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Classroom Assessment as a Catalyst for the Self-Regulation of Learning

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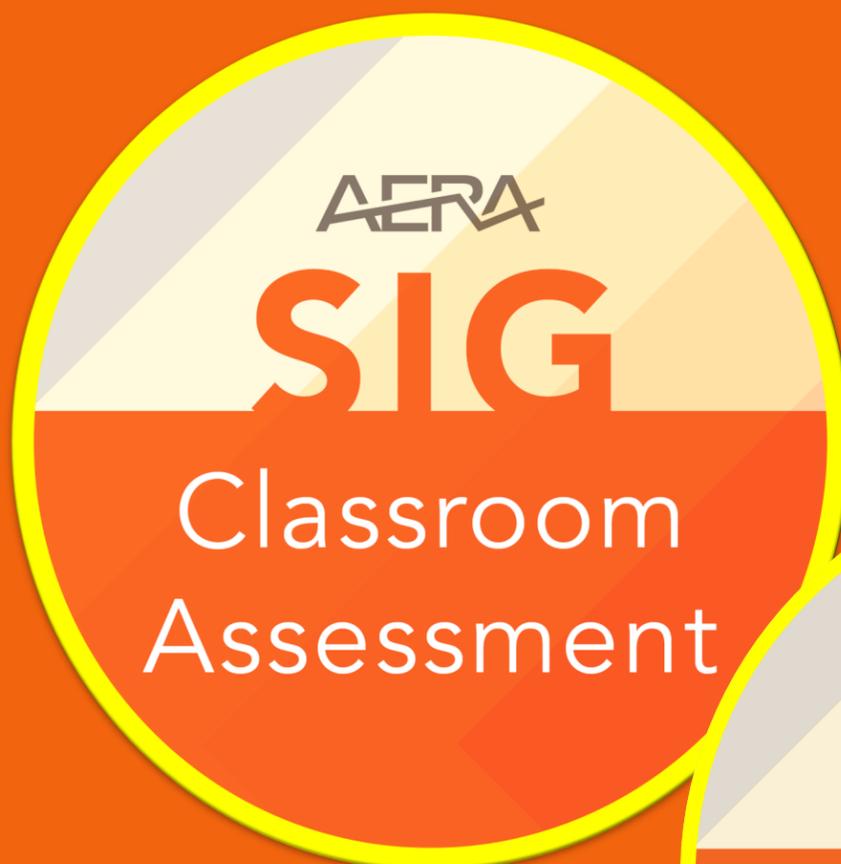
A Joint Special Issue: Studying and Self-Regulated SIG & Classroom Assessment SIG

"Future research should adopt a wider-angle lens on classroom assessment, bringing what has long remained outside the frame into view and examining how assessment practices simultaneously help the self-regulation of learners, teachers, and peers."

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Studying and Self-Regulated Learning

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Understanding Classroom Assessment as a Catalyst for the Regulation of Learning

Elie ChingYen Yu & Heidi L. Andrade

Elie ChingYen Yu, PhD, is a postdoctoral researcher at the University at Albany, SUNY. Her research resides at the nexus of classroom assessment and students' self-regulation of learning,

Heidi L. Andrade, EdD, is a Professor of Educational Psychology and Methodology at the University at Albany, SUNY. Her work focuses on the relationships between learning and assessment.

This special issue marks a milestone in the ongoing dialogue between two fields of study—self-regulated learning and classroom assessment—as represented by two vibrant scholarly communities. This collaboration is more than co-sponsorship: It reflects the maturation of a fusion that has been unfolding for nearly four decades (Panadero et al., 2018).

What began as parallel lines of inquiry has evolved into a shared intellectual project: understanding classroom assessment not merely as a tool for promoting and measuring learning, but as a catalyst for the regulation of learning among all participants in the classroom. To appreciate the significance of this 2026 moment, let us step back to trace the gradual and intentional convergence of these traditions.

The Evolution of a Fusion: From Parallel Paths to Deliberate Convergence

Our story begins in the late 1980s. While Francophone scholars such as Cardinet (1977) and Allal (1979) had already positioned regulation as a central tenet of classroom assessment, the Anglophone research communities largely advanced on parallel tracks. Early pioneers including Crooks (1988) and Sadler (1989) drew important connections among assessment, motivation, and self-monitoring, even if the explicit "self-regulated learning (SRL)" label had not yet entered the conversation.

By 1998, Black and Wiliam established formative assessment as a domain of practice and explicitly articulated its goal of developing self-regulated learners. In the years that followed, influential reviews (e.g., Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006; Wiliam, 2011; Clark, 2012) increasingly framed feedback as a mechanism for internal regulation, highlighting student agency and ownership of learning. The intellectual overlap was visible, but the fields were not yet fully in conversation.

2014: A Deliberate Convergence

A pivotal moment arrived in 2014, when Heidi Andrade and Sue Brookhart convened a landmark symposium at AERA, bringing the two strands of scholarship into direct dialogue. What had previously been implicit alignment became an explicit research agenda. The assessment–SRL connection was no longer inferred; it was articulated.

In the years that followed, theoretical syntheses (Allal, 2019; Andrade & Brookhart, 2016, 2019; Chen & Bonner, 2020) and empirical investigations (Dinsmore & Wilson, 2016; Meusen-Beekman et al., 2016; Speckesser et al., 2018) refined our understanding of the mechanisms linking assessment information to regulatory processes.

In 2020, Brandmo and colleagues organized a special issue in *Assessment in Education: Principles, Policy & Practice* explicitly calling for deeper integration of assessment and SRL theory and research. Around the same time, a special issue of *Metacognition and Learning* reflected similar themes. In Butler's (2021) commentary, she noted that "although educators' assessment practices are not a key theme, each paper includes a focus on metacognitive processes linked to assessment and feedback practices, such as self-monitoring and adjusting, which are so pivotal in SRL" (p. 671). Her updated model further embedded assessment as a core pedagogical practice supporting SRL development. The convergence was not just articulated; it had become programmatic.

Gradually, the guiding question in the fields shifted. No longer was it whether assessment supports SRL. The question became how assessment environments could be intentionally conceptualized, enacted, and studied to cultivate regulatory capacity.

