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From Self-Regulated Learning to Self-Directed Learning: A Developmental Shift Toward Learner Competence in the Digital Age

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ABSTRACT: In the context of digital transformation and the development of intelligent learning ecosystems, the role of learners is shifting from passive knowledge acquisition to active knowledge construction and the shaping of their personal learning paths. Although self-regulated learning (SRL) and self-directed learning (SDL) are both considered foundations of lifelong learning, the relationship between these two concepts remains unclear in educational practice. This paper analyzes the dialectical relationship between SRL and SDL to propose a theoretical framework for the shift towards developing learners' competencies. Through a synthesis of existing theoretical approaches, the study clarifies the functional hierarchy between the two concepts: SRL is seen as a process-level construct that supports learners in controlling the performance of specific learning tasks; Meanwhile, SDL is approached as a competency-level construct, linked to the level of autonomy, decision-making ability, and long-term learning strategy planning. Analysis shows that, in the digital age, these two concepts exist in a complementary and unified relationship, emphasizing the role of self-learning ability as a crucial factor not only for learning effectiveness but also for the sustainable adaptability of learners.

KEYWORDS: Self-Regulated Learning – SRL, Self-Directed Learning – SDL, Lifelong Learning Competency, Digital Age, Competency Development

1. INTRODUCTION

In the context of rapid digital transformation, education is shifting from a one-way content transmission approach to a learner competency development approach, emphasizing self-management, adaptation, and lifelong learning. The development of digital technology, artificial intelligence, and personalized learning models has fundamentally changed the role of learners, from passive recipients of knowledge to active creators and regulators of their own learning process.

In this process, self-regulating learning is considered a crucial scientific foundation that helps learners effectively plan, monitor, and evaluate their own learning activities. Simultaneously, self-learning is increasingly emphasized as a core competency of learners in flexible, technology-based learning environments.

Although both SRL and SDL play a central role in modern education, previous studies have often approached these two concepts as parallel or relatively separate structures, leading to a lack of a clear theoretical framework explaining the development and transition from SRL to SDL. There are still limitations in clarifying the foundational role of SRL in the formation of SDL, as well as how the digital learning environment promotes or reshapes this relationship.

Stemming from this gap, this paper aims to analyze the developmental relationship from SRL to SDL from the perspective of learner competency development in the digital age. Through a theoretical approach, the study contributes to clarifying SRL as a crucial prerequisite for SDL, while proposing an integrated understanding of this shift within the context of digital education.

2. THEORETICAL FRAMEWORK

Self-Regulated Learning (SRL) is understood as an active process in which learners set their own goals, choose and implement strategies, and monitor and adjust their own knowledge acquisition, motivation, and behavior to achieve desired learning outcomes (Barry J. Zimmerman, 2000). There are many SRL models, among which Zimmerman's three-phase model is the most typical and influential. SRL includes the forethought phase, in which learners define goals, expectations, and strategies; the performance and monitoring phase, focusing on controlling attention, applying strategies, and tracking progress; and the self-reflection phase, where learners evaluate results, attribute causes, and adjust their learning orientation for subsequent tasks (Zimmerman, 2002). This approach emphasizes that SRL is not merely a collection of discrete learning skills, but an integrated operating system in which cognitive, motivational, and behavioral processes interact closely and cyclically (Boekaerts, 1999; Panadero, 2017). From the perspective of modern educational science, SRL is considered the core foundation of effective self-learning in digital learning environments, where learners must make their own decisions, adapt to task requirements, and adjust strategies within the learning

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context with the support of technology and information (Winne & Hadwin, 2008; OECD, 2019).

Self-directed learning (SDL) originates from the theory of adult education, where Malcolm Knowles (1975) defined SDL as a process in which learners actively take responsibility for diagnosing learning needs, identifying goals, selecting strategies and resources, and self-assessing their learning outcomes. Unlike SRL, which focuses on managing learning processes within a pre-designed task or learning environment, SDL is considered a higher-level, integrated competency, reflecting the learner's level of autonomy, initiative, and long-term learning orientation (Garrison, 1997; Candy, 1991). In the context of a knowledge-based society and lifelong learning, SDL is not only a learning method but also a core characteristic of independent learners, capable of adapting to continuous, open, and flexible learning demands (Long, 2000; OECD, 2019). Typical manifestations of SDL include the ability to self-determine learning goals that align with personal needs and professional contexts, to independently select and effectively utilize diverse learning resources, and to self-assess and adjust learning outcomes to maintain sustainable competency development over time (Garrison, 1997; Loyens, Magda, & Rikers, 2008). From this perspective, SDL can be seen as the goal of learner competency development, where self-regulation skills are accumulated and expanded to serve autonomous and lifelong learning in the digital age.

