

A COMPREHENSIVE COURSE IN

Academic Self-Regulation

Theory, History, and Application
A Structured Self-Study Course

Drawing on the foundational work of Albert Bandura, Barry Zimmerman,
Paul Pintrich, Monique Boekaerts, Philip Winne & Allyson Hadwin,
Anastasia Efklides, and the applied research of Pola Ham

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Course Overview

This course provides a comprehensive, field-wide education in Academic Self-Regulation (ASR) and the broader domain of Self-Regulated Learning (SRL). It is organized into seventeen sections that move from foundational theory through the major research models, into measurement and application, and finally to contemporary frontiers. Each section opens with an Essential Understanding, a single statement capturing the core insight you should take from that section. The sequence is designed so that each section builds on what came before.

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Section 1

What Is Self-Regulated Learning? Defining the Construct

ESSENTIAL UNDERSTANDING

Self-regulated learning is not a trait you are born with. Rather, it is a learnable, cyclical process through which individuals actively direct their own cognition, motivation, and behavior toward achieving their goals.

1.1 Defining Self-Regulated Learning

Self-regulated learning (SRL) refers to the degree to which learners are metacognitively, motivationally, and behaviorally active participants in their own learning process. Zimmerman (2000) defined SRL as the self-generated thoughts, feelings, and actions that are systematically oriented toward the attainment of personal goals. Rather than being passive recipients of instruction, self-regulated learners set meaningful goals, select appropriate strategies, monitor their progress, and adjust their approach based on feedback. SRL is not a single skill but a coordinated system of cognitive, motivational, and behavioral processes that work together in a recurring cycle.

The construct of SRL distinguishes itself from general study habits in several important ways. While study habits tend to be static routines, SRL is dynamic and responsive. A self-regulated learner does not merely follow a fixed routine; they continuously evaluate what is working and what is not, then adapt accordingly. As Winne and Perry (2000) noted, SRL is an event that unfolds during learning, not a stable characteristic that learners either have or lack.

1.2 Three Pillars: Metacognition, Motivation, and Strategic Action

SRL theory attends to the development of three interrelated learning processes. Metacognition refers to awareness and regulation of one's own cognitive processes: knowing what you know, recognizing when understanding breaks down, and knowing which strategies to deploy. Motivation encompasses the beliefs, values, and emotional states that initiate and sustain learning effort, including self-efficacy, task value, and goal orientation. Strategic action involves having a repertoire of learning strategies and the flexibility to select, apply, and adapt them to meet the demands of different tasks. Effective self-regulation requires all three pillars working in concert.

1.3 Why SRL Matters in Higher Education

In higher education, students face a dramatically different learning environment from secondary school. Lectures are longer, assignments are more complex, instructor scaffolding decreases

substantially, and students are expected to manage their own time, prioritize competing demands, and take initiative in seeking help. Research consistently demonstrates that students with higher levels of SRL earn better grades, persist longer in their programs, and report greater satisfaction. Conversely, students with low SRL (approximately 30% of higher education students globally) are at elevated risk for not completing their first year (OECD, 2019). The transition to online and blended learning environments has only intensified these demands, as students must exercise even greater self-regulation when the structure of face-to-face instruction is removed.

1.4 SRL vs. Related Concepts

SRL is related to but distinct from several neighboring constructs. Metacognition is a component of SRL but does not encompass its motivational and behavioral dimensions. Self-discipline describes the capacity to persist but lacks the strategic planning and self-reflection central to SRL. Executive function provides the neurological substrate but is not identical to SRL. Academic self-regulation (ASR), the specific focus of applied work like Pola Ham's research, applies SRL principles to the specific context of academic performance, designing interventions that teach students the cyclical processes of SRL as they apply to studying, test preparation, assignment completion, and clinical learning.

Section 2

Theoretical Foundations: Bandura's Social Cognitive Theory

ESSENTIAL UNDERSTANDING

Human behavior emerges from a continuous, reciprocal interaction among personal beliefs, behaviors, and the social environment, and people are active agents in shaping all three.

2.1 From Behaviorism to Social Cognition

For much of the 20th century, behaviorism dominated psychology and education. B.F. Skinner argued that learning could be fully explained by environmental stimuli and reinforcement. Albert Bandura challenged this perspective, initially through his famous Bobo doll experiments in the early 1960s, which demonstrated that children could acquire new behaviors simply by watching an adult model without direct reinforcement. This placed cognitive processes (attention, retention, reproduction, and motivation) at the center of learning. Bandura initially called his framework social learning theory, then renamed it social cognitive theory in 1986 to emphasize the central role of cognition.

2.2 Triadic Reciprocal Determinism

The core architectural principle of social cognitive theory is triadic reciprocal determinism. Bandura (1986) proposed that human functioning results from the continuous, bidirectional interaction of three factors: personal factors (cognition, beliefs, emotions), behavior (overt actions and choices), and the environment (social contexts, feedback, physical setting). None of these operates in isolation; each influences and is influenced by the other two. Consider a student studying for an exam: their beliefs about their ability influence how they study, which shapes the environmental feedback they receive, which in turn modifies their beliefs. This constant interplay is the engine that drives all human learning and self-regulation.

2.3 Human Agency

Bandura identified four core features of human agency that make self-regulation possible. Intentionality is the capacity to form plans and strategies. Forethought allows people to anticipate outcomes and set goals that guide current behavior. Self-reactiveness involves monitoring and adjusting one's own actions. Self-reflectiveness, which Bandura (1986) called the most distinctly human capability, is the ability to examine one's own thinking and functioning. This agentic perspective is the philosophical foundation of all SRL theory: because people possess agency, self-regulation is both possible and teachable.

