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The Concept and Learning Structure Analysis of Online Self-Regulated Learning

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Abstract: Self-regulated learning integrates core insights from behaviorism, cognitive constructivism, and social cognitive theory. It goes beyond simple behavioral reinforcement to embrace active knowledge construction and self-efficacy, offering a comprehensive framework for understanding how learners independently guide their educational journeys. Amid digital technology's deep infiltration into education, traditional models face challenges like scenario adaptation and personalized needs, making online self-regulated learning a pivotal research focus. Its research methods combine interdisciplinary theoretical synthesis with empirical tools. The research holds dual significance: theoretically advancing interdisciplinary innovation between learning sciences and digital technology, and practically providing scientific support for online platform optimization and personalized program design. It empowers learners to plan progress, absorb knowledge efficiently, and enhance capabilities digitally, aligning with education's digital transformation needs.

Keywords: Self-Regulation; Self-Regulated Learning; Online Self-Regulated Learning

1. Introduction

Self-regulated learning synthesizes perspectives from behaviorism, cognitive constructivism, social cognition, and related frameworks. By bridging behavioral reinforcement, knowledge construction, and the role of self-efficacy, it offers a holistic account of how learners govern their own learning processes. While connected to concepts such as autonomous learning and meta-cognitive learning, it differs in emphasis: autonomous learning prioritizes independence and initiative, whereas meta-cognitive learning centers on the awareness and monitoring of one's own thinking. Self-regulated learning, by contrast, integrates motivation, behavior, and meta-cognition into a cohesive system that guides the entire learning journey.

In the digital era, online self-regulated learning has emerged as a new educational paradigm. It brings together the strengths of traditional pedagogy and the possibilities of the internet, enabling learners to navigate their progress with intention in virtual settings, assimilate knowledge effectively, and cultivate competencies in a sustained manner. Mastering the capacity for self-regulated learning--whether in physical classrooms or digital platforms--equips individuals with a key to unlocking lasting intellectual growth, providing a steady source of momentum for personal development.

2. The Concept of Self-Regulation

The term "self-regulation" first emerged in the field of biology, where it described the process by which organisms adapt to their external environment through internal adjustments, thereby maintaining a state of relative stability. Beginning in the 1980s, the concept was gradually expanded into disciplines such as psychology, behavioral medicine, and management, drawing increasing scholarly attention to individual self-regulatory behaviors and processes. The understanding of it has also been broadened: self-regulation may refer to initiating or halting activities according to situational demands, modulating the intensity, frequency, and duration of verbal and nonverbal behavior in socio-educational contexts, delaying action toward desired goals, or generating socially appropriate conduct in the absence of external monitoring.

In educational psychology, Albert Bandura was one of the early influential figures to study human self-regulation. He argued that changes in individual behavior could not be adequately explained by traditional stimulus--response behaviorism, emphasizing instead the role of self-regulatory processes [1]. Although multiple definitions of self-regulation exist, a widely

accepted view characterizes it as the process through which individuals control, respond to, and adjust their internal states--including thoughts, emotions, and motivations--as well as external behaviors, in order to achieve desired goals. It generally involves three sub-processes: self-monitoring, self-judgment, and self-reaction. Typically, self-regulation encompasses several core components: goal setting, monitoring and adjustment during execution, and evaluation of and reflection on behavioral outcomes. Moreover, self-regulation is essential to understanding human agency, closely linked to an individual's behavioral performance, social functioning, and psychological processes.

This paper endorses the view that a distinction should be made between self-regulation and self-control. Conceptually, self-regulation refers to any effort by an individual to alter their own responses, whereas self-control places greater emphasis on the volitional suppression of impulses. In terms of scope, self-regulation often subsumes self-control, implying both governance and adjustment. Self-control primarily involves the regulation of emotions and impulses, while self-regulation encompasses a broader range of behavioral systems and psychological activities, including cognitive and meta-cognitive elements, in addition to emotional and volitional control.

3. The Meaning of Self-Regulated Learning

When self-regulation is applied to different domains, it takes on specific meanings, such as emotional self-regulation, moral self-regulation, and consumer self-regulation. Building upon Bandura's social learning theory, American educational psychologist Zimmerman introduced the concept of self-regulation into the realm of learning, proposing the notion of self-regulated learning [2]. Since then, numerous researchers have contributed to its conceptual development, progressively enriching and refining its meaning.

