process in which technical approaches are persistent. Therefore, the challenge is to move towards collaborative and critical approaches that allow for the articulation of all areas involving teacher responsibility. Its impact lies in demonstrating how systematic, evidence-based reflection improves teaching, develops critical reflective thinking, and leads to more equitable pedagogical practices.

Keywords: reflection, scientific evidence, teachers

1. Introduction

Improving the quality of teacher training, particularly in terms of practical experience and the promotion of reflective processes, is a current challenge in education, given its transformative and comprehensive value in terms of knowledge. The use of evidence and the application of reflective processes should be encouraged within a reflective culture or reflective habitus (Perrenoud, 2011; Woldt & Nenad, 2021), which allows them to be conscious and methodical in achieving professional development, understanding the teaching profession, and understanding the ideas and ways of teaching that underlie it.

Reflection provides data to form a complete understanding of the context in which teaching and learning occur. This leads us to believe that the use of evidence and teacher reflection should be based on the premise of educational improvement, and that teachers should view their work as a process of self-examination and constant learning (Korthagen, 2004; Tiainen et al., 2024). In the current context, where the aim is to train competent teachers in complex, uncertain, and often unequal environments, reflection is a fundamental practice for questioning, interpreting, and understanding pedagogical experiences. It is not understood as a basic or exclusively introspective exercise, but rather as part of a structured framework that relates data, the conceptual framework, and lived experiences, allowing for more conscious and critical professional learning that tends toward continuous improvement. The above considers reflection as an inter-psychoic, non-linear, and therefore, non-hierarchical process (Correa et al., 2010; Lane & Roberts, 2022).

The literature presents different perspectives on what we understand as reflection, bringing us closer to a more complete characterization of it and establishing certain forms or levels that offer us the possibility of achieving it gradually. However, various authors (Gutiérrez-Tapias, 2018; Moral, 1997; Tajeddin & Aghababazadeh, 2018) suggest the use of teaching strategies or tools to promote reflective processes (reflective journals, video analysis, narrative classes, teaching portfolios, etc.) in learning environments, reinforcing the idea that reflection can be systematized and developed through the work that a tutor promotes in the initial teacher training.



These devices incorporate interpersonal mediation, which is necessary during for initial training. Tutors, mentors, supervisors, and so-called critical friends (Fuentealba & Russell, 2016; Michos & Petko, 2024) help future teachers incorporate other perspectives into their own work, thereby making reflection a space for dialogue and collaboration, where meanings are negotiated and learning is shared, allowing them to acquire a more solid professional identity and a much greater awareness of their ethical and social responsibility.

Evidence is an integral component of reflection processes and educational quality (Sepúlveda et al., 2025). Reflection is enriched by concrete documentary evidence, overcoming subjectivity and thus advancing toward an improvement in pedagogical knowledge, generating training processes through which teachers can contrast their assessments based on more objective data, and, in turn, broaden the horizons of their pedagogical knowledge. The use of evidence in reflection can give rise to pressures that restrict the teacher's critical capacity; therefore, it is necessary to reconcile the value of the most objective and documented evidence with the more situated interpretation experienced by teachers, all because teaching practice is always contextual, relational, and related to ethical considerations, values, and policies, which Korthagen (2010), called Gestalt.

Recent studies have concluded that reflective processes can range from descriptive and technical levels to more critical and transformative levels (Lizana-Verdugo & Burgos-García, 2024). The first case describes reflection in terms of identifying errors and describing procedures, while the second means problematizing beliefs by understanding institutional tensions in the educational world and acknowledging the inequalities that also occur in education, adjusting and transforming our educational practice and environment.

Consequently, reflective processes and the use of evidence in teacher training should not be understood as isolated practices, but rather as an intertwining of mediations, sources, and temporalities. Their importance lies not only in improving pedagogical strategies, but also, in particular, in contributing to the training of critical, conscious, and active teachers in relation to transformative education. To this end, it is necessary to create training spaces that encourage individual and collaborative reflection, dialogue with different types of evidence, and the planning of actions that not only respond to the unique characteristics of the classroom but also contribute to equity and social justice. This study had two objectives. First, to analyze how reflective processes in teacher training relate to using scientific evidence in lesson planning. Second, to identify the mediations of reflection that structure and guide training practices. Finally, we characterized the evidence mobilized during reflective processes.

2. Materials and Methods

To rigorously address the research objective, a systematic literature review design was chosen, following the guidelines proposed by Page et al. (2021). This methodology was selected for three reasons. First, it allows a research question to be addressed by identifying, selecting, and synthesizing a broad and relevant corpus of empirical and theoretical studies to answer the question. Second, it helps reduce potential biases by promoting traceability and transparency at each stage of the review process, thereby reinforcing the reliability and replicability of the study. Third, it enables an up-to-date understanding of the field of analysis by identifying knowledge gaps, emerging trends, and opportunities for future research. To ensure methodological rigor, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol was adopted, which is widely recognized for standardizing systematic review quality (Page et al., 2021).