2.4 The Bridge to SRL

Bandura's theory provides the theoretical justification for every SRL model and intervention that followed. If behavior is reciprocally determined by personal, behavioral, and environmental factors, then interventions can target any of these entry points. Zimmerman's models grew directly from this framework, applying triadic reciprocity to the specific processes of academic learning. Pintrich extended the motivational dimensions. Boekaerts built on the emotional and volitional implications. And applied programs like Ham's ASR intervention target all three corners of the triad: personal factors (building self-efficacy), behavioral factors (teaching strategies), and environmental factors (creating supportive peer communities).

Section 3

Self-Efficacy: The Engine of Self-Regulation

ESSENTIAL UNDERSTANDING

A student's belief in their capability to succeed at a specific task is the single most powerful predictor of whether they will attempt it, persist through difficulty, and ultimately achieve it.

3.1 What Self-Efficacy Is (and Is Not)

Self-efficacy is a person's belief in their capacity to execute the behaviors necessary to produce specific outcomes (Bandura, 1977, 1997). It is not about having skills; it is about believing you can use the skills you have effectively in a given situation. Self-efficacy is task-specific and context-dependent. A student might have high self-efficacy for writing essays but low self-efficacy for organic chemistry. This specificity distinguishes it from self-esteem (a global evaluation of self-worth) and self-concept (a general domain-level view of oneself). Bandura placed self-efficacy at the very core of social cognitive theory, arguing that unless people believe their actions can produce desired outcomes, they have little incentive to act or to persevere.

3.2 The Four Sources of Self-Efficacy

Mastery experiences are the most powerful source. Successful completion of challenging tasks builds robust efficacy beliefs, while early and repeated failures undermine them. This is why effective interventions scaffold tasks for incremental success.

Vicarious experiences involve observing others, particularly those perceived as similar to oneself, succeed through effort. Peer modeling is especially potent when the model shares demographic or experiential characteristics with the observer.

Verbal persuasion from credible others can bolster self-efficacy, provided the encouragement is realistic and within the bounds of what the student can achieve. Overly optimistic persuasion that leads to failure is counterproductive.

Physiological and emotional states also inform self-efficacy. Students interpret their anxiety, fatigue, or stress as indicators of capability. Interventions can teach students to reinterpret physiological arousal, recognizing that some anxiety is normal and can enhance performance.

3.3 Self-Efficacy and Academic Performance

Pajares (1996) and Schunk (1991) identified self-efficacy as one of the most enduring contributions of Bandura's work to academic achievement research. Meta-analyses consistently show that self-efficacy predicts academic performance above and beyond prior achievement, with higher self-efficacy associated with greater use of deep processing strategies, more effective goal setting, and stronger persistence in the face of difficulty. Stajkovic and Luthans' (1998) meta-analysis found a weighted average correlation of .38 between self-efficacy and work-related performance. In educational settings, the relationship is similarly robust and holds across cultures, disciplines, and educational levels.

3.4 Self-Efficacy in Applied Research

Ham's research consistently identified academic self-efficacy as a critical factor in the performance of first-generation occupational therapy students, finding that first-generation students had lower self-efficacy than continuing-generation peers and that this difference was associated with lower academic performance. Her ASR intervention studies demonstrated that academic self-efficacy could be improved through programming that leveraged all four sources of efficacy information. This aligns with broader evidence that self-efficacy is malleable and responsive to well-designed educational interventions (Schunk & Ertmer, 2000).

Section 4

Zimmerman's Cyclical Phases Model

ESSENTIAL UNDERSTANDING

Self-regulated learning is not a one-time event but a continuous cycle of forethought, performance, and self-reflection, and the quality of each phase determines the quality of the next.

4.1 Development of the Model

Barry J. Zimmerman developed three successive models of SRL over his career. His triadic model (1989) applied Bandura's reciprocal determinism to learning, identifying personal, behavioral, and environmental self-regulation. His cyclical phases model (2000) introduced the three-phase framework that became the most widely used SRL model in education. His multi-level model (2000) described four developmental stages for acquiring self-regulatory competence: observation, emulation, self-control, and self-regulation. The cyclical phases model, refined with Adam Moylan in 2009, remains the dominant framework, cited in over 51% of SRL research publications (Panadero, 2017).

4.2 Phase 1: Forethought

The forethought phase encompasses everything before task engagement and has two major categories. Task analysis involves goal setting (identifying specific, measurable objectives) and strategic planning (developing an action plan including strategies, time allocation, and resources). Self-motivation beliefs include self-efficacy, outcome expectations, intrinsic interest/task value, and learning goal orientation. The forethought phase most distinguishes self-regulated from non-self-regulated learners. Struggling students typically skip it entirely, diving into performance without goals or a plan.

4.3 Phase 2: Performance

The performance phase involves processes during the learning activity, organized into self-control and self-observation. Self-control strategies include task strategies (elaboration, summarization, practice testing), self-instruction (guiding self-talk), imagery, time management, environmental structuring, help-seeking, and interest incentives. Self-observation involves metacognitive monitoring and self-recording: tracking what you are doing, how well it is working, and whether you are on course. Self-monitoring generates the data that fuels self-control; without awareness, no adjustment is possible.

4.4 Phase 3: Self-Reflection

The self-reflection phase has two categories. Self-judgment involves self-evaluation (comparing performance against goals) and causal attribution (analyzing what caused the outcome). The type of attribution matters enormously: attributing success to effort and strategy (controllable factors) supports future self-regulation, while attributing failure to fixed ability undermines it. Self-reaction involves self-satisfaction (the affective response) and adaptive or defensive inferences. Adaptive inferences lead to strategy adjustments; defensive inferences lead to helplessness and avoidance. The quality of self-reflection determines the quality of the next forethought phase, completing the cycle.

