European Journal of Education

WILEY

SPECIAL ISSUE Self-regulated learning in K-12 school contexts

ORIGINAL ARTICLE OPEN ACCESS

Collaborative Lesson Planning Influences Teachers' Self-Regulated Learning Instruction (SRL-I): The Mediating Role of Perceived Benefits of SRL

Chi Keung Eric Cheng[1] | Norman B. Mendoza[2] | Zi Yan[2]

[1]Yew Chung College of Early Childhood Education, Hong Kong, China | [2]Department of Curriculum and Instruction, Faculty of Education and Human Development, The Education University of Hong Kong, Hong Kong, China

Correspondence: Chi Keung Eric Cheng (eric.cheng@yccece.edu.hk) | Norman B. Mendoza (nbmendoza@eduhk.hk) | Zi Yan (zyan@eduhk.hk)

Received: 25 March 2025 | **Revised:** 29 September 2025 | **Accepted:** 3 October 2025

Funding: The authors received no specific funding for this work.

Keywords: collaborative lesson planning | Hong Kong | self-regulated learning | teachers

ABSTRACT

Collaborative lesson planning (CLP) is deemed a sustainable professional development for teachers that can improve pedagogy and instruction in the classroom. This study examined how CLP influences teachers' self-regulated learning (SRL) instruction to students. Using data from 313 primary and secondary school teachers in Hong Kong, we conducted a structural equation model to test the link between teachers' CLP and SRL instruction, and whether such a link is mediated by teachers' perceived benefits of SRL (SRL-PB) and beliefs about students' capacity for SRL (SRL-SC). The findings suggest that higher teachers' CLP is correlated with increased perceived benefits of SRL, beliefs about students' capacity for SRL, and SRL instruction. The link between CLP and SRL instruction was partially mediated by teachers' perceived benefits of SRL, in that collaborative lesson planning influences teachers' perceptions of the benefits of SRL which, in turn, predicts their SRL instruction. Teachers' beliefs about the capacity of students for SRL did not mediate the link between CLP and SRL instruction. The study provides evidence to support the importance of collaborative lesson planning to teachers' implementation of SRL instruction in classrooms. The findings further suggest that while teachers might have varying beliefs about students' capacity to engage in SRL, what influences their use of SRL instruction is their perception of the benefits of SRL for students, which is fostered by collaborative lesson planning. Theoretical and practical implications are discussed.

1 | Introduction

Despite decades of research establishing the importance of self-regulated learning (SRL) for student achievement, many teachers struggle to implement effective SRL instruction in their classrooms (Dignath and Büttner 2018; Kramarski and Heaysman 2021; Yan 2018). Self-regulated learning refers to the proactive, reflective, and systematic use of cognitive, metacognitive, motivational, and behavioural strategies by learners to achieve their academic goals (Zimmerman 2002, 2008). Research consistently demonstrates that students who develop SRL skills exhibit higher academic achievement, greater motivation, and stronger lifelong learning capabilities (Dignath et al. 2008; Zimmerman and Schunk 2001; Karlen et al. 2020). It is recognised that the development of students' SRL skills requires teachers' instruction, which is influenced significantly by their beliefs about SRL, particularly

Prof Cheng and Dr Mendoza contributed equally to this manuscript and are co-first authors.

their perceptions of its benefits and their students' capacity to implement it (Spruce and Bol 2015; Yan 2018; Kramarski 2018).

Further, even when educational policy reforms emphasize the importance of SRL, such as Hong Kong's "Learning to Learn 2.0+" curriculum framework (CDC 2017), the implementation of explicit SRL instruction in classrooms remains limited. Teachers encounter numerous challenges including inadequate pedagogical knowledge, insufficient professional development, heavy workloads, and assessment pressures that constrain their use of SRL instructional strategies (Spruce and Bol 2015; Yan and Cheng 2015; Heirweg et al. 2021). These challenges highlight the need for effective professional development approaches that can help teachers overcome barriers to SRL implementation. Research indicates that teachers' beliefs significantly predict their instructional practices, with perceived benefits of SRL showing stronger predictive power than beliefs about student capacity (Yan 2018; Dignath and Veenman 2021; Karlen et al. 2020).

Collaborative Lesson Planning (CLP) offers a promising professional development strategy wherein teachers systematically engage in reflective dialogues, co-design instructional strategies, and collaboratively implement and refine their teaching practices (Bauml 2014; Ekin and Balaman 2024; Gutierez 2021). The SECI (Socialisation, Externalisation, Combination, Internalisation) knowledge creation model provides a theoretical framework for structured professional collaboration through continuous dialogue, collective reflection, explicit articulation, and practical application of pedagogical knowledge (Nonaka and Takeuchi 1995; Mendoza et al. 2022). This collaborative approach appears particularly well-suited for developing teachers' self-regulated teaching competencies through what Kramarski and Heaysman (2021) describe as "triple SRL-SRT processes"—where teachers must develop self-regulation of their own learning, self-regulation of their teaching practices, and activation of students' self-regulation.

However, despite extensive research on both CLP and SRL individually, there remains a notable research gap regarding how structured CLP processes influence teachers' implementation of SRL instructional practices. Specifically, existing studies predominantly focus either on teacher beliefs or on professional development strategies separately, without explicitly examining the mediating roles of teachers' perceived benefits of SRL and their beliefs regarding students' capacity for SRL. Furthermore, while Karlen et al. (2020) found that teachers' SRL competencies positively related to their intention to implement SRL, and Yan (2018) demonstrated that perceived benefits strongly predicted SRL instructional practices, how collaborative processes might shape these crucial beliefs remains underexplored. The current study addresses these gaps by investigating how teachers' participation in structured collaborative lesson planning—guided systematically by the SECI model—enhances their explicit SRL instructional practices, and by exploring the mediating roles that teachers' beliefs play in this relationship.

1.1 | Literature Review

Drawing from empirical studies across educational psychology and organisational learning, this literature review synthesises theoretical perspectives on collaborative lesson planning (CLP) and self-regulated learning (SRL) instruction. Central to this synthesis is the SECI model of knowledge creation, which provides a robust theoretical framework for understanding how teachers develop SRL instructional competencies through structured professional collaboration.

1.1.1 | The SECI Knowledge Creation Model

Originating from organisational theory, the SECI model developed by Nonaka and Takeuchi (1995) offers a comprehensive framework for understanding knowledge creation through four interconnected processes: Socialisation, Externalisation, Combination, and Internalisation. While initially conceptualised for business contexts, this dynamic model has demonstrated considerable relevance in educational settings, particularly for capturing the complex processes of professional knowledge development among educators (Cheng 2020; Mendoza et al. 2022).