2.1. Study search strategy

The bibliographic search strategy was implemented in three internationally renowned academic databases: Scopus, Web of Science (WoS), and ERIC (Education Resources Information Center). These platforms were selected for their wide coverage of peer-reviewed scientific literature and rigorous editorial standards, which guarantee the quality, timeliness, and relevance of the indexed studies. The search was conducted using the advanced options of each database, employing combinations of keywords derived from previous research and structured using Boolean operators ("AND," "OR"), applied to specific fields such as the title, abstract, and keywords of the articles.

To rigorously delimit the documentary corpus, specific filters were applied that functioned as both eligibility and exclusion criteria for the data. First, only empirical articles with full texts available were considered, as they provided verifiable findings that were applicable to the analysis. Second, the search was restricted to publications between 2014 and 2024, ensuring that the knowledge reviewed was current. Finally, studies published in English or Spanish were included, as these are the languages most widely used in international scientific dissemination in the field of education. The details of the terms used and filters applied are presented in Table 1, and the specific inclusion and exclusion criteria are presented in Table 2.

2.2. Study selection strategy

The study selection process was conducted in three sequential phases according to the PRISMA protocol (Figure 1). The first stage, corresponding to identification, was conducted between May 14 and June 14, 2025. During this period, the search equation was applied to the selected databases, yielding 689 initial records. These results were filtered according to the inclusion and exclusion criteria, reducing the sample size to 490 documents. The records were then exported to a spreadsheet

and managed using Mendeley bibliographic management software, which allowed 67 duplicates to be identified and eliminated.

Table 1 Search equation.

Database	Equation
WoS	("evidence-based" OR "evidence based" OR "evidence based practice" OR "evidence-based practice") AND ("teacher educator" OR "teacher educators" OR "teacher trainer" OR "teacher trainers" OR "university teacher" OR "university teachers" OR "university professor" OR "university professors") (Topic) and 2024 or 2023 or 2022 or 2021 or 2020 or 2019 or 2018 or 2017 or 2016 or 2015 or 2014 (Publication Years) and Article (Document Types) and English or Spanish (Languages).
Scopus	TITLE-ABS-KEY (("evidence-based" OR "evidence based" OR "evidence based practice" OR "evidence-based practice") AND ("teacher educator" OR "teacher educators" OR "teacher trainer" OR "teacher trainers" OR "university teacher" OR "university teachers" OR "university professor" OR "university professors")) AND (LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023) OR (PUBYEAR , 2024)) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English") OR LIMIT-TO (LANGUAGE , "Spanish"))
Eric	(reflective OR reflection) AND ("evidence-based" OR "evidence based" OR "evidence based practice" OR "evidence-based practice") AND ("teacher educator" OR "teacher educators" OR "teacher trainer" OR "teacher trainers" OR "university teacher" OR "university teachers" OR "university professor" OR "university professors")

Table 2 Inclusion and exclusion criteria.

Category	Inclusion criteria	Exclusion criteria
Time range	Publications between January 2014 and December 2024.	Publications prior to 2014 or after 2024.
Language	Studies written in Spanish or English.	Publications in other languages.
Access	Studies with full text available.	Documents without full text access, abstracts, or conference presentations not formally published.
Document type	Empirical research (qualitative, mixed methods, self-studies, case studies, action research, ethnographies).	Theoretical essays, non-systematic narrative reviews, editorials, comments, or opinions without empirical support.
Population	Teachers in initial training, teacher trainers, mentors, or coaches in training processes.	School students or teachers with no connection to teacher training.
Context	Studies conducted in formal teacher training contexts (universities, certified programs, partner schools).	Research conducted in informal, non-institutional contexts or non-pedagogical technical training contexts.
Thematic focus	Studies that explicitly address the relationship between teacher reflection and the use of scientific evidence (any type of data).	Research that does not explicitly link reflection and evidence, or that addresses only one of these elements in isolation.

The second phase, corresponding to screening, took place between June 14 and June 28. At this stage, the titles and abstracts of the remaining documents were reviewed, leading to the preliminary selection of 12 studies that showed potential relevance to the objectives of this study. Finally, during the inclusion stage, conducted between July 1 and 14, the texts were read their entirety to verify their thematic relevance and compliance with the established methodological criteria. The final inclusion of the 12 previously selected articles was confirmed.

All procedures were carried out independently by two researchers, thus ensuring greater reliability in decision-making. In cases where discrepancies arose, they were discussed and resolved by consensus among the authors.