Distinguishing and connecting self-regulated learning (SRL) and self-directed learning (SDL) requires a multi-level approach, in which the two concepts are considered in a complementary relationship. In terms of scope, SRL primarily operates at the task-level, focusing on how learners plan, monitor, and regulate cognitive, motivational, and behavioral processes to accomplish specific learning tasks within a defined context (Barry J. Zimmerman, 2000; Winne & Hadwin, 2008). SDL, on the other hand, operates at the learning trajectory-level, reflecting the learner's ability to independently define long-term goals, choose direction, and maintain motivation for continuous and lifelong learning (Malcolm Knowles, 1975; Candy, 1991). This difference leads to different levels of autonomy: while SRL typically occurs in structured learning environments where teachers and the curriculum retain a design and guidance role, SDL requires learners to take a central role in learning decision-making, with flexible support from the environment and technology (Garrison, 1997). On this basis, the paper argues that SRL can be seen as a micro-level platform, providing the necessary operational mechanisms for learners to effectively control their daily learning activities, while SDL is a macro-level competency, representing the level of autonomy and strategic orientation of learners throughout their entire competency development journey. This relationship is developmental and cumulative, in which self-regulation skills are accumulated, internalized, and gradually expanded to form sustainable self-learning capacity, especially in flexible and open digital learning environments (Loyens, Magda, & Rikers, 2008; Dabbagh & Kitsantas, 2012).

3. THE TRANSITION FROM SELF-REGULATED LEARNING TO SELF-DIRECTED LEARNING

3.1. Self-regulated learning as a Developmental Precursor to self-directed learning

From the perspective of learner competency development, SRL can be seen as a developmental precursor to SDL. Through repeated participation in the planning, execution, monitoring, and feedback cycles, learners gradually develop strategic learning habits, including setting goals, tracking progress, and adjusting their approach when encountering difficulties (Barry J. Zimmerman, 2000; Zimmerman, 2002). These skills not only help learners effectively complete specific learning tasks but also contribute to the development of metacognitive abilities and self-assessment – core elements of independent learning (Panadero, 2017; Winne & Hadwin, 2008). Over time, as SRL strategies are internalized and applied flexibly in various learning contexts, they tend to transform from micro-executive skills to a more autonomous learning orientation, laying the foundation for the formation of SDL (Loyens, Magda, & Rikers, 2008). Therefore, SRL not only plays a supporting role in current learning but also serves as a long-term mechanism for developing self-learning abilities.

3.2. Competency-Oriented Perspective

The shift from SRL to SDL reflects a fundamental change in the competency-based approach to education, from the goal of “learning a task well” to “mastering one’s own learning process.” While SRL primarily focuses on optimizing learning effectiveness in specific situations, SDL demonstrates the learner’s ability to orient, maintain, and adjust their long-term learning journey to suit personal goals and the social context (Candy, 1991; Garrison, 1997). From this perspective, SDL is considered a core competency of 21st-century citizens, linked to self-learning, lifelong learning, and adaptability to the rapid changes in knowledge and technology (OECD, 2019). The emphasis on SDL as a comprehensive competency shows that education needs not only to equip learners with effective learning skills in the short term, but also to create conditions for them to develop the ability to self-direct and restructure their learning throughout their lives.

3.3. The Role of Learner Agency

A central factor driving the shift from SRL to SDL is the increased learner agency. In traditional learning models, learners typically play the role of guided subjects, with learning goals, content, and pathways predetermined by the teacher or training program. Conversely, in modern learning environments, especially digital and open learning environments, learners are increasingly expected to be active agents, independently shaping their own learning paths through decision-making, resource selection, and self-assessment of competency development (Bandura, 2001; Dabbagh & Kitsantas, 2012). SRL acts as a “trigger mechanism” at the micro level, helping learners control their daily learning actions, while SDL manifests at the macro level, where learners are responsible for their entire personal learning trajectory. The continuous development of learner initiative is therefore key to understanding and fostering the transitional relationship from SRL to SDL in the context of personalized education and lifelong learning.