The model's first component, Socialisation, encompasses the sharing of tacit knowledge through direct interactions and collaborative discussions. Within educational contexts, this process enables teachers to access colleagues' implicit pedagogical insights and experiential wisdom that might otherwise remain unarticulated (Nonaka and Takeuchi 1995; Żatuchin 2024). Externalisation, the second process, involves transforming this tacit knowledge into explicit, shareable forms including lesson plans, teaching guidelines, and instructional resources (Cheng 2020; Songkram and Chootongchai 2020). This critical transformation crystallises intuitive teaching practices into concrete strategies that can be systematically examined and refined.

The third process, Combination, operates through the systematic integration of explicit knowledge from diverse sources to create comprehensive, higher-order frameworks. In educational settings, this manifests when teachers collaborate across subject boundaries to develop cohesive instructional approaches, promoting systems thinking and enabling the synthesis of varied pedagogical perspectives (Mendoza et al. 2022; Senge 1990). Internalisation, the final component, occurs as teachers transform explicit knowledge into personalised tacit knowledge through practical application and reflective experience, thereby deepening professional understanding and enhancing practical competencies (Nonaka and Takeuchi 1995; Cheng 2020).

Together, these four processes constitute a continuous knowledge creation spiral that effectively captures how teachers collectively develop, share, integrate, and personalize professional knowledge about teaching practices, including the complex domain of SRL instruction (Kramarski and Heaysman 2021).

1.1.2 | Collaborative Lesson Planning

Collaborative Lesson Planning (CLP) emerges as a structured, reflective process wherein teachers engage collectively in purposeful dialogue to design, implement, evaluate, and refine instructional practices (Bauml 2014; Ekin and Balaman 2024). Distinguished from traditional individual planning approaches, CLP harnesses the diverse expertise and experiences of multiple educators, thereby creating dynamic,

interactive professional learning environments that transcend the limitations of isolated practice (Lewis et al. 2004; Gutierez 2021).

The complexity inherent in current teaching demands nuanced approaches to professional development, positioning CLP as a critical component of effective teacher learning. By providing contextually embedded social learning environments, collaborative planning enables teachers to engage in open discussions and systematic reflections on their practices (Bauml 2014; Gutierez 2021). This collaborative process significantly enhances teachers' capacity to critically examine and refine lessons based on collective insights and evidence of student responses, ultimately strengthening both pedagogical content knowledge and instructional strategies (Shavard 2021; Gutierez 2019).

Theoretical alignment between the SECI model and CLP processes reveals compelling synergies. Within collaborative planning contexts, the four SECI processes manifest distinctively: Socialisation unfolds through both formal and informal teacher interactions as colleagues exchange pedagogical insights and classroom experiences (Ekin and Balaman 2024); Externalisation occurs when teachers articulate implicit knowledge into explicit lesson plans and assessment tools through structured collaborative discussions (Al-Shareef and Al-Qarni 2016); Combination operates as teachers synthesise knowledge from diverse sources, including curriculum documents and pedagogical frameworks, into coherent instructional designs (Gutierez 2021); while Internalisation develops through the implementation, observation, and reflection upon jointly planned lessons (Bauml 2014; Shavard 2021).

By systematically facilitating the continuous conversion of tacit and explicit knowledge, the SECI framework enriches teachers' collaborative dialogues and reflective practices. Ultimately, this integration strengthens teachers' collective agency, pedagogical content knowledge, and professional effectiveness, thereby enhancing overall instructional quality (Gutierez 2019, 2021; Ekin and Balaman 2024).

1.1.3 | Self-Regulated Learning and Teachers' Implementation

Self-regulated learning (SRL) encompasses learners' systematic orchestration of cognitive, metacognitive, motivational, and behavioural strategies in pursuit of academic goals (Zimmerman 2000, 2002; Dignath and Veenman 2021). This learner-driven approach emphasises proactive goal-setting, strategic planning, continuous self-monitoring, and adaptive adjustments throughout learning processes. Despite compelling evidence for SRL's educational value, a persistent implementation gap characterises many classrooms, where teacher adoption of explicit SRL instruction remains disappointingly limited (Spruce and Bol 2015; Kramarski and Heaysman 2021).

Research consistently reveals a troubling disconnect between teachers' positive beliefs about SRL and their actual classroom practices. While many educators acknowledge SRL's importance theoretically, they frequently resort to implicit instructional methods, inadvertently overlooking explicit strategies such as systematic goal-setting, structured self-monitoring, and deliberate self-evaluation (Spruce and Bol 2015; Yan 2018; Wan et al. 2023). This implementation paradox has prompted researchers to examine the underlying factors that influence teachers' instructional decisions regarding SRL.

Two critical belief systems emerge as particularly influential: teachers' perceived benefits of SRL (SRL-PB) and their beliefs about students' capacity for SRL (SRL-SC). Regarding perceived benefits, teachers typically demonstrate general recognition of SRL's educational value, including its potential for improving student achievement, increasing intrinsic motivation, and fostering learner autonomy (Spruce and Bol 2015; Yan 2018). However, the translation of these positive beliefs into sustained classroom practices frequently encounters substantial obstacles. Contextual constraints such as overwhelming workloads, accountability pressures, and severely limited instructional time often derail teachers' intentions to implement SRL strategies systematically (Yan and Cheng 2015; Heirweg et al. 2021).

The second belief system, concerning students' perceived capacity, presents additional complexities. Many teachers harbor concerns about their students' readiness for self-regulated learning, particularly regarding younger learners or those perceived as academically weaker. These educators often view such students as lacking the cognitive maturity, self-discipline, or metacognitive awareness necessary for effective SRL engagement (Spruce and Bol 2015; Yan 2018). Such perceptions can significantly constrain teachers' willingness to implement explicit SRL instruction, thereby limiting students' opportunities to develop these critical skills.

1.1.4 | Linking Collaborative Lesson Planning to SRL Instruction

Mounting empirical evidence demonstrates CLP's effectiveness in enhancing teachers' SRL instructional practices. In a particularly compelling study, Michalsky and Schechter (2018) found that teachers who engaged in systematic collaborative reflection on both challenging and successful teaching experiences demonstrated significant improvements in their SRL-based lesson design capabilities. This collaborative reflection process enabled educators to identify, analyze, and explicitly integrate key SRL strategies within their instructional plans, including clear goal articulation, strategic selection of student-centered activities, and optimal timing for self-regulation opportunities. The structured nature of these collaborative experiences provided teachers with practical insights and robust pedagogical strategies, ultimately increasing their confidence and competence in implementing explicit SRL instruction (Kramarski and Heaysman 2021).

The influence of CLP on teachers' SRL-related beliefs operates through carefully structured opportunities for professional reflection, dialogue, and collective inquiry. Through systematic collaborative analysis of successful teaching experiences, educators develop increasingly layered understandings of SRL's practical value in enhancing student learning outcomes, problem-solving capabilities, and intrinsic motivation (Michalsky and Schechter 2018; Dignath and Veenman 2021).

