

Original article

Metacognition and teacher reflection: pedagogical experiences to strengthen critical thinking



Metacognición y reflexión docente: experiencias pedagógicas para fortalecer el pensamiento crítico



Metacognição e reflexão do professor: experiências pedagógicas para fortalecer o pensamento crítico

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ABSTRACT

In the current context of teacher training and professional development, pedagogical reflection and metacognition are considered central processes for understanding how teachers analyze their practice, construct critical thinking, and shape their professional identity. The objective was to interpret teachers' experiences with metacognition and its influence on the development of self-regulated learning in students. A qualitative approach with a phenomenological design was adopted,

with the participation of 15 primary school teachers from three public schools in the Coquimbo Region of Chile. Data were collected through semi-structured interviews. Data analysis was conducted using semantic networks. The results show that metacognition fosters teacher self-regulation processes and promotes sustained critical reflection on professional practice, contributing to the strengthening of teacher identity and self-regulated learning in students. Barriers associated with institutional conditions, the persistence of traditional teaching models, and the scarcity of ongoing professional development opportunities were identified, limiting its systematic implementation in the classroom. The study highlights the need to strengthen institutional support and consolidate practice-oriented teacher training processes that promote the development of critical thinking and metacognitive skills.

Keywords: school curriculum; professional teacher identity; metacognition; critical thinking; pedagogical reflection.

RESUMEN

En el contexto actual de la formación y el desarrollo profesional docente, la reflexión pedagógica y la metacognición se consideran como procesos centrales para comprender cómo los profesores analizan su práctica, construyen pensamiento crítico y configuran su identidad profesional. El objetivo fue interpretar las experiencias docentes en torno a la metacognición y su influencia en el desarrollo del aprendizaje autorregulado en el estudiantado. Se adoptó un enfoque cualitativo con un diseño fenomenológico, con la participación de 15 docentes de educación básica pertenecientes a tres escuelas públicas de la región de Coquimbo, Chile. La información se recolectó mediante entrevistas semiestructuradas. El análisis de los datos se realizó a través de redes semánticas. Los resultados evidencian que la metacognición favorece procesos de autorregulación docente y promueven la reflexión crítica sostenida sobre la práctica profesional, contribuyendo al fortalecimiento de la identidad docente y al aprendizaje autorregulado en los estudiantes. Se identifican barreras asociadas a condiciones institucionales, a la persistencia de modelos tradicionales de enseñanza y a la escasez de instancia de formación permanente, que limitan su implementación sistemática en el aula. El estudio pone de relieve la necesidad de fortalecer el apoyo institucional y consolidar procesos de formación docente orientados a la práctica, que favorezcan el desarrollo del pensamiento crítico y de habilidades meta cognitivas.

Palabras clave: currículo escolar; identidad profesional docente; metacognición; pensamiento crítico; reflexión pedagógica.

RESUMO

No contexto atual da formação e do desenvolvimento profissional de professores, a reflexão pedagógica e a metacognição são consideradas processos centrais para a compreensão de como os professores analisam sua prática, constroem o pensamento crítico e moldam sua identidade profissional. O objetivo deste estudo foi interpretar as experiências de professores com a metacognição e sua influência no desenvolvimento da aprendizagem autorregulada em alunos. Adotou-se uma abordagem qualitativa com delineamento fenomenológico, com a participação de 15 professores do ensino fundamental de três escolas públicas da Região de Coquimbo, Chile. Os dados foram coletados por meio de entrevistas semiestruturadas. A análise dos dados foi realizada utilizando redes semânticas. Os resultados mostram que a metacognição fomenta os processos de autorregulação docente e promove a reflexão crítica sustentada sobre a prática profissional, contribuindo para o fortalecimento da identidade docente e da aprendizagem autorregulada nos alunos. Foram identificadas barreiras associadas às condições institucionais, à persistência de modelos tradicionais de ensino e à escassez de oportunidades de desenvolvimento profissional contínuo, que limitam sua implementação sistemática em sala de aula. O estudo destaca a necessidade de fortalecer o apoio institucional e consolidar processos de formação docente orientados para a prática que fomentem o desenvolvimento do pensamento crítico e das habilidades metacognitivas.