4.5 The Cyclical Feedback Loop

The three phases form a continuous feedback loop. Specific goals in forethought enable effective monitoring during performance, which produces rich data for reflection, which generates better-calibrated goals in the next cycle. Conversely, skipping forethought leaves nothing to monitor and nothing meaningful to reflect on, creating a vicious cycle of stagnation. Breaking into this cycle at any point (by teaching goal setting, self-monitoring, or reflective practices) can set the entire system in motion. This insight is the practical foundation of every ASR intervention.

Section 5

Pintrich's Phases and Areas Framework

ESSENTIAL UNDERSTANDING

Self-regulation operates not only across phases of time but simultaneously across multiple areas of functioning (cognition, motivation, behavior, and context), each of which can be independently monitored and controlled.

5.1 Pintrich's Contribution

Paul Pintrich (2000, 2004), also working from a social cognitive perspective, developed an SRL model that integrated both temporal phases and areas of regulation into a comprehensive matrix. Where Zimmerman organized SRL into three phases, Pintrich distinguished four: forethought/planning/activation, monitoring, control, and self-reflection. Where Zimmerman emphasized the cyclical process, Pintrich added a second dimension by identifying four areas of regulation: cognition, motivation/affect, behavior, and context. The intersection of four phases and four areas produced a 16-cell framework that specified what self-regulatory processes could occur at each point.

5.2 The Four Areas of Regulation

Cognition: Pintrich incorporated metacognitive research on judgments of learning, feelings of knowing, and calibration. Students regulate their cognition by planning cognitive strategies, monitoring comprehension, controlling strategy use, and reflecting on their understanding.

Motivation and Affect: Drawing on his own extensive empirical work (Pintrich et al., 1993), Pintrich argued that students can actively regulate their motivation (boosting interest, managing anxiety, adjusting goal orientations) rather than simply being subject to motivational states. Wolters (2003) provided further evidence for this claim.

Behavior: Based on Bandura's work, this area includes effort regulation, help-seeking, time management, and other observable actions the learner can control.

Context: Uniquely, Pintrich argued that students also regulate their learning environment (negotiating task demands, restructuring the physical space, seeking different social contexts), which distinguishes his model from those focused only on internal processes.

5.3 The MSLQ: A Landmark Instrument

Pintrich's most enduring practical legacy is the Motivated Strategies for Learning Questionnaire (MSLQ), an 81-item self-report instrument consisting of 6 motivation subscales (intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and performance, and test anxiety) and 9 learning strategies scales (rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, time and study environment, effort regulation, peer learning, and help seeking). The MSLQ has been translated into multiple languages, used with tens of thousands of students worldwide, and employed in over 75% of studies assessing SRL in higher education contexts (Broadbent & Poon, 2015).

5.4 Pintrich's Legacy

Pintrich died in 2003, but his framework continues to shape SRL research. His emphasis on motivation regulation (the idea that students can and do actively manage their own motivation) was ahead of its time and has become increasingly central to contemporary SRL theory. His work on achievement goal orientations (mastery vs. performance goals) provided critical nuance to understanding why students approach learning differently even when they possess similar cognitive abilities.

Section 6

Boekaerts' Dual Processing Model: Emotion and Self-Regulation

ESSENTIAL UNDERSTANDING

When students perceive a learning task as threatening to their well-being, they shift from a growth pathway focused on mastery to a coping pathway focused on ego protection, and this emotional shift can derail learning even when cognitive skills are intact.

6.1 The Role of Emotion in SRL

Monique Boekaerts brought emotion to the center of SRL theory in a way that neither Zimmerman nor Pintrich had fully elaborated. Her core insight was that students do not simply regulate their learning; they simultaneously manage their emotional well-being, and these two goals can conflict. When a student sits down to study and feels confident and interested, learning and well-being goals are aligned. But when a student feels anxious, threatened, or incompetent, the goal of protecting emotional well-being can override the goal of learning.

6.2 Two Pathways

Boekaerts' dual processing model (2006, 2007) describes two parallel processing modes. The mastery/growth pathway is activated when students appraise a learning task as congruent with their goals, needs, and resources. Positive cognitions and emotions are triggered, and the student deploys cognitive and motivational strategies aimed at expanding knowledge and competence. The well-being/coping pathway is activated when students appraise a task as threatening, when they perceive a mismatch between task demands and personal resources. Negative cognitions and emotions are triggered, and the student deploys strategies aimed at protecting the ego from damage: avoidance, procrastination, surface-level engagement, or withdrawal.

6.3 Switching Between Pathways

Critically, students can switch between pathways mid-task. A student who begins on the mastery pathway may shift to the coping pathway upon encountering unexpected difficulty. Boekaerts (2011) identified three purposes for self-regulation in this context: expanding knowledge and skills (top-down, mastery), preventing threat and preserving well-being (bottom-up, coping), and protecting one's commitment to learning by using volitional strategies to redirect from the coping pathway back to the mastery pathway. This third purpose is especially important for intervention design: teaching students volitional strategies, ways to manage negative emotions and re-engage with learning, is as critical as teaching cognitive strategies.

6.4 Implications for First-Generation and Underrepresented Students

Boekaerts' model has profound implications for students who experience chronic threats to their sense of belonging, competence, or identity, such as first-generation students, students from underrepresented backgrounds, or students entering high-stakes professional programs. For these students, the coping pathway may be activated not by a single difficult task but by an ongoing mismatch between their cultural background and the norms of the academic environment. Effective interventions must therefore address emotional regulation and belonging, not only cognitive strategy use. This insight directly informs the design of ASR programs that incorporate community-building, mentoring, and identity-affirming components alongside study skills instruction.