These collaborative experiences prove particularly effective in challenging prevalent misconceptions, such as viewing SRL as applicable only to high-achieving students or dismissing it as impractical due to time constraints.

When teachers participate in CLP, they gain opportunities to collectively examine their beliefs, share successful implementation experiences, and jointly develop strategies for overcoming perceived barriers. This collaborative approach facilitates meaningful shifts in educators' perceptions, moving them toward more positive evaluations of SRL's benefits and ultimately fostering stronger intentions for effective implementation (Yan 2018; Kramarski 2018).

Regarding student capacity beliefs, CLP provides structured contexts for teachers to systematically re-evaluate their assumptions about learners' self-regulatory capabilities. Many educators initially perceive younger students as developmentally unprepared for meaningful SRL engagement, leading them to limit their implementation of explicit self-regulation strategies (Spruce and Bol 2015). However, participation in collaborative planning enables teachers to engage in productive discussions about student capabilities, identify previously overlooked strengths, and develop appropriately scaffolded approaches that support students' emerging autonomy and self-regulatory skills. Through structured collaborative reflection on both successful and challenging teaching experiences, teachers cultivate more nuanced and accurate understandings of their students' SRL capacities, thereby strengthening their professional self-efficacy and increasing their willingness to implement explicit SRL strategies (Michalsky and Schechter 2018; Kramarski and Heaysman 2021).

1.1.5 | Conceptual Framework of the Study

Figure 1 presents this study's conceptual framework, which synthesizes insights from the preceding literature to highlight CLP's pivotal role in promoting teachers' SRL implementation. Grounded in the SECI model's four knowledge creation processes (i.e., Socialisation, Externalisation, Combination, and Internalisation), the framework positions structured collaborative lesson planning as a catalyst for enhanced SRL instruction. Teachers' engagement in systematic CLP facilitates explicit reflection on both problematic and successful instructional experiences, thereby strengthening their pedagogical knowledge, refining their instructional skills, and building their confidence in SRL practices (Michalsky and Schechter 2018; Spruce and Bol 2015).

The framework proposes that CLP positively influences two crucial mediating belief systems: teachers' perceived benefits of SRL (SRL-PB) and their beliefs regarding students' capacity for SRL (SRL-SC). Through joint reflection, collaborative evaluation, and systematic revision of instructional strategies based on collective experiences, teachers develop more nuanced and positive beliefs about SRL implementation (Lombaerts et al. 2009; Yan and Cheng 2015). These transformed belief systems subsequently serve as mediating psychological mechanisms that enhance teachers' explicit implementation of SRL instruction in their classrooms. The framework thus posits that collaborative lesson planning influences SRL implementation through both direct pathways and indirect routes mediated by teachers' evolving beliefs and perceptions, ultimately resulting in more frequent and effective integration of SRL strategies into daily teaching practices.

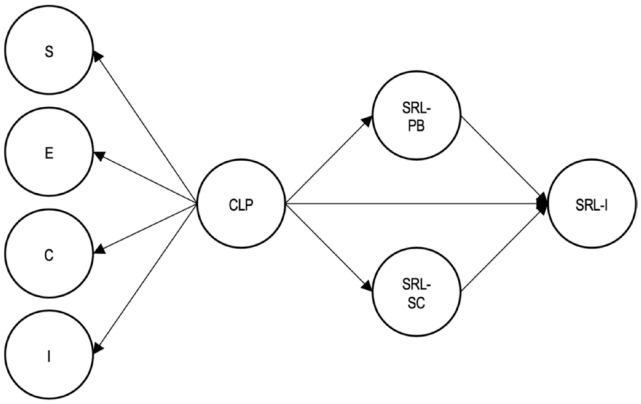

FIGURE 1 | Conceptual framework linking teachers' CLP to SRL-Instruction through SRL-PB and SRL-SC. CLP, collaborative lesson planning; SRL-PB, perceived benefits of SRL; SRL-SC, beliefs on students' capacity for SRL; SRL-IN, SRL instruction.

1.1.6 | The Present Study

This study aims to examine how collaborative lesson planning influences SRL instruction among teachers. Specifically, using a structural equation model, we aim to examine whether teachers' collaborative lesson planning (CLP) is positively associated with SRL instruction (SRL-I; H1.1) and two potential mediators: teachers' perceived benefits of SRL (SRL-PB; H1.2) and their beliefs about their students' capacity to use SRL (SRL-SC; H1.3). We also tested whether the association between CLP and SRL-I is mediated by SRL-PB (H2) and SRL-SC (H3).

1.1.7 | Research Context

Hong Kong's educational system operates within a unique socio-cultural context that blends Chinese educational traditions emphasising teacher-directed instruction with Western progressive pedagogical approaches. The 'Learning to Learn 2.0+' curriculum framework (CDC 2017) represents Hong Kong's most recent policy initiative promoting student-centered learning and self-regulation, building upon earlier reforms dating back to 2001. However, implementation challenges persist due to an examination-oriented culture, high-stakes assessment pressures (particularly the Diploma of Secondary Education), and traditional teacher-student hierarchical relationships. Globally, educational systems are increasingly emphasising student autonomy and self-directed learning as core 21st-century competencies. Similar policy initiatives promoting SRL can be found across diverse contexts, including Finland's phenomenon-based learning framework, Singapore's 21st Century Competencies model, and Australia's General Capabilities curriculum. Despite these widespread

policy commitments, international research consistently identifies implementation gaps between policy intentions and classroom practices across cultural contexts.

2 | Methods

2.1 | Participants

We used data from 340 teachers from four primary and four secondary schools in Hong Kong. Schools were selected from a school partnership project using non-probability sampling, where teachers received invitations to participate in a research survey. The sample consisted of teachers from eight schools: four primary schools (32, 47, 49, and 39 teachers respectively) and four secondary schools (47, 24, 41, and 61 teachers respectively).

Teachers represented diverse subject areas including Chinese Language ($n = 86$, 25.3%), English Language ($n = 81$, 23.8%), Mathematics ($n = 60$, 17.6%), Personal, Social and Humanities Education ($n = 41$, 12.1%), Arts ($n = 32$, 9.4%), Physical Education ($n = 32$, 9.4%), Science ($n = 21$, 6.2%), Technology ($n = 16$, 4.7%), and other subjects ($n = 16$, 4.7%). Schools represented different performance bands within Hong Kong's education system, with two Band 1 schools, four Band 2 schools, and two Band 3 schools, providing diversity across academic achievement levels. All schools operated within the Hong Kong public education system under Education Bureau oversight.