4. DIGITAL LEARNING ENVIRONMENTS AND THE DEVELOPMENTAL RELATIONSHIP BETWEEN SELF-REGULATED LEARNING AND SELF-DIRECTED LEARNING

4.1. Characteristics of Digital Learning Environments

The digital age has fundamentally changed the characteristics of the learning environment, shifting from closed, linear learning spaces to open, flexible, and increasingly personalized learning ecosystems. In these environments, learners can access diverse sources of knowledge, choose

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the pace and learn path that suits their individual needs, and continuously interact with content, technology, and the learning community (Siemens, 2005; Dabbagh & Kitsantas, 2012). The development of artificial intelligence, learning analytics, digital learning platforms, and intelligent feedback systems such as chatbots has facilitated the real-time collection, analysis, and response to learning data, thereby profoundly supporting the personalized learning process (Ferguson, 2012; Holmes et al., 2019). These characteristics not only broaden opportunities for accessing knowledge but also place higher demands on learners' self-management and self-direction abilities in a learning environment with rich choices and fewer constraints.

4.2. How Digital Technologies Support Self-Regulated Learning

In this context, digital learning technologies are seen as powerful tools to support SRL. Specifically, learning platforms that integrate planning, reminder, and progress tracking functions help learners define goals, manage time, and monitor the effectiveness of their learning process (Azevedo et al., 2012; Jivet et al., 2018). Simultaneously, real-time feedback systems based on learning analytics provide learners with data on behavior, outcomes, and progress levels, thereby supporting self-assessment and adjustment of learning strategies (Winne, 2017). These forms of support are particularly important in online and blended learning environments, where the direct presence of teachers is minimized and learners must rely more on their ability to self-manage their learning activities. Thus, technology not only plays the role of a means of content delivery but also serves as a "cognitive support framework" to activate and maintain SRL processes.

4.3. From Technology-Supported self-regulated learning to self-directed learning

However, the core value of educational technology lies not in replacing the role of the learner, but in its ability to promote the transformation from technology-supported SRL to self-learning competence (SDL). When learners know how to use digital tools to self-manage their learning, proactively ask questions, search for and evaluate information sources, and reflect based on personal learning data, technology becomes a lever for developing higher-level self-management competence (Littlejohn et al., 2016; Wong et al., 2019). In this case, technology is not just a technical support tool for completing tasks but becomes an environment and means to help learners construct their own learning cycle. From a competency development perspective, this shift highlights the crucial role of the digital learning environment in expanding self-regulation skills into sustainable self-learning competencies, meeting the requirements of lifelong learning in a knowledge-based society and digital economy (OECD, 2019).

5. PROPOSED CONCEPTUAL MODEL

Based on a synthesis of existing theoretical frameworks and research evidence, this paper proposes a conceptual model describing the developmental relationship between Self-Regulating Learning (SRL), Self-Directed Learning (SDL), and Lifelong Learning Competence, thereby reflecting the expansion and transformation from micro-level learning management processes to macro-level self-directed learning competencies of learners. This model describes a journey of competency maturation: starting with SRL as a technical foundation helping learners know "how to learn" to effectively manage specific daily tasks, it transforms into Self-Directed Learning Competence, a strategic level of autonomy that helps learners self-direct long-term goals and paths, and ultimately, Lifelong Learning Competence, enabling individuals to proactively and sustainably adapt to all changes in society and technology.