Section 7

Winne & Hadwin's Information Processing Model (COPES)

ESSENTIAL UNDERSTANDING

Self-regulation is fundamentally an information processing activity in which learners continuously generate, monitor, evaluate, and adapt the products of their thinking against internal standards.

7.1 A Cognitive Architecture for SRL

Philip Winne and Allyson Hadwin (1998) developed an SRL model grounded in information processing theory that offers the most granular cognitive architecture in the field. Where Zimmerman's model emphasizes motivational and behavioral self-regulation processes, Winne and Hadwin focus on how information is represented, processed, monitored, and adapted within the mind of the learner. Their model has become the second most cited SRL framework in the research literature (35% of published studies; Panadero, 2017).

7.2 Four Phases of Learning

Winne and Hadwin proposed that SRL occurs in four weakly sequenced phases: (1) Task definition, in which the learner constructs a mental representation of the task by interpreting both external conditions (instructions, resources, time constraints) and internal conditions (prior knowledge, beliefs, available strategies); (2) Goal setting and planning, in which the learner generates personal objectives and develops a plan of action; (3) Enacting study tactics and strategies, in which the learner applies operations to the task; and (4) Metacognitive adaptation, in which the learner makes large-scale adjustments to their beliefs, strategies, or understanding of tasks for future learning episodes. The first three phases correspond roughly to Zimmerman's three phases, but the separation of task definition from goal setting and the explicit addition of metacognitive adaptation are important distinctions.

7.3 The COPES Architecture

Each phase is analyzed through five facets, represented by the acronym COPES. Conditions include external task conditions (instructions, resources, social context) and internal cognitive conditions (domain knowledge, metacognitive knowledge, beliefs, motivational states).

Operations are the cognitive tactics and strategies the learner applies to information, both primitive abilities (memory, verbal processing) and acquired abilities (reasoning, elaboration).

Products are the tangible and cognitive outputs of operations, notes, summaries, mental models, solutions. Evaluations are the judgments the learner makes by comparing products against standards. Standards are the criteria for what constitutes acceptable or optimal performance. When evaluation reveals a gap between products and standards, the learner cycles back to modify operations, adjust conditions, or revise standards.

7.4 Monitoring and Control at Every Level

A key distinction of Winne and Hadwin's model is that monitoring and evaluation occur at the component level within every phase, rather than being confined to a separate reflection phase. This makes the model more fluid and recursive than Zimmerman's or Pintrich's. It also provides a natural framework for learning analytics and technology-enhanced SRL, because the products, evaluations, and standards can be externalized and traced through digital learning environments, an affordance that has made this model particularly influential in the educational technology and learning analytics communities.

Section 8

Historical Evolution and Comparative Analysis of SRL Models

ESSENTIAL UNDERSTANDING

SRL emerged not from a single breakthrough but from the convergence of multiple research traditions, metacognition, motivation, and social learning, and the major models complement rather than contradict one another, each illuminating different dimensions of the same complex phenomenon.

8.1 The 1986 AERA Symposium: The Birth of SRL

The formal origin of SRL as a unified construct is traced to a 1986 symposium organized by the American Educational Research Association (AERA). Researchers from previously separate traditions, learning strategies, metacognition, self-concept, volitional strategies, and self-control, explored common ground. Barry Zimmerman was instrumental in synthesizing these perspectives into a coherent framework, and the resulting construct of self-regulated learning gave the field a shared language. The first major handbook followed in 2000 (Boekaerts, Pintrich, & Zeidner, Eds.), establishing SRL as a major area of educational psychology.

8.2 Comparing the Major Models

Dimension	Comparison Across Models
Phases	Zimmerman: 3 (forethought, performance, self-reflection). Pintrich: 4 (adds monitoring as distinct from control). Winne & Hadwin: 4 (separates task definition from goal setting; adds adaptation). Boekaerts: Focuses on dynamic pathway switching rather than sequential phases.
Emphasis	Zimmerman: Motivational and behavioral processes. Pintrich: Motivation regulation and areas of functioning. Boekaerts: Emotion and volitional regulation. Winne & Hadwin: Cognitive/metacognitive information processing.
Agency	All models share Bandura's agentic perspective. Zimmerman and Pintrich are most explicitly social-cognitive. Winne & Hadwin adopt an information processing lens. Boekaerts integrates appraisal and emotion theory.
Monitoring	Zimmerman: Performance phase (self-observation). Pintrich: Dedicated monitoring phase. Winne & Hadwin: Component-level monitoring within every phase (most granular). Boekaerts: Ongoing emotional appraisal.
Key Instrument	Zimmerman: SRLIS, microanalysis. Pintrich: MSLQ. Boekaerts: On-line Motivation Questionnaire (OMQ). Winne: nStudy/gStudy trace data systems.

8.3 Efklides' Metacognitive and Affective Model (MASRL)

Anastasia Efklides (2011) contributed a model that integrates metacognitive experiences (feelings of difficulty, feelings of knowing, judgments of learning) with affect and motivation at the task level. Her MASRL model distinguished between a Person level (stable traits, self-concept, self-efficacy) and a Task×Person level (online metacognitive monitoring and affective reactions during specific tasks). This model is especially valuable for understanding microprocesses, what happens moment-to-moment as a learner works through a problem, and has influenced the design of real-time SRL support systems.

8.4 Shared and Co-Regulated Learning

More recently, Hadwin, Järvelä, and Miller (2011) extended SRL theory into social contexts, proposing three modes of regulation in collaborative settings: self-regulation (individual regulation within a group), co-regulation (where one group member scaffolds another's regulation), and shared regulation (where the group collectively sets goals, monitors progress, and reflects). This social dimension of SRL has become increasingly important as collaborative and team-based learning grows across disciplines, particularly in health professions education where interprofessional teamwork is essential.