Responses with missing data greater than 5% and outliers for each of the measures ($n = 27$) were removed, and data from 313 teachers remained for data analysis. Outliers were identified using the Mahalanobis distance rule (see Bedrick et al. 2000; Tabachnick et al. 2007). This method evaluates how far each participant's response pattern lies from the multivariate mean of all participants across the study variables. Two-thirds of the teachers were female ($n = 209$, 66.77%). The average teaching experience was 10.7 years (SD = 7.64).

2.2 | Procedures

Teacher data were collected through a paper-and-pen survey method. Procedures for this study were approved by the Human Research Ethics Committee of the authors' affiliated university. The data collection of the study was in the context of a teacher training and development program. All participants provided written informed consent prior to participation and were explicitly informed of their right to withdraw from the study at any time without penalty. No incentives were provided for participation, and all data were collected anonymously with no possibility of individual identification.

2.3 | Measures

2.3.1 | Collaborative Lesson Planning Scale (CLPS)

Teachers' collaborative lesson planning was assessed using the 21-item CLPS (Mendoza et al. 2022), grounded in the SECI knowledge-creation model (Nonaka and Takeuchi 1995). The scale captures the four SECI processes: Socialisation (e.g., "Members of the teaching team often share their teaching knowledge and experience actively"), Externalisation (e.g., "I often transform preliminary teaching ideas into concrete viewpoints for sharing"), Combination (e.g., "I compare new teaching methods with my existing experience to better understand their meaning"), and Internalisation (e.g., "The lesson implementation after collaborative lesson planning helps me internalize teaching knowledge"). Items were rated on a 6-point Likert scale (1 = Strongly disagree to 6 = Strongly agree). The scale demonstrated strong psychometric properties, with internal consistency ranging from 0.83–0.93 for the subscales and 0.96 for the overall construct.

2.3.2 | Self-Regulated Learning Instruction Scale (SRLIS)

The SRLIS was developed by Yan (2018) to assess teachers' self-regulated learning instruction practices. The SRLIS has items (e.g., "I teach students to ask themselves questions to check whether they have understood the course content", "I teach students to identify which topics they don't understand well in their learning") and all items are on a six-point Likert-type scale, ranging from Strongly Disagree (1), Disagree (2), Slightly Disagree (3), Slightly Agree (4), Agree (5) to Strongly Agree (6). The SRLIS has been validated from the Rasch measurement perspective (Yan 2018): the Rasch reliability was 0.90, and all items fitted the Rasch model requirements with Infit/Outfit MNSQ falling into the acceptable range (0.75–1.33). In this study, Cronbach's alpha on the scale is 0.94.

2.3.3 | Self-Regulated Learning Teacher Belief Scale (SRLTBS)

The SRLTBS (Lombaerts et al. 2009) was used to assess teacher beliefs about introducing SRL into their classrooms. Current studies suggest that the current 10 items can be further distinguished into two components: (1) teachers' perceived benefits of SRL (SRL-PB) and (2) their beliefs about their students' capacity for SRL (SRL-SC; Yan 2018). SRL-PB includes items such as.

"Students should be able to make decisions about the sequence and duration of their learning activities more often", while SRL-SC consists of items like "Self-regulated learning leads to a more efficient collaboration between students". All items were responded to on a Likert-type scale from 0 (Strongly disagree) to 6 (Strongly agree). The internal reliability of the SRL-PB and SRL-SC in this study is 0.90 and 0.83, respectively.

2.4 | Data Analysis

The analyses in the study are performed in R (R Core Team 2016) using Rosseel's (2012) lavaan package. All item responses were treated as continuous data. We used a fully latent structural equation model (SEM) to examine the role of collaborative lesson planning (CLP) on self-regulated learning instruction (SRL-I). We implemented the two-step approach (Anderson and Gerbing 1988) by first examining the factor structure of the

TABLE 1 | Intercorrelation among the latent constructs.

	1	2	3	4	5	6	7	8
Constructs	**Collaborative lesson planning**					**Mediators**		**Outcome**
1. Socialisation	(0.92)							
2. Externalisation	0.838***	(0.83)						
3. Combination	0.854***	0.829***	(0.88)					
4. Internalisation	0.869***	0.844***	0.859***	(0.93)				
5. CLP	0.929***	0.902***	0.919***	0.935***	(0.96)			
6. SRL-SC	0.402***	0.391***	0.398***	0.405***	0.433***	(0.83)		
7. SRL-PB	0.471***	0.457***	0.466***	0.474***	0.507***	0.899***	(0.90)	
8. SRL Instruction	0.659***	0.640***	0.651***	0.663***	0.709***	0.585***	0.691***	(0.94)

Note: All correlations are significant at ***$p < 0.001$, Values shown in parentheses on the diagonal are internal consistency reliabilities of the scales (Cronbach's alpha).

TABLE 2 | Confirmatory factor analyses fit indices for the measures used.

Model	χ^2	df	CFI	TLI	RMSEA	SRMR
CLPS 4-factor model (20 items)	396.473	183	0.945	0.937	0.068	0.042
SRL-SC/PB 2-factor model (10 items)[a]	89.976	32	0.953	0.934	0.094	0.039
SRL-I 1-factor model (10 items)[a]	141.927	33	0.931	0.906	0.123	0.040

[a]With less than three model modifications to achieve model fit; All fit indices are robust fit indices and used the Satorra-Bentler correction. All chi-square estimates are significant at *** $p < 0.001$.

constructs, followed by the use of a fully latent SEM. Because of the four-factor nature of collaborative lesson planning, we used a second-order factor to model it as a predictor. Next, we modelled a latent SRL-I (10 items) as an outcome. The two mediators between the CLP-SRL-I link, SRL-SC (5 items) and SRL-PB (5 items), were then included in the model (see Figure 1). We used the maximum likelihood estimator with robust standard errors and a Satorra-Bentler scaled test statistic to test the SEM. Then, we resampled the model with 5000 bootstraps to accurately test the indirect effects of the two mediators (see Preacher and Hayes 2008; e.g., Mendoza et al. 2023; Zhang et al. 2025).

The following goodness-of-fit indices were used to evaluate and compare the models: Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR). Following the Hu and Bentler (1995) recommendation, a good model fit would include model CFI and TLI of greater than 0.90 and an RMSEA of less than 0.08. An SRMR value of less than 0.08 is considered a good fit (Hu and Bentler 1999). For the indirect effects, standardised estimates falling within the lower and upper 95% confidence interval indicate significant effects.

3 | Results

The intercorrelations among the latent constructs are shown in Table 1. All constructs have significant positive correlations with moderate to strong associations. The CFA results examining the factor structure of the constructs support the four-factor model of the CLP, the two-factor model of the SRL-SC/PB, and the one-factor model of the SRL-I (see Table 2). These CFA findings suggest that the measurement model of each of the constructs represents the observed item-level constructs.