> **Self-regulated learning and classroom assessment represent two vibrant scholarly communities.**

2026: Consolidation and Expansion

As we stand in 2026, this joint special issue represents the maturation of that 2014 vision. Years of sustained collaboration have brought the two SIG communities to a point of shared ground and productive tension. What once required argument—that classroom assessment can support the regulation of learning—now stands as common ground, shifting our focus to how we conceptualize, design, enact, and study it as an engine of regulation. Increasingly, that engine is understood not as a one-directional transmission of information, but as a reciprocal process in which learners and teachers co-construct the conditions for adaptive learning (Allal, 2019; Andrade et al., 2021).

The five contributions in this issue extend this conversation from complementary vantage points. Panadero foregrounds student involvement as the mechanism that shifts assessment from judgment to generative regulatory process, positioning self-assessment, peer feedback, and rubric use as proactive tools for producing actionable self-feedback during learning. Dignath and Karlen turn to teacher expertise, introducing the Teacher's Knowledge of Self-regulated Learning (TK-SRL) framework and articulating Assessment Knowledge of SRL (AK-SRL) as essential for diagnosing and scaffolding students' regulatory processes.

Dinsmore, Wilson, and Thompson synthesize evidence from 71 studies, demonstrating how practices such as cognitive feedback, self-assessment, practice testing, and peer assessment strengthen both individual and social regulation while urging deeper attention to reciprocal dynamics.

Wesling and Rickey conceptualize formative self-assessment as self-regulated learning enacted across forethought, performance, and reflection, reframing assessment as a dynamic learner activity. Yu, Andrade, and Brookhart expand the lens further, theorizing classroom assessment as a space of reciprocal co-regulation in which students, teachers, and peers jointly construct a distributed regulatory system.

Together, these articles signal a field that has moved beyond establishing connection toward specifying mechanisms and expanding theoretical boundaries. We invite readers from both communities to engage with these contributions not only as individual studies, but as shared steps in an evolving and increasingly integrated research agenda on classroom assessment as a catalyst for the regulation of learning.

References are available upon request from Elie Ching-Yen Yu (cyu5@albany.edu)

Formative Self-Assessment as a Catalyst for Self-Regulated Learning

Piet Wesling & Nathan Rickey

Classroom assessment is often treated as a moment of information delivery. Students receive feedback, scores, or comments, and we hope that something productive follows. Sometimes it does; sometimes, it does not. Teachers routinely observe that students glance at feedback, file it away, or ignore it altogether. This familiar pattern raises an important question: if assessment provides information about learning, why does it so often fail to change what learners actually do next?

One reason is that assessment does not regulate learning on its own. Regulation requires anticipation, interpretation, judgment, and decision-making on the part of agentic learners. Without those processes, assessment information remains inert. This realization has shaped our recent work (Wesling et al., 2026), which reframes formative self-assessment—learners' noticing and judging of their work against criteria to improve learning (Andrade, 2019)—not simply as a helpful assessment practice, but as a concrete instantiation of self-regulated learning (SRL). From this perspective, classroom assessment becomes a catalyst for regulation when it actively engages learners in the processes that allow them to steer their own learning.

SRL is commonly described as learners' ability to plan, monitor, and evaluate their learning in pursuit of goals. Zimmerman's cyclical model (Zimmerman & Moylan, 2009) captures this process through three interconnected phases: forethought, performance, and self-reflection. In the forethought phase, learners analyze tasks and set goals according to their self-motivational beliefs like outcome expectations and self-efficacy.

During performance, they monitor progress and adjust strategies. In self-reflection, they evaluate outcomes, make attributions, and decide how to proceed. For those who study SRL, this cyclical model is foundational and familiar. But its connection to classroom assessment is often subtle and implicit. Assessment is assumed to support SRL, but the mechanisms are not always made explicit.

Our recent conceptual work argues that formative self-assessment can be understood as SRL in action. When students engage seriously in self-assessment, they do not merely give themselves a grade. They activate many of the same cognitive, affective, and behavioral processes described in SRL theory. This becomes clear when self-assessment is examined across the phases of the SRL cycle. In the forethought phase, effective self-assessment supports goal setting (e.g., Wang, 2017; Yan & Brown, 2017) and strategic planning (Punhagui & de Souza, 2013).

Students must make sense of the criteria for quality, often by studying rubrics, exemplars, or descriptions of strong work. Doing so early helps them clarify what they are aiming for and how success will be judged. When students internalize criteria before starting a task, they are better positioned to plan strategically and set meaningful goals rather than simply reacting to feedback after the fact.

Self-assessment also shapes motivational beliefs during forethought. For example, when students assess their work against clear standards and have opportunities to revise, their confidence in completing the task often increases (e.g., Kitsantas & Zimmerman, 2006; Yan et al., 2020).

Self-efficacy grows primarily because students can see evidence of improvement and understand how their actions led to better outcomes, not only not because students are told they did well. Similar might be true for other self-motivational beliefs, such as task value and goal orientations (Bourke, 2016; Yan et al., 2020), although these relationships warrant further investigation.

Piet Wesling is a PhD student in Educational Psychology at the University at Albany, SUNY. His research centers on internal mechanisms of feedback and on reciprocal forms of regulation of learning among students, their peers, and teachers.

Nathan Rickey is a Postdoctoral Fellow at the Faculty of Education, Queen's University. His research focuses on how educators can leverage classroom assessment to enhance students' learning.

During the performance phase, self-assessment supports monitoring (Andrade et al., 2009; Andrade et al., 2010) and strategic control (Panadero et al., 2024; Yan & Brown, 2017). As students compare their ongoing work to criteria, they notice discrepancies between where they are and where they want to be. These judgments can prompt adjustments, such as revising an argument, trying a different problem-solving approach, or allocating more time to a challenging section. In this way, assessment information becomes actionable. It feeds directly into decisions about what to do next. Without this interpretive step, feedback remains static and disconnected from learning activity.

Lastly, the self-reflection phase illustrates how self-assessing students engage in self-evaluation, attribution, and decision-making (Duque Micán & Cuesta Medina, 2017; Wang, 2017; Yan, 2020). They decide whether outcomes reflect effort, strategy use, innate intelligence, or external factors. These interpretations matter because they shape future engagement. A student who attributes improvement to effective strategies is more likely to persist and transfer those strategies to new tasks. Self-assessment can support adaptive attributions by making the links between criteria, actions, and outcomes more visible (Rickey et al., 2023).