8.5 Integration, Not Competition

These models are best understood as complementary lenses on the same phenomenon. A practitioner designing an ASR intervention might use Zimmerman's three phases as the organizing framework, Pintrich's areas to ensure that motivation and context are addressed alongside cognition, Boekaerts' pathways to inform emotional and belonging-related components, and Winne & Hadwin's COPES to design technology-mediated monitoring and feedback. The richest interventions draw from multiple models.

Section 9

Motivation, Attribution, and Goal Orientation in SRL

ESSENTIAL UNDERSTANDING

How a student explains their successes and failures (whether they attribute outcomes to effort, strategy, ability, or luck) determines whether they will approach the next learning challenge with resilience or helplessness.

9.1 Attribution Theory and SRL

Bernard Weiner's attribution theory examines how people explain the causes of events. In academic settings, students attribute their performance to factors that vary along three dimensions: locus (internal vs. external), stability (stable vs. changeable), and controllability (controllable vs. uncontrollable). A student who attributes failure to low ability (internal, stable, uncontrollable) is likely to feel helpless and disengage. A student who attributes the same failure to insufficient effort or poor strategy choice (internal, unstable, controllable) is likely to increase effort and try a different approach. Zimmerman placed causal attribution squarely in the self-reflection phase of his model, and both Pintrich and Boekaerts emphasized its motivational consequences.

9.2 Achievement Goal Orientations

Dweck, Elliot, Pintrich, and others distinguished between different types of achievement goals. Mastery goals (also called learning goals) orient the student toward developing competence and understanding. Performance-approach goals orient toward demonstrating competence relative to others. Performance-avoidance goals orient toward avoiding the appearance of incompetence. Research consistently shows that mastery goal orientations are associated with deeper processing, greater persistence, more adaptive attributions, and higher levels of SRL. Performance-avoidance orientations are associated with surface processing, anxiety, and lower SRL.

9.3 Intrinsic vs. Extrinsic Motivation

Self-Determination Theory (Deci & Ryan, 1985, 2000) distinguishes between intrinsic motivation (driven by inherent interest and satisfaction) and extrinsic motivation (driven by external rewards or pressures). SDT identifies three basic psychological needs, autonomy, competence, and relatedness, whose satisfaction supports intrinsic motivation and effective self-regulation. When learning environments support these needs, students are more likely to internalize the value of learning, develop autonomous motivation, and engage in SRL. When environments thwart these needs through excessive control, overly competitive climates, or social isolation, motivation shifts toward external regulation or amotivation.

9.4 Motivation Regulation

Building on Pintrich's insight, Wolters (2003) provided extensive evidence that students can and do actively regulate their motivation, using strategies such as self-consequating (promising themselves rewards), environmental control (removing distractions), interest enhancement (making tasks more engaging), mastery self-talk (reminding themselves of learning goals), and performance self-talk (reminding themselves of grade goals). Teaching students these motivation regulation strategies is an underemphasized but critical component of effective ASR interventions.

Section 10

Evidence-Based Learning Strategies: The Science of Studying

ESSENTIAL UNDERSTANDING

Not all study strategies are created equal. Decades of cognitive science research show that strategies requiring active retrieval and spaced practice produce dramatically more durable learning than passive strategies like rereading and highlighting.

10.1 The Strategy Gap

A central finding in SRL research is that many students, and particularly students who struggle academically, rely on ineffective study strategies. Surveys consistently show that the most common study methods (rereading textbooks, highlighting, and passive reviewing of notes) are among the least effective for producing durable learning. Meanwhile, the strategies with the strongest evidence base (retrieval practice, spaced practice, interleaving, elaborative interrogation, and self-explanation) are used much less frequently. Closing this strategy gap is one of the most impactful goals of ASR interventions.

10.2 High-Impact Strategies

Retrieval practice (also called practice testing or the testing effect): Actively retrieving information from memory, through flashcards, practice tests, or self-quizzing, strengthens memory traces far more than passive restudying. Dunlosky et al. (2013) rated it among the most effective learning strategies across a wide review of the evidence.

Spaced practice (distributed practice): Spreading study sessions over time rather than massing them into a single session produces substantially more durable learning. The spacing effect is one of the most robust findings in cognitive psychology.

Interleaving: Mixing different types of problems or topics within a single study session, rather than practicing one type at a time (blocking), improves the ability to discriminate between problem types and select appropriate strategies.

Elaborative interrogation: Asking why and how questions about the material being studied promotes deeper processing and integration with prior knowledge.

Self-explanation: Explaining the material to oneself (or to others) in one's own words forces active processing and reveals gaps in understanding.

10.3 Low-Impact Strategies to Move Beyond

Rereading and highlighting feel productive because they create a sense of familiarity with the material, but this familiarity is deceptive, it produces an illusion of knowing without the ability to retrieve and apply information. Summarization can be moderately effective but only when it involves genuine distillation rather than copying. Keyword mnemonics are useful for specific vocabulary learning but have limited generalizability. ASR programs explicitly teach students to replace low-impact strategies with high-impact ones and to recognize the difference between feeling familiar with material and actually knowing it.

10.4 Connecting Strategies to the SRL Cycle

Evidence-based strategies map naturally onto Zimmerman's cyclical model. During forethought, students select which strategies to use based on the task demands. During performance, they implement those strategies while monitoring their effectiveness. During self-reflection, they evaluate whether the strategies produced the desired learning outcomes and make adjustments for the next cycle. Teaching strategies without embedding them in the SRL cycle is less effective than teaching them as part of a self-regulatory process.

Section 11

Measuring SRL: Instruments, Microanalysis, and Trace Data

ESSENTIAL UNDERSTANDING

What you measure shapes what you can improve, and measuring self-regulation requires capturing a dynamic, context-dependent process through multiple complementary methods.

