



# Self-Regulated Learning-Based Approaches in Teacher Mentoring and Professional Development: A Systematic Review

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**Abstract:** The growing complexity of 21st-century education demands that teachers function not only as subject specialists but as self-regulated learners capable of sustaining their own professional growth. Despite an expanding body of research on self-regulated learning (SRL) in educational contexts, systematic reviews synthesizing SRL-based approaches in teacher professional development (TPD), particularly in relation to mentoring and advisory roles, remain limited. This study examined how SRL is integrated within TPD and its role in supporting changes in instructional practice. A systematic literature review following PRISMA 2020 guidelines was conducted, drawing on records from Scopus, ERIC, and ScienceDirect published between 2015 and 2025. Of 518 identified records, 27 articles met the inclusion criteria and were analyzed thematically. Three principal findings emerged: teachers' SRL functions as a foundational mechanism for professional development; SRL capacity is enacted through instructional practices including explicit strategy instruction, cognitive modeling, reflective task design, and formative assessment; and the sustainability of these practices depends on relational and organizational supports such as coaching, professional learning communities, and educational technology. These findings offer a coherent framework for designing TPD programs that are reflective, adaptive, and oriented toward lifelong professional learning.

**Keywords:** Advisor teacher; Self-regulated learning; Systematic review; Teacher mentoring; Teacher professional development

## Introduction

The transformation of contemporary education, driven by rapid technological advancement and the growing complexity of student learning needs, has fundamentally redefined what it means to be a professional teacher. World-leading educational organizations, including the OECD (2021) and UNESCO (2023), have consistently emphasized self-regulation as a foundational competency for 21st-century learning – one that is essential not only for students but for the teachers who guide them. In an era characterized by digital overload, shifting social dynamics, and expanding student mental health challenges (Haidt, 2024), teachers are increasingly expected to function as

adaptive, reflective professionals capable of sustaining their own learning while supporting students' capacity for independent learning.

Self-Regulated Learning (SRL) provides a conceptually robust and practically relevant framework for understanding this dual professional challenge. As Zimmerman (2002) articulated, SRL describes the capacity of individuals to set learning goals, plan and deploy strategies, monitor progress, and reflect on outcomes in a self-directed manner. This cyclical process – spanning forethought, performance, and self-reflection (Zimmerman, 2000) – operates not only at the cognitive level but integrates motivational and behavioral dimensions, making it a comprehensive mechanism for sustained learning (Panadero, 2017). For

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teachers, SRL is particularly consequential: teachers who regulate their professional learning tend to demonstrate stronger reflective capacity, greater instructional adaptability, and more effective student mentoring (Greene, 2021; Heaysman & Kramarski, 2022). Within TPD contexts, SRL enables teachers to engage with training as agentic learners who can transfer their self-regulatory experience directly into classroom practice and mentoring interactions (Perry et al., 2015; Heirweg, De Smul, et al., 2022).

In Indonesia, this intersection of teacher SRL and professional development carries particular urgency within the context of the Teacher Wali role – a formal responsibility that positions teachers as academic, character, and personal mentors for students. Given that Teacher Wali teachers are expected to support student self-regulation across subject domains extending well beyond their own disciplinary expertise, the capacity for SRL becomes a prerequisite competency rather than an optional professional enhancement. However, evidence consistently indicates that many teachers have not yet developed the mentoring and coaching competencies necessary for this role (Greene, 2021), while structural conditions including high workloads and limited training time constrain access to comprehensive professional development (Heirweg et al., 2022). The broader TPD literature reflects a parallel gap: while SRL research has expanded considerably, the majority of studies concentrate on student-facing dimensions of SRL, and research specifically addressing teachers as self-regulated learners within TPD remains fragmented across distinct contexts – learning teams (Perry et al., 2015), explicit training programs (Porter & Peters-Burton, 2025), educational technology (Heaysman & Kramarski, 2022), and targeted mentoring initiatives (Martins et al., 2022).