Viewing formative self-assessment through an SRL lens has important implications for classroom assessment design. First, it shifts attention away from assessment as information delivery and toward assessment as learner activity. The key question becomes not "*what feedback did students receive?*," but "*what regulatory processes did the assessment require students to engage in?*" Second, it highlights the importance of timing. Assessments that occur only at the end of tasks primarily support reflection, neglecting key regulatory processes such as forethought and monitoring. Third, it underscores the role of instructional support. Self-assessment does not automatically lead to regulation. Students often need scaffolding to interpret criteria, make accurate judgments, and act on what they notice.

This reframing also helps explain why some assessment practices fail to support SRL despite good intentions. When self-assessment is reduced to checklist completion or grade prediction, it may encourage compliance rather than regulation. In such cases, students engage in the appearance of assessment without activating deeper SRL processes that force them to plan, think, judge, and act.

Classroom assessment has enormous potential to support students' regulation of learning, but that potential is not automatic. Assessment becomes a catalyst for regulation when it engages learners in the work of setting goals, monitoring progress, interpreting evidence, and deciding how to move forward. Understanding formative self-assessment as SRL helps make those mechanisms visible and provides a clearer foundation for designing assessment practices that truly support learning.

References are available upon request from Piet Wesling (pwesling@albany.edu).

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Assessment as a Catalyst for Self-Regulation: Why Student Involvement in Assessment Matters

Ernesto Panadero

In many classrooms, assessment still marks the end of learning. A task is completed, a grade is given, perhaps a short comment is added, and then the class moves on. Students may feel relieved or disappointed, but not necessarily informed. The problem is not the absence of assessment; it is the absence of self-regulation. If assessment tells students what happened, it rarely helps them decide what to do next.

The relationship between classroom assessment and self-regulated learning (SRL) deserves attention. Classroom assessment refers to the everyday assessment practices embedded in instruction (e.g., questions, tasks, feedback, rubrics, self- and peer assessment) that generate information about learning and performance. In other words, classroom assessment is not only about measuring achievement; it is a constant stream of information that can guide decisions during learning (Black & Wiliam, 1998). The key question is: When does assessment truly become a catalyst for regulation?

A central idea from my research and the great work of others (e.g., Andrade, 2019, 2023) is simple: Classroom assessment becomes a catalyst for SRL when students are not only assessed but become active participants in the assessment process. Involvement transforms assessment from something that happens to students into something they use (and eventually create) to steer their learning. When students take part in judging quality, interpreting evidence, and planning improvements, they engage in the very processes that SRL models describe goal setting, monitoring, strategic action, and adaptation (Pintrich, 2000; Zimmerman, 2000).

Why Involvement Matters

SRL research has long shown that learners do not regulate effectively simply by receiving information. Regulation requires interpretation, effort, purpose and agency (Greene, 2018). Students need to make sense of the information relative to the standards, decide whether the gap matters, and select actions to close it. Classroom assessment can trigger those processes, but only if students have a role that goes beyond receiving scores and comments.

Student involvement creates that role (Falchikov, 2003). It introduces a powerful shift in classroom routines: assessment becomes a learning event rather than a judgment event. It invites students to compare their work to quality criteria, to generate feedback for themselves (self-feedback) or for others (peer feedback), and to turn feedback into plans. This is where formative assessment and SRL naturally converge: both are concerned with how information is transformed into action.

From self-assessment to self-feedback

Self-assessment is often presented as asking students to rate their work or reflect on how they did (Andrade, 2019). However, the real regulatory value of self-assessment lies elsewhere: in its capacity to produce self-feedback. Self-feedback is what happens when students actively evaluate evidence from their work, identify gaps relative to standards, and generate concrete next steps (Panadero et al., 2019). That process strengthens monitoring and helps students shift from vague intentions ("I need to improve") to actionable decisions ("I will revise my argument by adding evidence in paragraph three").

Self-assessment more often catalyzes self-regulation when scaffolded. Without guidance, students may focus on superficial features or show overly positive or negative judgments. Effective design requires transparent criteria, examples of different quality levels, and direct instruction and feedback about self-assessment (Panadero et al., 2019). In short, self-assessment becomes powerful when it ends with a plan.

Peer Assessment As Social Regulation

Peer assessment adds a social dimension (Alqassab, 2023). When students review peers' work, they practice evaluating quality, articulating standards, and providing improvement-oriented guidance. When receiving peer feedback, they must interpret it, decide what to accept, and integrate it into revisions. Both roles require regulatory processes.

Its effectiveness depends on classroom conditions, often underestimated in SRL research: trust, psychological safety, and perceived fairness. Without these, students may offer vague praise, avoid critique, or disengage. When implemented with modelling and structured guidance, peer assessment promotes co-regulation: students help one another notice issues, clarify criteria, and persist through revision (Topping, 1998).

Rubrics: Not Scoring Tools, But Self-Regulatory Tools

Rubrics are widely used in education, yet they remain controversial (Brookhart, 2018). Some argue that rubrics constrain creativity, reduce quality to checklists, or push students toward "criteria compliance." These risks are real, but they are not inherent to rubrics. They depend on design and use (Panadero & Jonsson, 2020).

Rubrics become catalysts for regulation when they function as regulatory tools, not merely scoring tools (Andrade, 2023). This happens when students use rubrics before and during performance: to plan their approach, monitor progress, and make trade-offs (e.g., time allocation). Used this way, rubrics support SRL by clarifying targets and enabling self-monitoring. The problem is not that rubrics provide criteria; the problem is using them only at the end as post hoc justification for grades. Rubrics should be introduced as learning support, not just as verdicts.

Designing Assessment For Self-Regulation

These ideas can be implemented through simple routines. For example, students can use rubrics after drafting to identify strengths and weaknesses with evidence and produce a concrete revision plan, with teacher feedback focused on improving the plan rather than judging the work. Similarly, structured peer feedback can require students not only to give suggestions but also to decide which feedback to implement and justify their decisions. In both cases, assessment information is transformed into monitoring, strategy selection, and action, which are central regulatory processes.

If classroom assessment is to catalyze regulation, three principles are particularly important. First, make standards usable: clarify criteria, show examples, and teach students what quality looks like. Second, make feedback actionable: prioritize next steps over exhaustive commentary. Third, make students assessment participants: embed routines for self-assessment, peer assessment, and rubric use **during learning**, not after it.