The SEM where SRL-SC and SRL-PB are mediators between CLP and SRL-I ran normally after 89 iterations. The robust fit indices were χ^2 (765) = 1439.09, $p > 0.001$, CFI = 0.912, TLI = 0.906, RMSEA = 0.058 (CI = 0.053 to 0.063), SRMR = 0.05 suggesting adequate model fit. The model predicted 19% of the variance of SRL-SC, 26% of the variance of SRL-PB, and 64% of SRL-I (see Figure 2). This model included four model modifications, which were carried over from the measurement models (i.e., CFA) where four pairs of items under three latent constructs (i.e., SRL-SC, SRL-PB, SRL-I) were allowed to covary due to high item-level correlations.

The results of the SEM (see Table 3) suggest a positive and direct link between CLP and SRL-I ($\beta = 0.48$, $p < 0.001$, supporting H1.1). CLP is also positively associated with the mediators SRL-SC ($\beta = 0.43$, $p < 0.001$, supporting H1.2) and SRL-PB ($\beta = 0.56$, $p < 0.001$, supporting H1.3). In examining how the mediators predicted SRL-I, only SRL-PB was positively associated with SRL-I ($\beta = 0.56$, $p < 0.001$) while SRL-SC was not ($\beta = -0.13$, $p > 0.05$). Consequently, in testing for indirect effects, we found that only the link between CLP and SRL-I that is mediated by SRL-PB had significant indirect effects ($\beta = 0.29$, [95% CI = 0.136, 0.611], supporting H2). And since the total effect in the link between CLP and SRL-I as mediated by SRL-PB was significant ($\beta = 0.77$, [95% CI = 0.628, 1.114]), we conclude that the link from CLP to SRL-I is partially mediated by SRL-PB. That is, increased collaborative lesson planning among teachers is associated with increased perception of the benefits of SRL which, in turn, links to increased SRL instruction. The indirect

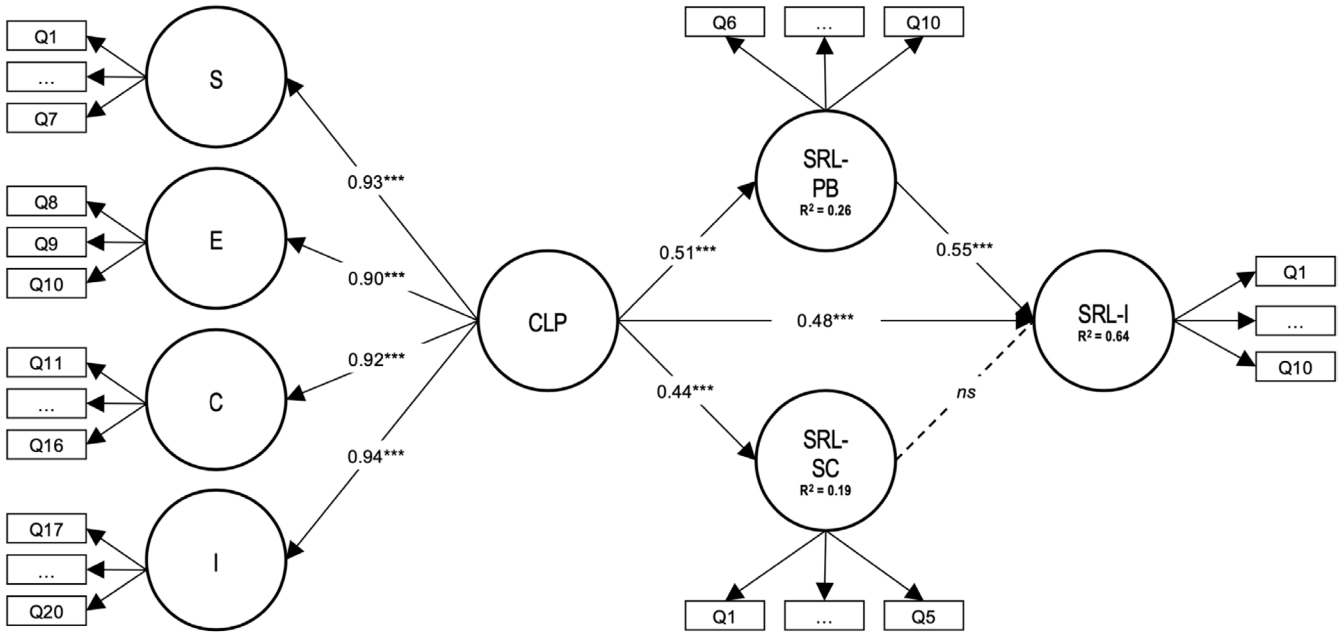

FIGURE 2 | Illustration of structural equation model where SRL-PB partially mediates CLP to SRL-I. ***$p < 0.001$; ns = non-significant association; "..." = consecutive items between the adjacent items; R^2 = variance predicted by the model.

TABLE 3 | Results of the SEM, including indirect and total effects.

Path	β	SE	Lower CI	Upper CI
CLP → SRL-I	0.479***	0.077	—	—
CLP → SRL-SC	0.433***	0.083	—	—
CLP → SRL-PB	0.507***	0.094	—	—
SRL-SC → SRL-I	−0.129	0.189	—	—
SRL-PB → SRL-I	0.563**	0.155	—	—
CLP → SRL-SC → SRL-I (indirect effect)	−0.056	0.086	−0.275	0.076
CLP → SRL-SC → SRL-I (total effect)	0.424***	0.129	0.166	0.685
CLP → SRL-PB → SRL-I (indirect effect)	0.286**	0.117	0.136	0.611
CLP → SRL-PB → SRL-I (total effect)	0.765***	0.122	0.628	1.114

Note: Total effect represents the combined direct and indirect effects of CLP on SRL-I through each mediator pathway. Indirect effects show the specific mediated pathways. **$p < 0.01$, ***$p < 0.001$; Model fit: χ^2 (765) = 1439.09, $p > 0.001$, CFI = 0.912, TLI = 0.906, RMSEA = 0.058 (CI = 0.053 to 0.063), SRMR = 0.05.

effect on the link between CLP and SRL-I through SRL-SC was not significant (rejecting H3).

4 | Discussion

This study examined how collaborative lesson planning (CLP) guided by the SECI model influences teachers' implementation of self-regulated learning instruction (SRL-I), and whether this relationship is mediated by teachers' perceived benefits of SRL (SRL-PB) and their beliefs about students' capacity for SRL (SRL-SC). Our findings revealed strong empirical support for the proposed conceptual framework. The SECI processes significantly predicted teachers' engagement in CLP, which in turn predicted teachers' SRL-related beliefs and instructional practices. Importantly, teachers' perceived benefits of SRL partially mediated the relationship between CLP and SRL instruction, while contrary to expectations, their perceptions of student capacity did not play a significant mediating role.