2.3. Data analysis strategy

The data extraction and analysis processes were conducted in two successive stages. The first stage, conducted between July 1 and 14, 2025, consisted of a descriptive review of the included studies, through which their main methodological characteristics and findings were organized into comparative matrices, tables, and figures, providing an overview of the selected corpus.

The second stage, conducted between July 15 and 26, 2025, involved the development of a reflective thematic analysis guided by the methodological principles of Braun and Clarke (2019). This approach made it possible to identify patterns of meaning in the data through a three-phase qualitative coding process that involved the following: First, open coding was performed to detect significant units emerging directly from the text. Next, selective coding was applied to group the initial



codes around articulating sub-themes. Finally, axial coding was performed, which allowed for the structuring of thematic categories at a higher level of abstraction based on the relationships between the subcategories.

NVivo 15 software was used to systematically organize the qualitative data. To ensure interpretive validity and mitigate potential biases, two researchers independently analyzed the data, comparing and contrasting their results in successive collaborative review sessions until a consensus was reached regarding the final categorical structure.

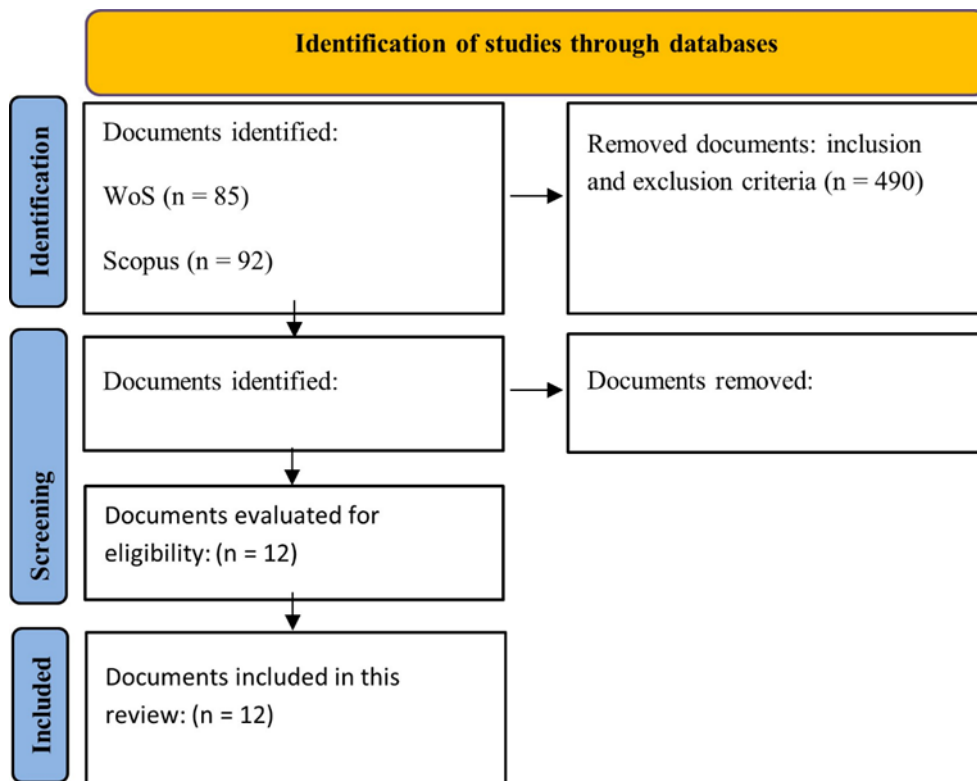


Figure 1 PRISMA protocol.

3. Results and Discussion

Table 3 presents the results obtained in the bibliographic searches, arranged chronologically and providing an overview of publications that consider reflective processes and scientific evidence in teacher training. The description considers: Reference, objective, methodology, type of reflection, and relationship between reflection and evidence.

3.1. Thematic trends in the studies

The analysis of the articles allowed us to identify three main categories or thematic trends: a) mediation and reflection devices, b) evidence ecologies, and c) types and timing of reflection. The research studies that comprise the corpus for each category are presented and described below (figure 2). It is important to note that some studies covered two or more topics; however, they were classified according to their main topic.

In the reviewed works, it can be observed that teacher reflection is a complex process in which three interdependent dimensions converge. First, mediations and devices act as channels that guide reflection, whether through technological tools, training artifacts, or interpersonal support that structures and shapes the reflective exercises. Second, evidence ecologies constitute the inputs that determine what to reflect on, as they provide the data, experiences, and interpretive frameworks, from classroom records to international standards, that inform practice analysis. Finally, the types and temporalities of reflection define what to reflect on, that is, the depth and scope of the process, which can range from immediate adjustments to retrospective analyses or transformative projections of a critical and emancipatory nature. Together, these three dimensions allow us to understand reflection not as an isolated activity but as a dynamic framework that articulates sources, content, and purposes, thereby giving meaning and direction to professional teacher development.