Ultimately, the regulatory power of classroom assessment does not come from measurement itself: It comes from student involvement. When students are active participants in assessment, assessment becomes more than a classroom requirement; it becomes an engine for SRL.

References are available upon request from Ernesto Panadero (ernesto.researcg@gmail.com).

Ernesto Panadero, PhD, is affiliated to the Centre for Assessment Research Policy and Practice in Education (CARPE), Dublin City University, Ireland; Education Regulated Learning and Assessment, Universidad de Deusto, Bilbao, Spain. His research focuses on applying educational psychology to understand self-regulated learning, educational assessment, and their interaction.

Teachers' Knowledge as a Key Lever for Assessment

Charlotte Dignath & Yves Karlen

In recent years, classroom assessment has increasingly been reframed as a formative process that supports learning rather than merely evaluating it (Andrade et al., 2021). From this perspective, assessment is deeply intertwined with students' self-regulation of learning (SRL): it provides feedback that informs goal setting, monitoring, reflection, and strategy adjustment. Assessment, therefore, has the potential to function as a catalyst for SRL. However, research and classroom practice reveal a gap between this potential and its realization. While many teachers use classroom assessment regularly, fewer employ it systematically to diagnose or foster students' SRL.

Teachers play a key role in translating assessment opportunities into SRL experiences. They decide what evidence to attend to, how to interpret students' behavior, and how to respond instructionally. Studies show substantial variation in teachers' knowledge of SRL and their ability to recognize SRL processes (Callan & Shim, 2019; Dignath & Sprenger; Karlen et al., 2020). Teachers' knowledge (TK) of SRL thus represents a leverage point for strengthening the role of classroom assessment in promoting SRL. However, this knowledge is multifaceted, and it lacks a conceptual framework.

The TK-SRL Framework: Connecting Assessment and Regulation

The TK-SRL framework (Karlen & Dignath, under review) addresses this gap by conceptualizing teachers' knowledge of SRL as a distinct, domain-specific form of professional expertise. Building on Shulman's (1987) taxonomy, the framework differentiates between three interrelated SRL-knowledge components:
1. Content Knowledge of SRL (CK-SRL)
2. Pedagogical Content Knowledge of SRL (PCK-SRL)
3. Assessment Knowledge of SRL (AK-SRL)

A central conceptual decision is the explicit inclusion of AK-SRL as a core knowledge domain, as it directly links classroom assessment and SRL.

CK-SRL: Understanding What Is Being Regulated

CK-SRL refers to teachers' theoretical understanding of SRL as a dynamic, multi-component process. SRL encompasses cognitive, metacognitive, motivational, emotional, and behavioral regulation across the phases of forethought, performance, and reflection (Zimmerman, 2000; Boekaerts, 1999). CK-SRL also includes conditional knowledge of strategies and their effective application across contexts.

For assessment to support students' SRL, teachers must understand *what* they are assessing. CK-SRL enables teachers to recognize that SRL involves more than task completion, and to distinguish between surface strategies and genuine self-regulatory processes, such as planning, monitoring, reflecting or adapting strategies after feedback. Without this conceptual grounding, assessment risks focusing on products rather than processes, thereby limiting its potential to foster SRL (Panadero et al., 2018).

PCK-SRL: Designing Assessment-Sensitive Instruction

While CK-SRL provides the conceptual foundation, PCK-SRL enables teachers to translate this understanding into instructional and assessment practices that support SRL. This includes both direct approaches, such as explicitly teaching SRL strategies, and indirect approaches, such as designing tasks and learning environments that naturally elicit SRL (Dignath & Veenman, 2021). From a formative assessment perspective, PCK-SRL helps teachers align assessment tasks, criteria, and feedback with regulatory processes rather than isolated outcomes (Andrade & Brookhart, 2016; Panadero et al., 2018). PCK-SRL also involves anticipating common misconceptions about learning and assessment – for example, the belief that feedback is only about grades – and selecting instructional strategies that reframe assessment as a tool for supporting SRL (Vosniadou et al., 2024).

AK-SRL: Assessment as a Catalyst for Regulation

At the heart of the TK-SRL framework lies assessment knowledge of SRL (AK-SRL). AK-SRL refers to teachers' ability to recognize, interpret, and respond to evidence of students' SRL, and concerns the diagnosis of how students plan, monitor, and reflect, rather than what they know in a particular subject. AK-SRL encompasses understanding about:
- which indicators can signal regulatory processes (e.g., students' questions, or strategy choices),
- which assessment approaches are appropriate for capturing SRL (e.g., learning journals, or observations), and
- how to use assessment information formatively to support SRL over time.

Because SRL processes are largely internal and context-dependent, AK-SRL requires professional judgment and continuous monitoring. It allows teachers to use assessment not merely to judge performance, but to render learning visible, provide targeted feedback, and adapt instruction to students' evolving regulatory needs. However, many teachers struggle with this diagnostic task and rely on intuitive or unsystematic judgments (Dignath & Sprenger, 2020; Karlen et al., 2023; Michalsky, 2017). Strengthening AK-SRL is therefore essential if classroom assessment is to function as a genuine catalyst for SRL.

The TK-SRL framework highlights that classroom assessment supports SRL best when teachers can integrate all in practice: CK-SRL enables teachers to identify relevant regulatory processes; PCK-SRL guides the design of assessment-rich learning environments and adaptive instructional responses, and AK-SRL supports the interpretation of assessment evidence. Importantly, assessment practices are also shaped by teachers' beliefs about learning and learners. Teachers who view SRL as teachable and malleable are more likely to use assessment diagnostically and formatively, whereas skeptical beliefs may constrain the regulatory potential of assessment (Dignath, 2016; Lawson et al., 2019).

Implications for Teacher Education and Professional Development

For classroom assessment to best catalyze SRL, teacher education must explicitly address SRL and assessment in tandem. Professional development should not treat assessment as a generic skill, but as an SRL-specific competence that requires theoretical understanding, diagnostic expertise, and reflective practice (Karlen et al., 2020). Effective programs integrate SRL theory with applied assessment tasks, video-based reflection, and opportunities to practice interpreting students' regulatory processes. They are crucial for enabling teachers to move beyond outcome-focused assessment toward formative practices that actively promote SRL.

Classroom assessment holds powerful potential to support students' SRL when teachers possess the knowledge to use it diagnostically and formatively. The TK-SRL framework provides a theoretically grounded lens for understanding the knowledge teachers need to turn assessment into a catalyst for SRL. By strengthening this, education systems can use classroom assessment to develop self-regulated learners.