Since its emergence, self-regulated learning has remained a prominent topic in education and psychology. It represents a key concept in the study of learning strategies and serves as a central framework for understanding the cognitive, motivational, and affective dimensions of learning. Currently, scholars do not have a unified definition of self-regulated learning. In summary, there are mainly three typical perspectives.

The first viewpoint views self-regulated learning as a mental or meta-cognitively regulation activity. For instance, self-regulated learning is a process in which learners actively engage in meta-cognition, motivation, and behavior, that is, learners initiate and guide the acquisition of knowledge and skills on their own [3]. Self-regulaed learning is an active, constructive process in which learners set goals and monitor, regulate, and control their cognition, motivation, and behavior in light of those goals and contextual demands [4]. Simons and colleagues characterized it as a form of self-education involving self-direction, planning, execution, monitoring, guidance, testing, reflection, and evaluation [5]. Self-regulated learning is neither a mental ability nor an academic skill, but rather a self-directed process through which students translate their mental abilities into task-specific skills [6]. Self-regulated learning is a cyclical process involving self-planning, self-monitoring, self-regulation, and self-evaluation of one's learning and behavior. It is a process through which learners actively adjust their cognition, motivational-emotional states, and behaviors to achieve learning goals [7].

The second perspective views self-regulated learning as a psychological trait or capability. Early on, Bandura considered it the ability to generate and control one's own thoughts, feelings, and actions in pursuit of self-set goals. It is a multifaceted capacity encompassing willpower, cognitive regulation, behavioral regulation, and motivational and emotional regulation during learning [8].

The third perspective views self-regulated learning as a key learning strategy or set of behaviors. Some scholars in China viewed it as learning that is actively driven by the learner and supported by the strategic use of learning strategies. Initially, the understanding of self-regulated learning focused primarily on the control and regulation of learners' behaviors. In later studies, the connotations of motivation and emotion control were gradually added. For example, Alvi and others described self-regulated learning as the meta-cognitive, motivational, and strategic behaviors of learners occurring in social contexts [9].

Integrating these definitions and the focus of this paper, this paper tends to understand self-regulated learning from the perspective of an activity process. That is to say, self-regulated

learning refers to the process in which learners regulate their cognition, emotion, and behavior while completing specific learning tasks. It involves a series of behavioral processes, such as setting learning goals, motivating learning motivation, selecting and applying appropriate learning strategies, monitoring and adjusting the learning process, and conducting self-assessment and reflection.

4. Distinguishing Related Concepts

To clarify the meaning of self-regulated learning, it is useful to distinguish it from several related concepts.

4.1 Self-Regulated Learning vs. Autonomous Learning

In some Chinese academic literature, the terms "self-regulated learning" and "autonomous learning" are used interchangeably. This paper, however, regards them as distinct concepts with different connotations. Autonomous learning is a broad, macro-level concept referring to learners taking charge of their own learning. It emphasizes the establishment of learner agency, typically in contrast to teacher-directed instruction, collaborative learning, or other externally guided approaches. In essence, autonomous learning involves self-identification, self-selection, self-cultivation, and self-control. As such, it encompasses not only self-regulated learning but also self-directed learning, self-organized learning, and self-paced learning.

In comparison, self-regulated learning focuses on micro-level learning processes and capabilities--specifically, how learners plan, execute, control, and reflect on specific learning tasks. The key distinction lies in the following: autonomous learners are necessarily capable of regulating their learning processes, whereas self-regulating learners may not necessarily be fully autonomous in guiding their overall learning journey [10].

4.2 Self-regulated Learning vs. Adaptive Learning

Adaptive learning generally refers to an educational approach and technological framework that automatically adjusts the learning process to fit individual learners' needs. It does not denote a new form of learning method, but rather an intelligent educational technology--often realized through adaptive learning systems that provide personalized content, recommend learning pathways, and offer tailored support based on learner profiles. Thus, the difference is clear: self-regulated learning concerns the individual's internal learning process, while adaptive learning deals with the technological implementation of personalized learning experiences [11].