Table 3 Articles included in the review.

Reference	Objective	Methodology	Reflection	Reflection–evidence relationship
Seung et al. (2014)	Exploring understanding of scientific inquiry traits in primary school trainees.	VAT analysis of 33 lessons	on; collaborative; limited for-action	Reflection uses evidence from classroom episodes, but understanding of inquiry is superficial; mentors and trainees interpret it differently.
Walsh and Mann (2015)	Rethinking reflective practice towards collaborative and data-led approaches.	Conceptual + cases; transcripts	in/on; dialogic; critical	Reflection is redefined as collaborative, data-led research, as opposed to a mere institutional obligation.
Hamilton (2018)	Exploring the identity transition from school teacher to university lecturer via portfolio.	Self-study via teaching portfolio	in/on; critical; identity	he portfolio acts as a mediator for critical reflection and identity; multiple evidence supports the transition to university lecturer.
Whang-Sayson et al. (2017)	Examine the effects of the CalTeach program on participants who did not pursue teaching.	Survey (n=226)	on; critical; identity	Reflection allows us to reevaluate the teaching profession and transform civic identity; evidence translates into social awareness.
Nagro et al. (2020)	Propose a self-directed approach to PD based on video analysis (classroom management).	Innovation/practice article + case	on; for-action; identity	Reflection shifts from subjective memories to objective analysis of classroom data; it takes shape in action plans (4R cycle).
Ciampa and Reisboard (2020)	Exploring how postgraduate action research transforms the identity of literacy leaders.	Case; action research + video + blogs	in/on; critical; for-action	Critical reflection and identity formation are framed within action research; evidence validates intuitions and guides change and leadership.
Shannon et al. (2021)	Analyze coach–teacher interactions in Practice-Based Coaching.	Mixed; coded feedback meetings (CPT-RVI)	guided reflection; collaborative; problem-solving	Reflection arises from the joint analysis of evidence with coaches; the balance between praise and criticism guides the appropriation of evidence-based practices.
Miyake-Trapp and Wong (2021)	Present CLRT to promote critical reflection in TESOL.	Conceptual + tool design (CLRT)	critical; contextual; for-action	Critical reflection is guided by CLRT; evidence allows us to move from analyzing beliefs to transformative praxis with a focus on social justice.
Ho (2022)	Understanding the role of qualitative data in teaching decisions.	Multiple-case; interviews, obs., docs	in/on; critical	Reflection articulates professional judgment to integrate multiple sources, questioning the hegemony of standardization.
Turan and Yiğitoğlu (2023)	Analyze epistemic asymmetry in post-observation feedback (POCs).	CA of 17 post-observation conferences	collaborative; critical; conditioned by evaluation	Reflection depends on the mentor's epistemic management: it is activated when authority is reduced and turned off when evaluation predominates.
Mutluoğlu and Balaman (2023)	Analyze the use of VEO in post-observation conversations in online EFL practice.	Video-mediated post-observation; qualitative CA of interactions	for/in/on-action	Reflection is triggered around tagged clips; evidence organizes feedback, but the mentor concentrates interpretation.
Horváth et al. (2025)	Validate DigCompEdu as a self-reflection tool for trainers.	Survey/PLS-SEM validity study	self-assessment; critical (bias awareness)	Self-assessment reflection compares perceptions with objective results; evidence reveals overestimation and guides digital training.



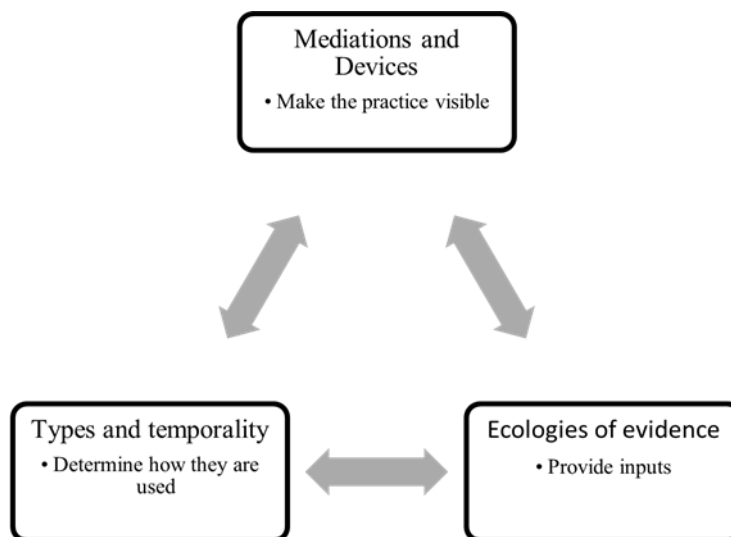


Figure 2 Dimensions analyzed in the documents are as follows.