References are available upon request from Charlotte Dignath (dignath@psych.uni-frankfurt.de).

Charlotte Dignath is a Professor of Educational Psychology at Goethe University Frankfurt and head of the SeLFI Lab (www.selfilab.com).

Yves Karlen is a Professor at the University of Zurich, specializing in teaching and learning research with a focus on self-regulated learning, mindsets, and teachers' professional and diagnostic competencies.

Assessment as a Two-Way Street: The Reciprocal Co-Regulation of Learning

Elie ChingYen Yu, Heidi Andrade & Sue Brookhart

Much of the research on self-regulated learning asks us to look closely—very closely—at the individual learner. We zoom in on how students regulate their learning through goal setting, monitoring their understanding, and adjusting their strategies. This close-up view has been productive, but it can also obscure what is happening just outside the frame. In classrooms, learning and regulation do not unfold in isolation.

Assessment information moves among students, teachers, peers, and tools, shaping how each responds and adjusts. Here, we invite readers to zoom out from the individual learner and take a wide-angle view of classroom assessment—not as something done *to* students, but as a shared process *with* students through which regulation of learning is jointly constructed.

Classroom assessment provides a natural entry point for this wider view. Broadly defined, classroom assessment refers to the processes through which teachers and students gather, interpret, and use evidence of learning for purposes ranging from diagnosing understanding to assigning grades (Andrade et al., 2021). Formative assessment, a central focus in classroom assessment, includes all the processes by which teachers and/or students use information about student achievement to adjust students' learning (Wiliam, 2006).

Although formative assessment and SRL developed along separate theoretical paths, their alignment has become increasingly clear (Panadero et al., 2018). The formative assessment cycle enables students to address three important questions: "Where am I going?", "Where am I now?", and "How to get there?", a process that mirrors the goal-setting, monitoring, and control processes involved in regulating learning (Andrade et al., 2016, 2019). Across decades of research, including systematic reviews and meta-analytic evidence (e.g., Yan et al., 2020; Yu, 2025), classroom assessment practices, particularly formative assessment, have been shown to enhance the full range of regulatory processes.

As a field, we have made significant progress in understanding how classroom assessment can support students' regulation of learning. However, this work has largely conceptualized regulation as residing within the individual learner. Even when social or instructional supports are acknowledged, they are often treated as inputs that act on the student, rather than as part of a shared regulatory process. This framing, while useful, offers only a partial account of how regulation unfolds in classrooms.

From a situated perspective, regulation cannot be understood as an isolated individual activity (Allal, 2020).

Recognizing regulation as situated highlights the role of *inter-individual* reciprocity in the assessment process. Much of the literature has emphasized *intra-individual* reciprocity, particularly through socio-cognitive models that highlight the dynamic interplay among personal, behavioral, and environmental factors within the learner.

While this work remains foundational, it does not fully capture the *inter-individual* reciprocity in which students, teachers, and peers simultaneously regulate and are regulated through the shared use of assessment information. For example, teachers are themselves regulated by the evidence they gather, adjusting instruction, pacing, and supports in response to students' work.

Classroom assessment, therefore, is not a one-way transmission but a shared regulatory space, characterized by reciprocal interactions with arrowheads on both ends (Figure 1). As Andrade et al. (2021) argue, classroom assessment is best understood as a process of co-regulated learning, defined as the "interactive, reciprocal influences of all sources of information about learning on each other" (p. 2). This definition moves beyond earlier views of co-regulation that framed it either as a transitional stage on the way to independent self-regulation or as a feature of collaborative group work alone (Hadwin et al., 2018; Panadero & Järvelä, 2015). In classrooms, feedback loops rarely regulate a single individual in isolation. Instead, assessment information circulates, shaping how students learn, how teachers teach, and how peers support one another. Regulation, in this sense, is distributed across participants and unfolds through ongoing interaction.

To situate regulation within classroom assessment, Andrade and Brookhart (2019) and Andrade et al. (2021) extended Pintrich and Zusho's SRL model to explicitly incorporate multiple sources of regulation. In this expanded framework, regulation continues to unfold across familiar phases—forethought, monitoring, control, and reflection—and within four areas: cognition, motivation, behavior, and context. What changes is not the regulatory architecture itself, but who participates in these processes and how their regulatory processes become interdependent.

Designing classroom assessment to support reciprocal co-regulation, therefore, requires attention to how multiple sources of regulation are positioned and connected. Teachers initiate regulation by articulating goals and interpreting evidence of learning, but reciprocity becomes visible when they also use that evidence to regulate their own instructional decisions.

Peers contribute through assessment practices that support learning not only for those receiving feedback, but also for those providing it, as evaluating
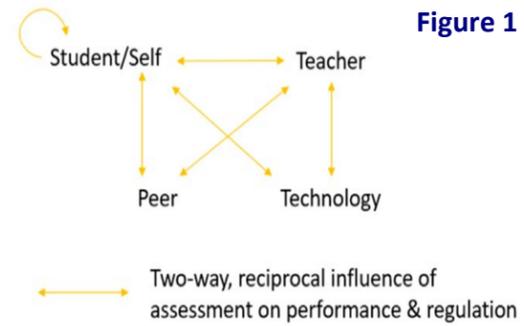
Figure 1

Two-way, reciprocal influence of assessment on performance & regulation

others' work prompts reflection on one's own understanding (Tsivitanidou et al., 2018).

Conclusion and Future Direction

The scholarship reviewed here points to a fundamental shift in how the *self* in SRL is conceptualized. While individual agency remains essential, it is always embedded within social and material contexts. Classroom assessment provides the structure, information, and opportunities through which this embedded regulation unfolds (Allal, 2020). However, our current understanding is limited. Although reciprocity is often theorized, most empirical studies continue to examine one-way effects, typically focusing on how teachers' assessment practices influence students.

Future research should adopt a wider-angle lens on classroom assessment, bringing what has long remained outside the frame into view and examining how assessment practices simultaneously help the self-regulation of learners, teachers, and peers. In this way, we move closer to assessment practices that are not just about measuring learning, but about jointly constructing the capacity to learn. It is time we develop an eye for everyone in the classroom and the reciprocal regulatory processes that connect them.

References are available upon request from Elie Ching-Yen Yu (cyu5@albany.edu).