To date, no systematic review has comprehensively synthesized SRL-based approaches in teacher professional development with specific attention to mentoring and advisory roles. This gap is significant given the growing global policy emphasis on teacher mentoring and the practical demands facing teachers in roles such as Teacher Wali in Indonesia. The present study addresses this gap through a systematic literature review designed to map, analyze, and synthesize the current evidence base on SRL integration in TPD. Three research questions guide this inquiry.

RQ1: How is the SRL approach implemented in teacher professional development programs across different countries?

RQ2: What training models are most effective in enhancing teachers' capacity as mentors through the SRL approach?

RQ3: What are the cross-study implications for designing an SRL-based mentor teacher training program in the Indonesian educational context?

By addressing these questions, this study contributes both theoretically and practically through a comprehensive mapping of SRL practices in TPD and design recommendations for an SRL-informed mentor teacher program tailored to Indonesia.

## Method

### *Research Design*

This study employed a Systematic Literature Review (SLR) to identify, evaluate, and synthesize studies related to SRL approach in teacher professional development (TPD). The approach was chosen due to the effectiveness in providing a comprehensive picture about research development and identifying pattern, gap, and new direction of literature (Snyder, 2019). SRL procedure was developed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA 2020) (Page et al., 2021), comprises the following steps: (1) study identification, (2) screening, (3) Eligibility assessment, and (4) final inclusion for analyses.

### *Data Sources and Search Strategy*

The literature search was conducted across three majors internationally recognized academic databases, namely Scopus, ERIC, and ScienceDirect. Scopus and ScienceDirect were selected due to their broad coverage of peer-reviewed empirical and intervention studies articles related to TPD. ERIC was selected due to its focus to educational research in the field of teacher trainings, pedagogical strategies, and instructional competencies development. Google Scholar was used as an additional source to ensure that no relevant studies were overlooked. All the records published from 2015 to 2025 were searched to capture the recent development in SRL practices in teacher training context.

The literature searching strategy was systematically structured following identification phase, screening, and selection in accordance with PRISMA 2020 guidelines. The searching processes were conducted in November and December 2025 using keywords combination related to research focus, namely: "self-regulated learning", "teacher professional development", "teacher training", "SRL intervention for teachers", and "self-regulated teaching". To expand and narrow the scope of the search within the three databases, a combination of keywords, Boolean operator (OR, AND), and the use of truncation was systematically applied. Initial database searches yielded 46 records from Scopus, 30 records from ERIC, 224 records from ScienceDirect, and 200 records from Google Scholar. In addition to free keyword searches, a

title and abstract screening was conducted to ensure the initial relevance. A backward and forward reference tracking was also employed to identify additional relevant records that might not have detected in the initial search results. This final method gathered an additional 18 records, bringing the total number of retrieved articles to 518.

The complete search results were exported to RIS format, merged and imported to reference manager, and followed by automatic and manual deduplication processes. After deduplication process, 353 unique articles remained. Subsequently, all the articles were screened based on title and abstract before underwent a full-text screening based on inclusion-exclusion criterion.

*Inclusion and Exclusion Criteria*

The inclusion and exclusion criteria applied in this review are summarized in Table 1.

**Table 1.** Inclusion and Exclusion Criteria

Category	Criteria
Inclusion	<ol style="list-style-type: none"> <li>1. Focus on SRL approach in TPD, teacher mentoring, and teacher education</li> <li>2. Applies an intervention</li> <li>3. Contains empirical data</li> <li>4. Published in indexed journals with full-text access</li> <li>5. Written in English</li> </ol>
Exclusion	<ol style="list-style-type: none"> <li>1. Focuses on students' SRL only</li> <li>2. Discusses SRL purely at a theoretical level</li> <li>3. Full-text not available</li> <li>4. Not a scientific publication</li> <li>5. Irrelevant topics, such as SRL in sport and health</li> </ol>

*Screening Processes: PRISMA*

The implementation of the aforementioned criteria narrowed the 518 initial records become 326 articles post deduplication process, then became 80 articles after title-abstract screening. The final eligibility assessment yielded 27 articles, comprising 17 primary articles for thematic analysis and ten supplementary articles to strengthen the contextual understanding and interpretation of the findings. Figure 1 presents the flow diagram illustrating the identification, screening, eligibility assessment, and inclusion of studies.