3.2. Mediation and reflection tools

This category refers to the resources, tools, and support contexts that structure, guide, and enable reflective practice among teachers and those training to become teachers. In this sense, reflection does not arise spontaneously or in isolation, but is constantly mediated by specific tools that allow for the observation, recording, analysis, and questioning of educational practices.

Among these mediations, those of a technological nature were identified first, such as video analysis platforms that enable the systematic review of classes (VEO) in Mutluoğlu and Balaman (2023), video analysis tools (VAT) in Seung et al. (2014), CT Scan and Reflection Matrix in Nagro et al. (2020), CPOT-RVI interaction coding protocols in Shannon et al. (2021), and DigCompEdu digital self-assessment questionnaires in Horváth et al. (2025). Similarly, critical tools have been designed to promote social and political awareness, such as the Critical Language Reflection Tool (CLRT) presented by Miyake-Trapp and Wong (2021). These instruments facilitate access to objective evidence of practice and promote systematic and rigorous analytical processes.

Second, there are formative artifacts that support the systematization of reflection, such as teaching portfolios (Hamilton, 2018), blogs and reflective narratives in action research projects (Ciampa and Reisboard, 2020), and reflective journals and essays linked to service-learning experiences (Whang-Sayson et al., 2017). These devices play a key role in converting experience into analyzable material and simultaneously into documented evidence of professional development.

Similarly, interpersonal mediations stand out, where the support of mentors and supervisors (Turan and Yiğitoğlu, 2023), structured coaching (Shannon et al., 2021), and the figure of critical friends (Walsh an Mann, 2015; Hamilton, 2018) are fundamental to grounding the reflection processes in a dialogical and collaborative framework. These instances not only enrich the analysis of practice but also allow for the adjustment of meanings, validation of perspectives, and projection of concrete changes.

In line with the above, mediations, whether digital, institutional, or interpersonal, constitute a structural framework that makes teaching practices visible and provides new possibilities for interpretation. Thanks to them, reflection can unfold with greater depth, shared richness, and transformative orientation, favoring both the improvement of immediate practice and the construction of more critical and conscious professional identities.

3.3. Ecologies of evidence

This category refers to the various sources of information on which teachers and teacher educators base their reflective processes to understand, evaluate, and transform their practices. The notion of ecology highlights that evidence is not limited to a single type of source but encompasses a network of materials, experiences, and frameworks that coexist and interact, thereby giving meaning to professional reflection.

First, there is situated evidence directly linked to classroom practice and immediate teaching experience. This type of evidence is expressed in class recordings and transcripts, observation notes, and excerpts selected by the practitioners or trainers themselves (Mutluoğlu & Balaman, 2023; Seung et al., 2014; Shannon et al., 2021; Turan and Yiğitoğlu, 2023; Turan & Yiğitoğlu, 2023). These sources allow for a detailed analysis of what occurs in pedagogical interactions and constitute the most recurrent basis for reflection in the studies reviewed.

Second, there is relational evidence, which highlights the voice of students, interactions with peers, and recognition of teachers' intuitions or perceptions. Examples of this can be found in the work of Ho (2022), who places a central value on



qualitative data produced in school contexts, and Whang-Sayson et al. (2017), where students' reflections on service-learning activities become inputs for rethinking teaching and social commitment.

Similarly, structured or standardized evidence is important because it provides reference frameworks for measuring, comparing, or systematizing practices. This includes self-assessment questionnaires such as DigCompEdu (Horváth et al., 2025), coaching and fidelity protocols (Shannon et al., 2021), and NRC scientific inquiry frameworks applied in VAT (Seung et al., 2014). While these tools provide rigor and comparability, studies have shown that they can also strain reflection when imposed rigidly or without context.

Likewise, some studies recognize the importance of external evidence from the scientific literature, international standards, and educational policies (Ciampa & Reisboard, 2020; Miyake-Trapp & Wong, 2021). In these cases, reflection is strengthened when teachers analyze their own practice and engage in dialogue with theoretical and normative frameworks that broaden the possibilities for interpretation and action.

Finally, the idea of critical and political evidence is incorporated, understood as questioning the structural conditions of inequality, institutional biases, and policies in which their teaching processes are situated. Such is the case of Ho (2022), who emphasizes the limitations of standardized assessment; Hamilton (2018), who problematizes tensions between pedagogical care and institutional norms; and Miyake-Trapp and Wong (2021), who promote critical awareness of dominant linguistic ideologies. Taken together, the category of ecologies shows that teacher reflection draws on multiple sources of information and that its transformative potential depends on how this evidence is articulated and legitimized, whether from the micro level of situated experience, through the meso level of the relational and structured, or to the macro level of the critical and normative. This diversity of inputs not only strengthens the reflective process but also allows practice to be linked to research and broader ethical and political commitments to be made.