Elie ChingYen Yu, PhD, is a postdoctoral researcher at the University at Albany, SUNY. Her research resides at the nexus of classroom assessment and students' self-regulation of learning, and she specializes in meta-analysis and systematic reviews.

Heidi Andrade, EdD, is a Professor of Educational Psychology and Methodology at the University at Albany, SUNY. Her work focuses on the relationships between learning and assessment, with an emphasis on student self-assessment and self-regulated learning.

Susan M. Brookhart, PhD, is Professor Emerita at the School of Education at Duquesne University. Her research interests include the roles of both formative and summative classroom assessment in student motivation and achievement.

A Systematic Review of the Role of Metacognition and Types of Regulated Learning in Assessment

Daniel L. Dinsmore, Hope E. Wilson, & Conner G. Thompson

Daniel L. Dinsmore, PhD. studies how individuals' knowledge and strategic processing develop over time, examining learners from early elementary through adulthood across subjects like reading and STEM.

Hope E. Wilson, PhD, specializes in the assessment of learners and standardized and classroom-based assessments. She is a founding member of the board of directors and research director of the Innovation Collaborative.

Conner Thompson is a doctoral student and graduate research assistant in the Department of Educational Leadership at the University of North Florida. His research focuses on innovative approaches to improving degree completion.

In this reflection, we explore contemporary relations among assessment practices, metacognition, self-regulation, co-regulation of learning, and socially shared regulation of learning. Scholarship on self-regulation has begun to focus more on its social aspects. Thus, we focus here on how both individual (i.e., metacognitive and self-regulatory) and social (i.e., co-regulation and socially shared regulation) factors influence or are influenced by current assessment practices.

We highlight the addition of more social factors into SRL research, specifically co-regulation of learning (co-RL) and socially shared regulation of learning (SSRL). Co-RL has been defined as the process of guiding and supporting the regulatory processes of one group member by another. In contrast, SSRL has been defined as an activity in which the regulation of group members is coordinated and discussed, thereby enabling members to influence one another through group negotiation, consultation, discussion, and the exchange of ideas. These emerging frameworks represent a significant shift from individually focused models of self-regulation to more collaborative approaches. Assessment does not simply "happen to" learners; rather, learners activity participate in the assessment process while operating within a larger assessment system.

Key Findings

Drawing on a systematic review of 71 studies published between 2015 and 2024, we found that diverse assessment practices, from self-assessment to automated tools, may promote metacognition and self-regulation (Dinsmore & Wilson, in press). However, mixed and null findings indicate that simply having students self-assess is unlikely to improve these outcomes. Contextual factors must be carefully considered when designing interventions. Implementation quality matters as much as the assessment approach itself.

How Assessment Acts as a Catalyst for Self-Regulated Learning

Our findings demonstrate several mechanisms through which assessment catalyzes SRL. Cognitive feedback has well-documented effects on learning outcomes, but our findings suggest it also enhances metacognition and self-regulation, creating a multiplier effect. Feedback not only supports immediate learning but may also improve students' long-term capacity for SRL, benefits that compound over time. Self-assessment offers significant benefits for metacognition and self-regulation, particularly in helping learners identify useful tasks and strategies for future study planning. It can prevent overconfidence that might reduce study effort and, when combined with practice testing, enables recursive engagement with self-regulation through repeated exposures to the material. Within frameworks such as the COPES model (Winne & Hadwin, 1998), this recursive process helps students better regulate their behavior across learning cycles.

Peer Assessment and Socially Shared Regulation

Peer assessment can develop socially shared regulation. Although research on socially shared regulation is relatively new, our findings suggest that peer assessment supports both short-term cognitive gains and long-term self-regulatory development when used for meaningful learning objectives. Beyond supporting socially shared regulation, peer feedback can enhance goal setting and planning, regulatory strategies, collaborative regulation, and evaluative judgment calibration—all essential skills for lifelong learning.

Understanding Reciprocal Relations

While research clearly demonstrates how assessment influences metacognition and self-regulation, we know considerably less about the reverse relationship, specifically how students' existing self-regulatory capacities shape their engagement with assessment. Research examining reciprocal relations suggests that this bidirectional approach yields more useful and ecologically valid findings than unidirectional studies. These studies reveal that students' self-regulatory skills not only develop through assessment but also determine how effectively they can engage with and benefit from various assessment practices. Though such investigations require multiple data collection points and complex analytical approaches, they illuminate the truly interconnected nature of assessment and self-regulation.

The mixed findings reflect several theoretical and methodological issues, including weak theoretical frameworks, reliance on self-report measures, and overrepresentation of Western, educated, industrialized, rich, democratic (WEIRD) populations. These limitations make it difficult to conduct a meaningful meta-analysis. However, more focused meta-analyses on specific constructs (e.g., self-assessment and student agency) would be valuable.

Practical Implications

Based on our systematic review, we recommend that teachers engage students in four key practices: cognitive feedback, self-assessment, practice testing, and peer assessment. Teachers should provide cognitive feedback that goes beyond simple correctness to address students' thinking processes and strategies. We recommend integrating self-assessment throughout instruction (before, during, and after units) to maximize the benefits of metacognitive monitoring and help students develop accurate self-evaluation skills. Practice testing should be used not merely for evaluation but as a tool for recursive engagement with self-regulation, allowing students to monitor and adjust their learning strategies repeatedly.

When implementing peer assessment, teachers should be mindful of group dynamics and ensure equitable participation. However, when properly structured, peer assessment activities can simultaneously develop students' capacity for socially shared regulation while building essential skills for lifelong learning. The key is to use peer assessment for meaningful learning objectives rather than as a simple replacement for instructor feedback.

Recommendations for Future Research

To examine bidirectional relations between metacognition/self-regulation and assessment, we will require more sophisticated frameworks, theories, and models to capture and explain these findings adequately. Additionally, given positive findings on peer assessment, we suggest that an increased focus on assessment models that align with models of socially shared regulation of learning is likely to capture assessment best as both individual and shared in groups. A better understanding of how assessment, metacognition, and self-regulation operate simultaneously at the individual, group, and contextual levels will enable us to better understand why and when certain interventions are effective.