11.1 The Measurement Challenge

SRL is inherently difficult to measure because it is a process rather than a product, it unfolds over time, it is context-dependent, and many of its components are internal and not directly observable. Any single measure captures only a partial view, which is why researchers and practitioners increasingly advocate for multi-method approaches.

11.2 Self-Report Questionnaires

Self-report instruments are the most widely used approach. The MSLQ (Pintrich et al., 1991, 1993) is the benchmark, with 81 items across 15 scales. A meta-analysis by Credé and Phillips (2011) based on 67 independent samples and nearly 20,000 students confirmed the MSLQ's subscale structure and found that effort regulation was the strongest predictor of grades ($\rho = .40$). Other widely used instruments include the Learning and Study Strategies Inventory (LASSI), the Academic Self-Regulated Learning Scale (A-SRL-S), and Zimmerman's SRLIS. Self-reports are practical and scalable but have limitations: students may overestimate their strategy use, fail to accurately recall their learning behaviors, or respond in socially desirable ways.

11.3 Microanalytic Assessment

Microanalytic protocols, developed by Cleary and Zimmerman (2001, 2012), assess SRL in real time through brief, context-specific questions administered at strategically chosen points before, during, and after a task. Before the task, students report their goals and strategies (forethought). During the task, they report monitoring and control processes (performance). After the task, they report evaluations and attributions (self-reflection). Microanalysis produces more valid and ecologically grounded data than retrospective self-report but is more labor-intensive and typically used with smaller samples.

11.4 Trace Data and Learning Analytics

The Winne and Hadwin model has been especially influential in the development of trace-based SRL measurement. Digital learning environments can capture unobtrusive traces of SRL behavior: time stamps, navigation patterns, resource access, annotation behavior, search queries, and revision histories. These traces provide objective, real-time evidence of what learners actually do (as opposed to what they say they do). Tools like nStudy and gStudy, developed by Winne and colleagues, were designed specifically to capture and analyze these traces. The growing field of learning analytics is increasingly using trace data to detect, model, and support SRL at scale.

11.5 Learning Diaries and Portfolios

Structured learning diaries ask students to record goals, strategies, progress, and reflections at regular intervals. Research under Zimmerman's model has found that learning diaries enhance all SRL phases and serve a dual function as both assessment instrument and intervention. Reflective portfolios extend this approach by collecting evidence of SRL over longer periods and across multiple tasks.

11.6 Multi-Method Best Practice

The most robust approach combines pre-post self-report questionnaires to detect overall changes, microanalytic or qualitative protocols to capture the process of change, trace data or app logs to track behavior in real time, and structured reflections to promote and document self-regulation simultaneously. Ham's research exemplified this multi-method approach, employing both quantitative instruments (measuring self-efficacy and self-regulation) and qualitative interviews (exploring students' lived experiences of academic challenge).

Section 12

The First-Generation Student Challenge

ESSENTIAL UNDERSTANDING

First-generation students do not lack ability, they lack the inherited academic capital and self-regulatory strategies that continuing-generation students absorb informally from their college-educated families, making SRL instruction a powerful equity intervention.

12.1 Scope of the Challenge

First-generation students, those whose parents have not completed a four-year college degree, constitute a substantial and growing proportion of higher education enrollment globally. In many countries, they represent the majority of the student body. Despite their numbers, first-generation students face well-documented disparities in academic performance, persistence, and degree completion (Tibbetts et al., 2016; Vaughan et al., 2014). They are more likely to leave college without a degree (Manzoni & Streib, 2019) and face compounding challenges including limited family cultural capital, lower socioeconomic status, and reduced access to the informal networks and knowledge that smooth the path through higher education.

12.2 Cultural Mismatch Theory

Stephens and colleagues (2012, 2019) proposed cultural mismatch theory to explain the persistent underperformance of first-generation students. Universities operate according to cultural norms (valuing independence, self-advocacy, and intellectual confidence) that align more closely with the socialization patterns of continuing-generation students. First-generation students, who may come from backgrounds emphasizing interdependence and deference to authority, experience a persistent mismatch that affects motivation, engagement, and belonging. This mismatch is not about deficiency; it is about fit between the student's cultural framework and the institution's unspoken expectations.

12.3 SRL Gaps

Research consistently finds that first-generation students report lower levels of self-regulated learning than continuing-generation peers (Williams & Hellman, 2004). They use fewer metacognitive strategies, set less specific academic goals, engage in less self-monitoring, and rely more on surface-level strategies. They also report lower academic self-efficacy, creating a negative spiral in which low confidence leads to ineffective strategies, poor outcomes, and further erosion of confidence. Ham's qualitative research (2025) provided rich descriptions of how these factors interact in the lived experience of first-generation occupational therapy students.

12.4 Belonging and Identity

Sense of belonging, the feeling of being a valued, accepted member of the academic community, is a critical mediator of academic success. Ham's 2025 research on sense of belonging among first-generation OT students found that belonging directly influences engagement, help-seeking, and persistence. When students feel marginal, they withdraw from the very behaviors that would support their success. ASR interventions that include community-building, peer support, and mentoring address the belonging gap alongside the strategy gap.

12.5 SRL Interventions as Equity Interventions

Because SRL is learnable rather than fixed, teaching it explicitly is a powerful equity strategy. First-generation students are not inherently less capable of self-regulation; they have had fewer opportunities to develop these skills. By providing structured instruction in goal setting, strategic planning, self-monitoring, and reflection, ASR programs address a systemic disadvantage. Ham's research demonstrated that her ASR program produced measurable improvements in both self-regulation and self-efficacy among first-generation OT students, confirming that targeted intervention can close these gaps.