3.4. *Types and timing of reflection*

This category refers to the moments, forms, and depths at which reflection manifests in the practice of teacher educators and teachers-in-training (Table 4). This dimension allows us to distinguish not only when reflection occurs (in action, after action, or projected toward action) but also the level of complexity it reaches, moving from the technical-instrumental to the critical and emancipatory. At the most immediate level, reflection appears in action, linked to the pedagogical adjustments made during the teaching and learning process is taking place.

This can be seen in the works of Mutluoğlu and Balaman (2023) and Ho (2022), where teachers make immediate decisions in response to emerging situations in the classroom. Similarly, in the studies by Ciampa and Reisboard (2020) and Walsh and Mann (2015), systematic observation of discourse and interaction allowed them to modify their practice in real time. The second moment is reflection on action, understood as the retrospective analysis that occurs once the practice is complete.

This type of reflection is widely documented in the studies discussed and is supported by specific records and mediation. Examples include post-observation video clip analyses (Mutluoğlu & Balaman, 2023; Seung et al., 2014), blogs and reflective narratives (Ciampa and Reisboard, 2020), teaching portfolios (Hamilton, 2018), and the video analysis cycle proposed by Nagro et al. (2020). All these devices facilitate a process of critical rereading that allows for the identification of strengths, weaknesses, and patterns in pedagogical practice.

Reflection for action, aimed at planning future improvements, appears in research that emphasizes the projection and design of new practices. These include goal setting within the framework of Practice-Based Coaching (Shannon et al., 2021), the development of improvement and leadership plans in action research projects (Ciampa and Reisboard, 2020), planning matrices derived from the 4R cycle (Nagro et al., 2020), and proposals for emancipatory action promoted by CLRT in TESOL contexts (Miyake-Trapp and Wong, 2021).

Beyond this temporal dimension, studies also identify levels of depth of reflection, since, in many cases, reflection remains at a technical or descriptive level, as is the case with the identification of characteristics of scientific inquiry by practitioners (Seung et al., 2014), which was partial and superficial. However, other studies go further and demonstrate critical reflection, understood as the ability to question beliefs, assumptions, and institutional tensions. Examples of this are Ho (2022), who problematizes the overvaluation of standardized data; Walsh and Mann (2015), who warn of the risk of bureaucratization of reflective practice; Hamilton (2018), who highlights tensions between institutional policies and the ethics of care; Turan and Yiğitoğlu (2023), who analyze practitioners' resistance to the epistemic power of the mentor; and Miyake-Trapp and Wong (2021), who invite us to question dominant linguistic ideologies in English language teaching.

Some studies address a level of emancipatory reflection, where the reflective exercise not only seeks to understand or improve practice but also to transform it from the perspective of social justice and ethical-political commitment. This is the case of Whang-Sayson et al. (2017), where service learning enhances students' civic engagement with public education, and Miyake-Trapp and Wong (2021), who articulate critical reflection with pedagogical actions aimed at linguistic equity and the defense of learners' rights.

Finally, the articles show that teacher reflection is configured as a continuum that ranges from the immediate and technical (in-action), through the analytical and retrospective (on-action), to the prospective (for-action), incorporating deeper levels of critical and emancipatory characteristics. The richness of this process depends on the available mediations and

evidence and the ability of the teacher or trainer to problematize their practice in relation to broader frameworks of identity, equity, and educational transformation.

Table 4 Topics addressed by category of analysis.