Our first finding confirmed that the SECI model processes strongly predicted teachers' collaborative lesson planning activities. The high path coefficients from Socialisation ($\beta = 0.93$), Externalisation ($\beta = 0.90$), Combination ($\beta = 0.92$), and Internalisation ($\beta = 0.94$) to CLP validate Nonaka and Takeuchi's (1995) knowledge creation framework as an effective theoretical foundation for understanding teachers' professional collaboration. These robust associations suggest that successful CLP depends on creating environments where teachers can share tacit knowledge through dialogue (Socialisation), articulate their implicit understandings into explicit forms (Externalisation), integrate diverse knowledge sources into

coherent instructional designs (Combination), and apply their collective knowledge in classroom practice (Internalisation). This finding extends previous research (Mendoza et al. 2022; Żatuchin 2024) by empirically demonstrating how these knowledge conversion processes specifically enhance teachers' collaborative practices in educational settings.

The second key finding revealed that CLP significantly predicted teachers' perceived benefits of SRL ($\beta = 0.51$), beliefs about student capacity ($\beta = 0.44$), and SRL instructional practices ($\beta = 0.48$). These results align with Michalsky and Schechter's (2018) conclusion that collaborative reflection enhances teachers' understanding of SRL's educational value and Kramarski and Heaysman's (2021) finding that collaborative professional development strengthens teachers' SRL implementation. The moderate effect sizes observed suggest that CLP provides a powerful context for teachers to collectively examine and refine their understanding of SRL's benefits, reconsider their assumptions about students' capabilities, and develop concrete strategies for classroom implementation. Through structured collaborative dialogue, teachers appear to develop more nuanced conceptualizations of SRL and greater confidence in implementing SRL strategies, addressing the knowledge and skill gaps identified by previous researchers (Spruce and Bol 2015; Yan 2018).

Perhaps the most theoretically significant finding was that teachers' perceived benefits of SRL partially mediated the relationship between CLP and SRL instruction ($\beta = 0.55$), while their perceptions of student capacity did not demonstrate a significant mediating effect. This partially supports our conceptual model and aligns with Yan's (2018) finding that perceived benefits more strongly predict instructional practices than beliefs about student capacity. That teachers' recognition of SRL's value serves as a motivational foundation for overcoming implementation barriers makes theoretical sense. When teachers deeply understand how SRL enhances student learning outcomes, they become more willing to invest the significant effort required to transform their instructional approaches. The non-significant path from SRL-SC to SRL-I, however, suggests an important refinement to our understanding of what drives teachers' instructional decisions.

The non-significant pathway from student capacity beliefs to SRL instruction, despite the significant relationship between CLP and both mediator variables, suggests important theoretical distinctions in how teachers' beliefs translate into practice (Spruce and Bol 2015; Lombaerts et al. 2009). While collaborative lesson planning enhances both perceived benefits and capacity beliefs simultaneously, these belief systems appear to operate through different psychological mechanisms in predicting instructional behaviour.

Teachers' recognition of SRL benefits may serve as a more proximal motivational factor, directly addressing 'why' they should implement SRL strategies, while capacity beliefs may function more as enabling conditions that moderate implementation quality rather than drive initial adoption decisions. This finding aligns with expectancy-value theory, where outcome expectancies (benefits) often show stronger predictive relationships with behavioral intentions than capability beliefs, particularly when teachers already possess basic pedagogical knowledge (Yan 2018, 2021; Kramarski 2018).

The strong correlation between teachers' perceived benefits of SRL and beliefs about student capacity ($r = 0.90$) suggests these constructs share substantial conceptual overlap. While theoretically distinct, with perceived benefits focusing on SRL's educational value and student capacity beliefs addressing developmental readiness, teachers' evaluations of these aspects appear highly interrelated in practice (Spruce and Bol 2015). However, our SEM results demonstrate that despite this high correlation, only perceived benefits significantly predicted SRL instruction, indicating that teachers' recognition of SRL's value serves as the more proximal motivational pathway to implementation than their assessments of student readiness (Yan 2018; Dignath and Veenman 2021). This finding suggests that even when teachers recognize students' potential for self-regulation, contextual barriers such as curriculum constraints, assessment pressures, and limited instructional time may still impede implementation, but these barriers are more effectively overcome when teachers have strong convictions about SRL's benefits (Yan and Cheng 2015; Heirweg et al. 2021).

4.1 | Theoretical and Practical Implications

The findings from this study offer several important theoretical contributions to the literature on teacher professional development and self-regulated learning. First, our results empirically validate the integration of Nonaka and Takeuchi's (1995) SECI model with collaborative lesson planning as a theoretical framework for understanding how teachers develop and implement SRL instructional practices. This integrated framework extends previous dual-process conceptualizations (Karlen et al. 2020; Kramarski and Michalsky 2009) by highlighting the specific knowledge conversion processes that support teachers' development of SRL-related beliefs and practices. Second, our findings refine the theoretical understanding of the mediating mechanisms between professional development and instructional implementation by demonstrating that perceived benefits of SRL, rather than perceptions of student capacity, serve as the primary psychological pathway linking collaborative experiences to classroom practices. This distinction advances our theoretical understanding beyond the general assertion that "beliefs matter" (Spruce and Bol 2015) to a more nuanced model specifying which particular beliefs most directly influence instructional decisions regarding SRL. These findings align with international professional development research demonstrating that collaborative approaches effectively enhance teacher implementation of student-centered pedagogies across diverse cultural contexts, including lesson study in Japan, professional learning communities in Canada, and collaborative inquiry in New Zealand.

These findings yield several practical implications for educational stakeholders. For school administrators and professional development coordinators, our results suggest that structured collaborative lesson planning should be systematically incorporated into teacher professional development programs, with explicit attention to all four SECI processes. Practical implementation might include creating dedicated time and physical spaces for teacher collaboration, developing protocols that guide

teachers through articulating tacit knowledge, and establishing mechanisms for documenting and sharing collaborative insights across teaching teams. Structuring these dedicated time and giving teachers autonomy within these can be beneficial for them (e.g., Mendoza and Dizon 2023) For teacher educators, our findings highlight the importance of explicitly addressing teachers' perceptions of SRL benefits rather than focusing exclusively on student capacity beliefs. Professional development activities should incorporate empirical evidence demonstrating SRL's positive impacts on student outcomes (see Yan and Mendoza 2025), opportunities to observe successful SRL implementation, and structured reflection on teachers' own experiences with SRL strategies. Finally, for policymakers, our findings suggest that educational reforms promoting self-regulated learning should be accompanied by substantial investments in collaborative professional learning structures that enhance teachers' understanding of SRL benefits and provide concrete support for overcoming implementation barriers.