Section 13

From Theory to Practice: Designing ASR Interventions

ESSENTIAL UNDERSTANDING

An effective ASR intervention does not merely tell students about self-regulation. Rather, it structures an experience in which students practice forethought, performance, and self-reflection within the authentic demands of their academic lives.

13.1 Design Principles

Drawing from the theoretical and empirical foundations covered in this course, several core design principles emerge. First, interventions must address all three phases of the SRL cycle. Teaching study strategies (performance) without teaching goal setting (forethought) or reflection (self-reflection) produces incomplete results. Second, interventions must build self-efficacy alongside self-regulation by providing mastery experiences, peer modeling, encouragement, and emotional management support. Third, interventions must be embedded in authentic academic contexts rather than delivered as abstract workshops. Fourth, interventions should be sustained over time. Fifth, interventions should address emotion and belonging, not only cognition and behavior.

13.2 Ham's ASR Program: A Case Study

Ham's Academic Self-Regulation program, grounded in Bandura's social cognitive theory and Zimmerman's cyclical model, was developed through a systematic process: needs assessment, literature review, and iterative design informed by preexperimental and qualitative research. The program teaches students to apply the three-phase cycle to their academic work, setting SMART goals, selecting evidence-based study strategies, self-monitoring progress, reflecting on outcomes, and adjusting for the next cycle. In her 2023 Inside Higher Ed article, Ham outlined seven evidence-based ASR interventions: teaching goal setting, strategic planning, evidence-based study strategies, real-time self-monitoring, systematic reflection, proactive help-seeking, and emotional/motivational state management.

13.3 Other Exemplary Programs

Ham's work sits within a broader tradition of SRL intervention research. Schunk and Ertmer (2000) demonstrated that self-evaluation and goal-setting training improves self-regulation and achievement. Cleary and colleagues developed the Self-Regulation Empowerment Program (SREP) for middle and high school students, showing that microanalytic-based interventions improve strategic planning and self-monitoring. Broadbent and Poon (2015) reviewed SRL strategies in online higher education, finding that metacognitive strategies, time management, and effort regulation were the strongest predictors of academic success. A meta-analysis by Jansen et al. (2020) confirmed that SRL training programs enhance both SRL strategies and academic performance in university students, with metacognitive training producing the largest effect sizes.

13.4 Common Pitfalls

Intervention research has also identified common pitfalls. Single-session workshops produce minimal lasting change. Programs that teach strategies without addressing motivation are poorly adopted. Interventions disconnected from authentic coursework feel irrelevant to students. Programs that ignore emotional and social dimensions fail to engage students who are disengaged for belonging-related reasons. And programs that lack structured follow-up and reinforcement see gains fade over time. Effective ASR design accounts for each of these risks.

Section 14

Technology-Enhanced Self-Regulation: Apps, AI, and Learning Analytics

ESSENTIAL UNDERSTANDING

Technology does not replace the human processes of self-regulation. It amplifies them by providing accessible, real-time scaffolding for goal setting, self-monitoring, and reflection at the point of need.

14.1 Affordances of Technology for SRL

Digital platforms offer unique affordances for supporting SRL: delivering prompts and reminders at the right moment, providing structured templates for goal setting and reflection, tracking behavior over time to make patterns visible, offering immediate and personalized feedback, and making SRL tools accessible anywhere and anytime. These features align naturally with the demands of Zimmerman's cyclical model and with Winne and Hadwin's emphasis on external traces of internal processes.

14.2 Ham's Mobile App Research

Ham's December 2025 study examined the effects of an ASR program supported by a mobile app on self-regulated learning among first-generation OT students. The app served as a digital companion to the structured program, providing tools for each SRL phase: goal-setting templates for forethought, self-monitoring prompts for performance, and structured reflection templates for self-reflection. The technology-enhanced model supported engagement with the ASR program and the development of SRL skills.

14.3 Learning Analytics and Trace-Based Measurement

Building on Winne's work, the field of learning analytics uses trace data from digital environments to detect, model, and support SRL in real time. By capturing behavioral traces, time on task, resource access patterns, revision behavior, search queries, learning analytics systems can identify students who are struggling to self-regulate and provide targeted interventions. Recent advances in AI have enabled more sophisticated modeling of SRL processes, including hidden Markov modeling to capture latent SRL states and recommender systems that suggest SRL strategies based on detected needs.

14.4 AI and the Future

Emerging research explores how AI might support SRL through adaptive scaffolding, personalized feedback, and intelligent tutoring. However, critical questions remain about whether AI support promotes genuine self-regulation or creates dependence on external regulation. Effective SRL technology follows key design principles: it prompts rather than prescribes, makes thinking visible, supports but does not replace metacognition, is integrated into authentic tasks, and provides informative rather than merely evaluative feedback. The challenge is to design AI tools that gradually fade scaffolding as learners develop their own self-regulatory capabilities.

Section 15

Social and Shared Regulation of Learning

ESSENTIAL UNDERSTANDING

Self-regulation does not happen in isolation, learning is inherently social, and the most effective regulation often occurs through co-regulation with peers and shared regulation within collaborative groups.

15.1 Beyond the Individual

While the classic SRL models focus on the individual learner, learning in higher education increasingly occurs in social contexts: study groups, team-based projects, clinical rotations, interprofessional teams. Hadwin, Järvelä, and Miller (2011, in press) proposed three modes of regulation in collaborative settings that extend Zimmerman's and Winne's models into the social domain.

15.2 Three Modes of Social Regulation

Self-regulation in social contexts: Individual learners regulate their own cognition, motivation, and behavior while participating in group work. This is standard SRL applied within a collaborative setting.

Co-regulation: One member of a group temporarily scaffolds another's self-regulation, for example, a more experienced student helping a peer set goals, select strategies, or reflect on outcomes. Co-regulation is asymmetric and transitional, ideally leading to greater independent self-regulation.