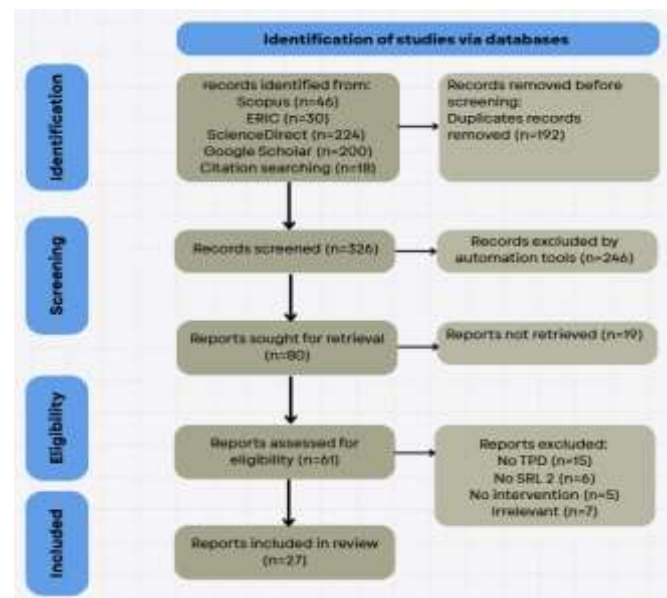
*Data Analyses Procedure*

Data analysis was conducted using thematic synthesis approach, comprising the following stages: (1) open coding: find the key concepts related to SRL, teacher training, and mentoring discussed in the 18 included studies; (2) axial coding: identifying categories and patterns such as SRL strategies used by teacher, effective training model, transfer mechanism of

competencies from teacher to student, school environment that support SRL practices; (3) synthesis themes development: three main themes emerged from the analysis: (a) SRL as teacher core competence in PD, (b) SRL as mechanism of mentoring quality improvement, and (c) effective SRL-based teacher professional development; (4) integration of the findings into a conceptual models: thematic findings were synthesized into a Conceptual Model of SRL-Based Teacher Professional Development.

*Bibliometric Analysis*

In addition to the systematic literature review, a bibliometric analysis was conducted to provide an overview of the research landscape on SRL in TPD. A total of 326 unique records were retrieved from the initial database search and exported in RIS format. The bibliometric analysis was performed using VOSviewer to examine keyword co-occurrence patterns and to identify major thematic clusters within the literature.



**Figure 1.** PRISMA 2020 flow diagram that shows identification, screening, eligibility assessment, and inclusion of studies in the systematic literature review examining self-regulated learning in teacher professional development

**Result and Discussion**

Based on SRL theory, TPD literature, and mentoring framework, this review adopts an integrated conceptual lens that positions SRL as a multidimensional construct in the teacher professional development. In this framework, SRL not only viewed as students' learning skills, but also as a key mechanism which connects teacher professional development with sustainable instructional practices. First, SRL conceptualized as a teacher professional learning mechanism, through

which teachers regulate their own learning process during TPD program. This mechanism includes goal setting, reflection of teaching practices, and adaptation of teaching and learning strategies. Second, SRL viewed as teacher instructional competence that enabling teacher to explicitly design learning experience to foster students' self-regulated learning. In this regard, teacher become SRL facilitator through learning strategy model, self-regulation-oriented assignment design, the use of formative assessment, and facilitating students with structured reflection room. Third, SRL is positioned as contextual and sustainable practice, whose development is strongly influenced by relational and organizational support. Professional environments such as mentoring, coaching, and professional learning communities (PLCs), and the use of educational technologies are seen as ecosystems that enable teachers to develop, maintain, and reflect their SRL practices continuously.