4.3 Self-Regulated Learning vs. Meta-Cognition

The relationship between self-regulated learning and meta-cognition is often a source of confusion. Meta-cognition refers to an individual's awareness and regulation of their own cognitive processes. It can be simply understood as cognition about cognition, and it plays an important role in an individual's cognitive activities: monitoring and regulation. Structurally, meta-cognition consists of three components: meta-cognitive knowledge (understanding of one's own cognition, task demands, and strategies), meta-cognitive experience (the conscious feelings and experiences related to ongoing cognitive efforts), and meta-cognitive monitoring (the supervision, control, and adjustment of cognitive activities).

Research has not reached a consensus regarding the relationship between self-regulated learning and meta-cognition. Some consider self-regulation a sub-component of meta-cognition, while others treat meta-cognition as an element of self-regulation. This paper takes the viewpoint that self-regulated learning is the broader construct. As evidenced by its theoretical origins in social cognitive theory, self-regulated learning encompasses not only meta-cognitive monitoring and regulation but also motivational and socially shaped affective processes. Therefore, beyond meta-cognitive regulation, self-regulated learning involves the regulation of cognition, motivation, and emotion.

5. Understanding Online Self-Regulated Learning

Online self-regulated learning refers to the process through which learners engage in self-regulation within digital learning environments. It represents a contextualized manifestation of self-regulated learning in online settings and, in essence, shares the same core meaning as its traditional counterpart. However, due to the distinctive nature of online learning environments, the process places

greater emphasis on learners' application of self-regulatory strategies and their ongoing regulation of motivation, emotion, and behavior. At the same time, the online learning environment itself offers rich resources, technological tools, and interpersonal support that facilitate these self-regulatory processes.

5.1 Characteristics of Online Self-Regulated Learning

In terms of its characteristics, online self-regulated learning can be described by the following key aspects:

(1) It is a goal-directed process, where learning objectives guide engagement and trigger regulatory behaviors as learners work toward desired outcomes.

(2) It highlights the agency of the learner, framing learning as an active process of meaning-making and purposeful goal attainment.

(3) Monitoring and adjustment lie at the heart of the process, spanning cognitive, affective, and behavioral domains.

(4) It is not a purely individual endeavor; regulation often involves social support and interactive learning strategies, such as seeking help or collaborating with others.

5.2 Elements of Online Self-Regulated Learning Structure

According to Zimmerman's cyclical phase model, self-regulated learning is primarily divided into three stages: planning, performance, and self-reflection. The planning stage includes elements such as task analysis and self-motivational beliefs. The performance stage encompasses self-control and self-observation. The self-reflection stage involves self-judgment and self-reactions.

This paper analyzes the connotations of the three stages proposed by Zimmerman--planning, performance, and self-reflection--as well as the specific learning behaviors, to distill the structural elements of online self-regulated learning. During the planning stage, the main activities of the learner are to analyze the learning task, set learning goals and plans for achieving these goals, and activate individual learning motivation and beliefs (self-efficacy). Therefore, the core components are goal planning and self-motivational beliefs. During the performance stage, the main activity of the learner is to complete the learning task according to the goal plan. In this process, it is necessary to monitor one's learning progress, control the learning environment, and use self-monitoring strategies to maintain learning engagement and motivation. Therefore, the core components are task strategies, self-observation, and self-monitoring. During the self-reflection stage, the main activity of the learner is to evaluate and reflect on the learning process and outcomes in order to influence subsequent learning. Therefore, the core components are self-assessment and self-reflection.

Based on these analyses, this paper divides online self-regulated learning into six elements: goal planning, self-motivation, task strategies, academic help-seeking, self-monitoring, and evaluation and reflection. The planning stage includes elements such as goal planning and self-motivation. The performance stage encompasses elements like task strategies, academic help-seeking, and self-monitoring. The evaluation stage involves elements such as evaluation and reflection.

5.3 Analysis of the Structure of Online Self-Regulated Learning

This paper constructs four subsystems based on the six structural elements mentioned above: the goal system, the motivation system, the monitoring system, and the execution system.