Palavras-chave: currículo escolar; identidade profissional do professor; metacognição; pensamento crítico; reflexão pedagógica.

INTRODUCTION

Metacognition, understood as the ability to reflect on and regulate one's own cognitive processes, is an essential component in education. It is conceived as a process that integrates both knowledge of how one learns and the ability to self-regulate that learning, orienting it toward the objectives of the educational context (Florencia & Urquijo, 2025; De León & Zarazúa, 2024). Despite its relevance,

many educational settings still show shortcomings in the implementation of metacognitive strategies, which limits students' autonomous development and their ability to become aware of their own learning (Hinojosa *et al.*, 2025).

The absence of metacognitive strategies poses a challenge to pedagogical practice, as it conditions how students approach tasks involving analysis, reflection, and adjustment of their study methods. In this scenario, teachers' pedagogical decisions become a key factor, since they are mediated by sociocultural, institutional, and personal realities that directly influence the degree of self-regulation achieved by students (Quintana *et al.*, 2022).

Therefore, reflection on teaching practice becomes essential, and the teacher's role as a cognitive mediator gains greater relevance, serving as the bridge that guides students in becoming aware of their own learning processes (Cabanés *et al.*, 2025). From this perspective, the importance of creating educational environments that promote autonomy, critical analysis, and the ability to question what has been learned is highlighted; these skills are enhanced when metacognition is incorporated into the classroom (Galarza-Guevara *et al.*, 2025). Velásquez *et al.*, 2021).

The literature has shown significant progress in this area. For example, Gambarini *et al.* (2025) highlight how self-regulation is strengthened when learning is linked to reflective pedagogical experience, as this combination allows for better adjustment of the strategies used by students. The close relationship between metacognitive processes and self-regulation indicates that reflecting on how one learns contributes to maintaining conscious control of cognitive processes and, consequently, facilitates adaptation to new learning demands (Dinamarca & Yáñez-Monje, 2024).

Analyzing educational practices in diverse contexts has revealed that metacognitive processes play a crucial role in addressing the challenges that arise in teaching. Moreno Badajós *et al.* (2025) emphasize that when teachers integrate metacognitive strategies, they can guide students toward more meaningful learning experiences, even in complex or challenging situations. Metacognition, along with self-regulation, is a cornerstone for achieving deep learning, as it fosters a critical and autonomous perspective in students regarding their educational process (Gutiérrez *et al.*, 2025).

This situation highlights that, although there is consensus on the importance of metacognition and teacher reflection, challenges remain regarding their systematic integration into educational practice. Previous research has shown that when teachers incorporate these strategies, they enhance not only

academic skills but also aspects related to professional identity and strengthen pedagogical practice. However, studies also indicate that the application of these strategies is not uniform and depends on multiple contextual factors.

The question guiding this study is: how do the metacognitive strategies used by teachers impact their pedagogical practice? The objective is to interpret teachers' experiences regarding metacognition and its influence on the development of self-regulated learning in students.

MATERIALS AND METHODS

The study is framed within a qualitative approach with a phenomenological design. This choice responds to the need to understand in depth the teaching experiences, exploring how participants give meaning to and narrate their experiences related to pedagogical practice and metacognition.

The study included 15 teachers from the Coquimbo Region, specifically from the La Serena metropolitan area. Participants teach 5th grade in the subjects of Physical Education and Health, History, Mathematics, Language Arts, and Natural Sciences. The selection was purposive, ensuring diversity in schools, geographic contexts, and teaching experience, thus allowing for a broad perspective of the phenomenon at the educational level studied.