This conceptualization guided the analysis process of the systematic literature review. Specifically, it guided

the coding process, theme development, and findings interpretation by organizing the review results into three main domains: (1) teachers' practice in promoting SRL through instruction, (2) teachers' development as self-regulated learners within TPD context, and (3) relational and organizational supports that enable the sustainability of SRL-oriented practices.

To ensure a strong alignment between the theoretical framework and the study findings, a mapping was constructed between the conceptual frameworks and the synthesized SLR themes (Table 2). The mapping aims to demonstrate how theories of SRL, SRL in teaching, mentoring, and teacher professional development provided the analytical lenses through which the thematic patterns of the included studies were interpreted. Therefore, the identified themes are not seen as isolated categories, but rather as reflections of well-established theoretical constructs in the existing literature.

**Table 2.** Mapping of Theoretical frameworks and SLR themes

Theoretical framework	Conceptual Focus	SLR Themes
SRL Theory (Zimmerman)	Forethought-Performance-Reflection	Theme-1: Teachers as Self-Regulated Learners
SRL Instruction Theory	Strategy instruction, modelling	Theme-2: Teaching for SRL
Mentoring & TPD Theory	Coaching, PLC, organizational support	Theme-3: Relational & Organizational Supports

The mapping highlighted that the main themes emerging from the SLR were grounded in strong theoretical foundations and demonstrated complementary relationships. The SRL theory provided a conceptual framework for understanding the teachers' self-regulation process as professional learners. The theory of SRL in teaching outlined the instructional practices necessary for facilitating students' self-regulation, while mentoring and TPD theories highlighted the urgency of relational and organizational supports in sustaining effective practices. Together, these frameworks set to define the presentation and discussion of the study in the subsequent sections

*Overview of the Included Studies*

This section presents an overview of the characteristics of the studies included in the systematic literature review (Table 3). Based on the selection process guided by PRISMA, a total of 27 studies met the inclusion criteria and were analyzed further, consisting of 17 core studies and 10 supporting studies. These studies were published over a range of years and covered diverse educational contexts, including primary education, secondary education, and preservice teacher education.

Geographically, the included studies were conducted across various regions with different educational systems, including the United States,

Europe, Asia, Africa, and the Middle East. This diversity of contexts provides a broad perspective on the implementation of self-regulated learning within teacher professional development across different educational settings.

In terms of participants, the majority of studies involved in-service teachers, including both novice and experienced teachers, while several studies also included preservice teachers. The research designs employed varied across studies, encompassing qualitative, quantitative, and mixed-methods approaches, as well as design-based research, program evaluations, and doctoral dissertations.

The forms of teacher professional development examined included face-to-face training, mentoring and coaching, professional learning communities, online learning, and e-training programs and MOOCs. The focus of self-regulated learning in these studies also varied, ranging from the development of teachers' self-regulation as professional learners to the implementation of instructional practices aimed at fostering students' self-regulated learning. Table 3 summarizes the main characteristics of the included studies, including research context, participants, research design, forms of TPD, and the SRL focus addressed.