4.2 | Limtations and Directions for Future Research

This study has several limitations that must be acknowledged when interpreting the findings. First, data were collected from primary and secondary teachers in Hong Kong, potentially limiting generalizability to other educational contexts or cultural settings where educational philosophies, policy frameworks, and implementation challenges may differ. Cross-cultural validation studies are needed to determine whether the relationships identified here maintain their strength and direction across diverse educational systems (Heirweg et al. 2021; Karlen et al. 2020). Second, the cross-sectional design precludes causal inferences about the relationships between collaborative lesson planning, teacher beliefs, and instructional practices. While the structural equation modelling approach allows the examination of hypothesized directional relationships, alternative causal pathways cannot be definitively ruled out. Third, reliance on self-report measures introduces potential response bias or social desirability effects, particularly when assessing instructional practices. Future studies should incorporate classroom observations, artefact analysis (e.g., lesson plans, student work), and measures of actual student SRL behaviours to triangulate findings and provide more objective assessments of teacher practices (Dignath and Veenman 2021; Kramarski and Heaysman 2021).

Future research should pursue several promising directions to extend these findings. Longitudinal and intervention designs would be particularly valuable for establishing causal relationships and examining how teachers' collaborative practices and SRL instruction evolve over time. Applying Kramarski and Heaysman's (2021) "triple SRL-SRT processes" framework could enhance the understanding of how teachers' self-regulation of their own learning, self-regulation of their teaching practices, and activation of students' self-regulation interact within collaborative professional development contexts. Additionally, future studies should explore the contextual factors that moderate these relationships, such as school leadership support, organisational culture, assessment systems, and policy environments (Heirweg et al. 2021; Mendoza and Dizon 2023; Yan 2018). Mixed-methods approaches would be particularly valuable for unpacking the complex mechanisms through which collaborative lesson planning influences teacher beliefs and practices. Finally, examining the downstream effects on student outcomes would provide critical evidence for the educational value of CLP-driven SRL instructional approaches, ideally incorporating direct measures of student SRL behaviours alongside academic achievement indicators.

5 | Conclusion

This study demonstrates the role of collaborative lesson planning, grounded in the SECI knowledge creation model, in promoting teachers' self-regulated learning instructional practices. Our findings revealed that CLP positively influences teachers' SRL instruction both directly and indirectly through enhancing their perceived benefits of SRL, while perceptions of student capacity alone proved insufficient for translating beliefs into action. These results highlight the critical importance of structured collaborative professional development that systematically guides teachers through knowledge creation processes while explicitly addressing their understanding of SRL's educational value. By providing teachers with opportunities for collaborative dialogue, reflection, and pedagogical knowledge-sharing focused on SRL's benefits, schools can foster instructional environments where students develop the self-regulatory capabilities essential for academic success and lifelong learning. As educational systems worldwide increasingly emphasize student autonomy and metacognitive development, collaborative lesson planning can be a powerful approach for transforming teaching practices and ultimately enhancing students' capacity to become self-regulated learners.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Al-Shareef, S. Y., and R. A. Al-Qarni. 2016. "The Effectiveness of Using Teacher–Teacher Wikis in Collaborative Lesson Planning and Its Impact on Teacher Professional Development." *Educational Technology & Society* 19, no. 2: 1–14.

Anderson, J. C., and D. W. Gerbing. 1988. "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach." *Psychological Bulletin* 103, no. 3: 411–423.

Bauml, M. 2014. "Collaborative Lesson Planning as Professional Development for Beginning Primary Teachers." *New Educator* 9, no. 3: 172–192.

Bedrick, E. J., J. Lapidus, and J. F. Powell. 2000. "Estimating the Mahalanobis Distance From Mixed Continuous and Discrete Data." *Biometrics* 56, no. 2: 394–401. https://doi.org/10.1111/j.0006-341X.2000.00394.x.

Cheng, E. C. K. 2020. *Knowledge Management for School Education*. Springer Nature.

Curriculum Development Council (CDC). 2017. *Learning to Learn 2.0+: The Way Forward in Curriculum Development*. Education Bureau, Hong Kong SAR Government.

Dignath, C., G. Buettner, and H.-P. Langfeldt. 2008. "How Can Primary School Students Learn Self-Regulated Learning Strategies Most Effectively?: A Meta-Analysis on Self-Regulation Training Programmes." *Educational Research Review* 3, no. 2: 101–129. https://doi.org/10.1016/j.edurev.2008.02.003.

Dignath, C., and G. Büttner. 2018. "Teachers' Direct and Indirect Promotion of Self-Regulated Learning in Primary and Secondary School Mathematics Classes – Insights From Video-Based Classroom Observations and Teacher Interviews." *Metacognition and Learning* 13, no. 2: 127–157. https://doi.org/10.1007/s11409-018-9181-x.

Dignath, C., and M. V. Veenman. 2021. "The Role of Direct Strategy Instruction and Indirect Activation of Self-Regulated Learning—Evidence From Classroom Observation Studies." *Educational Psychology Review* 33, no. 2: 489–533.

Ekin, S., and F. Balaman. 2024. "Collaborative Lesson Planning as a Reflective Practice: EFL Teachers' Professional Development." *Teaching and Teacher Education* 136: 104–131.

Gutierez, S. B. 2019. "Collaborative Lesson Planning: A Promising Professional Development Approach to Promote Teachers' Competencies." *Teaching and Teacher Education* 86: 102883.

Gutierez, S. B. 2021. "Teachers' Reflective Practice in Lesson Study: A Tool for Improving Teaching and Learning." *Reflective Practice* 22, no. 1: 47–59.

Heirweg, S., M. de Smul, E. Merchie, G. Devos, and H. van Keer. 2021. "The Long Road From Teacher Professional Development to Student Improvement: A School-Wide Professionalization on Self-Regulated Learning in Primary Education." *Research Papers in Education* 37, no. 6: 929–953. https://doi.org/10.1080/02671522.2021.1905703.

Hu, L., and P. M. Bentler. 1995. "Evaluating Model Fit." In *Structural Equation Modeling: Concepts, Issues, and Applications*, edited by R. H. Hoyle, 76–99. Sage.

Hu, L., and P. M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* 6, no. 1: 1–55.

Karlen, Y., S. Hertel, and C. N. Hirt. 2020. "Teachers' Professional Competences in Self-Regulated Learning: An Approach to Integrate Teachers' Competences as Self-Regulated Learners and as Agents of Self-Regulated Learning in a Holistic Manner." *Frontiers in Education* 5: 159.