The semi-structured interview was used to collect the information, based on a script consisting of four central questions about the presence of metacognition in pedagogical practice. This technique proved suitable for obtaining in-depth accounts, since, in addition to the predefined questions, it allowed for the exploration of emerging themes that arose during the dialogue with the participants.

The interviews were conducted in person at the teachers' schools. Each session was audio-recorded after obtaining informed consent, ensuring the confidentiality of the accounts and the ethical integrity of the study. Subsequently, the recordings were transcribed in full and reviewed to guarantee the accuracy of the information.

The analysis was conducted using an inductive coding process. The first stage involved repeated readings of the transcripts to familiarize the researchers with the data. Then, open coding was applied to identify initial patterns and categories related to metacognition and teaching practice. Through axial analysis, relationships between categories and subcategories were established, allowing the

information to be organized around the main factors influencing pedagogical practice. Finally, triangulation among researchers was used to compare interpretations, strengthen the coherence of the findings, and ensure the validity of the conclusions (Table 1).

Table 1. Script dimensions and questions

Dimensions	Questions
Reflection on teaching practice	How does reflection on practice influence the construction of professional identity?
Difficulties and resistance in applying metacognitive strategies	Do teachers encounter difficulties or resistance in applying metacognitive strategies in their educational practice?
Barriers to critical reflection	What institutional, curricular, or social barriers limit teachers' ability to develop critical reflection practices in their teaching?
Support from the education system for critical reflection	How can the education system promote the incorporation of critical reflection into teaching and learning?

Source: Own elaboration

RESULTS

The analysis identified reflection as a central element in strengthening pedagogical practice, as it enables teachers to constantly evaluate and adjust their teaching methods (Figure 1). This capacity for self-evaluation is directly related to the development of professional identity and the ability to adapt to the changes and demands of the school context. Testimonials demonstrate how this process becomes a tool for continuous improvement: "Reflecting helps me avoid stagnation. Ultimately, I'm like a mirror for the students: if I don't question myself, how can I teach them to think critically?"



Figure 1. Semantic network: reflection on teaching practice

Source: Own elaboration

In the vocation code, reflection is linked to the profound meaning teachers attribute to their work and to how they maintain their commitment to their educational role. One participant noted, "If you don't have a vocation, it's difficult to stay in teaching; reflecting reminds me why I chose to be a teacher." This process fosters teaching that is more connected to classroom needs and pedagogical objectives. Regarding the teaching code, the accounts show how reflection allows them to adapt their strategies to the specific contexts in which they work. As one teacher expressed, "When I review my classes, I realize which activities worked and which ones I need to modify so that everyone learns." This confirms that reflection is not limited to self-criticism but is projected into concrete improvements for teaching.

Teacher-student interaction codes, critical thinking, and decision-making emerge as elements closely linked to the reflective process. In the words of one interviewee: "Fostering critical thinking in students allows them to address problems more consciously and with greater autonomy." These findings show how reflection fosters both the development of a positive socio-emotional environment and the strengthening of students' cognitive skills.

Reflection also appears associated with the codes of challenge in practice, continuous improvement, and pedagogical adaptations. Most teachers acknowledge that they face limitations in time, resources, and external demands, which forces them to rethink their methods. As one, participant indicated: "Some colleagues believe that metacognition is complicated and consider it unnecessary; they think they already have too much work and that it is just an educational fad." This testimony reflects how reflection allows teachers to cope with the tensions of daily practice and move toward sustainable pedagogical adjustments. In the teacher training code, reflection is closely related to ongoing professional development. Several participants highlighted the importance of having opportunities for continuous training to improve their practice: "I think we should focus more on the learning process than on test results; that changes when we have opportunities for reflection in teacher training." This demonstrates that reflection is not only limited to individual practice but is also strengthened through collective processes of professional development and training (Figure 2).