5.3.1 Goal system

Goal planning is the foundational layer of online self-regulated learning and constitutes the goal system of the entire self-regulated learning system. Goal planning serves as the backbone of the entire self-regulated learning process and is the root of all learning activities and psychological processes. The first step in self-regulated learning is to establish learning goals, set criteria for learning goals or behavioral performance, and formulate plans to complete tasks. These plans guide the learning process and regulate one's learning behaviors, cognitive strategies, and motivational emotions during the learning process.

5.3.2 Motivation system

Self-motivation is the motivation system of online self-regulated learning, primarily responsible for providing motivational support and efficacy beliefs for the completion of learning tasks.

Having a goal plan does not necessarily mean that learners can effectively implement the self-regulated learning process. Learners must

also have the motivation and belief to complete the learning tasks. This is one of the key elements of successful self-regulated learning and also an important reason why many MOOC learners tend to drop out during the learning process. The formation of self-motivation depends not only on the individual learner's perception of task value and the activation of self-motivation but also on the interaction between the individual and the external environment. The role of self-motivation is reflected in two aspects: first, it provides motivational support for completing learning tasks, such as selecting appropriate task strategies, seeking help from the surroundings when encountering problems, and conducting timely self-assessment and reflection; second, it can promote individual self-monitoring, enabling learners to maintain focus on the learning tasks and maintain a high level of self-discipline.

5.3.3 Monitoring system

Self-monitoring is the monitoring system of online self-regulated learning, primarily responsible for self-observation and control of the learning process.

During the self-regulated learning process, learners must constantly monitor their learning process to understand and grasp their current learning status and progress, especially to monitor whether they have completed the learning tasks according to the schedule and requirements, so as to regulate and improve the behavioral process. Learners with a high level of self-monitoring often exhibit a high level of self-discipline, maintain high attention to learning tasks, control their learning behaviors and emotions, use appropriate task strategies to complete tasks, and maintain effort and persistence. At the same time, self-monitoring also has a strong effect on self-motivation. It gives individuals a high sense of self-efficacy and has a good promoting effect on the activation of learning motivation.

5.3.4 Execution system

The execution system of online self-regulated learning consist of task strategies, academic help-seeking, and evaluation and reflection constitute. The execution system is the core processes through which learners complete their learning tasks.

Task strategies refer to the various cognitive strategies that learners select and use based on their goals and prior learning experiences during the learning process. These strategies include rehearsal strategies, elaboration strategies, organizational strategies, and more. They represent the specific cognitive processes through which learners implement self-regulated learning. Moreover, as learners implement task strategies, they may seek academic help based on the progress of their learning.

Academic help-seeking is an important process in online learning. It emphasizes that self-regulated learning is not conducted in isolation by the learner and highlights the significant role of social interaction in self-regulated learning. Due to the characteristic separation of teachers and students, and students from each other in online learning, self-regulated learners, in addition to individual learning, will actively seek help from teachers, peers, or virtual communities to facilitate the completion of learning tasks. Moreover, through academic help-seeking, learners can change and adjust their original task strategies.

Evaluation and reflection are important components of self-regulated learning. True self-regulated learners continuously reflect on and review the process of task completion to assess whether their goals have been achieved and whether their strategies have been effective. They also attribute the success or failure of their learning. Through evaluation and reflection, learners can influence the formulation of goals and plans for the next learning session, as well as their motivation and beliefs, and strategy selection.

Additionally, in the aforementioned model, it can be observed that self-motivation and self-monitoring serve as bridges and mediators between goal planning and the actual completion of tasks. This indicates that in the process of online self-regulated learning, the achievement of goals and plans largely depends on the mediating role of the motivation system and the monitoring system.

6. Conclusion

This paper has examined self-regulation and related concepts by defining its scope, distinguishing it from self-control, outlining three representative perspectives on self-regulated learning, and clarifying its differences with neighboring constructs such as autonomous learning. Finally, it has articulated the meaning and characteristics of online

self-regulated learning.

Online self-regulated learning exhibits distinct traits: it transcends temporal and spatial constraints, allowing learners to embark on their educational journeys whenever and wherever they choose. In terms of interactivity, learners not only interact with digital course materials but also exchange ideas and share insights with instructors and peers through social platforms and discussion forums. This layered interactivity injects new vitality into the learning experience and broadens the horizons of what learning can be.

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