Article	Mediations and devices	Ecologies of evidence	Types/Temporality
(Mutluoğlu and Balaman, 2023)	VEO digital mediation in POCs	Situated evidence: videos + student reactions	In-action (mentor intervenes), On-action (post-observation), Limited for-action
(Ho, 2022)	Peer dialogues; collectively validated insights	Formal/informal qualitative evidence + quantitative data	In-action (adjustments in secondary education), On-action (retrospective analysis), Criticism (questions standardization)
(Ciampa and Reisboard, 2020)	Blogs, video analysis, action research	Mixed evidence: video, surveys, tests, literature	In-action, On-action (blogs, reports), For-action (improvement plans), Critique/Identity
(Walsh and Mann, 2015)	Tools: SETT, stimulated recall, critical friends	Micro evidence: transcripts, classroom recordings	In-action, On-action, Critical (against bureaucratization), Dialogic
(Whang-Sayson et al., 2017)	Service-learning + discussions with mentors	Experiential and political evidence (social discourses)	On-action (essays), Critical (educational inequalities), Emancipatory (civic engagement)
(Shannon et al., 2021)	Practice-Based Coaching, CPOT-RVI	Observational and structured evidence: videos + checklists	On-action (guided feedback), For-action (planning), Collaborative
(Hamilton, 2018)	Teaching portfolio + peer feedback	Documentary evidence: student/peer feedback, panels	On-action (portfolio), Criticism (institutional tensions), Identity
(Nagro et al., 2020)	CT Scan, Reflection Matrix, 4R cycle	Objective digital evidence (videos + matrices)	On-action (video), For-action (future plans), Identity
(Horváth et al., 2025)	DigCompEdu as a self-assessment tool	Standardized evidence: questionnaire + PLS-SEM analysis	Self-assessment (on-action), Critical (self-perception bias)
(Seung et al., 2014)	VAT (Video Analysis Tool)	Structured evidence: NRC-coded clips + validation	On-action (clips), Collaborative (mentor-novice), Critical (gaps in understanding)
(Turan and Yiğitoğlu Aptoula, 2023)	POCs in Zoom, mentor regulates asymmetry	Multimodal evidence: videos, notes, gestures, categorizations	On-action (POC review), Critique (resistance to judgments), Conditioned by evaluation (assist vs. assess)
(Miyake-Trapp and Wong, 2021)	CLRT (Critical Language Reflection Tool)	Critical evidence: assumptions, sociopolitical context, TESOL standards	For-action (emancipatory actions), Deep critique, Emancipatory

The findings of this systematic review indicate that reflective processes in teacher training are not isolated practices but rather emerge from the dynamic interaction between mediations, evidence ecologies, and types/temporalities of reflection. This configuration confirms Korthagen's (2004, 2010) assertion regarding the need to understand reflection as a complex system that integrates cognitive, emotional, and contextual dimensions rather than as a purely technical process. Likewise, the results are in line with Perrenoud's (2011) proposal of reflective habitus, in that they show that reflection unfolds in a situated and systematic way when there are various concrete devices that support it, such as video analysis, portfolios, or mentoring.

In line with previous studies (Walsh and Mann, 2015; Ciampa and Reisboard, 2020; Shannon et al., 2021), it has been observed that the incorporation of technological and interpersonal mediations amplifies the possibilities of pedagogical analysis but also generates tensions around the control of the interpretation developed by the researcher. Evidence suggests that, although digital devices facilitate the objectification of practice, the epistemic asymmetry between the mentor and practitioner can condition the depth of reflective practice (Turan and Yiğitoğlu, 2023). This poses the challenge of moving towards collaborative and dialogical models of reflection, preventing technological tools from becoming mere mechanisms for monitoring the process.

With regard to evidence ecologies, this review confirms that teacher educators mobilize multiple situated, relational, structured, and critical sources to inform their professional judgment and decision-making. However, there is a predominance of situated and standardized evidence over critical and political evidence, which could limit the transformative potential of reflection (Ho, 2022; Miyake-Trapp and Wong, 2021). In this sense, the results invite us to question the hegemony of normative devices and promote the integration of ethical and sociopolitical frameworks that allow reflection to be linked to a commitment to equity and social justice in pursuit of transformation.

In terms of types and temporalities, the studies reviewed show a continuum ranging from technical levels of practice description to critical and emancipatory levels of practice. However, most research focuses on on-action and for-action



reflection, while in-action reflection, although recognized, receives less empirical attention from trainers. This coincides with the international literature that has highlighted the difficulty of capturing reflective processes in real time (Lizana-Verdugo and Burgos-García, 2024).

A central contribution of this review is to highlight that reflection is a multilevel process: technical, identity-based and political. Thus, beyond promoting instrumental adjustments in training, reflection devices can become catalysts for identity changes (Hamilton, 2018) and emancipatory commitments (Whang-Sayson et al., 2017; Miyake-Trapp and Wong, 2021) in the teaching. This perspective broadens the conception of reflection from a practice of individual improvement to a collective and transformative practice, consistent with global calls to strengthen teacher professionalism and its social role.

However, this study has some limitations. First, the review was restricted to publications in English and Spanish, which may have excluded relevant evidence from other languages. Second, the methodological heterogeneity of the included studies made it difficult to establish systematic comparisons between contexts. Finally, the geographical concentration of some studies may have biased views toward educational models specific to those territories, limiting extrapolation to contexts in the Global South.

4. Conclusions

Reflective processes supported by scientific evidence constitute a crucial and complex dimension of the initial teacher education. This systematic review shows that reflection cannot be reduced to an individual or technical exercise focused solely on improving instructional performance. Instead, reflection emerges as a situated, relational, and multilevel process through which future teachers interpret their experiences, negotiate meanings with others, and progressively construct their professional identities within educational contexts characterized by uncertainty, accountability pressures, and social inequality.