**Table 3.** Characteristics of Included Studies (n = 27)

Study	Country & Context	Participants	Research Design	TPD Intervention / Setting	SRL focus
(Adewoye, 2018)	South Africa	Primary student & teacher	Quasi-experiment	PD formative assessment	SRL student
(Arvatz et al., 2025)	Israel	2 teacher + 101 students	Mixed-methods	SRL&T PD	SRL teacher & students
(Benick et al., 2021)	Germany	Primary Primary student & teacher	Quasi-experiment	iSELF PD	SRL strategy for students
(Brenner, 2024)	USA	Teacher	Mixed methods	Coaching PD	SRL Explicit teaching
(Hadas et al., 2023)	Israel	Teacher	Design-based	Task-design PD	SRL-oriented tasks
(Heirweg, Smul, et al., 2022)	Belgium	Teacher	Longitudinal	Year-long PD	SRL teaching
(Li & Yongqi Gu, 2024)	China	Teacher	Quantitative	Online PD	SRL teacher
(Miller, 2024)	USA	Novice teacher	Mixed method	Reflective PD	SRL teacher
(Mokoena & Van Tonder, 2024)	South Africa	Novice teacher	Qualitative	Mentoring	Self-directed learning
(Mulholland et al., 2025)	UK	Teacher	Experimental	Scaffolded PD	Teacher metacognition
(Nganga et al., 2025)	Kenya	Teacher	Quantitative	Goal-setting PD	SRL teacher
(Nguyen-Khoa et al., 2025)	Vietnam	Preservice teacher	Mixed methods	SRL-TPF	SRL PST
(Persico et al., 2023)	Italia	Teacher	Design-based	E-training	SRL teacher
(Peters-Burton & Botov, 2017)	USA	Science teacher	Qualitative	Metacognitive coaching	SRL teacher
(Shamir-Inbal & Blau, 2022)	Israel	Teacher	Mixed-methods	Tech-enhanced PD	SRL teacher
(Sins et al., 2024)	Netherlands	Teacher	Design-based	iSELF PD	SRL teaching
(Xu & Ko, 2019)	China	Teacher	Qualitative	CoP	SRL teaching
(Bodensteiner et al., 2025)	USA	Novice teacher	Quantitative	SRL training	Well-being & SRL
(Cherkowski & Schnellert, 2018)	Canada	Teacher	Qualitative	PLC	Co-regulation
(Huang et al., 2022)	China	Teacher	Mixed-methods	PLC	SRL teacher
(Koukis & Jimoyiannis, 2019)	Greece	Teacher	Learning analytics	MOOC PD	SRL patterns
(Kramarski & Kohen, 2017)	Israel	Teacher	Experimental	Metacognitive guidance	SRL instruction
(Lee et al., 2025)	Korea	Teacher	Mixed-methods	AI-supported PD	SRL regulation
(Passarelli et al., 2022)	Italia	Preservice teacher	Experimental	Gamified PD	SRL PST
((Peters-Burton et al., 2022b) et al., 2022)	USA	Teacher	Qualitative	Coaching & inquiry	Reflective SRL
(Taranto & Buchanan, 2020)	Italia	Teacher	Survey	PD perception	SRL awareness
(Zhang & Liu, 2019)	China	Teacher	Quantitative	TPD motivation	Motivational regulation

*Bibliometric Overview of the Research Landscape*

To complement the thematic synthesis, a bibliometric analysis of the 326 unique records retrieved from the initial database search was conducted using VOSviewer, examining keyword co-occurrence patterns and major thematic clusters within the broader SRL-TPD literature. The resulting network (Figure 2) reveals four interconnected clusters that reflect the multidimensional character of research in this field.

The bibliometric landscape confirms that SRL in TPD has developed into a multidimensional field covering individual teacher learning, instructional

practice, and broader organizational and technological contexts, a structure that directly supports the thematic organization of the present review. One dominant cluster centers on teacher self-regulated learning and professional learning processes (green), encompassing keywords such as self-regulation, reflection, teacher education, and professional development, indicating that teachers’ regulatory capacities constitute the core of SRL-oriented TPD research.

A second cluster (blue) highlights instructional practices and empirical studies, with prominent keywords including intervention, questionnaire, case



beyond the formal structure of TPD programs (Mokoena & Van Tonder, 2024; Miller, 2024). This pattern suggests that teachers' self-regulation serves as a foundation that enables professional learning to occur in a sustained and adaptive manner. Overall, this theme demonstrates that the development of teachers' SRL acts as a connecting mechanism between participation in TPD and changes in instructional practice, as consistently reported across the analyzed studies.