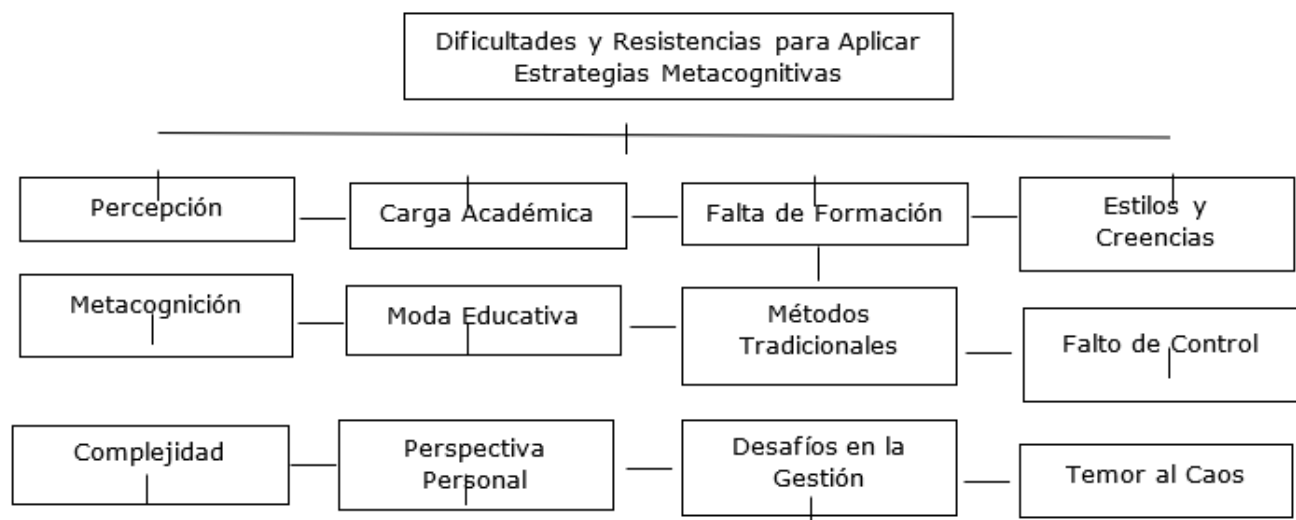


Figure 2. Semantic network: difficulties and resistance to change

Source: Own elaboration

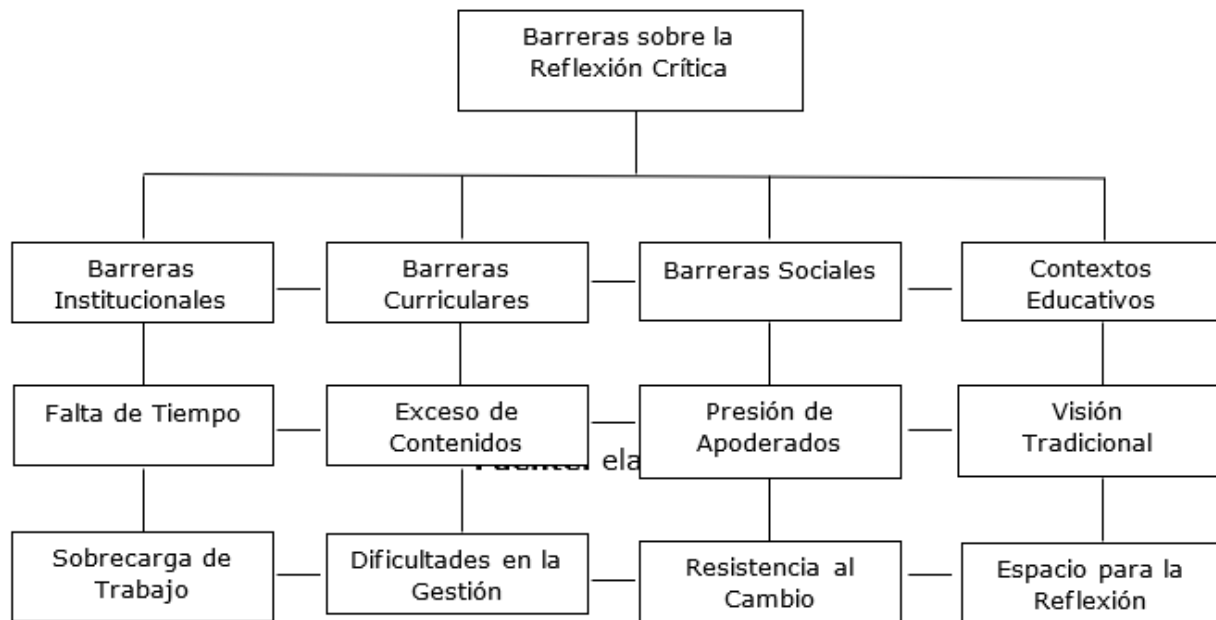
The implementation of metacognitive strategies faces various difficulties and resistance among teachers. These barriers are related both to teachers' perceptions of the usefulness of these strategies and to practical factors within the school context, such as academic workload and traditional teaching methods. Regarding teachers' perceptions, it was evident that while some consider reflection and metacognition useful tools for improving teaching, others perceive them as