Shared regulation (SSRL): The group collectively negotiates goals, monitors progress, and adjusts strategies. SSRL is a jointly regulated process in which the regulatory functions are distributed across group members. It requires shared awareness of the task, shared standards, and collective metacognition.

15.3 Implications for Practice

Understanding social regulation has direct implications for ASR interventions. Peer study groups can serve as powerful co-regulation environments when structured intentionally. Group-based reflections, shared goal-setting exercises, and collaborative monitoring protocols harness the social dimension of SRL. In health professions education, where interprofessional teamwork is a core competency, shared regulation skills are not just academic, they are professional.

Butler and Cartier's (2018) sociocultural lens on SRL further emphasizes that self-regulation is always situated within historical, cultural, social, and community contexts. This perspective reinforces the importance of attending to the cultural and social dimensions of learning, not as add-ons to cognitive strategy instruction but as integral components of effective self-regulation.

Section 16

SRL Across Disciplines: Health Professions, STEM, and Beyond

ESSENTIAL UNDERSTANDING

The principles of self-regulated learning are discipline-agnostic, but their specific expression, the strategies used, the tasks regulated, and the social contexts navigated) must be adapted to the demands and culture of each field.

16.1 Health Professions Education

Health professions education, including occupational therapy, medicine, nursing, and physical therapy, places unique demands on SRL. Students must master large volumes of content, develop clinical reasoning skills, navigate emotionally challenging patient interactions, and transition from classroom to clinical settings where self-regulation is both more difficult and more consequential. Ham's work in occupational therapy exemplifies this context: her research shows that SRL directly affects not only academic outcomes but preparation for professional practice. Artino, Cleary, and colleagues have applied microanalytic SRL assessment to medical education, demonstrating that medical students' forethought processes predict clinical performance.

16.2 STEM Education

In STEM fields, self-regulation is particularly important for problem-solving, laboratory work, and mathematical reasoning. Research shows that STEM students who set specific learning goals, use self-monitoring during problem solving, and reflect on their solution processes perform significantly better than those who do not. The challenge in STEM is that domain knowledge and self-regulation interact: students need sufficient content knowledge to deploy metacognitive strategies effectively (Winne & Hadwin, 1998), and the abstract nature of many STEM concepts can trigger the well-being pathway (Boekaerts) when students feel overwhelmed.

16.3 Writing and the Humanities

SRL is equally relevant in writing-intensive disciplines, where the writing process itself is a self-regulatory cycle of planning, drafting, monitoring, revising, and reflecting. Zimmerman and Kitsantas (1997, 1999) conducted foundational studies on self-regulation in writing, demonstrating that students who set process goals (focused on technique) before shifting to outcome goals showed greater writing improvement than those who set only outcome goals. This finding has broad implications for how writing instruction is designed.

16.4 Online and Blended Learning

The shift toward online and blended learning has made SRL more important than ever. Without the structure of face-to-face instruction, students must regulate their own time, attention, and engagement to a much greater degree. Research consistently finds that students with higher SRL perform better in online environments, while students with low SRL are at particular risk. First-generation students, who already report lower SRL, face compounding disadvantages in online settings (Williams & Hellman, 2004). This makes SRL instruction in online environments both more necessary and more challenging to deliver.

Section 17

Bringing It All Together: A Practitioner's Framework

ESSENTIAL UNDERSTANDING

The goal of any ASR intervention is not to create students who follow a formula but to develop learners who possess the self-awareness, strategic repertoire, and motivational resilience to regulate their own learning across any context they encounter.

17.1 Synthesis: An Integrated Practitioner Framework

The theoretical and empirical landscape covered in this course converges on a set of actionable principles for anyone designing, delivering, or studying academic self-regulation interventions:

Use Zimmerman's three phases as the organizing architecture. Forethought, performance, and self-reflection provide the simplest, most robust structure for teaching students to regulate their learning. Every session, module, or assignment can be framed in terms of these three phases.

Address Pintrich's four areas. Ensure that your intervention targets not just cognition but also motivation/affect, behavior, and context. Teaching study strategies without addressing motivation or environmental structuring is incomplete.

Attend to Boekaerts' emotional dimension. Build components that address emotional regulation, sense of belonging, and identity. Teach volitional strategies that help students redirect from the coping pathway to the mastery pathway.

Leverage Winne & Hadwin's COPES for technology design. If using digital tools, design them to externalize conditions, operations, products, evaluations, and standards. Use trace data to provide real-time feedback and adaptive scaffolding.

Build self-efficacy through all four sources. Scaffold mastery experiences, provide peer models, offer realistic encouragement, and teach students to manage physiological and emotional states.

Teach evidence-based strategies explicitly. Replace passive strategies with retrieval practice, spaced practice, interleaving, elaborative interrogation, and self-explanation. Embed these within the SRL cycle.

Design for social regulation. Create structured opportunities for co-regulation and shared regulation through peer learning, collaborative reflection, and team-based goal setting.

Measure with multiple methods. Combine self-report instruments, microanalytic protocols, trace data, learning diaries, and qualitative inquiry to capture the full picture of SRL development.

17.2 Looking Forward

The field of SRL is evolving rapidly. Key frontiers include the integration of AI-powered scaffolding that fades as learner competence grows, the development of culturally responsive SRL interventions that account for diverse student backgrounds and values, the extension of SRL to professional and lifelong learning contexts beyond formal education, and the refinement of real-time measurement approaches that capture the dynamic, moment-to-moment unfolding of self-regulation. As Ham's work demonstrates, the translation of SRL theory into practical, evidence-based interventions is both achievable and urgently needed, for first-generation students, for all students, and for the professionals they will become.

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