### *Theme 2: Teaching Practices to Facilitate SRL*

In line with the development of teachers' self-regulation as professional learners, the second theme illustrates how this capacity is enacted in instructional practices oriented toward fostering students' self-regulated learning (SRL). The analyzed studies indicate that teachers who participate in SRL-based TPD tend to implement instructional strategies in a more explicit and structured manner (Arvatz et al., 2025; Benick et al., 2021; Sins et al., 2024). Explicit strategy instruction is the most frequently reported practice within this theme. Teachers directly teach learning strategies related to planning, monitoring learning processes, and post-learning reflection, often through modeling and concrete examples embedded in classroom activities (Kramarski, 2016; Peters-Burton, 2016; Arvatz et al., 2025).

Beyond modeling, teachers also design learning tasks that provide opportunities for students to set learning goals, monitor progress, and evaluate their own learning outcomes. Project-based tasks, reflective journals, and learning diaries are reported as strategies used to promote students' self-regulation (Hadas, 2023; Benick et al., 2021; Sins et al., 2024). Formative assessment practices also emerge as an important element within this theme. Teachers use formative feedback to help students understand learning goals, identify gaps between their current performance and expected targets, and plan improvement strategies (Adewoye, 2018; Hadas, 2023). In this context, formative assessment is positioned as a means to support self-regulatory processes rather than merely as a tool for evaluating learning outcomes. Overall, this theme demonstrates that teaching practices aimed at facilitating SRL represent the instructional manifestation of teachers' SRL capacity developed through participation in TPD.

### *Theme 3: Relational and Organizational Supports*

The third theme highlights the role of relational and organizational supports as conditions that enable the development and sustainability of teachers' SRL within the context of TPD. The analyzed studies consistently report that teachers' SRL develops more effectively when supported by a conducive professional environment, both through social interactions and

supportive organizational structures (Brenner, 2024; Cherkowski, 2017; Huang, 2022). Coaching and mentoring emerge as dominant forms of relational support. Teachers who receive ongoing guidance from mentors or coaches are reported to engage more consistently in reflection, monitor their instructional practices, and adjust teaching strategies in a sustained manner (Peters-Burton, 2020; Brenner, 2024; Mokoena, 2024). Dialogic interactions within coaching processes provide teachers with opportunities to discuss instructional challenges, evaluate professional progress, and plan improvements in a reflective way. Beyond relational support, organizational structures such as professional learning communities (PLCs) and communities of practice (CoPs) function as spaces for co-regulation that strengthen teachers' self-regulation. Through collaboration and collective reflection, teachers not only regulate their professional learning individually but also develop shared regulation that supports sustained professional learning (Cherkowski, 2017; Huang, 2022; Xu & Ko, 2019).

The use of educational technology emerges as part of organizational support that extends and mediates SRL-based TPD practices. Technology-enhanced learning environments—such as e-training platforms, online learning, and MOOCs—provide teachers with flexibility to manage time, pace, and learning strategies according to individual needs (Koukis, 2019; Shamir-Inbal, 2020). Several studies also report that technological support enables teachers to monitor professional learning progress, document reflections, and participate in professional collaboration across time and space, including in TPD contexts supported by artificial intelligence (Lee, 2025).

This theme demonstrates that relational and organizational supports (including coaching, professional collaboration, and technology-enhanced learning environments) function as enablers that strengthen and sustain teachers' SRL practices. In this context, technology does not serve as a primary learning mechanism, but rather as a structural condition that supports flexibility, sustainability, and connectedness in teachers' professional learning.

### *Summary of Findings*

The three themes identified in this systematic literature review depict a general pattern of the development and implementation of self-regulated learning within the context of teacher professional development. Teachers' self-regulation emerges as the primary foundation of professional change, SRL-oriented teaching practices as its instructional manifestation, and relational and organizational supports as the conditions that sustain these practices

over time. These findings provide the basis for further discussion in the following section.

### *Discussion*

This systematic literature review aims to understand how SRL is integrated within the context of TPD and its role in supporting changes in instructional practice. Based on the synthesis of the 27 included studies, this discussion interprets the main findings by positioning teachers' self-regulation as the core mechanism, SRL-oriented teaching practices as the instructional manifestation, and relational and organizational supports as the conditions that sustain these practices over time.