One of the main contributions of this review lies in articulating reflection as a dynamic framework shaped by the interaction between mediations, evidence ecologies and temporalities of reflection. By synthesizing empirical findings from diverse contexts, this study advances a more integrative understanding of how reflective practices are scaffolded, what kinds of evidence are legitimized, and when reflection occurs throughout the teaching process. This perspective helps overcome fragmented or instrumental approaches to reflection and highlights its value as a coherent professional practice that connects experience, theory and ethical judgment.

The findings further demonstrate that reflective processes are strongly influenced by the mediations through which evidence is accessed and interpreted. Technological tools, formative artifacts, and interpersonal relationships, such as mentoring, coaching, and critical friendships, can either expand or constrain reflective learning. When these mediations promote dialogue, shared inquiry, and trust, reflection supported by evidence becomes a space for questioning assumptions, revisiting beliefs, and envisioning more inclusive alternative pedagogical actions. Conversely, when reflection is framed primarily as evaluation or compliance, its critical and formative dimensions tend to weaken. This tension underscores the importance of considering not only the availability of evidence but also the conditions under which it is discussed and made meaningful to the public.

Another significant contribution of this review is the concept of evidence ecology. The analysis revealed that teacher reflection draws on multiple sources of information, ranging from classroom records and student voices to standardized instruments, theoretical frameworks, and policy references. However, the predominance of situated and standardized evidence over ethical, political, and sociocultural perspectives suggests that reflective practices may remain limited in their transformative scope for the foreseeable future. Recognizing and legitimizing diverse forms of evidence, particularly those that make issues of power, inequality, and social justice visible, is essential for fostering deeper and more critical forms of reflection in teacher education.

From a formative and institutional perspective, this review highlights the need to design teacher education programmes that intentionally cultivate reflective cultures rather than isolated reflective activities. This implies creating structured yet flexible spaces where future teachers can engage in collective reflection, dialogue around multiple forms of evidence, and reflection across different moments of practice, including reflection during action, after action, and future action. Such an approach supports the development of reflective competence not only as a cognitive skill but also as an ethical and professional disposition oriented toward continuous learning and social responsibility.

In methodological terms, this review contributes to the field by demonstrating the value of systematic, transparent, and theory-informed syntheses for advancing knowledge on reflective practice in teacher education. By integrating qualitative and mixed-methods evidence, this study offers a comprehensive map of current trends, tensions, and gaps, pointing to the need for longitudinal and context-sensitive research that captures how reflective processes evolve over time and across diverse educational settings, particularly in regions that have been underrepresented in international research.

Finally, this systematic review affirms that reflection supported by scientific evidence holds significant potential for strengthening teacher professionalism when understood as a human, contextualized, and ethically grounded practice. Supporting reflection as a shared and meaningful process enables future teachers to improve their pedagogical decisions and develop critical awareness, professional agency, and a sustained commitment to educational transformation. In this sense,

reflective practice grounded in scientific evidence emerges as a key pathway for aligning teacher education with the broader goals of quality, equity, and social justice in education.

5. Implications and Projections

The findings of this systematic review allow us to project various lines of action in both research and training practices.

First, longitudinal and comparative research is needed to track the evolution of reflective processes and their relationship with evidence over time, considering different sociocultural contexts and institutional models, with a specific focus on the use of scientific evidence. This is particularly relevant for the Global South, where the dynamics of inequality and cultural diversity pose specific challenges that have yet to be fully explored.

Second, it is important to integrate innovative methodologies that capture reflections in action, thereby overcoming the limitations of retrospective data. The use of digital technologies, multimodal tools, and artificial intelligence-based analytics could contribute to generating more complete evidence of how teachers process information and make pedagogical decisions in real time.

Third, opportunities are identified for the design of initial and continuing training programs that incorporate reflection mechanisms aimed not only at technical improvement, but also at identity building and the ethical-political commitment of teachers as well. The inclusion of digital portfolios, action research practices, and critical tools such as the Critical Language Reflection Tool can promote more conscious and socially committed career paths for language teachers.

Finally, at the educational policy level, the results invite us to rethink teacher evaluation frameworks, moving from a standardization-centered approach to one that values situated, collaborative, and critical reflections. This implies that professional development is not limited to technical indicators but requires institutionalized spaces for deliberation, dialogue, and transformative actions.

6. Declarations

6.1. Ethical considerations

Not applicable.

6.2. Use of artificial intelligence (AI)

The authors declare that no generative artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript.

6.3. Conflict of interest

The authors declare no conflicts of interest.

6.4. Funding

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