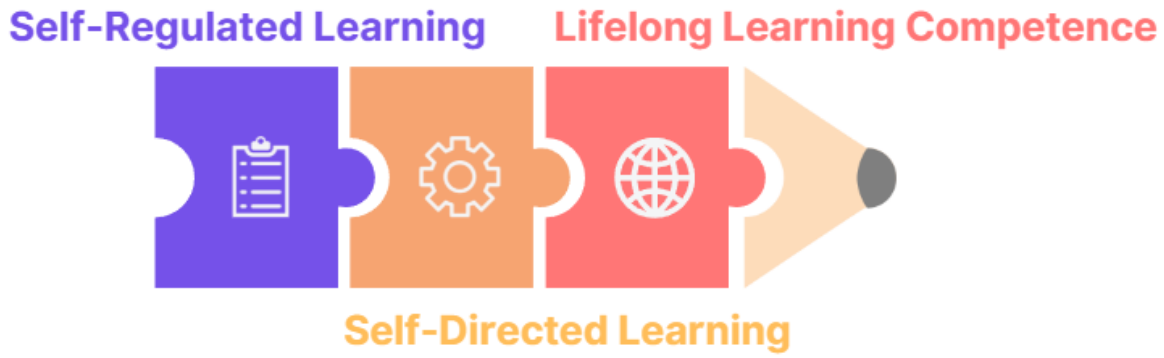


Figure 1. Conceptual model describing the developmental relationship between SRL, SDL, and Lifelong Learning Competency

In this model, Lifelong Learning Competency is the ability of learners to sustainably and continuously adapt to the rapid changes in knowledge, technology, and professional requirements in modern society. This is considered the highest level of development of learner agency, resulting from the accumulation and transformation of self-regulating skills at the micro level to self-learning competency at the macro level. This competency allows individuals to move beyond completing individual learning tasks to proactively diagnose needs, strategize, and continuously restructure their own learning trajectory to develop independently within the open and flexible educational ecosystems of the digital age.

In the proposed model, self-regulating learning acts as the initial operating mechanism, enabling learners to effectively control specific learning tasks through planning, monitoring, and self-reflection (Barry J. Zimmerman, 2000; Panadero, 2017). As SRL skills are accumulated and flexibly applied in various contexts, they gradually transform into self-directed learning (SDL), where learners are able to orient, maintain, and restructure their own long-term learning trajectory (Malcolm Knowles, 1975; Garrison, 1997). In this relationship, SDL is not an end point but a bridge to lifelong learning, allowing learners to continuously adapt to changes in knowledge, occupation, and technology (OECD, 2019).

A key contribution of the model is the clarification of the role of mediating factors driving the transition from SRL to SDL. First, metacognitive awareness acts as a "catalyst" that helps learners not only implement learning strategies, but also understand and control their own learning methods, thereby expanding the scope of self-regulation to self-direction (Flavell, 1979; Winne & Hadwin, 2008). In addition, intrinsic motivation helps maintain learner engagement and persistence in less structured learning contexts, which is characteristic of SDL and lifelong

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learning (Deci & Ryan, 2000). Finally, the digital learning environment, supported by AI, learning analytics, and intelligent feedback systems, facilitates the activation, monitoring, and feedback of SRL processes based on data, thereby promoting the development of SDL rather than merely supporting the completion of immediate tasks (Dabbagh & Kitsantas, 2012; Winne, 2017).

In the proposed model, the teacher's role also shifts from knowledge transmitter to learning competency designer and trainer. Instead of focusing primarily on providing content and controlling the learning process, teachers play a role in creating challenging learning environments, designing tasks that encourage self-regulation, and providing purposeful scaffolding to gradually develop learners' self-learning abilities (Vygotsky, 1978; Azevedo et al., 2012). This approach emphasizes that the development of lifelong learning competencies cannot be achieved through teaching fragmented learning skills but requires a systematic pedagogical strategy in which SRLs are nurtured as a foundation and SDLs are shaped as long-term development goals of education in the digital age.

6. CONCLUSION

Based on the theoretical framework of SRL and SDL, this paper proposes a conceptual model describing the development process from SRL to SDL and lifelong learning competencies, thereby contributing to clarifying the theoretical basis for the shift from a content-based approach to a learner competency-based approach in the digital age. By viewing SRL as the process and SDL as the destination, SRL as the micro-foundation and SDL as the macro-competency, the study provides a consistent conceptual framework for understanding how learning skills are accumulated and transformed into sustainable self-learning competencies. This model is not only theoretically significant but also opens important implications for pedagogical design, competency assessment, and the development of digital learning environments that support self-learning.

Although a theoretical study, this paper lays the groundwork for future empirical research directions, such as testing models of the transition from SRL to SDL in specific learning contexts, measuring the mediating role of metacognitive cognition and intrinsic motivation, or evaluating the impact of intelligent learning technologies on the development of self-learning abilities. In the context of global education moving towards training learners who are adaptable, autonomous, and lifelong learners, clarifying the developmental relationship between SRL and SDL is not only academically significant but also has profound practical value for modern educational policy and practice.

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