#### *Teachers as Self-Regulated Learners: The Foundation of Professional Development*

The findings indicate that teachers' self-regulation constitutes a central foundation in the process of professional development. Teachers who participate in SRL-based TPD do not merely adopt new strategies; they actively regulate their goals, monitor their progress, and reflect on their instructional practices (Heirweg, 2021; Miller, 2024). This reinforces the view that teachers' professional learning is active, reflective, and oriented toward long-term development.

Conceptually, these findings align with models of teacher development that emphasize the importance of self-regulation and reflection in professional learning (van der Lans et al., 2017; Vermunt, 2023). From this perspective, teachers are understood as agentic learners who consciously manage their own learning processes, rather than merely acting as policy implementers or recipients of training. In this sense, teachers' SRL functions as an internal mechanism that bridges TPD experiences and changes in instructional practice.

Furthermore, the role of self-directed learning identified in several studies (Mokoena, 2024; Persico, 2023) suggests that effective TPD needs to provide space for teacher autonomy. This finding supports the argument proposed by De Corte (2019), who highlights the importance of learning environments that enable adult learners to develop self-regulation in a contextualized and sustainable manner.

#### *From Teachers' Self-Regulation to SRL-Oriented Teaching Practices*

The discussion further highlights how teachers' self-regulation is translated into instructional practices that support students' self-regulated learning (SRL). The findings indicate that teachers who develop SRL through TPD are better able to implement explicit strategy instruction, cognitive modeling, and task designs that promote students' self-regulation (Arvatz et al., 2025; Benick et al., 2021; Sins et al., 2024). This

relationship between teachers' SRL and SRL-oriented teaching practices supports the theoretical framework of SRL instruction, which emphasizes that teaching self-regulation requires teachers' metacognitive awareness and reflective capacity (Kramarski, 2016). Teachers who have experienced self-regulatory processes in their own professional learning tend to be more aware of the importance of planning, monitoring, and reflection in students' learning. Furthermore, the use of formative assessment as a means to support students' self-regulation (Adewoye, 2018; Hadas, 2023) suggests that SRL-oriented teaching practices are not limited to cognitive strategies alone, but also involve the management of learning goals and feedback processes. These findings extend the understanding that the development of students' SRL is highly dependent on the quality of instructional and assessment design enacted by teachers.

#### *Relational and Organizational Supports as Drivers of Sustainability*

Although teachers' self-regulation functions as a core mechanism, the findings of this review indicate that the development and sustainability of SRL-oriented practices are strongly influenced by relational and organizational contexts. Coaching, mentoring, and collaboration within professional learning communities (PLCs) play an important role in strengthening and sustaining teachers' reflective practices (Brenner, 2024; Cherkowski, 2017; Huang, 2022). Conceptually, these findings align with perspectives on co-regulation and social learning, which emphasize that self-regulation does not develop in isolation but through interaction with social and professional environments (Vermunt, 2023; van der Lans et al., 2017). Within this perspective, teachers' SRL can be understood as an individual process that is reinforced through shared regulation (co-regulation) within professional communities.

The use of technology in TPD also emerges as an important supporting factor (Koukis, 2019; Shamir-Inbal, 2020; Lee, 2025). Online learning environments allow teachers to manage time, pace, and learning strategies more flexibly, which in turn supports the development of SRL. These findings strengthen the argument that the design of technology-enhanced TPD should explicitly consider SRL principles, rather than focusing solely on issues of accessibility. In this review, the role of technology in SRL-based TPD is understood as a supportive condition that mediates teachers' professional learning, rather than as a standalone pedagogical mechanism. By providing flexibility, sustained access, and opportunities for professional collaboration, technology reinforces self-regulatory and co-regulatory processes that are established through relational interactions and organizational structures.