unnecessary or as an educational fad. As one teacher stated, "The perception of reflection is influential, since there are teachers who believe it contributes nothing and is just a waste of time."

The complexity of teaching also emerged as a factor hindering the consistent application of metacognitive strategies. Managing classes in diverse contexts, with limited resources and time constraints, often relegates reflection on practice to the back burner. One teacher expressed: "Some colleagues believe that metacognition is complicated or unnecessary. They think they already have too much work and that it's just an educational fad, but when you see children begin to question their own learning, you realize it's worthwhile." Another key element identified was the academic workload, which limits opportunities for reflection for both teachers and students. One participant commented: "The academic workload often prevents us from providing students with these opportunities to reflect, and we ourselves are even deprived of these opportunities."

The lack of training in metacognitive strategies is another significant barrier. Many teachers acknowledge that, while they possess a solid knowledge of their subjects, they lack specific preparation to effectively apply metacognition in the classroom. One teacher stated, "I think there's a lack of training; many don't know how to apply them, but when they do, students begin to question and reflect much more on history and its context."

Resistance was identified stemming from adherence to traditional methods and fear of chaos in the classroom. The rigidity of these structures limits teacher autonomy and active student participation. One teacher stated: "The challenge lies in breaking out of the routine; this phenomenon is closely related to the fear of losing control of the classes, since many teachers do not dare to innovate for fear of chaos or for fear that their classes will not work" (Figure 3).

**Figure 3.** Semantic network: on critical reflection barriers

Source: Own elaboration

Teachers face various barriers that limit their ability to reflect on their teaching practices. Among the main obstacles identified were an excessive workload of administrative tasks, a rigid curriculum, and pressure to achieve immediate academic results. These conditions significantly reduce the time available for reflection and hinder the adoption of more reflective pedagogical approaches tailored to students' needs. One teacher commented, "Standardized assessments are an obstacle. We are so focused on meeting targets that there is no time for students to reflect. Furthermore, many parents only see the grades and not the learning process." This testimony demonstrates how the demand for tangible results limits opportunities for reflection and deep learning.

External and social barriers, such as high societal expectations and pressure for academic results, influence the prioritization of traditional methods. Content overload and a lack of resources prevent teachers from consistently implementing reflective strategies. As one participant noted, "Content overload is a problem. We often feel there isn't time to stop and reflect. Furthermore, not all schools have the resources to support these practices".

At the institutional level, insufficient support and policies focused on immediate results present additional barriers. A lack of time and administrative support limits the possibility of engaging in reflective practice adapted to students' contexts. One teacher summarized this situation: "Lack of time and insufficient institutional support are key factors hindering critical reflection." Although strategies exist to overcome these barriers, such as ongoing professional development, teacher collaboration, and action research, participants indicated that external pressures and a focus on immediate results continue to limit the effectiveness of these initiatives. One teacher stated: "Despite the good intentions reflected in training policies, the lack of time and resources remains an obstacle for teachers to critically reflect on their pedagogical practice."