We were encouraged to see both WEIRD and non-WEIRD samples represented in the review, with similar patterns of results across both groups strengthening overall validity. This suggests that the relationships observed may show some cross-cultural consistency. However, more research incorporating frameworks like culturally responsive teaching would deepen understanding of how assessment practices intersect with classroom and broader cultural contexts. Additionally, future research should examine other population differences, including socioeconomic status and gender composition, to ensure findings are equitable and applicable across diverse student populations.

References are available upon request from Daniel Dinsmore (**daniel.dinsmore@unf.edu**).

Selected Abstracts

"An argument is made for less research on consistency and summative self-assessment, and more on the cognitive and affective mechanisms of formative self-assessment" (Andrade, 2019).

Andrade, H. L. (2019). A critical review of research on student self-assessment. *Frontiers in Education, 4*, Article 87. https://doi.org/10.3389/feduc.2019.00087

"This article is a review of research on student self-assessment conducted largely between 2013 and 2018. The purpose of the review is to provide an updated overview of theory and research. The treatment of theory involves articulating a refined definition and operationalization of self-assessment. The review of 76 empirical studies offers a critical perspective on what has been investigated, including the relationship between self-assessment and achievement, consistency of self-assessment and others' assessments, student perceptions of self-assessment, and the association between self-assessment and self-regulated learning. An argument is made for less research on consistency and summative self-assessment, and more on the cognitive and affective mechanisms of formative self-assessment."

Andrade, H. L., Brookhart, S. M., & Yu, E. C. (2021). Classroom assessment as co-regulated learning: A systematic review. *Frontiers in Education, 6,* Article 751168.   https://doi.org/10.3389/feduc.2021.751168

"Current conceptions of assessment describe interactive, reciprocal processes of co-regulation of learning from multiple sources, including students, their teachers and peers, and technological tools. In this systematic review, we examine the research literature for support for the view of classroom assessment as a mechanism of the co-regulation of learning and motivation. Using an expanded framework of self-regulated learning to categorize 94 studies, we observe that there is support for most but not all elements of the framework but little research that represents the reciprocal nature of co-regulation. We highlight studies that enable students and teachers to use assessment to scaffold co-regulation. Concluding that the contemporary perspective on assessment as the co-regulation of learning is a useful development, we consider future directions for research that can address the limitations of the collection reviewed."

Andrade, H. L., Wang, X., Du, Y., & Akawi, R. (2009). Rubric-referenced self-assessment and self-efficacy for writing. *Journal of Educational Research, 102*(4), 287–302. https://doi.org/10.3200/JOER.102.4.287-302

"The authors investigated the relation between long- and short-term rubric use (including self-assessment), gender, and self-efficacy for writing by elementary and middle school students (N = 268). They measured long-term rubric use with a questionnaire. They manipulated short-term rubric use by a treatment that involved reviewing a model and using a rubric to self-assess drafts. The authors collected self-efficacy ratings 3 times. Results revealed that girls' self-efficacy was higher than boys' self-efficacy before they began writing. The authors found interactions between gender and rubric use: Average self-efficacy ratings increased as students wrote, regardless of condition, but the increase in the self-efficacy of girls in the treatment group was larger than that for girls in the comparison group, and long-term rubric use associated only with the self-efficacy of girls."

Brandmo, C., Panadero, E., & Hopfenbeck, T. N. (2020). Bridging classroom assessment and self-regulated learning. *Assessment in Education: Principles, Policy & Practice, 27*(4), 319-331. https://doi.org/10.1080/0969594X.2020.1803589

"Over the past few decades, educational research has made considerable progress in describing activities that promote more effective student learning. Two fields of research that have made significant contributions to this progress have been self-regulated learning (SRL) (Panadero, 2017; Schunk & Greene, 2018a) and educational assessment (Brown,2018; Wiliam, 2017), more specifically formative assessment (Black & Wiliam, 1998;Wiliam, 2011). However, fewer researchers have tried to combine theories from these two fields of research or have grounded their empirical work in both camps (for a review see; Panadero et al., 2018). In line with this incipient line of research, we believe the combination of these two fields holds significant potential to help us understand how to better tailor instructional practices to increase students' learning, both with respect to cognitive and non-cognitive learning outcomes…"

Panadero, E., Andrade, H., & Brookhart, S. (2018). Fusing self-regulated learning and formative assessment: A roadmap of where we are, how we got here, and where we are going. *Australian Educational Researcher, 45,* 13-31. *https://doi.org/10.1007/s13384-018-0258-y*

"We have known for a long time that a relationship exists between how learning is assessed and the learning processes and strategies students employ when engaged in those assessments. Black and Wiliam pointed out in 1998 that self-regulated learning should be a primary goal of formative assessment (FA). Since then, a growing body of research on this relationship has been produced. The purpose of this paper is to present and discuss keystone publications that inform our current understandings of the relationship between FA and self-regulated learning. The result is a roadmap of the development of the field and directions for future research."

Panadero, E., Fernández, J., Pinedo, L., Sánchez, I., & García-Pérez, D. (2024). A self-feedback model (SEFEMO): Secondary and higher education students' self-assessment profiles. *Assessment in Education: Principles, Policy and Practice, 31*(3–4), 221–253. https://doi.org/10.1080/0969594X.2024.2367027

"While self-assessment is a widely explored area in educational research, our understanding of how students assess themselves, or in other words, generate self-feedback, is quite limited. Self-assessment process has been a black box that recent research is trying to open. This study explored and integrated two data collections (secondary and higher education) that investigated students' real actions while self-assessing, aiming to disentangle self-assessment into more precise actions. Our goal was to identify self-assessment processes and profiles to better understand what happens when students self-assess and to design and implement better interventions. By combining such data, we were able to explore the differences between secondary and higher education students, the effects of external feedback on self-assessment, and to propose a model of ideal self-assessment (SEFEMO). Using think-aloud protocols, direct observation and self-reported data, we identified six main actions (read, recall, compare, rate, assess, and redo) and four self-assessment profiles. In general, secondary and higher education students showed the same actions and very similar profiles. External feedback had a negative effect on the self-assessment actions except for the less advanced self-assessors. Based on data from more than 500 self-assessment performances, we propose a model of self-feedback."