### *Theoretical and Conceptual Implications*

From a theoretical perspective, this review enriches the literature on teacher professional development by positioning teachers' self-regulated learning as an integrative foundation linking professional learning and instructional practice. The findings confirm that the development of teachers' SRL is not only relevant for enhancing individual capacity, but also contributes to the transformation of instructional practices and the learning culture within schools. The integration of SRL theory, SRL instruction theory, and mentoring/TPD theory suggests that fragmented approaches to professional development tend to be less effective. In contrast, integrated approaches that combine self-regulation, reflective practice, and relational support show greater potential for producing sustainable change (de Corte, 2019; Vermunt, 2023).

### *Practical Implications for Teacher Professional Development*

The findings of this review suggest that the design of teacher professional development should explicitly incorporate self-regulated learning as a central principle. TPD programs need to move beyond content transmission and provide structured opportunities for teachers to set professional learning goals, monitor their progress, and engage in systematic reflection. Embedding reflective activities, such as learning journals, mentoring conversations, and guided self-assessment, can support teachers in developing sustained self-regulatory capacity.

In the Indonesian context, these implications are particularly relevant to the implementation of the Teacher Wali role, which positions teachers as academic and personal mentors for students. The findings of this review suggest that effective preparation for the Teacher Wali role requires TPD that develops teachers' self-regulation, reflective capacity, and mentoring skills in an integrated manner. Coaching, mentoring, and collaboration within professional learning communities can support Teacher Wali teachers in sustaining reflective practice, while technology-enhanced learning environments may provide flexible platforms for documentation, monitoring, and professional collaboration. Importantly, such TPD initiatives should be guided by SRL principles to ensure that professional learning is adaptive, sustainable, and responsive to students' needs.

## **Conclusion**

This systematic literature review examined how self-regulated learning (SRL) is integrated within the context of teacher professional development (TPD) and its role in supporting changes in instructional practice. Based on the synthesis of 27 included studies, the review

demonstrates that teachers' SRL serves as a central foundation for meaningful and sustainable professional development. The findings indicate that teachers who develop self-regulatory capacities - through goal setting, monitoring of professional learning, and systematic reflection - are better positioned to benefit from TPD and to translate professional learning into SRL-oriented instructional practices. Teaching practices that support students' SRL, such as explicit strategy instruction, cognitive modelling, reflective task design, and formative assessment, emerge as direct extensions of teachers' self-regulated professional learning processes. Furthermore, the review highlights that the development and sustainability of teachers' SRL are closely shaped by relational and organizational supports, including coaching, mentoring, professional collaboration, and technology-enhanced learning environments. These supports function as enabling conditions that strengthen both individual self-regulation and shared regulation within professional contexts. This review concludes that effective integration of SRL in TPD requires an integrated approach that connects teachers' self-regulation, instructional practices for SRL, and sustained relational and organizational support. This integrated perspective offers a coherent framework for understanding and designing professional development that is reflective, adaptive, and responsive to the demands of contemporary education. Despite providing a comprehensive overview of the integration of SRL in TPD, this review has several limitations. First, it was limited to English-language studies with full-text access, which may have restricted the representation of local or non-English educational contexts, particularly from developing countries. Second, most included studies focused on the short-term effects of SRL-based TPD interventions. As a result, evidence regarding the long-term sustainability of changes in teachers' instructional practices remains limited. In addition, methodological diversity across studies constrained the possibility of deeper quantitative synthesis. Future research should therefore examine the long-term impact of SRL-oriented TPD through longitudinal designs, while also incorporating policy, leadership, and organizational perspectives. Further studies in diverse and local educational contexts are also needed to strengthen understanding of SRL implementation in TPD across different education systems.

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Risdiyanto: original draft preparation (conceptualization, methodology, data curation, formal analysis, investigation, writing). A.H. Hernawan: review and editing (supervision, validation, writing). R.C. Johan: review and editing (validation, writing). A.F. Fadlillah: validation, writing (review and editing). All authors have read and agreed to the published version of the manuscript.

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**Conflict of Interest**

The authors declare no conflict of interest.

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