Kramarski, B. 2018. "Teachers as Agents in Promoting Students' SRL and Performance: Applications for Teachers' Dual-Role Training Program." In *Handbook of Self-Regulation of Learning and Performance*, edited by D. H. Schunk and J. A. Greene, 223–239. Routledge.

Kramarski, B., and O. Heaysman. 2021. "A Conceptual Framework and a Professional Development Model for Supporting Teachers' "Triple SRL–SRT Processes" and Promoting Students' Academic Outcomes." *Educational Psychologist* 56, no. 4: 298–311. https://doi.org/10.1080/00461520.2021.1985502.

Kramarski, B., and T. Michalsky. 2009. "Investigating Preservice Teachers' Professional Growth in Self-Regulated Learning Environments." *Journal of Education & Psychology* 101, no. 1: 161–175. https://doi.org/10.1037/a0013101.

Lewis, C., R. Perry, and J. Hurd. 2004. "A Deeper Look at Lesson Study." *Educational Leadership* 61, no. 5: 18–23.

Lombaerts, K., N. Engels, and J. van Braak. 2009. "Determinants of Teachers' Recognitions of Self-Regulated Learning Practices in Elementary Education." *Journal of Educational Research* 102, no. 3: 163–174.

Mendoza, N. B., E. C. K. Cheng, and Z. Yan. 2022. "Assessing Teachers' Collaborative Lesson Planning Practices: Instrument Development and Validation Using the SECI Knowledge-Creation Model." *Studies in Educational Evaluation* 73: 101139. https://doi.org/10.1016/j.stueduc.2022.101139.

Mendoza, N. B., and J. I. W. T. Dizon. 2023. "Principal Autonomy-Support Buffers the Effect of Stress on Teachers' Positive Well-Being: A Cross-Sectional Study During the Pandemic." *Social Psychology of Education* 27, no. 1: 23–45. https://doi.org/10.1007/s11218-023-09834-7.

Mendoza, N. B., Z. Yan, and R. B. King. 2023. "Supporting Students' Intrinsic Motivation for Online Learning Tasks: The Effect of Need-Supportive Task Instructions on Motivation, Self-Assessment, and Task Performance." *Computers & Education* 193: 104663. https://doi.org/10.1016/j.compedu.2022.104663.

Michalsky, T., and C. Schechter. 2018. "Teachers' Self-Regulated Learning Lesson Design: Integrating Learning From Problems and Successes." *Teacher Educator* 53, no. 2: 101–123. https://doi.org/10.1080/08878730.2017.1399187.

Nonaka, I., and H. Takeuchi. 1995. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press.

Preacher, K. J., and A. F. Hayes. 2008. "Contemporary Approaches to Assessing Mediation in Communication Research." In *The Sage Sourcebook of Advanced Data Analysis Methods for Communication Research*, edited by A. F. Hayes, M. D. Slater, and L. B. Snyder, 13–54. Sage Publications, Inc. https://doi.org/10.4135/9781452272054.n2.

R Core Team. 2016. R: A Language and Environment for Statistical Computing [Computer Software]. https://www.R-project.org/.

Rosseel, Y. 2012. "Lavaan: An R Package for Structural Equation Modeling." *Journal of Statistical Software* 48, no. 2: 1–36. https://doi.org/10.18637/jss.v048.i02.

Senge, P. M. 1990. *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday/Currency.

Shavard, G. 2021. "From School Improvement to Student Cases: Teacher Collaborative Work as a Context for Professional Development." *Professional Development in Education* 48, no. 3: 493–505. https://doi.org/10.1080/19415257.2021.1879216.

Songkram, N., and S. Chootongchai. 2020. "Effects of Pedagogy and Information Technology Utilization on Innovation Creation by SECI Model." *Education and Information Technologies* 25: 4297–4315. https://doi.org/10.1007/s10639-020-10150-2.

Spruce, R., and L. Bol. 2015. "Teacher Beliefs, Knowledge, and Practice of Self-Regulated Learning." *Metacognition and Learning* 10, no. 2: 245–277.

Tabachnick, B. G., L. S. Fidell, and J. B. Ullman. 2007. *Using Multivariate Statistics (Vol. 5)*. Pearson.

Wan, Z. H., J. C.-K. Lee, Z. Yan, and P. Y. Ko. 2023. "Self-Regulatory School Climate, Group Regulation and Individual Regulatory Ability: Towards a Model Integrating Three Domains of Self-Regulated Learning." *Educational Studies* 49, no. 5: 783–798. https://doi.org/10.1080/03055698.2021.1894093.

Yan, Z. 2018. "How Teachers' Beliefs and Demographic Variables Impact on Self-Regulated Learning Instruction." *Educational Studies* 44, no. 5: 564–577.

Yan, Z. 2021. "Assessment-As-Learning in Classrooms: The Challenges and Professional Development." *Journal of Education for Teaching* 47, no. 2: 293–295. https://doi.org/10.1080/02607476.2021.1885972.

Yan, Z., and E. C. K. Cheng. 2015. "Primary Teachers' Attitudes, Intentions and Practices Regarding Formative Assessment." *Teaching and Teacher Education* 45: 128–136.

Yan, Z., and N. B. Mendoza. 2025. "Learning and Practicing Simultaneously: The Synergistic Effect of Online Self-Assessment Diaries and Teacher Self-Assessment Instruction on Learning and Growth Mindset." *Assessment in Education: Principles, Policy & Practice* 32, no. 3: 276–298. https://doi.org/10.1080/0969594x.2025.2534134.

Żatuchin, D. 2024. "Enhancing Knowledge Transformation in Digital Education: An Analysis of the SECI Model's Application in Course Design and Execution." *Discover Education* 3, no. 1: 140. https://doi.org/10.1007/s44217-024-00229-0.

Zhang, L., N. B. Mendoza, and Y. Jiang. 2025. "From Classroom Goal Structures to Academic Outcomes: The Mediating Role of Expectancy-Value Beliefs in Adolescent Learning." *European Journal of Psychology of Education* 40, no. 2. https://doi.org/10.1007/s10212-025-00958-2.

Zimmerman, B. J. 2000. "Self-Efficacy: An Essential Motive to Learn." *Contemporary Educational Psychology* 25, no. 1: 82–91.

Zimmerman, B. J. 2002. "Becoming a Self-Regulated Learner: An Overview." *Theory Into Practice* 41, no. 2: 64–70.

Zimmerman, B. J. 2008. "Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects." *American Educational Research Journal* 45: 166–183.

Zimmerman, B. J., and D. H. Schunk. 2001. "Reflections on Theories of Self-Regulated Learning and Academic Achievement." In *Self-Regulated Learning and Academic Achievement: Theoretical Perspectives*, edited by B. J. Zimmerman and D. H. Schunk, 2nd ed., 289–307. Lawrence Erlbaum Associates Publishers.