Rickey, N., DeLuca, C., & Beach, P. (2023). Towards a new theory of student self-assessment: Tracing learners' cognitive and affective processes. *Metacognition and Learning, 18*, 945–981. https://doi.org/10.1007/s11409-023-09359-6

"Despite their essential role in learning, the cognitive and affective underpinnings of student self-assessment are not yet well understood. This research responded to calls to examine how students in K-12 contexts think and feel while engaged in evidence-informed self-assessment activities (i.e., self-assessment processes). We drew on a framework of classroom assessment as the co-regulation to theorize the cognitive and affective self-regulatory operations learners may activate during self-assessment. Leveraging a collective case study, we collected digital trace data as participants, a class of Year 12 students (n = 16) in England, completed a self-assessment-based English literature lesson. In the lesson, participants completed a writing task, self-generated feedback using resources, and revised their writing using a study website. Matomo Analytics, a web analytics platform, ambiently collected session recording, heatmap, and keystroke log data. Participants also completed an exit survey to provide qualitative data on their cognitive and affective processes. We analyzed logs of trace data using transition graphs and graph theoretic statistics to identify patterns across participants' self-assessment processes. Analyzing trace data concurrently with qualitative and heatmap data, we mapped each participant's cognitive and affective processes as they self-assessed and revised their writing. Findings highlighted key cognitive and affective operations across participants, pointing to mechanisms whereby participants' self-assessment processes shaped their learning, and illuminated the recursive nature of self-assessment processes. Informing an initial theory of self-assessment processes, this research advances a core component of classroom assessment theory and practice."

Dissertation

Effects of Formative Assessment on Students' Regulation of Effects of Formative Assessment on Students' Regulation of Learning: A Meta-Analysis

Elie ChingYen Yu

University at Albany, State University of New York (chingyen.yu@gmail.com)

Abstract

"Does formative assessment (FA) promote self-regulated learning (SRL)? Theoretically, FA has long been believed to facilitate SRL due to their overlapping conceptual frameworks, yet empirical evidence has remained scattered and inconclusive. This study presents the first comprehensive, large-scale meta-analysis to examine whether, to what extent, for whom, and under what conditions FA enhances SRL.

Following a preregistered, PRISMA-guided protocol, we systematically searched the literature from 1998 to 2024 and synthesized 999 effect sizes from 138 studies (n = 23,293 students) using multilevel meta-analytic models that accounted for dependent effects. Across educational levels and contexts, FA, on average, demonstrated a statistically significant, positive impact on SRL (g= .46, 95% CI [.35, .58]). Moreover, FA was found to have statistically significant positive effects across all SRL components—cognitive processes, metacognition, motivational regulation, and regulation of behavior and context—though with considerable heterogeneity. Moreover, FA was found to have statistically significant positive effects across all SRL components—cognitive processes, metacognition, motivational regulation, and regulation of behavior and context—though with considerable heterogeneity.

A comprehensive set of theoretically derived moderators was examined to examine for whom and under what conditions FA most effectively promotes SRL. Two moderators, the type of SRL outcome measure and the number of feedback sources, emerged as statistically significant, suggesting that methodological choices and the integration of multiple feedback sources shape observed effects. While other intervention, learner, and contextual factors were not statistically significant, consistent descriptive patterns provide insights that may challenge several prevailing theoretical assumptions about the relationships between FA and SRL.

The credibility of outcome in primary studies was assessed using What Works Clearinghouse standards, and the certainty of synthesized evidence was rated with the GRADE framework. Although the overall effect was large, the certainty of evidence was rated low due to substantial heterogeneity, underscoring both the promise and fragility of the current evidence base.

Overall, this study lends robust empirical support to the long-held theoretical claim that FA promotes SRL development while advancing a refined theoretical and methodological agenda for future research. Implications are discussed for (a) educators in tailoring FA to support SRL, (b) policymakers in making evidence-based decisions, and (c) researchers in advancing more precise, transparent, and context-sensitive investigations."

"In conclusion, this meta-analysis reveals that while formative assessment demonstrates a meaningful, large, positive impact on self-regulated learning, its true power is unlocked when implemented as a comprehensive cycle that pairs multiple feedback sources with self assessment. This work underscores the promise of FA to promote all components of SRL but also highlights the need for the field to advance its methodological and research practices to better capture the nuances of this complex relationship and its potential to cultivate life-long learners.

Moving from evidence to practice, a consistent lesson emerges: FA is effective in prompting SRL not by being frequent, but by being enacted with integrity as a full cycle. Effectiveness depends on scaffolding student up-take, explicitly targeting SRL, and adapting practices to disciplinary, developmental, and cultural contexts. Professional development and policy should recognize that there is no universal formula for FA and SRL. The challenge is not to do more FA but to build conditions for doing it well—coherently, adaptively, and with sustained attention to enactment quality."
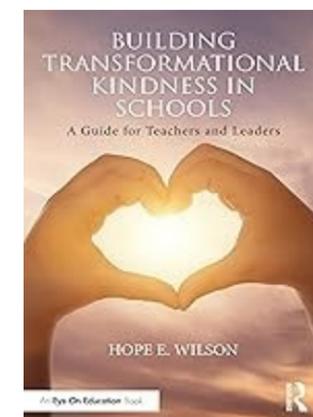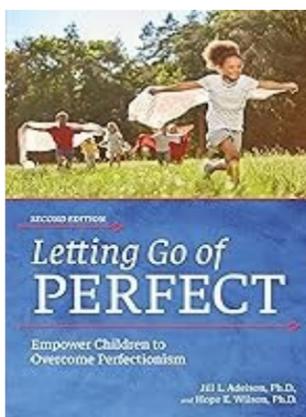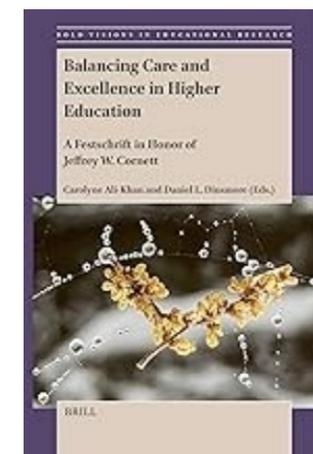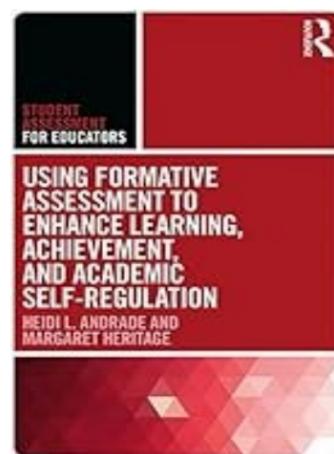
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