DISCUSSION

Teacher reflection is a central element in teacher training and practice, allowing educators to continuously evaluate and adjust their strategies, fostering connection with students and promoting self-regulated learning. Findings show that teachers who integrate reflection into their practice strengthen their professional identity and consolidate their role as facilitators of learning, creating more flexible educational environments better adapted to students' needs (Galarza-Guevara *et al.*, 2025; Dinamarca & Yáñez-Monje, 2024). Furthermore, reflection enhances teachers' vocation and their ability to make conscious pedagogical decisions, while also fostering critical thinking in students, highlighting the interdependence between professional development and meaningful learning.

The implementation of metacognitive strategies faces various obstacles linked to personal and contextual factors. Teachers' perceptions of the usefulness of reflection, the inherent complexity of teaching, and their academic workload are recurring barriers that limit their reflective practice. Evidence indicates that a lack of time and institutional support, along with deeply ingrained traditional methods, hinders the adoption of innovative and adaptive approaches (Jarpas *et al.*, 2024; Vélez-Gutiérrez & Ruiz-Ortega, 2025). However, testimonies show that when teachers recognize the value of metacognition, they can effectively integrate these strategies, demonstrating that these obstacles can be mitigated through appropriate support and ongoing professional development.

Barriers to critical reflection linked to the institutional and social context were identified. Pressure for tangible results, excessive administrative tasks, and curricular rigidity reduce opportunities for reflection, while external expectations generate a focus on immediate results rather than meaningful learning processes (Hinojosa *et al.*, 2025; Quintana *et al.*, 2022). Overcoming these barriers requires

integrated strategies, such as action research, teacher collaboration, and continuing professional development programs, that enable teachers to develop more reflective and creative pedagogical approaches (Florencia & Urquijo, 2025; Gambarini *et al.*, 2025).

These findings align with recent studies highlighting the relationship between teacher reflection, self-regulation, and improved teaching practice (Fierro-Saldaña & Velásquez-Salazar, 2026; Arregui-Valdivieso *et al.*, 2023). They also provide evidence of how personal, contextual, and institutional factors intertwine to facilitate or limit the implementation of metacognitive strategies, underscoring the importance of educational policies that integrate teacher training and structural support.

Teacher reflection, overcoming resistance, and addressing contextual barriers emerge as interrelated elements that directly impact pedagogical practice. This study confirms that, to enhance metacognition in the classroom and improve learning, it is essential to support teachers through ongoing professional development, adequate resources, and educational policies that foster pedagogical innovation. The teacher's role is key to promoting pedagogical experiences that integrate metacognition, strengthening critical thinking and helping students progressively construct their professional identity (Cabanes *et al.*, 2025).

From a practical perspective, strengthening teacher reflection can improve educational quality and student autonomy. Promoting learning environments that integrate continuous reflection and the development of critical thinking is a path toward a more meaningful and adaptable education. Among the study's limitations, it is worth noting that the sample is limited to 5th- grade teachers in the Coquimbo Region, which may affect the generalizability of the findings; however, the depth of the analysis and the triangulation of the data strengthen the validity of the conclusions.

Research shows that pedagogical reflection and metacognition are key to teacher development, although their implementation is limited by a lack of training, rigid curricula, and pressure for immediate results. These strategies facilitate self-reflection, improved practice, and pedagogical decision-making tailored to students. The findings suggest promoting institutional support, practical training, and curriculum flexibility to consolidate a culture of reflection and continuous learning.

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Conflict of interest

Authors declare no conflict of interests.

Authors' contribution

The authors participated in the design and writing of the article, in the search and analysis of the information contained in the consulted bibliography.



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